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THE VALUE OF ISOLATION HOSPITALS.*

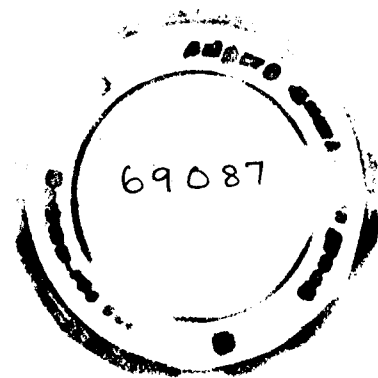
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DR. E. D. MARRIOTT, of Nottingham, in 1900, in a paper entitled "The Case against Hospital-Isolation," ended his peroration by saying, "The infective sick are herded like dumb-driven cattle in pest-houses miscalled isolation hospitals." We are the drivers, and it is well for us occasionally to review our methods, and see if Dr. Marriott's pugilistic accusation is true.

It is well to begin paradoxically with the opinion of the President of the Society, Sir Shirley Murphy, who, in the course of a memorable discussion on this very subject, declared, "The statistical method is not applicable; mere isolation could not be expected to influence laws of nature or prevalence of disease. But would they not all gladly isolate their children in hospital?"

The statistical method, then, must be considered inapplicable. But statistics are facts of superlative importance; they present a definite statement, which, as given by certain Medical Officers as arguments against the value of isolation hospitals, is a true statement. These facts cannot be passed by. They have, unfortunately, obtained a wide hearing amongst the lay and medical public; and they have acted and are acting as a definite hindrance to the erection of further isolation hospitals; for the laity can understand professional facts and statistics, when they cannot appreciate the complementary processes and principles which have not been or cannot be expressed on present experience in figures. True statistics cannot be ignored. But they can be given their true relative proportion; they can be swamped by other facts, whether statistically presented or not.

* Read before the Home Counties Branch of the Society.



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THE MORTALITY FROM SCARLET FEVER.

In this paper it will be well to limit our view to the problem of scarlet fever. The value of isolation hospitals for diphtheria and typhoid fever is not in dispute. It is well first to consider the facts of the problem to be faced in the prevalence of scarlet fever. The mortality amongst children up to 5 years of age, according to the Registrar-General's last Report, was in 1904 per 1000 living at ages 0-5, for

England and Wales	..	..	..	..	0.60
Urban Counties	..	..	..	..	0.76
Rural	..	..	..	..	0.34
London	..	..	..	..	0.41
Hertfordshire	..	..	..	..	0.04

The lowest for any County except Sussex and Cornwall, comparing with its neighbours as follows :—

Middlesex	..	..	..	..	0.70
Essex	..	..	..	..	0.39
Bucks	..	..	..	..	0.35
Cambs.	..	..	..	..	0.14
Beds.	..	..	..	..	0.11

At the present time, therefore, it forms a relatively insignificant factor in the death-rate.

THE CYCLE AND WAVES OF DISEASE.

But in the natural history of diseases we know they are subject to cycles. The figures for Hertfordshire for the last eight years show part at least of the current cycle. The number of notifications and of deaths is as follows :—

	1898	1899	1900	1901	1902	1903	1904	1905
Notifications—								
Urban Districts	153	421	459	826	749	397	415	380
Rural Districts	184	181	166	446	453	192	130	306
Deaths—								
Urban Districts	3	4	4	16	10	5	8	3
Rural Districts	3	2	2	10	8	3	1	2

The population of Urban Districts is about three-fourths as much again as that of Rural Districts.

Let us now step back from the canvas and look at a wider field. Our view is limited by the date of the Notification Act in this country and corresponding Acts in others. Without this we can only say that

during the last century scarlet fever was especially prevalent and malignant in the years 1801-4, 1834, 1861-70, and recently in 1900-2. The more precise statistics under notification and registration Acts show that the curves of this disease undergo a 30-yearly swell, a 5-yearly wave, and a seasonal ripple. This is shown alike in attack-rate, death-rate and fatality, in every city and country where trustworthy records are available for a sufficient space of time, the wave-crests in general averaging lower during the last thirty years.

This at once forces us to admit that comparisons of attack-rate, death-rate, and fatality of cases notified before and after erection of isolation hospitals in single districts entirely lose their value, for no one can say what would have been the rise or the fall during the later period if the hospital had not been erected. Figures for a former period are no clue.

Yet the public and many of our profession are convinced by such figures, and have argued in favour of isolation hospitals on these grounds, in the same way as they formerly argued in favour of blood-letting.

In 1843 Dr. Graves in his *Clinical Medicine*, p. 492, wrote :—

"In the year 1801 . . . scarlet fever committed great ravages in Dublin . . . returned at intervals during the years 1803-4, when the disease changed its character; and although scarlet epidemics returned very frequently during the next twenty-seven years, yet it was always in the simple or mild form. . . . The epidemic of 1801-4, on the contrary, was extremely fatal. . . . All those whose medical education began at a much later period, were taught to believe that the diminished mortality from scarlet fever was entirely attributable to the cooling regimen and to the timely use of lancets and aperients. . . . The experience derived from the present epidemic (1834-1835, 'destructive') has completely refuted this reasoning."

With this warning in mind, let us set to work to test the facts available as to the value of isolation-hospitals; bearing always in mind that we shall probably repeat in the near future the experience of Dr. Graves, and find ourselves in the midst of another grave epidemic, by which all our measures will be tested as severely as was blood-letting in the destructive epidemic of 1834-5, when it was found lamentably wanting.

THE ATTACK ON ISOLATION HOSPITALS.

The honourable desire for truth, which in 1901 inspired Dr. Killick Millard, of Leicester, to read before our Society a memorable paper,

discrediting the value of isolation hospitals, prompted a no less memorable reply before the Epidemiological Society in the same year by Dr. Newsholme, of Brighton, who from a broader standpoint was able by his well-known statistical methods to make a rejoinder at least satisfactory to those in favour of the isolation system. The two papers, respectively in PUBLIC HEALTH and in the *Transactions of the Epidemiological Society* for 1901, will repay careful study, together with the discussions to which they gave rise. Those who court criticism by trying to reduce the value of this system to figures cannot object to the use of similar methods by their critics. It was well pointed out, therefore, by Dr. Robinson, of Leicestershire, that from Dr. Millard's own figures for Oldham and Bolton, with approximately the same population, the same proportion of cases isolated in hospital, and other similar features, the attack-rate in one town was 3.1, in the other 5.5. Wigan and Warrington, on the other hand, had the same attack-rates; but one town isolated only 47 per cent, the other 77 per cent of its cases of scarlet fever. What is the reason for these 50 per cent discrepancies? Can they also be reduced to figures? And if not, does not the failure to do so invalidate the possibility of the proposed test?

Yet again, notification of infectious disease is at most 26 years old in this country, and most isolation hospitals have only been built in the last fifteen years, during which we have been in the trough after the scarlet fever outbreak of the seventies. Our experience is not nearly of sufficiently long duration to warrant us in mathematical conclusions.

On the other hand, we must dissociate ourselves from the opinion of Roger McNeil in his *Epidemics and Isolation Hospitals*, 1893, which suggested that by hospitals and by disinfection we could "check the spread of infectious diseases, if not exterminate them altogether." It is just such exaggerated hopes and expressions of opinion that have made many of the laity, several even of ourselves, find disappointment in the efficacy of these measures, a disappointment, to my mind, wholly unjustified.

We must admit that both measures are a confession of the failure of preventive medicine, failure to repel the invasion of the disease. Typhus and small-pox, with thorough vaccination, as in Germany, and proper administration, now require neither isolation nor disinfection; preventive medicine has prevented them, or would if she might. But preventive medicine has failed apparently with scarlet fever; and therefore we *must* depend on the inferior methods of isolation and disinfection to limit the area of invasion.

For all families of the industrial classes, broadly speaking, home-isolation is impracticable. No hygienist, to quote Dr. Newsholme, anticipates that isolation and disinfection will destroy the epidemic waves of the disease; but it is good if they will merely flatten out the waves, and let susceptible children escape until they arrive at a less susceptible age and at a milder stage in the epidemic cycle. "I could occupy you for hours," wrote the late Sir R. Thorne-Thorne in the 10th Annual Report of the Local Government Board in 1882, "in telling you instances in which epidemics have evidently been prevented by the isolation of first cases of infectious disease."

SIX METHODS OF STATISTICAL COMPARISON.

We have six methods by which to test statistically the value of isolation hospitals. Let us speak of towns provided with isolation hospitals as "*a* towns," patients treated in isolation hospitals as "*a* patients," houses from which such patients are removed as "*a* houses," as opposed to "*b* towns," "*b* cases," "*b* houses."

I. The first method is in any town, district, or other area to compare the number of secondary cases notified from "*a* houses" with the number of secondary cases notified from "*b* houses."

II. The second method is to compare the proportion of secondary cases to susceptible persons in "*a* houses" with the proportion of secondary cases to susceptible persons in "*b* houses."

III. The third method is to compare the falling mortality from scarlet fever in "*a* towns" and "*b* towns."

IV. The fourth method is to compare the relative fatality in "*a* cases" and "*b* cases."

V. The fifth method is to compare the number of scarlet fever cases in any area before and after the erection of an isolation hospital.

VI. The sixth method is to compare the number of cases or the attack-rate from scarlet fever in "*a* districts" or areas and "*b* districts" or areas.

We will take these methods in order.

I. The fallacies of this criterion are many and of great importance. The number of secondary cases occurring in houses from which primary cases have already been reported will depend on the possibility of direct or indirect communication between the primary case and other susceptible inmates of a house. In the case of "*a* houses," therefore, this figure will be less where primary cases are promptly notified and promptly removed to hospital, that is, where medical men are in attendance and are keen, and where sanitary administration is well organized; while in "*b* houses" it will be less where home-isolation

is efficient, that is, in the families of the well-to-do when well advised by medical men. The comparison of secondary cases, therefore, respectively in "a" and "b houses" is no certain guide to the value of isolation hospitals, for "b houses" are bound to include a majority of well-to-do houses, in which there is no doubt that isolation can effectively be carried out; and many of the milder cases, especially where diagnosis is made only in the peeling stage; while "a cases" include most of the cases from large families, and most of the serious cases which, during the interval before removal to hospital, are more likely to spread infection, and so falsely discredit the record of cases removed to hospital. But at Brighton, of cases removed to hospital, only 32 out of 511, or 6.2 per cent, were secondary cases, while of cases treated at home, 23 out of 71, or 32.1 per cent, were secondary cases. The Eastbourne figures are similar: "a cases," treated in hospital, gave rise to 11.9 per cent secondary cases; "b cases," treated at home, to 71.4 per cent. Both are markedly in favour of hospital treatment. Even despite the fallacies, such figures as are available on this point are decidedly to the credit of the hospitals. There are no figures on the subject from Hertfordshire.

Side-light is thrown on the question by the experience, to which Prof. Osler, of Oxford, has drawn my attention, of Dr. Chapin, of Providence, U.S.A., where home-isolation is intelligent and hospital isolation is rare. Of over 4000 persons under 21 years of age in infected families, 26.1 per cent took the disease. He strongly advised that other children should be sent out of the house. Of over 1000 such children, in 17 years only 5 per cent were attacked. On their return to their infected homes 19 cases were attacked.

Another fallacy lies in the fact that doubtful cases isolated at home, especially if mild, include some cases wrongly diagnosed as scarlet fever, of which they cannot produce secondary cases; while wrongly diagnosed cases sent to hospital are discovered and eliminated from the statistics. Finally, an instance may be given of a family of six children successively removed to hospital, all due to one child kept at home for a fortnight before the removal of the first, and concealed from the inspector's enquiries. All six were therefore due to a home-isolated case, and it is precisely in poor houses, where isolation is most impossible, that ignorance is most ready to conceal cases, or to conceal infected clothes and toys from disinfection. The need is for isolation hospitals, with better sanitary officials and administration throughout the districts.

II. In comparing the proportion of secondary cases with the number

of persons in contact with the primary cases respectively in "a" and "b houses," we meet with the same fallacies. "B houses" and "b families" include the wealthier, the better educated, those with fewer inmates, those in which the primary case was very mild. Here again there are no trustworthy figures for Hertfordshire. The Annual Report for Essex for 1905 contains figures on the subject for Chelmsford Rural District; 49 per cent of "b contacts" (persons exposed to infection from patients kept at home) developed the disease, as compared with only 47 per cent of "a contacts" (those in houses from which first cases were removed to hospital). These figures deal, however, with only 43 houses, and are not, therefore, of value. Figures for Brighton deal with 744 houses, in which 820 cases occurred, showing an attack-rate as follows:—

	Percentage in same Family		Percentage in same House	
	of those under	over 20.	of those under	over 20.
Primary case treated in hospital ...	32.5	4.1	28.5	2.8
" " " " home ...	51.1	5.1	47.2	4.1

These Brighton figures are large enough to be of some value, and despite the fallacies of this criterion they are definitely in favour of isolation hospitals.

III. In comparing the reduced mortality from scarlet fever in "a" and "b towns," the difficulty is that no two towns, or group of towns, are similarly circumstanced; and in general, as is the case in Hertfordshire with Barnet and Hitchin at the present time, so long as the disease is of a mild type, so long will there be a natural reluctance to erect an adequate hospital; but so soon as the disease becomes more virulent, a hospital is erected and the town is added to those with hospital accommodation. "B towns," therefore, are mostly those in which the disease is of a mild type, and so long only as it is mild. "A towns" are those in which it has been severe, and has taken root. This is the history of the foundation of fever hospitals at Watford, St. Albans, Hertford, and Hemel Hempstead in Herts, and probably all the world over. It tends to invalidate any comparison between towns as to the value of the hospital system. Neither science nor common-sense can tell on what the virulence of an epidemic depends. This fallacy cannot, therefore, be eliminated from the statistics. Dr. Killick Millard cited the cases of Preston and Bolton,

similar towns with similar figures for scarlet fever before the erection of a hospital at Bolton, after which event it was the Preston and not the Bolton figures that showed most reduction. He showed that the greatest decrease in scarlet fever of any town from a large list he had collected was that at Swansea, which, without a hospital, reduced its fatality from scarlet fever between 1891 and 1899 from a high figure to a figure only slightly above the average, 5·7, with a fatality of 2·2; and in comparing groups of towns he found a very slight difference, mostly in favour of those provided with isolation hospitals. But the reduction at Swansea was due to panic sanitation, the result of an abnormally high death-rate, directly attributable to considerable errors in sanitation, which adherents of either system would have tackled with effect on general lines.

In fact, comparison of different towns is useless. The wave-crests come in different years in different towns; and towns provided with hospitals are, as a rule, the larger, and so more open to infection from without; the slummier, and so more liable to disease prevalence within; the more extended in suburbs, and so more difficult to control.

The third criterion also is found wanting.

IV. The fourth criterion is the relative fatality in "*a* cases" and "*b* cases." This criterion is condemned by Dr. Killick Millard himself. The fallacies are obvious. There are too few deaths to give trustworthy statistics. Many patients too ill to be moved, or dying before removal, will be classed as home-patients; and many mild cases pass unrecognized that, if recognized, would largely dilute the mortality of home cases; while, on the other hand, of cases that are recognized, the serious are, *cæteris paribus*, more likely to go to hospital. "The difficulty in these criteria," as after Dr. Millard's paper it was pithily put, "the difficulty is to get the *cæteris paribus*." In Huddersfield, for instance, specially selected for a good instance as isolating 90 per cent of its cases, the fatality in 48 cases treated at home between 1890 and 1899 was 16·9 per cent, while that in 3862 cases removed to hospital was only 3·2 per cent. These figures are evidence of some value to set off against the supposed "hospitalized strain" adduced by those who condemn the influence of isolation hospitals on the cases isolated. Again, during 10 years at Eastbourne the fatality of hospital-treated cases was under 1 per cent, that of those treated at home over 2 per cent. But these figures again are too small to be of value, being dependent on death in only seven severe cases with complications.

It may then be retorted that the value of isolation hospitals is largely counterbalanced by the number of "return cases," secondary

cases reported from houses after the return of convalescent patients from hospital. At Eastbourne in 10 years there were 22 such cases; but from 1901 to 1905 there were none, and this result was attributed by Dr. Willoughby to the practice introduced of separating convalescents in a special scarlet-fever discharging block, to the erection of a steam disinfecter, and to the warning given to all concerned of the danger thus expressed, and of the responsibility resting on them to avert it. Return cases, moreover, are probably incurred through the vicious practice of overcrowding in time of epidemic, and this should be strenuously resisted. Finally, there is much evidence to show that the conditions which produce return cases will also produce secondary cases infected from sick treated at home, in far greater degree. Dr. Cameron traced 533 return cases of scarlet fever in his report in 1902 on the records for 13 months of the Metropolitan Asylums Board. It would seem probable that during those months there had been a far larger number of cases infected by patients treated at home. But the fallacies of this criterion are too great for its use in statistical proof.

V. Our fifth criterion, that of comparing the number of cases in any area or town before and after the erection of an isolation hospital, fails when we consider the natural history of the disease, with its varying wave-length and height in different areas and in successive waves and years. Thus at Oldham, in 1892, the scarlet fever cases were turned out of hospital to make way for small-pox, and there were fewer cases of scarlet fever in 1892-5 than ever before. But that may have been only a phase in the natural history of the disease.

In the annual report for Essex for 1905 the figures are given for two districts during 10 years, in which on an average of 100 cases a year the number of cases per 10,000 of population has increased from 27 a year before the erection of the hospital to 38 a year since. But the latter year include, as already noted, one of the great epidemic waves that occur only three or four times in a century; and the comparison is without value. On the other hand, the attack-rate at Derby in the 10 years before erection of a hospital was 5·2, in the 10 subsequent years 4·8. The fallacies deprive this criterion, too, of significance.

VI. Finally, the number of cases or the attack-rate per 1000 of population may be compared in "*a*" and "*b* districts." This method, like that (III) of comparing mortality in "*a*" and "*b* towns," fails because of the scarcity of deaths in small areas and the diversity of circumstance in small and large. An attempt to apply this criterion to Hertfordshire has resulted in the preparation of a chart. For this

purpose the county has been divided into two fairly equal halves, the one containing districts well provided, the other those only moderately, ill, or not provided with isolation hospitals for scarlet fever. The population of the "a half" includes 77,722 persons in urban and 47,989 in rural districts, those in the "b half" 77,428 persons in urban and 55,284 in rural districts. The former include Hertford, Ware, Hoddesdon, Bishop's Stortford, Buntingford, Hadham, Watford, and Rickmansworth districts, and St. Albans city; the latter constitute the rest of the county.

The chart shows that disease spreads first in the "a half," which includes the larger towns and greatest slums, and in these it hangs about longer; while the epidemic on reaching the "b half" flares up suddenly and more quickly dies down. The wave-crest in the "a half" is a year later than in the "b half." If any conclusion may be deduced, it is that more complete isolation has tended to flatten out and retard the wave-crest of the recent epidemic period; in other words, to let some susceptible children escape till they come to a less susceptible age. Even this conclusion can be barely justified owing to the complexity of conditions in the two groups. Other conclusions, based on the inadequately small numbers dealt with, would appear totally unjustifiable.

Our sixth criterion, like its five predecessors, bristles with fallacies.

Surely the logical conclusion of this analysis is that of Sir Shirley Murphy: "The statistical method is not applicable."

HISTORY OF ISOLATION HOSPITALS IN HERTS.

Let us consider, then, a few general facts, not in figures. In Hertford, a small provincial borough of 9000 inhabitants, some fifteen years ago the usual arguments with which we are all so familiar were still being made by the lay members of the Borough Council against the erection of an isolation hospital. It would be of only small value or it would be, of course, of value, but the rates were already too high—and, *sotto voce*, the ratepayers would express their dislike of those who had raised the rates at the next election of the municipal councillors. But an epidemic of scarlet fever supplied a practical argument in the other direction, and the result is now a fine hospital, with 46 beds, serving six districts. It cost £7271, or, with cost of site, £8171; and 1d. rate in the pound of the five districts to whom it belongs produces in 10 years £9500. The cost of erection is wiped out by a farthing rate in 30 years. The total annual expenditure, other than out of loans, has varied from £530 for 2265 bed-days

maintained* to £3940 for 8848 and £2088 for 10,746 bed-days maintained; or from 5s. in a full year to £1 in an empty year per bed-day maintained. In 1900, a fairly average year, it cost £1573 for 3365 bed-days maintained*; and even if this entirely fell on the rates, it would amount only to a rate for those five districts of 1½d. in the pound. During the 15 years of its history it has steadily been expanded to the proportion of one bed per 1000 of the population, and no voice against its existence is ever heard; it is universally regarded, especially by the tradespeople, as a great blessing.

The borough of Hemel Hempstead, with about 12,000 inhabitants, was until recently averse to the erection of a proper hospital. The existing hospital was on an absurdly small site in the town, and the provisions of Lord Thring's Act unfortunately puts all towns of over 10,000 inhabitants outside the jurisdiction, in these matters, of the County Council. The County Council wished the surrounding Rural District to be properly provided with isolation accommodation, and the Rural District desired a better arrangement than that of being paying guests in the inadequate hospital of the borough. Last year an extensive epidemic of scarlet fever broke out, numbering over 300 cases in the borough and neighbouring districts. Tents had to be hurriedly bought from Watford and Winslow and erected on the Sewage Farm, and the employers at the large paper-mills refused to admit their employes from houses in which cases were still retained or from houses after admission of the cases to hospital until properly disinfected. The Committee of Enquiry of the County Council, which had visited the borough in 1903 and twice in 1904, on visiting it again in December, 1905, were pleasantly surprised to find that the Borough Council had agreed on the previous evening to apply with the Rural District Council to the Local Government Board to be made an Isolation Hospital District, and a proper hospital will now be erected.

The largest town in Hertfordshire, that of Watford, which since the census of 1901 has shown an increase of population from 29,000 to nearly 35,000, has now a 66-bedded hospital on a presented site, opened in 1896 at a cost of £15,000, or, with subsequent additions, a total cost of £25,000. A penny rate of the three constituent districts would in 10 years produce £15,600; and the debt is therefore almost met by a halfpenny rate in 30 years. The cost of upkeep in the last three years was as follows:—

* This figure is the sum of the numbers of days during which each bed has been occupied during the year, as compared in this case with the maximum possible of $46 \times 365 = 16,790$.

	Bed-days maintained.	EXPENDITURE.		
		Administration.	Maintenance.	Total, other than out of loan.
		£	£	£
1904	13,835	2268	1285	4443
1905	14,155	2226	1078	4814
1906	10,930	2479	860	4884

N.B.—A penny rate produces £1560.

The rest of the county is for the most part fairly well provided with isolation hospitals for scarlet fever. In memory of his children, who died of the disease, the late Sir J. Blundell Maple, in 1893, presented the city of St. Albans with the "Sisters' Hospital," as it is called, accommodating 18 cases; and this hospital, providing for the needs of three districts, is now to be enlarged.

Lord Rothschild, with his usual generosity, has provided a small hospital of four wards at Tring. The Urban and Rural Districts of Great Berkhamstead have a good little hospital at Aldbury, not far from Tring. Bishop's Stortford and Hadham in the east of the county share a temporary hospital with Stansted in Essex, erected for £1,513 to take 29 patients, on a site bought for £500, and costing £592 to £754 a year for maintenance and administration. Royston and Ashwell in the north share a good hospital with Melbourn in Cambridgeshire, opened in 1903 at a cost of £3372 and £270 for site. The financial figures of working this hospital are as follows:—

	Bed-days maintained	EXPENDITURE.		
		Administration.	Maintenance.	Total, other than out of loan.
		£	£	£
1903-4	1932	106	451	883
1904-5	1896	81	391	790
1905-6	1091	82	350	744

Cheshunt, in the south-east, is building a hospital for 12 beds, with administrative block, for its present temporary structure, at a cost of £6595, on a site which cost £475. Welwyn, in the centre, and Buntingford, in the north-east, have accommodation for a few cases; and Barnet, in the south, has a small iron and wood building. The only districts seriously deficient in this respect are those of Barnet Urban and Rural and East Barnet Valley, in the south, within 15 miles of London, and Hitchin Urban and Rural and Baldock, in the north, at

the junction of the Cambridge branch with the main line of the Great Northern Railway.

Surely the panic which promoted the building of the three hospitals first mentioned and the generosity that promoted the benefactions of Sir J. B. Maple and Lord Rothschild represent facts which cannot be controverted. These hospitals undoubtedly are of value. As Sir Shirley Murphy has said: *Would we not all gladly isolate our children, or at least our servants, in hospital?*

THE LOCAL GOVERNMENT BOARD AND HITCHIN.

Unfortunately, the Local Government Board, by a recent decision, have given the reactionaries some reason to believe that their faith in the value of isolation hospitals for scarlet fever was on the wane. The history of affairs in the Hitchin and Baldock districts may be quoted from the 1905 Annual Report for Herts.

Early in 1900 Dr. J. A. Turner, at that time County Medical Officer, reported to the County Council that as the result of enquiries held by him he considered that some hospital accommodation ought to be provided for the Urban Districts of Baldock and Hitchin, and the Rural District of Hitchin. In 1901 the Urban Districts of Hitchin, Stevenage, and Baldock, and the Rural District of Hitchin, combined to form an Isolation Hospital District. In 1904 a site of about seven acres of land, situated some two miles south of Hitchin, on the main road to London, was purchased.

On December 7th, 1904, a Local Government Board Enquiry was held at Hitchin into the application of the Hitchin Joint Hospital Board for sanction to borrow money for the erection of an infectious diseases hospital. The plans submitted by the architect, Mr. Adams, provided for the erection of a lodge, administration block, laundry, steam disinfecter, and two ward blocks for the isolation of twelve cases of scarlet fever and five each of diphtheria and enteric, twenty-two beds in all, at a cost of about £10,000. The Local Government Board agreed to sanction the loan, subject to the analysis of the water taken from the tube well on the site proving satisfactory. At the Local Government Board Enquiry representation was made that the erection of a block for scarlet fever cases was not at present necessary, and the Local Government Board decided that:—

"If, on consideration, the Joint Hospital Board decide to postpone the erection of the scarlet fever pavilion, the Board will not, on that account, refuse to sanction a loan for the remainder of the hospital scheme, provided that the arrangement

of the hospital buildings on the site is so maintained as to permit of the subsequent erection of the pavilion in question."

Fresh plans were made for a hospital on these lines, but as it would cost £5000, opinions were divided, and no further steps were taken. The County Medical Officer, therefore, held an enquiry at Hitchin in March of this year, and reported that, as matters were at a complete deadlock, the District Council was in default. Before taking further action under "The Isolation Hospitals Act, 1893," an enquiry must be made by members of the County Council; and this enquiry is to be held next autumn, if sanctioned at the next meeting of the Council.

The Medical Officer for Hitchin and Baldock, in his Annual Reports for 1905, considers "that on the exclusion of scarlet fever from the scheme the question of isolation loses its acuteness." He then proceeds to show that cases of typhoid fever can be well treated at the Hitchin General Hospital, and that diphtheria by antitoxin is "robbed of most of its dangers." He has, however, "no doubt that typhoid and diphtheria . . . would be benefited individually by isolation;" he shows that in his three districts, on an average of five years, apart from 55 cases of scarlet fever in Hitchin Urban alone, there are annually some 20 cases of these two diseases requiring isolation, and says that "if an isolation hospital were provided, there is little doubt but that the population of the several districts would make use of it . . . and the individual cases would doubtless be benefited. Many premises belonging to tradesmen would not suffer so much inconvenience or loss. Children, too, from infected houses would sooner be able to return to school. There would also be some tendency to limitation of an epidemic." He does not think the benefit worth the expense; and reports a tendency "for the Isolation Board to dissolve and each district to provide for itself."

But it would appear that provision for the isolation of scarlet fever is not excluded, as has been imagined, by the reply of the Local Government Board. Further enquiry explained the somewhat ambiguous nature of their decision. The cases just quoted from Dr. Day's report illustrate the value of isolation for scarlet fever; any gentleman with a servant suffering from the disease would prefer to send her to an isolation hospital; and the exclusion of workers from the paper-mills at Hemel Hempstead during the recent epidemic (*see p. 55*) confirms the common experience that scarlet fever is a highly infectious disease, and is safest in hospital. Inasmuch, however, as the country is at present free from the disease in an acute form, inasmuch as a considerable proportion of cases are of so mild a type

as not to be recognized, and inasmuch, therefore, as comprehensive measures for its extermination are impossible, the Board held it reasonable to accommodate at first only the most urgent cases, on the express understanding that the initial structure will permit of the subsequent erection of the pavilion for scarlet fever. The Board admit that the ideals once held by some promoters of hospital isolation cannot in the present form of the disease be fully attained; scarlet fever cannot be entirely removed from the life of the community into a hospital and there stamped out. But the common-sense view still holds good, that home isolation, except in the most intelligent and well-disciplined households, is a failure, and hospital isolation, where intelligently managed, is a success. It follows that the County Council is responsible for seeing that isolation accommodation is provided for the four districts concerned; that if at the forthcoming enquiry it is shown that the Joint Hospital Board, formed under "The Public Health Act, 1875," has in six years arrived at no scheme for providing isolation accommodation, the proper course for it to take would be to make an Order constituting a hospital district or districts, under Lord Thring's Act of 1893; and if the Joint Hospital Committee fail to devise a scheme, to dissolve the Committee, and appoint its own nominees for the purpose.

It is unlikely, however, that such drastic measures will be necessary. At the proposed enquiry information should be demanded as to the readiness and capacity of the Hitchin General Hospital to take in all cases of typhoid fever; as to the provision by the District Councils of antitoxin; as to the reported preference of each district for the system—more expensive in administration—of separate isolation cottages instead of a well-built hospital on the very central and appropriate site already bought; as to the usefulness and cost of isolation cottages, such as those suggested at a cost of £550 for four beds by the County Medical Officer for Wilts; as to the accommodation required in times of epidemic, as in Hitchin in 1901-4, and in Hemel Hempstead last year; and as to the liabilities of the respective districts and the Joint Hospital Board, if the present site and the well already sunk are not utilized. Meanwhile a report is in preparation for the County Council as to the value of existing isolation hospitals in the county. The general experience in Herts and elsewhere is that, when provided, there has been an increasing disposition of the population to make use of them.

There is one other aspect of the case to which it will be well to draw attention, and that is the need for good nursing and food in the

treatment of infectious disease. On these essentials often depend not only the immediate result of the illness, but also the after health of the patient. Scarlet fever, unlike enteric, chiefly attacks young children, and it seems a pity, when so much is being done for their welfare, not to give them the advantage of good nursing in a disease which so often causes permanent ill-health. It must be recognized that an isolation hospital serves a triple purpose: (i) The limitation of an epidemic; (ii) The preservation of individuals in the same house as an infected patient from infection; (iii) The comfort and care of the patient and the relief of his relations from attending upon him. It is only the attainment of the first object that is in dispute, and that, even by the limited number of sceptics, not in all cases.

CONCLUSION.

I venture, therefore, to suggest that we should turn our attention to the following points for the improvement of our isolation system:—

1. The Tubb-Thomas cottage hospital, as it may be called for present purposes, designed by the County Medical Officer of Wilts, in which a resident nurse has accommodation, closed when not required, for four cases in separate rooms, as such a building, costing about £550, would seem very suitable for certain healthy rural areas, and might form the nucleus of a larger hospital, if public opinion were moved in that direction by an epidemic. Such would be a suitable object of philanthropy in country districts, especially in connection with the village nurse, now increasingly common in many country villages as a result of local charity and public spirit.

2. The absolute forbidding of overcrowding in existing hospitals during an epidemic, and the erection, if necessary, of tents, all the more to bring home to the public the need of increased hospital accommodation.

3. Careful discharge of patients, with a view to the recently expressed opinion of superintendents of Metropolitan Fever Hospitals in their comment on Dr. Cameron's exhaustive report on "Return cases," showing their opinion that desquamating epithelium is seldom, if ever, the cause of infection, that nasal discharges are the chief cause, and that a convalescent should be discharged for a day or two after the final bath into a disinfected room, rather than into the outside air and home surroundings.

4. A diligent observation on our part of other possible channels of infection, of milk for instance, and of the possible influence of insects or other parasites in carrying infection.

5. Earlier and more complete notification of cases, as we are arranging in Hertfordshire, from the schools, and weekly returns from the districts to the County Medical Officer of Health for redistribution to the districts; and, as might possibly be suggested, a notification of cases along railway and road by the Local Government Board and by the police.

6. Earlier removal to hospital.

7. Earlier closure of schools.

8. Eventually a co-ordination of isolation arrangements under the County Council, with local boards of managers, as is already being done in the matter of education.

I have entered into a study of this question at your request with a perfectly open mind and a keen sympathy as a ratepayer with the ratepayer's burden. I have no hesitation in saying that the value, both relative and absolute, of isolation hospitals for the curtailment of outbreaks of scarlet fever is very considerable, and that they are an indispensable part of the organization necessary to modern civilization for the control of infectious disease.

DISCUSSION.

DR. H. BEALE COLLINS said that before agreeing to the conclusions of Dr. Fremantle he begged his fellow Medical Officers of Health to consider whether this form of expenditure was the best way in which they could ask their authorities to lay out money for Public Health requirements. It was possible that the severe characteristics of scarlatina might again become prevalent; but was it reasonable to ask their authorities to run hospitals at a cost of from 2d. to 8d. in the pound upon the rates for twenty-nine years to provide for an explosive outbreak which might occur in the thirtieth? Was it not even possible that the continued presence of scarlatina in a mild form, kept constantly going by elementary schools, might be the means of using up the susceptibility in the general population, and thus by keeping alive a mild form of the disease insure us against these explosive outbreaks? The expenses of hospital treatment were increasing with the extra precautions necessary for the prevention of return cases and the spread of other diseases in hospital, and authorities were growing more restless in consequence. In comparing his own district with the neighbouring districts of Wimbledon and Richmond, he found very little difference in the incidence of scarlatina. These two authorities had large establishments costing from 2d. to 3d. on the rates; his own town spending about £250 to £300 per annum, one-third of a penny on the rates, on sending special cases to the hospital of a neighbouring authority. The number of cases of scarlet fever in Richmond, Wimbledon, and Kingston during five years, 1901-5, was 383, 547, and 535, or in ratio to population 2·32, 2·36, and 2·92. Considering that Kingston was almost entirely working class in the population, whereas the other two districts were largely residential, the comparison was very favourable to the district without a hospital.

who had anything to do with elementary schools must see that it was through the schools that this disease was spread, and surely if an explosive outbreak did come we should be able to control it by school inspection and closure. Constant school inspection, with the co-operation of the teachers and continued efforts to improve the housing of the working classes, prevention of overcrowding, enforcement of general hygiene by teaching, especially the open window and nose breathing, were more likely to prove remunerative forms of Public Health expenditure than extensive isolation hospital accommodation. Joint hospitals for special cases, 5 to 10 per cent of the cases, those coming from milk-shops, tailors, etc., must be maintained, but more inspectors, health visitors, and teachers with power to exclude individual children or classes from the schools would do more to keep this disease under control than the more costly, though excellent, socialistic establishments known as isolation hospitals.

DR. E. C. SEATON said that he differed from Dr. Beale Collins as to the policy of towns such as Kingston-on-Thames. He thought that borough had shirked its work and at the same time surreptitiously took advantage of the isolation system by sending their urgent cases to the hospital of Croydon County Borough at Waddon. Kingston would be very awkwardly placed if Croydon refused to take cases from Kingston milk-shops, tailors, milliners and other places of business. In his opinion, what the town should do was to throw in their lot with the neighbouring authorities of the Tolworth Joint Hospital Board, and for his friend Dr. Collins and the Kingston representatives on the Board to exercise their influence in the direction of much-needed reform of hospital administration. Having said this much he desired to add that he agreed with some of the criticisms of isolation hospitals by Dr. Millard, Dr. Collins, and others. It was high time that a review of the whole subject should take place. When the hospitals were established it was quite expected they would be often empty owing to their having proved efficient parts of a preventive system. Instead, they were practically never empty, and the scarlet fever wards were frequently full to overflowing. Such being the case, they were obviously a failure at present from a preventive point of view. How their failure was to be turned into a success was the problem before them. In conclusion, he had dealt with this subject specially in his annual report for 1904 and again in his annual report for 1905, now ready for issue.

DR. W. GRUGGEN desired to express the opinion that isolation hospitals had not obtained the success expected in preventing preventable diseases because they had not been general throughout the country, and until the whole country was provided with proper and efficient hospitals we had not begun to touch the fringe of the matter. The question was a national one, and it should never have been left in the hands of the local authority to provide or not provide a hospital just as they pleased, and in consequence of this unbusinesslike proceeding the money spent had been wasted.

DR. MARK SHARMAN's experience was diametrically opposed to Dr. Collins' view that scarlet fever spread more amongst the better class houses and patients than amongst the poor and working class. From the individual point of view of the poor patient badly housed, it was a great gain that this patient should be isolated in a well-appointed hospital. There was no cooping up in a small, badly arranged room for the orthodox

six weeks. His view was that a better recovery was made in hospital by patients of that class, and they were most in need of consideration.

DR. CASEY thought Windsor had not suffered much from the want of a fever hospital. During the last fifteen years there had been only seven deaths from scarlet fever in the borough. The annual sickness rate was 2.1 per 1000, and the fatality of notified cases about 1.1 per cent. Of the houses in which notified cases of scarlet fever occurred, in only 10 per cent were secondary cases infected after notification of the first, and in the cases of which notes have been kept only about 10 per cent of the other inmates presumably susceptible—children and young adults—were secondarily attacked. He expressed the opinion that the sources of infection of scarlet fever were in the great majority of instances persons who had the disease in so mild a form that it was not recognized, or were mere bearers of the contagion without being themselves sick. The removal of an infectious member did sometimes prevent a spread of the infection, but the advantage thus gained might be counterbalanced by the mischief done by patients discharged from hospitals while still in an infectious state. He would attribute the immunity of 90 per cent of the households in which cases of scarlet fever have occurred much more generally to the absence of inmates in a readily susceptible condition than to any effectiveness of the means of isolation employed, and he argued that if 2 per cent of discharged patients do in practice produce return cases, probably two or three times that number are set at liberty in an infectious condition, often undetected, to work mischief among their schoolfellows and playmates.

DR. ARTHUR KING said it was impossible to compare pre-hospital times in Watford with those after the isolation hospital was established, as statistics were not forthcoming for the former period. Still, some deductions might be made from material at hand tending to show the preventive value of isolation hospitals. (1) The constant existence of imported cases from districts where hospital accommodation was either imperfect or non-existent pointed to the need of every district being supplied before one could really gauge their efficiency. (2) Comparing the year 1902 with 1893 (an epidemic year), he found only an increase of 38 in the number of notifications in 1902, although the population had increased from 17,000 to 30,000, and he felt if the hospital had not been a benefit one might have expected to see the number of notifications increase in somewhat the same ratio as the population. (3) Since he had inspected Board schools and obtained help from the teachers, he had secured valuable information, and by quick removal to hospital, he felt, prevented the spread of disease. (4) The occurrence of return cases was not against them, as those cases left at home were simply those where we had reason to expect no spread: those removed included the unhealthy and neglected children who often had been suffering from chronic discharge before being attacked by scarlet fever or diphtheria. These cases would probably spread the disease whether left at home or isolated in hospital, and some would, he felt, be really best left at home.

DR. NASH said, in these days, when the utility of isolation hospitals is being called in question, and men of ability are voicing the opinion that such institutions for scarlet fever have not reduced the incidence of this disease proportionately in the towns in which scarlet fever hospital isolation is practised, it becomes necessary to enquire closely into the reasons or fallacies of the arguments adduced. In the first place, it is

evident that we do not know in what proportion the towns which practise isolation in hospital would have suffered had there been no such hospital isolation. Against this those who call in question the utility of isolation hospitals claim that if statistics for a sufficient number of years for a sufficient number of towns are considered, this objection will have no weight. In reply, I beg to be of opinion that even fifty years' observation of fifty towns will not be of sufficient numerical value to more than suggest a conclusion on this head. Sir Shirley Murphy, with his usual perspicacity, has clearly indicated that the question hardly lends itself to statistical investigation. In the second place, it must not be forgotten that although notification of certain diseases is compulsory throughout the country, a larger proportion of notifications are made in towns where adequate hospital isolation is provided. I am of opinion that many more doubtful cases of scarlet fever are notified in towns where a hospital is available than in towns not so provided. This is only one of the fallacies which forbid too much reliance being placed on mere statistical records. There are numerous other debatable points, but I wish to deal only with one, which must indeed be the very crux of the matter. If hospital isolation, as contended, is not only useless but actually tends to increase the incidence of scarlet fever in a town, how is it alleged that such a contrary effect to what was intended is brought about? The very foundation of the whole case against hospital isolation must stand or fall on this point. Surely hospital isolation can only act in a contrary way in a very limited sense, which must be inappreciable in a large population. There appear to be only two possibilities: (1) Air-borne infection from a large fever hospital. The available evidence is altogether against any such influence as regards scarlet fever, and indeed is not universally admitted even as regards small-pox. (2) By "return cases." These really form a very small percentage of the total notifications. The statistics quoted by Dr. Fremantle show that return cases occur also among home-treated cases, as indeed almost every Medical Officer of Health can bear witness. It seems impossible at present to be able to know definitely when a scarlet fever convalescent is free from infection. The chief preventive measures as regards return cases are (1) To discourage as far as possible the intermingling of children admitted to fever hospitals; (2) To impress upon the nurse that each child may prove a source of infection to another child, and that therefore bared arms and the dipping of the nurse's hands in a disinfectant solution between attending to each child, in addition to separate utensils for each child, should be strictly aimed at; (3) Special attention should be paid to nasal and other mucous membranes, even when no discharge is noticed; (4) In the way of discharge of convalescents, Dr. Knyvett Gordon's method of giving a disinfectant bath the night before the day of discharge and then placing the patient in a perfectly clean bed, and dressing in disinfected clothes in the morning for discharge, is worthy of trial. Dr. Gordon points out the danger of a patient contracting catarrh if bathed immediately before discharge. With these views I entirely agree, and mention them in addition to the precautions quoted by Dr. Fremantle. The hospital isolation question is a burning question of the day, and to-day's discussion will prove very useful in crystallizing the most recent opinions and practice.

DR. SANDERS felt that the relative value of hospital isolation had been obscured by the actual benefit to the individual case. In his own district

they had a hospital of some 200 beds. He could only give accurate figures during the seven years before the hospital was opened and the ten years subsequent to the opening. During the former period the average scarlatinal attack rate was 6.1 per 1000 population, and the average death-rate .25 per 1000. During the latter period the average attack rate was 4 per 1000, and the average death-rate .11 per 1000. The fatality also had been reduced from 1.3 per cent of notified cases in the former to .63 per cent during the latter period. How far this result was due to hospital isolation it was impossible to say, for one had to bear in mind that the hospital had hitherto isolated only about 50 per cent of the cases. The cost in maintenance alone was upwards of £15,000 a year, nearly a fourpenny rate, a very different figure from that quoted by Dr. Fremantle; and if provision was to be made to isolate all cases occurring, this cost would probably be nearly doubled. In view of the fact that at present scarlatina was responsible for only 1 per cent of the total deaths, it certainly was a moot point whether the money spent in isolating this disease could not be more profitably expended in other directions. The value of the hospital to the individuals admitted in many cases was undoubted, and the absolute necessity for means of better isolation in many other cases, such as those occurring in connection with milk, clothing, and food businesses, was agreed; but very many cases were exposed to risks in hospital which did not arise at home, and the question which each authority had to settle for itself was what proportion of cases should be provided for. He doubted the wisdom of attempting to provide hospital isolation for all possible cases of scarlet fever.

DR. MEREDITH RICHARDS emphasized the importance of distinguishing between the two problems, whether hospitals limit the spread of scarlet fever, and whether isolation of scarlet fever was, from a financial point of view, worth while. In 1904 he was able to analyse the percentage of secondary cases occurring in Croydon, and the results were distinctly in favour of the "hospital groups," in spite of the fact that the "home group" consisted of patients who could be satisfactorily nursed at home, either because they lived in large houses, or because there were few, if any, susceptible children in the infected premises. He believed that the effect of hospital isolation on the prevalence of scarlet fever was obscured by the fact that the majority of cases were probably infected by missed or atypical cases of the disease. At any rate, in a large proportion of the notified cases no definite history of infection could be elicited. It was well known to be impossible to stamp out diphtheria in large institutions by the isolation of clinical cases alone, and he was firmly convinced that there were also "carrier cases" of scarlet fever that largely accounted for the spread of the latter disease. In any case it was reasonable to suppose that the isolation of marked cases tended to diminish the average virulence of the disease. He did not consider that return cases were to be ascribed to "hospital influence." This seemed to be proved by the observations of Dr. Chapin, who isolated a large number of scarlet fever patients at their homes and arranged for the quarantine of the non-infected children in other houses. On the return home of the healthy children a considerable number of secondary cases arose, showing that protracted infectivity and not hospital influence was at fault. School closure had been mentioned in connection with scarlet fever, but he believed that this was hardly ever necessary if medical inspection were substituted. In conclusion, he hoped to study Dr. Fremantle's figures

more thoroughly when he saw them in print, and in the meantime desired to add his thanks for the very interesting contribution which they had just heard.

DR. WILLIAM BUTLER endorsed what Dr. Sanders and Dr. Richards had said as to the distinction to be borne in mind (a) As to the value of isolation hospitals for dealing with the diseases for which they were intended; and (b) As to the relative importance and cost of dealing with the diseases isolated in hospital and of all the other diseases which fell to be dealt with by the Public Health Department. In his own district the cost of the isolation hospital was something like a fivepenny rate, whereas the cost of Public Health administration, deducting hospital expenditure, probably did not exceed a penny rate. Each morning he had presented to him in tangible form the relative volume of these two provinces of Public Health administration. On the one hand an average of two or three notifications a day represented the work which fell to be dealt with by the hospital, on the other an average of 20 or 30 notifications from schools of non-notifiable infectious diseases, such as measles, whooping cough, ringworm, scabies, impetigo, etc., were but a part of the other work to be dealt with.

There was the other consideration raised by the occurrence of return cases. It did not appear, in the present state of medical knowledge, that any one was in a position to say where a case of scarlet fever, for instance, had definitely ceased to be infectious. Notwithstanding these considerations, if one were faced with the alternative of having to carry on one's work without an isolation hospital, there was not much question that despite the cost the possibility which such a contingency would open in a densely populated town could not be faced. What unquestionably was called for was further knowledge of the epidemiology of scarlet fever and diphtheria. At present it was impossible to revert to the conditions existing in the days prior to isolation hospitals, and further knowledge of the epidemiology of scarlet fever and diphtheria, which would enable us to determine their periods of infectiousness, would still further increase the utility of the hospitals.

INFECTIOUS DISEASES AND SCHOOLS.—The London County Council have adopted the following regulations with reference to the exclusion of children from schools, in substitution for those hitherto existing.

(vi.) Children suffering from the following diseases must be excluded from school for the undermentioned periods: Mumps, for one month; chicken-pox, for at least two weeks or until every scab has fallen off the scalp or body; whooping cough, for as long as the cough continues, and not less than five weeks from the commencing of the whooping.

(vii.) Children coming from houses in which either mumps, chicken-pox, or whooping cough exists must be dealt with as follows: (a) Children in schools other than infants' schools who have not had the disease and all children in infants' schools must be excluded. (b) Children in schools other than infants' schools who have had the disease need not be excluded.

(viii.) Children living in infected houses and excluded from school under section vii. (a) and (b) must absent themselves for the undermentioned periods: Mumps, for such time as the medical attendant dealing with the case deems necessary or, in cases where there is no medical attendant, for three weeks; chicken-pox, for two weeks; whooping cough, for two weeks.

THE INFLUENCE OF SCHOOL CLOSURE IN THE CONTROL OF SPREAD OF INFECTIOUS DISEASE AMONG CHILDREN.

By WILLIAM WRIGHT, M.D., D.P.H. (Camb.),
Senior Assistant Medical Officer of Health, Glasgow.

It is chiefly in connection with the three diseases, diphtheria, scarlet fever, and measles, that school closure is ever contemplated, and in consequence I have deemed it necessary to discuss only those three.

If we take the cases of diphtheria occurring during the school holiday period, i.e., six weeks, and contrast them with the number occurring in corresponding periods before and after, it will bring into prominence the extent of the influence which the schools exercise on the prevalence of the disease. I quote the Glasgow figures for 1905. For those three periods the total number of cases of diphtheria notified was 207, and these were distributed as follows:—

During the 1st or pre-holiday period ..	57	} 207
" " 2nd " " period ..	57	
" " 3rd post-holiday period ..	93	

Of these 93 cases notified in the third period, 24 were under three years of age, 57, or 61 per cent, were between three and thirteen (i.e. school ages), while the remaining twelve cases were at ages beyond.

Again, taking the whole of the cases notified during the three periods, namely 207:—

60, or 29 per cent, were under three years of age,
116, " 56 per cent, " at school ages, while only
31, " 15 per cent, " at ages beyond.

These figures go towards showing that the segregation of large numbers of children of susceptible ages in schools is in favour of its dissemination; and when one recognizes that it can be propagated only through the breath or saliva this ought to be generally accepted.

Example.

On the occurrence of two cases of diphtheria in one class-room in a school in the northern district of the city, quite recently, I examined all the children, and was successful in isolating two definite cases and five suspicious ones; the first two being sent to hospital, and the others home. Two of the latter on bacteriological examination proved positive, and were similarly dealt with, the remaining three

being kept at home until better. The slates and sponges were steeped in lysol over the week-end, and such rags as the scholars had for drying their slates, with all their pencils, were burned the same day. No other cases occurred. Scribbling blocks are preferable to slates, and should be in use in all schools.

If we examine scarlet fever in the same manner, we shall find what at first sight would appear to be similar results, but their interpretation is different. During the three periods there were 300 cases notified, distributed as follows :—

- | | | |
|-----------------------------------|---------------------------|-------|
| 1. During the pre-holiday period, | 85 cases, or 28 per cent | } 300 |
| 2. „ „ holiday period, | 69 cases, or 23 per cent | |
| 3. „ post-holiday period, | 146 cases, or 49 per cent | |

It will be seen that almost twice the number of cases occurred during the post-holiday period than during the pre-holiday period. Although this would appear to condemn the school, it is to be remembered that the increase in the seasonal incidence of scarlet fever is coincident with the commencement of the post-holiday period, the average weekly figures for the twelve years 1893–1904 being as follows :—

1st period average for six weeks	=	50·7
2nd „ „ „ „	=	46
3rd „ „ „ „	=	66

rising to its highest point in the third week in October, i.e., 93.

I think it will generally be agreed that the school exerts but little influence in the spread of scarlet fever. The experience in Glasgow has been that, except from the occasional occurrence of limited groups of cases due to class infection, no epidemic has resulted from contact at school.

Examples.

1st April to 11th May, 1901, 5 cases, one classroom, ceased thereafter.

26th Sept. to 10th Oct., 1901, 5 cases, one classroom, ceased thereafter.

10th Jan. to 28th Jan., 1904, 5 cases, one classroom, ceased thereafter.

21st April to 8th May, 1903, 9 cases, one classroom, ceased thereafter.

The problem of the control of measles by school closure is the one with which we are most familiar. The question of the utility of attempting to control it by this means is best approached by reviewing the characteristics of the disease itself. These are :—

1. High infectivity in the early stages of the disease before it is recognized.
2. Its virulence.

3. Liability to recur in epidemic form two years in succession in the same district, the second being more virulent than the first.

4. Liability to a recrudescence in the third year in the same district and in a form so severe that the case-rate incidence will be greater than that of the city as a whole.

As an illustration, I quote the figures for Glasgow for the years 1903, 1904, and 1905 :—

In Springburn Ward measles formed 51 per cent of all infectious diseases in 1903, in 1904 98 per cent, and in 1905 66 per cent. The percentage for the whole city was 63 per cent in 1905.

In Anderston Ward measles formed 31 per cent of all infectious diseases in 1903, in 1904 59 per cent, and in 1905 67 per cent. Here the proportion of measles in the third year was greater than that of the city by 4 per cent.

The theory has been advanced that, since the age-incidence of the disease is known to be 1–6 years, if we can prevent the child from coming into contact with the disease during that period it will then enter into a period of comparative immunity. In other words, if we succeed in altering the age-incidence of the disease from that critical period, 1–6, we shall thereby diminish its case-incidence. If this theory held good in practice, then it would follow that children brought up in the country, or in small villages where the population is sparse, and where they are comparatively free from measles or other epidemic diseases, ought to be practically immune from attack when exposed to infection in adult life. That this is not the case I shall proceed to show. In Belvidere Fever Hospital Report for 1904 I find that almost the whole of the adult patients treated for measles had come from remote and sparsely populated districts, and had not been exposed to infection in childhood. The actual figures are as follows :—

The number of cases occurring between 15 and 45 years of age was 75; and of these 67, or 89 per cent, were born in the country. This clearly demonstrates the continued susceptibility of persons who have not already had the disease. I may refer also to the outbreak of measles which occurred in the Volunteer Camp at Fort George last year, I think. The saving point in the argument is that the recuperative forces are greater in the adult than in the child; and this is effected in the case-mortality, which is overwhelmingly in favour of the adult. The highest case-mortality is 0–2 years. Again, it may be contended that by raising the compulsory age-limit from 5 to 6 years all or most of the children shall already have suffered from the disease before attendance at school. If all have been attacked,

then it is obvious that the school can no longer spread infection, and Public Health administration has achieved nothing, but school attendance shall go on uninterrupted, and the measure consequently shall be of great educational value. If *most* have been attacked, then the remainder (very few indeed, I think), as far as school influence is concerned, are just as they were, ready for attack, but with this difference, that they form members of a class who have all suffered from measles: the possibility of direct infection has been removed, but that of indirect still exists.

It is held by some that school closure is efficacious in the control of measles. In several districts, where the home conditions are all that could be desired, this may be the case; but in large populous centres, such as Glasgow, where slum dwellings exist, and rows and rows of tenements where large numbers of children are gathered together playing in and out of each other's houses, in alleys and courts, such highly desired results are not to be expected.

As regards large centres, it must not be forgotten that if schools were to be closed whenever infectious disease was prevalent, there are many places where schools *would never be open*.

Remedy.

1. The regular medical inspection of schools, with the view of picking out the earliest cases, is infinitely better and more capable of carrying into effect than the closure of the school on the recognition of the first case (more theoretical than practical), or the indiscriminate closure of schools after the attendance has fallen 30 to 40 per cent. This, combined with the swabbing of the throats in the case of diphtheria, and the free distribution of antitoxin as a prophylactic in infected households.

2. The education of the mothers of the lower working classes in their responsibility to their children towards uprooting the old-established idea of so lightly regarding measles as a disease, its infection and spread; warning them of its extreme virulence and complications. This might be embodied in a circular for distribution similar to that in use in Glasgow since 1897, and examples made in all instances where carelessness has been exhibited in the spread of infection. I quote a case in point, where a drunken, careless mother, carrying her infant, which was suffering from measles, was proven to have infected fifteen different households, and, when severely reprimanded, pleaded ignorance of the nature of the child's illness. Doubtless many other instances of the kind can be recorded.

THE BACTERICIDAL EFFICIENCY OF HYPOCHLORITES IN THE PRESENCE OF ORGANIC MATTER.

By E. KLEIN, M.D., F.R.S.

In a paper published in a recent number of the *Public Health Engineer* (June 9th, 1906) I gave the results of a series of experiments undertaken to determine the carbolic co-efficient of chloros when tested against *B. typhosus* in a watery distribution, free from organic matter.

I need not repeat here the details of these experiments, as they have been fully set forth in the paper referred to: suffice it to say that chloros 1:1500 + 1:1750 was found to be equal to 1:75 + 1:80 absolute phenol, thus showing a carbolic co-efficient of 21.0.

Since, however, under natural conditions, and in practice, a disinfectant is not used on a watery distribution of *B. typhosus* but on *B. typhosus* in fæces or in urine, it is important and interesting to compare the above results with those obtainable by allowing chloros to act under the latter condition, i.e., on *B. typhosus* in urine.

The following experiments were therefore made in order to answer this question:

Series 1.—The same race of *B. typhosus* as had been employed in the experiments with chloros on a watery emulsion of *B. typhosus* was distributed in urine in the following manner: a mixture was made of equal parts of sterile urine and a definite dilution of phenol, or chloros, respectively; this mixture was allowed to stand for one hour. After the lapse of this time five drops of an emulsion of *B. typhosus* were added to 5 cc. of the phenol-urine and chloros-urine: cultures were then made on sloped agar, after two and a half, five, and seven and a half minutes' exposure. These agar cultures were incubated at 37° C., and the results noted.

It should be stated here that in this, as also in the former and in the following series, a forty-eight hours' agar-culture was used; the emulsion in this and the next series was made by distributing the growth covering the whole surface of the agar slope in 5 cc. of sterile urine, and filtering the resulting emulsion.

The following table (I) shows the result of this series :—

TABLE I.
ACTION OF PHENOL-URINE AND CHLOROS-URINE ON
B. TYPHOSUS.

Sample	Dilution	Time exposure in minutes			Temperature of Incubation
		2½	5	7½	
Phenol-Urine	1 : 100	—	—	—	37° C
	1 : 120	—	—	—	"
	1 : 150	++	+	—	"
Chloros-Urine	1 : 100	—	—	—	37° C
	1 : 120	++	+	—	"
	1 : 150	++	++	++	"

++ Means abundant and normal growth.

+ " reduced growth.

— " no growth.

∴ Carbolie co-efficient $\frac{1 \cdot 50}{1 \cdot 20} = 0 \cdot 8$.

From this table it is seen that by mixing the chloros with an equal amount of urine and letting the mixture stand for an hour, and then adding the typhoid bacillus, the co-efficient of chloros falls to 0·8.

This represents one extreme, just as the result obtained when working with a watery emulsion of the organism represents the other. In the former case, the disinfecting power of chloros is very small, owing to the fact that it was first brought in contact with an organic fluid (urine). This is readily understood when it is borne in mind that chloros possesses a great affinity for all organic matter. In the latter case, viz., when chloros is tested against a watery emulsion of *B. typhosus*, in the absence of organic matter, its disinfecting potency has full scope to act on the organism.

Series 2.—In this series of experiments a middle course was taken, to ascertain the behaviour of chloros under conditions which, in my opinion, approach more nearly to those existing in actual practice. A forty-eight hours' agar slope (whole growth) was distributed in 5 cc. of sterile urine. Five cc. of normal, fresh urine were then mixed with 5 cc. of the dilutions of chloros and phenol respectively, the total bulks representing the desired dilutions of phenol and chloros. To each of these two dilutions were then added 10 drops of the above typhoid emulsion.

The following table (II) gives the result of this series :—

TABLE II.
ACTION OF PHENOL AND CHLOROS ON TYPHOID-URINE.

Sample	Dilution	Time exposure in minutes			Temperature of Incubation
		2½	5	7½	
Phenol	1 : 80	—	—	—	37° C
	1 : 100	—	—	—	"
	1 : 120	+	—	—	"
Chloros	1 : 220	—	—	—	37° C
	1 : 275	+	—	—	"
	1 : 300	++	+	+	"

++ Means abundant and normal growth.

+ " reduced growth.

— " no growth.

∴ Carbolie co-efficient $\frac{1 \cdot 20}{2 \cdot 2} = 2 \cdot 2$

Under these conditions then, i.e., when chloros is added in equal bulk to typhoid-urine, and the action of the disinfectant is brought to bear on the organism without delay, the co-efficient is 2·2; and I am of opinion that this result would more nearly correspond to that obtainable in actual practice than either of the two extremes above referred to.

TUBERCULOSIS AND PNEUMONIA.—German statisticians have sought to prove that the decline in phthisis mortality has been counterbalanced by an increase in that of pneumonia. At first sight their view appears to be supported by statistics published for the City of Boston (*Am. Stat. Assoc.*, Vol. x., June, 1906). Such a condition suggests that the decline of tuberculosis is not a real one, but is due rather to changed diagnosis. It might be held that persons with a naturally sensitive respiratory apparatus, who had been saved from tuberculosis, would be apt to die of pneumonia at a later age, and thus swell the death-rate from the latter disease. However, a study of the age distribution shows that the incidence of the two diseases is quite different; 7 per cent of the deaths from tuberculosis occur under 15 years, against 40 per cent of the deaths from pneumonia. The period from 15 to 40 includes 62 per cent of the deaths from tuberculosis, and only 17 per cent of the deaths from pneumonia. 31 per cent of the deaths from tuberculosis and 43 per cent of the deaths from pneumonia are at ages over 39. Possibly in Boston the changing racial constitution of the population might lead to a rise in the death-rate from respiratory diseases among young children. It is found that the largest mortality from pneumonia occurs in those wards which have the largest foreign population.

RETURN CASES OF SCARLET FEVER AND DIPHTHERIA, NOTIFIED FOR THE THREE YEARS 1902, 1903, AND 1904.

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THIS Report is a supplement to that by Dr. Cameron, dated March, 1904.

When I was desired to continue the investigation of return cases, I obtained permission to omit the routine visitation of every house in which a return case had occurred, and to devote my time to summarizing the material which had accumulated since the end of the period with which Dr. Cameron's Report deals, viz., July, 1902.

The chief object with which I undertook this research was to find out whether the more important conclusions reached by Dr. Cameron would remain unshaken if a fresh set of cases were examined. For the omission of the preliminary house investigation, and for the other less important differences between my methods and those of my two predecessors, Professor Simpson and Dr. Cameron, the justification will be found below.

The following are the most important conclusions arrived at by Dr. Cameron :—

1. Of the alleged return cases, a moderate proportion were due to coincidence. Of alleged scarlet fever cases nearly one in four were proved coincidences, and of the remainder many were doubtful. The proportion of undoubted return cases was 40 per cent.

In diphtheria the proportion of coincidences was higher than in scarlet fever.

2. In scarlet fever infecting cases occurred in larger proportion among those discharged from acute than from convalescent hospitals.

3. A very high proportion of infecting cases, over 50 per cent, when examined after the return case had arisen, showed a discharge from the nose.

4. A larger proportion of infecting cases was found amongst those scarlet fever patients who were detained from 8 to 12 weeks than among those detained for periods shorter than 8 or longer than 10 weeks.

5. The infectivity rate varied with the season of the year, and was highest in autumn and winter. Perhaps this effect was due to the weather.

6. Those hospitals which examined their diphtheria cases bacteriologically before discharge had a slightly lower infectivity rate than those which did not. The difference was not beyond the limits of accidental error.

7. Return cases had a somewhat higher death-rate than the average.

On all these points, except No. 3, I have summarized the evidence obtainable from the records of return cases for the three years 1902-1904. As to No. 1, my evidence points to a different conclusion from that arrived at by Dr. Cameron. As to Nos. 6 and 7, the results differ in so far that Dr. Cameron found a slight preponderance in one direction, while my figures show a slight preponderance in the other; but agree in

Abstract of Report, dated January, 1906.

so far as the differences found are slight, and in three out of four instances are insignificant. In regard to Nos. 2, 4, and 5 my results confirm his.

The words "return case" have been used in two senses. In the broader sense they include the whole phenomenon of a second case arising in a house to which a first case has recently been discharged from hospital. The first case is usually called the "infecting" or "primary case;" the second may be called the "infected case," but is more usually called the "return case." To avoid the ambiguity I shall use the term "return outbreak" or, more shortly, "the outbreak," instead of "return case" in the former sense, and "infected case" instead of "return case" in the latter sense.

A return outbreak therefore consists essentially of two cases—an infecting and an infected case; but there may be more than two. Not infrequently the discharge of one patient is followed by the infection of two or more. Rather less commonly the infection of one case is preceded by the discharge from hospital of two or more patients.

As a rule, both infecting and infected cases suffered from the same disease, but not necessarily so. A number of outbreaks are recorded where the discharge of a scarlet fever patient was followed by an outbreak of diphtheria in the house, or *vice versa*. This phenomenon I shall call "cross infection." Where there are two or more infected cases it frequently happens that all have not the same disease, but some have scarlet fever, some diphtheria. These I shall call "mixed outbreaks." Since outbreaks of scarlet fever and of diphtheria have been tabulated separately in this Report, special care has been given to the classification of these mixed outbreaks. No outbreak has been reckoned as a cross infection which could be classed with the straightforward cases. Thus, a case admitted with scarlet fever, who developed diphtheria, and after discharge was alleged to have infected another child with diphtheria, would be included in the diphtheria outbreaks. For certain tables, however, such a case would not be included. In the Annual Reports of the Board a case of diphtheria secondary to scarlet fever is entered in the scarlet fever tables; and in those of my tables where figures are utilized, which were obtained from the Board's Reports, outbreaks due to secondary scarlet fever or diphtheria have been omitted to keep the comparison correct.

The 1573 outbreaks may be classified as follows :—

(a) Outbreaks where both infecting and infected cases suffered with scarlet fever (or at least one infecting and one infected case, when there were more than one) ..	1176
(b) Outbreaks where both infecting and infected cases suffered with diphtheria (three of these have also been included in Class a) ..	168
(c) Outbreaks of diphtheria following the discharge of a scarlet fever case or cases ..	101
(d) Outbreaks of scarlet fever following the discharge of a diphtheria case or cases ..	44
(e) Outbreaks where the diagnosis of either the infecting or the infected cases was not confirmed in hospital ..	61
(f) Outbreaks which could not be traced in the registers ..	23
Total	1573

The Interval.

In those instances where two or more infected cases occurred, the interval is reckoned to the onset of symptoms of the first infected case. In some instances, however, the date of onset not having been noted, the interval has been reckoned from the discharge of the infecting to the admission of the infected case to hospital.

Confining our attention to the scarlet fever cases of group (a), we see a very pronounced maximum on the fifth day, when there were 103 cases. The frequency is very high on every day from the third to the seventh inclusive, and after the latter day gradually but steadily declines. Since the incubation period of scarlet fever usually lies between two and four days, the table shows definitely that more cases contract infection within two or three days of the discharge of the alleged infecting case than at any other period. By the sixth week the number of cases has declined to an average of less than two per diem, and after that to less than one per diem. This seems to me conclusive evidence against ascribing any large number of the return cases to coincidence.

Any cause, such as presence of scarlet fever in the school attended by the return case, or in the immediate neighbourhood of the house, or any insanitary conditions of the house, acting through a series of years in a large area like the Metropolis, must bring about outbreaks in houses to which fever patients have been discharged with approximately equal frequency in the tenth week after the discharge as in the first or second. But I find only one case occurs in the tenth week and 441 in the first. Assuming that the solitary case in the tenth week was a coincidence, we have a right to assume that one or two cases out of the 441 were also coincidences; also that the vast majority were not coincidences but were casually connected with the alleged infecting case.

I expect the objection to be raised that my two predecessors both arrived at a different result, and that they both investigated all cases on the spot before coming to any conclusion. Prof. Simpson ascribed 36 per cent of his cases to other causes than the alleged infecting case; and Dr. Cameron ascribed 22.5 per cent. In addition, both observers class a large number of cases as doubtful. And some may prefer to accept their estimates to mine on account of their conclusions having been formed on the spot, not by a statistical investigation.

I think this argument is unsound, for investigation at the houses can only give a definite answer to the two questions:—

1st. Was the return case exposed to infection from the alleged infecting case? In other words, did the two patients meet?

2nd. Was the return case exposed to any other source of infection, such as scarlet fever, in the same school, or in houses which the child had visited, or was he exposed to infected clothes or toys?

If both these questions are answered in the affirmative, the cause of the outbreak is doubtful, and no further evidence that can be obtained will definitely exclude either source. Apart from the present investigation, it has been my duty to investigate and write reports on certain return cases, and in doing so I have judged each case on the evidence obtainable. For instance, in an outbreak where the supposed infecting case had nasal discharge, I considered him to have been probably infectious; on the other hand, where he was free from all recognizable signs of a previous attack of fever, and where a long interval had elapsed between the discharge of the first case and the illness of the second, I judged him to be probably

non-infectious; and if in such a case an independent source of infection came to light, I attributed infection to the latter.*

In this, however, probability only is obtained, not certainty. For statistical purposes it is safest to include all alleged cases in the tables, even though some appear probably coincidences. To collect cases, and sort out a certain number as presumably "false" cases because of the absence of mucous discharge or other signs of infection, or because of the long interval, and then to make tables of the remaining cases to show the infectivity rate of cases with mucous discharge, or to show the distribution of the interval in a number of outbreaks, involves the fallacy of reasoning in a circle. The only exception I have made is in those cases where infecting and return cases have not met, which are demonstrable "false" cases.

The above argument does not apply to infection from undisinfected clothes or toys, for it is usual for the patients' clothes to be packed away soon after his removal to hospital, and to be brought out again in anticipation of his return. Such outbreaks would naturally take place soon after the return of the first case from hospital. Neither Simpson nor Cameron, however, attributes a large number of outbreaks to this cause. Simpson gives 17 scarlet fever outbreaks,† or 10 per cent, as certainly due to either clothes or house infection, and a further 12 cases,† or 7 per cent, as possibly due to undisinfected clothing.

Cameron gives no figures, but publishes details of certain illustrative cases. His remarks on page 37 of his Report show that he does not attribute very much importance to this cause.

In group (b) diphtheria outbreaks occurring after the discharge of a diphtheria patient, the crowding of the cases into the first and second weeks is not so marked as in group (a). Still, there is a definite scarcity of outbreaks more than 28 days after the discharge of the infecting case. The same argument, therefore, applies as in the case of scarlet fever, though not with equal force. In groups (c) and (d) also there is a definite crowding of cases into the first three or four weeks. One would have supposed that the fact that infecting and infected cases did not suffer from the same disease was sufficient to disprove any causal connection between the two. The table, however, shows that there was such a connection, and in these two groups the hypothesis of clothes' infection is inadequate to explain the outbreak. No doubt some such outbreaks are mere coincidences, but not the majority. For if 50 per cent were due to causes independent of the discharged patient, the clustering of the cases in the first weeks after discharge could not occur to the extent observed.

The consideration of these facts shows that in group (a) coincidence can account for only a small proportion of the outbreaks recorded. Although infection from clothes is not included among coincidences, I think it probable that both causes together do not account for more than 10 per cent.

* Professor Simpson attached weight in a number of cases to the argument that a child, A, who was alleged to have infected B., could not really have carried infection if he had slept with another child or children, C and D (who had not previously had scarlet fever) and had not infected the latter. Such an argument could not convince anyone who had worked in a fever hospital, and known how many cases contract fever only after several weeks' exposure to infection.

† These cases have been counted from the Appendix, and are not found in the body of his Report.

GROUP A.—SCARLET FEVER FOLLOWING THE DISCHARGE OF A SCARLET FEVER CASE.

The total number of outbreaks originating in patients discharged during the three years 1902-1904 was 1176. The total number of "infecting" cases was 1262, and the total number of "return" or "infected" cases was 1442.

The total number of scarlet fever discharges for the same three years, as given in the Annual Reports of the Statistical Committee, was 35,516. This, however, includes only cases of primary scarlet fever. The cases of diphtheria who contracted scarlet fever subsequently, and were discharged during the same period, are not given in the Reports. I estimate the number, however, at about 750: so that the total scarlet fever discharges, primary or secondary, during this period were about 36,270. The infectivity rate among these patients was, therefore, 3.33 per cent.

There were therefore only 1132 outbreaks following the discharge of a primary case of scarlet fever.

The number of such discharges was 35,516, but since notification of return cases from the North-Western Hospital was incomplete during 1903 and in abeyance during 1904, I have subtracted the discharges from that hospital during these two years, leaving 34,601.

The percentage of outbreaks of scarlet fever among these discharged cases was, therefore, 3.27.

The Occurrence of Infecting Cases at the Various Hospitals.

At four hospitals, Grove, South-Eastern, Park, and Brook, the rate persisted above the average for the whole period. At the Northern the rate was persistently lower than the average. It is impossible, therefore, to attribute the whole of the differences between different hospitals to accident.

The most striking difference to be deduced is that between the acute and convalescent hospitals.

	Total Scarlet Fever discharges.	Infecting cases.	Infectivity rate. per cent.
Acute Hospitals	24,006	900	3.75 + .08
Convalescent Hospitals	10,595	213	2.01 + .09
Total	34,601	1113	3.22

At several hospitals desquamating cases are not always detained, and the practice of discharging cases desquamating has increased of late years. If late desquamation were infectious, we ought to find a higher rate at these institutions than at the others. At only one were cases sent home regardless of desquamation; at the others either few or many were discharged peeling, but no exact numbers are recorded.

There is no connection between a high infectivity rate and a high proportion of peeling cases discharged. The highest rate occurs in those hospitals which were most consistent in detaining cases until peeling was complete. If we confine our attention to the acute hospitals the rates all lie between 3.19 and 3.99, and are little beyond the limits of accidental variation.

The above figures are, therefore, what we should expect if late desquamation has no relation to power of conveying infection. If any such connection exists it must be insignificant in amount.

In regard to classification of cases, three distinct systems have been tried. A discharge ward was used at the North-Eastern only, and only during 1904. Acute and convalescent patients were, as a rule, treated separately at both the North-Eastern and Park; this rule, however, did not apply to the cot wards. At the Brook a plan was adopted intermediate between these two. Female scarlet fever cases under 12 years old were isolated for a week preceding discharge. Unfortunately this plan only came into force towards the end of 1904, and I have accordingly reckoned the Brook Hospital amongst those where patients were not classified. At the Fountain the separation of mild acute cases from severe acute cases has been carried out.

Those hospitals which adopted some method of classification had a lower infectivity rate than the remainder, and it is also true that with each of the three systems that have been adopted a slightly lower rate than the average was obtained. The evidence in favour of classification, however, is by no means strong. The difference of infectivity rate in favour of those hospitals which adopted it is not so large as the differences between hospitals which do not adopt any classification at all.

As regards the allocation of parishes to the different hospitals my investigation is not yet complete. In the observations of the Medical Superintendents on Cameron's Report it was shown, however, that this allocation had a large influence on the infectivity rate.

Period of Detention.

The majority of infective cases were discharged between the seventh and eleventh weeks inclusive. What we really want is to compare the number of infecting cases with those that are not infecting, or with the total, for each period of detention.

To obtain the latter figures for the years 1902 and 1903 would have involved the compilation of the whole of the bed-cards for those two years, a task which would have taken more time than I or my clerk could afford. For the year 1904, however, certain manuscript returns were available, from which it appears that the infectivity rate is greater than the average in cases discharged after a detention of six, seven, eight, or nine weeks; or that there is more risk of infection arising from patients discharged then than those discharged after either a shorter or longer period. This conclusion confirms that arrived at by Cameron.

In one respect the above comparison is unsatisfactory. In order to estimate the effect of short or long detention on the infectiousness of patients after discharge, we want a table of infectivity rates similar to the above, in which all patients were of the same type; or, if not, all types occurred equally in the different groups. The above figures, both my own and Cameron's, fail in this; for there is no doubt that those patients who were discharged after six weeks were very different in some respects from those discharged after twelve weeks.

To get over this difficulty I have obtained particulars of 1000 consecutive scarlet fever cases from the registers of the Eastern Hospital. In every case the period of detention and all complications were noted. Cases from only one hospital were used, because the difference in noting certain complications, especially rhinorrhœa, by different observers, is

thus as far as possible avoided. I chose the Eastern Hospital because Dr. Goodall has paid special attention to noting slight cases of rhinorrhœa. My list of cases in part coincides with those on which Goodall founded his paper in the Supplement to the Board's Reports for 1904, but no fatal cases are included in my list.

Twenty-two outbreaks of scarlet fever and one outbreak of diphtheria were notified as occurring after the discharge of these 1000 cases. The scarlet fever outbreaks include 26 "infecting" cases. Of these, however, nine were doubtful, two or more cases having been discharged to the same house. In each of two outbreaks two cases were discharged from the Eastern either directly or after transfer. In three other outbreaks children from the Eastern and North-Eastern Hospitals were discharged to the same house.

Since the omission of the doubtful cases causes a perceptible variation in the percentages among so small a number, the following figures have been calculated twice; firstly including and secondly excluding the doubtful cases.

The experience of the Eastern differs from that of the average of all the hospitals, in that with one exception no case proved infective which was detained over ten weeks. The average detention of Eastern Hospital infecting cases was ten days less than that of infecting cases from the whole of the Board's hospitals during 1904.

Clinical Condition of Infecting Cases.

In Simpson's and Cameron's Reports a high percentage of the infecting cases are shown to have had rhinorrhœa when examined after the return outbreak. Cameron, however, found that in more than half the cases the discharge had appeared for the first time after the patient left the hospital.

From the point of view of the medical officer of an infectious hospital, it is more important to know the proportion of infecting cases among those who showed a discharge while still in the hospital. Do those cases which have suffered with rhinorrhœa in hospital prove infective in greater proportion than those which have not? In the Eastern Hospital 1000 cases the proportion was almost identical in the two groups.

The high rate among the uncomplicated cases was unexpected, and it is possible that a further series of cases might not show the same result. The point deserves further investigation.

Seasonal Incidence.

Taking the totals for the three years, the maximum number of outbreaks were recorded in January and the minimum in June. The maximum infectivity rate occurred in February and the minimum in June. The figures agree with those compiled by Dr. Cameron in showing a high winter and low summer prevalence, but differ in showing a maximum incidence and infectivity rate respectively two and three months later than that found by him.

It seems probable that this seasonal variation is due to the weather, as suggested by Dr. Cameron. During inclement weather a larger proportion than usual of the patients contract a cold on the way home; and such colds are probably capable of conveying scarlet fever infection. In compiling the list of cases on which my tables are based I was struck with the fact that in several instances three, four, or more infecting cases

were discharged on the same day, while on other days no infecting cases were discharged. It seemed possible that the former days were characterized by inclement weather, either wet or cold, and this point I have investigated as follows. For each day of the year 1904 the total scarlet fever discharges of all Metropolitan Asylums Board hospitals was extracted from the chief office records. The number of infecting cases discharged on each day was then entered. Finally, the mean temperature, the rainfall, the direction and velocity of the wind, and the difference of the temperature of that day from the average of the past 50 years were entered from the Reports of the Registrar-General. By grouping together all days with a heavy rainfall and all with a moderate rainfall or none, we can test the connection between rainfall and high infectivity rate, and similarly for the other factors.

The result of this investigation, which involved a good deal of labour, was negative. The figures for the three months from January to March inclusive were examined in respect of each of the following: (1) Temperature above or below the average, (2) rainfall, (3) direction of wind, and (4) velocity of wind. Only the direction of the wind showed any connection with the infectivity rates. Thus it was seen that the infectivity rate among patients discharged during the existence of easterly winds was 4.5 per cent, while that for days when the wind was northerly, westerly, or southerly was 2.6, 1.2 and 3.0 per cent respectively. When, however, the figures for the whole year were examined, this excess of infecting cases connected with easterly winds on the day of discharge disappeared. The figures were:—

Wind, easterly.	Infectivity rate ..	..	..	2.96
„ northerly	„ ..	..	..	2.54
„ westerly	„ ..	..	..	1.93
„ southerly	„ ..	..	..	3.09

In the light of these figures it does not appear probable that return outbreaks would be appreciably reduced in number by detaining patients in hospital, when the weather turns out inclement, either wet, or cold, or windy, on the day fixed for their discharge.

In comparing Cameron's results and my own, an allowance should be made due to my tabulating outbreaks instead of infecting cases. It would not be safe to argue from a drop in the infectivity rate unless the drop exceeds one in ten.

GROUP B.—DIPHTHERIA FOLLOWING THE DISCHARGE OF A DIPHTHERIA CASE.

The total number of diphtheria outbreaks recorded after the discharge of diphtheria patients who left the hospitals between January 1st, 1902, and December 31st, 1904, inclusive, was 168. Five of these were demonstrable "false" cases, having occurred before the discharge of the alleged infecting cases. In six of the remainder and one of the false cases the infecting case suffered from scarlet fever and post-scarlatinal diphtheria. There remain, therefore, 157 outbreaks possibly due to the discharge of a primary diphtheria case.

The number of primary diphtheria cases discharged during the same period was 15,105. If the cases discharged from the North-Western Hospital during 1903 and 1904 be subtracted, the discharges were 14,262. Accordingly 157 outbreaks followed on 14,262 discharges, an infectivity rate of 1.10 per cent.

Although we should expect *a priori* that the bacteriological examination would give increased protection against the discharge of infecting cases, the actual results of three years' working do not confirm this view. The details of the bacteriological examination differ at different hospitals. At the South-Eastern one negative culture was deemed sufficient. At the North-Eastern five negative cultures—three from the throat and two from the nose—are required. In spite of this, however, the infectivity rate at the latter hospital has risen since the adoption of the above routine.

CROSSED INFECTION. GROUPS C AND D.

From the length of the interval in these outbreaks it appears that a considerable number of them are really due to the alleged infecting case.

The number of outbreaks of diphtheria following the discharge of a scarlet fever patient was 101, which is equivalent to 0.28 per cent upon the 35,516 scarlet fever discharges; and the number of outbreaks of scarlet fever following the discharge of a diphtheria patient was 44, equivalent to 0.29 per cent upon the 15,105 diphtheria discharges. Strictly, however, we should add to these numbers certain mixed outbreaks which have already been counted in Groups A and B. In twelve outbreaks following the discharge of a scarlet fever patient two or more infected cases were taken ill, one or more with diphtheria, and one or more with scarlet fever. Similarly five outbreaks following discharge of a diphtheria patient contained both scarlet fever and diphtheria among the infected cases. Adding these, we find 113 diphtheria outbreaks after the discharge of scarlet fever cases, or 0.32 per cent on the total discharges; and 49 scarlet fever outbreaks after the discharge of diphtheria cases, or 0.32 per cent on the total discharges.

Recurrent Outbreaks in the same House.

A return case is essentially a recurrence of infectious disease in a house after the return of a patient supposed to be cured and free from infection. There are several instances, however, recorded during the three years where the second or infected patient again started the disease after his or her discharge, thus proving an infecting case in turn.

In all, there were 26 such cases of recurrence; in 25 of these, two return outbreaks, and in one, three outbreaks occurred in succession. One outbreak, however, out of the 25 was a demonstrable coincidence. Cases 118 and 725 are peculiar, in that the infecting case of the first outbreak afterwards became infected in the second outbreak. A parallel case occurred under my care in 1901, and is quoted by Cameron in his Report.

In 17 of the recurrent outbreaks all the patients suffered with scarlet fever; in two all suffered from diphtheria. In the remaining 7 (including the false case) the diseases were crossed.

However return cases are caused, we should expect a certain number of recurrent outbreaks, if the numbers dealt with are sufficiently large. If 3 per cent of primary scarlet fever cases are infectious after discharge, we should expect 3 per cent of the infected cases to give rise to a further outbreak, if the conditions remained the same. The same would be true if return outbreaks were simply coincidences. On the discharge of the 1442 infected scarlet fever cases we should therefore expect about 45 recurrent outbreaks. The reason that only 17 are recorded is probably

that the conditions are not the same in the two outbreaks. In families containing only two children, the first outbreak leaves no further cases to be infected, and in families of three or four, all may be infected at the first outbreak, or the one or two who escape may be insusceptible.

Summary.

The chief conclusions to be drawn from this investigation are:—

1. The alleged return cases include some coincidences as well as true cases, but the proportion of the former is small. Among scarlet fever outbreaks arising after the discharge of scarlet fever cases, the proportion is probably less than 10 per cent. Among diphtheria outbreaks following diphtheria, and in outbreaks where the diseases are different, the proportion is probably higher than in the former group.

2. The convalescent hospitals discharge fewer scarlet fever infecting cases in proportion than the acute hospitals.

3. Classification in scarlet fever has not yet caused any notable reduction in the infectivity rate.

4. In diphtheria cases the adoption of routine bacteriological examination before discharge has not caused any reduction in the infectivity rate.

5. The connection between a high infectivity rate and the weather is not close enough to permit of any notable reduction of return cases by withholding the discharge of patients on bad days.

6. In regard to Group C—diphtheria following discharge of a scarlet fever case—it has been suggested that a routine examination of scarlet fever patients for diphtheria bacilli before discharge would abolish such outbreaks. In the light of the very inconclusive results obtained hitherto by bacteriology in reducing return diphtheria cases, I cannot recommend its adoption for scarlet fever.

These conclusions as a whole are disappointing. Had a positive result been obtained in each of the above lines of enquiry, we might have hoped to adopt measures to seriously reduce the percentage of infecting cases discharged.

The lower proportion at the convalescent hospitals is undoubted; and past experience leads to the hope that return cases might be reduced to about two-thirds or less of the present number by discharging all cases from the convalescent hospitals. The experience of the three years does not lead to any similar hope as regards further classification or bacteriological examination. It is true that classification has hardly had a fair trial, and other systems, or a further trial of those already in use, may give better results.

DIPHTHERIA AND SCHOOLS.—The London County Council, at its meeting on July 10th, adopted a recommendation from the Education Committee to the effect that during the presence of diphtheria in any district the Committee should be authorized to refuse the readmission to school of children excluded on account of diphtheria or sore throat until such children shall have obtained a medical certificate of freedom from infection, based on a bacteriological examination. The certificate of freedom from infection based on bacteriological examination will be accepted either from general practitioners or from the Medical Officer of Health.

THE EMISSION OF BLACK SMOKE.*

By J. B. WILKINSON, M.D., C.M., D.P.H.,
Medical Officer of Health, Oldham.

DURING the past three months a special Smoke Inspector has been engaged in taking smoke observations, and the following is a brief report of the results. These statistics hardly show the full amount of black smoke which is being issued, as at my request many of the observations have been taken of the smaller mills, of which frequent complaints are received, but which, though causing considerable nuisance, practically never, owing to the small amount of coal used, exceed the 4-minutes limit. As many of these mills have lower chimneys than the larger mills, the nuisance is proportionately greater. Several observations have been taken also, for purposes of comparison, of mills which are known to emit very small quantities of black smoke, and of which in practice it is unnecessary to take more than casual observations.

Mills with One Boiler.—Thirty-one observations were taken at 13 of these mills. Of course none of them exceeded the 4-minutes limit, and only three mills exceeded 2 minutes in the half hour, these three burning 34, 26, and 24 tons per week respectively. Another mill burning 34 tons per week gave off no black smoke, and seven others did not exceed 1 minute in the half hour.

Mills with Two Boilers.—Observations were taken of 25 such mills, the total number of observations being 62. As would be expected, none of these emitted over 4 minutes black smoke, though they include several of which complaints are frequently received. Only 11 burn more than 20 tons per boiler, and only two of these above 25 tons; one of these two burns 30 tons per boiler, and the black smoke emitted never exceeded in any of the observations 1 minute. The other one burns 28 tons per boiler, and the black smoke emitted averaged at each observation 3½ minutes, a marked difference between the two mills. In 45 observations the black smoke did not exceed 2 minutes in the half hour. In 17 observations a limit of 2 minutes was exceeded, and the amount of coal per boiler burned in the mills at which these 17 observations were taken, is as follows: 28, 25, 22, 20, 20, 18, 17, 17, 16, 11 tons. This shows that only three out of the 11 boilers fired the heaviest exceeded this limit, while seven out of the 14 more easily fired ones do so.

Mills with Three Boilers.—Seventy-three observations were taken in connection with 25 such mills. Only one of these mills is stated to burn above 30 tons per boiler, and the black smoke emitted from its chimney did not exceed 1½ minutes. With 5 exceptions, the other mills burn from 20 to 30 tons per boiler.

In the observations of four mills burning respectively 26, 25, 22, and 19 tons per boiler no black smoke was recorded, and in 12 other mills the amount did not exceed 2 minutes. Only five mills ever exceeded 3 minutes in the half hour; these five mills burning respectively 30, 23, 23, 20, and 18 tons per boiler. The latter two emitted the largest amount of black smoke of any of the 25 mills, though burning considerably less

* Report presented March, 1906.

coal than most of the others. With one exception, therefore, in this class of mills, those burning a very moderate amount of coal give off the largest amount of black smoke.

Mills with Four Boilers.—Observations were taken of 23 mills with the above number of boilers, and the total observations numbered 68. Only one of these mills is stated to consume over 30 tons of coal per boiler per week; and the amount of black smoke emitted in the four observations of the chimney were 1½ minutes, 3 minutes, ½ minute and 1 minute. The average amount consumed per boiler at the other mills was from 20 to 23 tons per week. In six observations no black smoke was emitted, and the limit of 4 minutes was only exceeded in four cases, or 5½ per cent.

Out of the above number of mills only seven mills exceeded 3 minutes' black smoke in the half hour.

Mills with more than Four Boilers.—There were observations taken of 17 such mill chimneys with a total of 62 observations. Out of this number only three, or 5 per cent, exceeded the 4-minutes limit, and of these three, two were by no means the largest consumers of coal per boiler. The mill stated to have the largest consumption of coal, viz., 34 tons per boiler per week, did not exceed 1 minute's black smoke at each observation. Out of the total number of observations 70 per cent did not exceed 3 minutes' black smoke in the half hour, and these results appear to show that 4 minutes in the half hour is by no means a low limit, and can easily be kept within, if the necessary measures be taken.

The perusal of the above brief statistics, and still more of the detailed observations, which it would be unwise to publish, very strongly indicates that even in the large mills, with four or more boilers, the limit allowed by the Corporation, of 4 minutes' black smoke in the half hour, is a very lenient one, and can be observed without any hardship. When two of the largest and heaviest fired mills never exceeded 1 minute's black smoke in the half hour, it is only reasonable to expect that mills smaller and less heavily fired should have no difficulty in keeping within the 4-minutes limit.

With respect to the smaller mills, with 1, 2, or 3 boilers, it has frequently been suggested, and most recently, by the deputation of engineers who met the Committee on March 13th, that it was unfair to allow them the same limit as the large mills, with four or more boilers, or, in other words, to allow the same limit to a mill burning from 20 to 60 tons of coal per week as to one burning from 90 to 120 tons per week, and it has been also pointed out that under these regulations a mill giving off say 3½ minutes' black smoke in the half hour, could by putting up a second chimney emit black smoke in the half hour, could by putting up a second chimney emit double the amount of black smoke without exceeding the limit. The result of the observations show distinctly that in proportion to the amount of coal burned, many of the smaller mills give off considerably more black smoke than the larger mills. For example, one mill with three boilers burning 16 tons per boiler, or 48 tons per week, averaged over 2 minutes' black smoke at each observation. Another mill, with two boilers, and burning about 56 tons per week, averaged 3 minutes' black smoke in each observation, while one of the worst mills, burning about 140 tons per week in six boilers, only averaged 3½ minutes' in the half hour.

The deputation above mentioned suggested a sliding scale, but based upon the amount of coal consumed. The following was their suggested time allowance:—

Mills	burning	up to 30	tons of coal per week,	2 minutes' black smoke.
"	"	60	3	"
"	"	90	4	"
"	"	120	5	"
"	over 120	"	6	"

The result of this plan if adopted would be, briefly, to curtail the smoke emitted in some of the smaller mills and allow an increase in the larger mills. The more coal burnt, and consequently the lower the quality of the coal used, the more black smoke would be allowed. Moreover, the authority would have a basis to work on, which would be changeable and indefinite.

Some five years ago I suggested to the Health Committee a sliding scale which I considered would be equitable and could be easily observed, and the result of these observations has confirmed me in this opinion.

This scale is based on the number of boilers at the various mills, and is as follows :—

Where 1 or 2 boilers,	2 minutes in the half hour
„ 3 „	3 „
„ 4 or more „	4 „

This leaves those mills having four or more boilers the same scale as at present, but reduces the limit for those mills with three or less boilers. This method is in use in Blackburn and Sheffield, but both towns have a lower limit than that suggested above.

I attach to this Report a table of the amount of black smoke in other large towns which shows that only three other towns—Wigan, Preston, and Burnley—allow such a large amount to be emitted as in Oldham.

With regard to the taking of observations, I must reiterate my opinion that the observations are not only taken more frequently but better taken by a special Inspector. The district Inspectors may frequently see a chimney emitting quantities of black smoke, but are unable, being engaged on other business, to stop and take an observation, and when this special business is completed, and they return to take the observation, the circumstances may be entirely changed: whereas a special Inspector, having no other business, can take an observation whenever he sees a chimney giving off a larger quantity of smoke than usual.

In conclusion, I must again draw attention to the nuisances frequently caused in the borough by the black smoke emitted from mill chimneys just outside the borough boundaries. No observations are taken of these by the surrounding authorities, and, being chiefly on a lower level, cause a greater nuisance than the chimneys within the borough, and I suggest that, whenever the direction of the wind causes them to be a nuisance in the borough, observations should be taken and proceedings instituted. This seems to me only fair to the millowners within the borough.

BLACK SMOKE EMISSION IN OTHER TOWNS

		TOWN.					LIMIT.		
							3 Minutes in an Hour.		
Leeds	..	..	..	..	..	..	3		
Bolton	..	..	..	..	..	..	4	"	"
Liverpool		..	..	..	..	..	4	"	"
Halifax		..	..	..	..	..	5	"	"
Warrington		..	..	..	..	..	6	"	"
Huddersfield		..	..	..	..	..	6	"	"

	TOWN.	LIMIT.
Wigan		8 Minutes in an Hour.
Oldham		8 " " "
Preston		10 " " "
Burnley		12 " " "

Manchester allows only 2½ minutes in the hour, but takes proceedings for less if a nuisance is caused.

for less if a nuisance is caused.				2 Minutes in an Hour.	
Sheffield—for 1 Boiler	..	..	..	3	..
„ 2 „ „	..	..	..	4	..
„ 3 „ „	..	..	..	6	..
„ 4 or more	..	..	..	4	..
Blackburn—for 1 Boiler	..	..	..	5	..
„ 2 „ „	..	..	..	6	..
„ 3 „ „	..	..	..	7	..
„ 4 or more	..	..	..	..	..

Bradford and Nottingham—No limit is fixed, but proceedings are taken whenever a nuisance is caused.

PHYSICAL EXAMINATION OF SCHOOL CHILDREN.—From the *Tasmanian News* we learn that Dr. Elkington has arranged a scheme whereby 1000 children attending the State schools in Hobart will be carefully examined as to physical condition.

TRANSMISSION BY POST OF PATHOLOGICAL SPECIMENS.—The Postmaster-General has recently revised the regulations governing the transmission by post of deleterious liquids and substances sent for medical examination or analysis, and on and from October 1st such specimens may be sent by letter post, without registration, by qualified medical practitioners and qualified veterinary surgeons under the following conditions:—

1. That they are addressed to a laboratory or institute, public or private, or to a medical practitioner or veterinary surgeon within the United Kingdom.

2. That they are enclosed in a receptacle hermetically sealed, which receptacle must itself be placed in a strong wooden, leather, or metal case, in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton-wool), so packed about the receptacle as absolutely to prevent any possible leakage from the package in the event of damage to the receptacle.

3. That they are conspicuously marked "Fragile, with care," and bear the words, "Pathological specimen," and also the signature and address of the medical practitioner or veterinary surgeon who sends them.

The packet must on no account be sent by parcel post. Any packet of the kind found in the parcel post, or found in the letter post, not packed and marked as directed, will be at once stopped and destroyed with all its wrappings and enclosures. Any person who sends by post a deleterious liquid or substance for medical examination or analysis, otherwise than as provided by these regulations, is liable to prosecution. It is recommended that if receptacles are supplied by a laboratory or institute to medical practitioners or veterinary surgeons, they should be submitted to the General Post Office, in order to ascertain whether they are regarded as complying with the regulations.

ENTERIC FEVER IN INDIA.

LORD KITCHENER presided at the first meeting of the newly-formed Standing Committee for the purpose of investigating and advising on enteric fever in India and its prophylaxis, held at Simla, on July 31st. Surg.-Gen. Gubbins, P.M.O., of the Forces in India, is *ex officio* president of the committee, which consists of eight Medical Officers nominated by the Commander-in-Chief, and four nominated by the home Department. In addressing the committee, Lord Kitchener said that the three principal diseases whose ravages crippled the troops were malaria, venereal disease, and enteric fever. With regard to the two former they had made very successful progress in limiting the evil, but the same could not be said of the third. Last year there were 1146 admissions to hospitals, and 213 deaths from enteric; and for the first half of the current year there had been 513 admissions and 126 deaths. The ravages of cholera in the army were now happily a reminiscence of the past, and if they were equally energetic in stamping out enteric he had great hopes that they would succeed in bringing that scourge in turn eventually under control. The general lines on which they should work were, he thought, fairly clearly defined, but the details of elaboration formed the crux on which he hoped the advice and effort of the committee would be of the greatest assistance. He suggested as the main lines for action, sanitation in cantonments and barracks, isolation of enteric patients, detection of the origin of an outbreak or a single case, inoculation, and blood examination. Of course sanitary reforms meant the expenditure of money, but money would not be wanting if they could be sure that they were working on right lines.

The detection of the origin of enteric outbreaks was a question of the gravest importance, and also of great difficulty; yet some conspicuously successful results had ensued from immediate and careful deductions persistently followed up. Early diagnosis was absolutely essential, for it made possible early prophylactic measures. Commanding officers and the whole military machinery of a unit should be associated with the Medical Officer in the search for the originating cause, and the precautions to be adopted should be communicated to all concerned.

Antityphoid inoculation was still in its infancy, and though they had sufficient data to justify them in introducing the system generally, he looked forward to great improvements in its operation. The medical profession sometimes expressed surprise that this safeguard against dangerous disease was not more willingly adopted by the troops. But, if they wished to make inoculation popular, their efforts should be directed to making its application less painful and unpleasant, even at the expense of some reduction in the period of immunity. Since the South African war the dose injected had been reduced considerably with good results, and he asked whether they could not go a step further in the same direction. If all discomfort could be avoided in the process of inoculation, an immune period of six months might be sufficient, instead of the two years the profession now aspired to. They might then look for universal inoculation of all soldiers arriving in the country, it being in their early months in India that young soldiers were most subject to enteric fever.

Finally, he assured the committee that their views and opinions would be received with the greatest interest, and in the confident anticipation that their labours would contribute to the important work of stamping out enteric fever among the British soldiers in India.

INSTITUTION DEATHS AND DEATHS OF NON-RESIDENTS.

IN many annual reports reference has been made to the imperfect manner in which it is possible for Medical Officers of Health to correct their statistics with regard to deaths occurring outside the boundary of their sanitary districts. Dr. Howard Jones, of Newport, writes: "In calculating the death-rates in their districts, Medical Officers of Health are instructed by the Local Government Board to subtract those referring to sick people who belong to other districts but who have died in public institutions in the district, and to add those of *residents* who have died outside the districts in public institutions, etc. Unfortunately, there are no official means of securing this information, and no obligation on the part of any official to supply it, consequently these corrections are very imperfectly made. In some towns a large number of deaths of 'outsiders' are thus excluded, whilst those deaths are not added to the returns of the districts whence they came. Hence the death-rates in some towns are incorrectly stated, particularly in some health resorts where the deaths of 'non-residents' occurring in private houses even are excluded.

"If Medical Officers of Health are to correct their death returns by (1) subtracting the deaths of 'outsiders' and (2) adding the deaths of 'residents' who have died elsewhere, correct information respecting the latter class in particular should be supplied to them. At present the only official in possession of these returns is the Registrar-General."

Dr. A. K. Chalmers, of Glasgow, also refers to this difficulty and demands the establishment of a proper system of transference of deaths, which should be national and compulsory. He is of opinion that it can only be effected through the Registrar-General's Department. It needs no argument to show that some reform of the present custom is required. The object of local statistics is to reflect the influence of local conditions affecting health. In a true accounting, impairment of vitality as well as loss by death should be indicated. For many persons in all populations impaired vitality implies a drift towards parochial relief.

Dr. McVail also alludes to the subject in his annual report for Dumbartonshire. He has endeavoured to correct his list of deaths by enquiries at the hospitals of Edinburgh and Glasgow, but "even yet," he says, "the facts are not stated with sufficient completeness, and they cannot be so stated until the system is revised and made uniform for the whole of Scotland. That can hardly be done unless by a central authority—naturally the Local Government Board along with the Registrar-General. The Board have already very usefully raised the question by their requirement of an indication of the number of institutional deaths belonging to each burgh and county district, but it will be necessary to see that these statements are reasonably complete, and that each district is endeavouring to take cognisance of all deaths legitimately belonging to it, no matter where they have occurred."

In the Schedule of causes of death published by the Society in 1901, will be found a form recommended to Medical Officers for the interchange of information of deaths of "non-residents"; but the hope that this intercommunication would be generally made has not been realized. The time is probably opportune for the Society to take further steps towards the establishment of a national clearing house.

NOTES ON THE MIDWIVES ACT.

THE existing rules of the Central Midwives Board have been extended by the Privy Council for another six months, from August 12th, on which date they were due to expire, having been approved for three years from August 12th, 1903. This extension till February 12th, 1907, is made in order that amendments to the draft rules may be properly considered.

The Office of the Central Midwives Board has been moved to the fifth floor of Caxton House, Westminster, between the Imperial Theatre and the site of the late Westminster Aquarium.

The Council of the Royal College of Surgeons has resolved that in their opinion "it is essential for the efficient working of the Midwives Act that adequate provision be made to secure just remuneration for professional services rendered by medical men when called into attendance by midwives practising under the Act." The difficulty will be to carry their resolution into effect. It has been submitted to the Central Midwives Board.

In our last issue we began an analysis of the new rules revised according to the draft, now under consideration by the authorities. The draft has been returned by the Privy Council to the Central Board with certain amendments, which will be dealt with later. We have discussed all sections except those dealing respectively (*D*) with training and examinations, and (*E*) with directions to midwives.

THE NEW RULES—continued from p. 639.

Section D.—This corresponds with section *C* in the old rules, "regulating the course of training and the conduct of examinations, and the remuneration of the examiners." The old rules prescribed that, previous to the examination, a candidate should have conducted 20 labours and nursed 20 lying-in women for 10 days after delivery, under satisfactory supervision; besides attending a three months' course of instruction. The warrant as to the supervision of lying-in is now to be "satisfactory to the Central Midwives Board," not merely to "the person certifying." The certificates had formerly to be "filled up and signed" by certain persons, now they are only to "be signed" by them. The course of instruction is henceforth to include at least 15 lectures.

The chief difficulty in this section was the relationship of the Midwives Board to the Poor Law authorities. In this connection the old rules as to satisfactory supervision of labours and nursing have been amended, but further amendments are deemed necessary by the Privy Council, as follows:—

Old Rules.	Draft New Rules.	Amendments.
1 (i) "She must have, under supervision of the Central Midwives Board, have attended . . ."	1 (i) "She must, under supervision satisfactory to the Central Midwives Board, have attended . . ."	1 (i) "She must, under supervision satisfactory to the Central Midwives Board, or, where the course of training has been in a Poor Law institution, to the Local Government Board, have attended . . ."

The same addition is made by the Privy Council to clause 1 (2) as to nursing of 20 lying-in women. The certificates required for this purpose are to be signed by the following:—

"A registered medical practitioner, or by the chief midwife, or, in the absence of such an officer, by the matron of an institution recognized by the Board, or, in the case of a poor-law institution, by the matron, being a midwife, certified under the Midwives Act, or a superintendent nurse, certified in like manner and appointed under the Nursing in Work-houses Order, 1897, and attached to such an institution, or by a midwife certified under the Midwives Act and approved by the Board for the purpose."	"(a) A registered medical practitioner; (b) The matron, being a certified midwife, or the chief midwife, being a certified midwife, of an institution approved by the Board as a Training School; (c) A certified midwife approved by the Board for the purpose."	The same as the draft, with the following addition:— "(d) Where the course of training has been undergone in a Poor Law institution, a certified midwife attached to such institution and holding a qualification in midwifery satisfactory to the Local Government Board."
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The certificate of instruction is now to "be signed by one or more" recognized medical teachers, not necessarily by one only, and the Privy Council have added the following: "Or where the course of instruction has been undergone in a Poor Law institution, by the duly appointed chief medical officer of the institution, or other medical practitioner authorized by the Guardians with the approval of the Local Government Board to give such instruction."

This seems a serious division of responsibility and an obstacle to the complete control of midwifery. Local supervising authorities have no control of midwives in Poor Law institutions, it is true, and their authority ends with the registration of such midwives, so long as they do not practise midwifery outside the walls of such institution. But that a nurse may be let loose on the public with the hall-mark of Government registration, on the strength of teaching and certificates given by some of the matrons and medical officers of small infirmaries that we have known, is a serious menace to public health. And even if the Local Government Board were as chary of countenancing inferior training as are the Midwives Board—and we very much doubt if this would be so—it is probable that there would be a difference in the requirements of the two bodies, and eventually a difference in the abilities of the nurses trained under the two systems.

It may be observed that the whole Poor Law system is in the melting-pot of a Royal Commission; and it is possible that the administration of the Poor Law, too, may be decentralized and given over to County Councils, which would to some extent show a way out of the difficulty. But this is a mere shadowy possibility; and we hope that the Central Midwives Board will be able to induce the Privy Council to withdraw what seems to us their most unwise amendments.

D 2.—As to entry of name and fee for examination, proposals for reduction of the three weeks' notice to one week, and for increase of the fee on second examination from 15s. to the original guinea, were rejected. But a paragraph has been added by which, if a candidate is prevented by illness from completing the tests, her fee is forfeited and another fee of 10s. 6d., together with a medical certificate, is due when she next presents herself. This is presumably a business measure to provide the cost of the examination. But midwifery is not a profitable profession, and a half-guinea fee is a serious matter to many nurses, who may by this be prevented from coming forward for re-examination. The clause, therefore, is surely bad policy and an unjustifiable hardship to candidates.

D 3, 4.—The examination is unchanged, with the small exception that, in the management of infants, the signs of all diseases which may develop during the first ten days, and not only the important diseases, must be known. The last subject of examination has now been amplified to its great advantage as follows:—

- (k) Puerperal fever, its nature, causes, and symptoms.
- (l) The disinfection of person, clothing, and appliances.
- (m) The principles of hygiene as regards the home, food supply, and person.

In our next issue we hope to discuss the numerous amendments to Section E, "regulating, supervising, and restricting within the limits the practice of midwives."

THE ELECTROLYSIS OF WATER PIPES.—The Report of the Commission appointed by the German Gas and Water Companies on the effects of leakage electric currents on gas and water pipes has recently been published. An investigation extending over three years has been carried out by Herr Besig in many towns in Germany, and the data obtained justify some general conclusions. For instance, the amount of the electrolytic corrosion depends largely on the nature of the soil. In Danzig, where the average value of the electric currents in the iron water pipes in the immediate neighbourhood of the tramways was found to be as high as five amperes, corrosion was only beginning to be noticed. The small amount of the damage done was due to the soil being mostly dry sand. The extensive nature of the leakage was shown by the rails themselves being in many places badly corroded. In Erfurt, on the other hand, where the mean value of the leakage electric currents was less, the gas and water mains were badly corroded. Recently the pressure of the water supply was increased, a new reservoir being used. An immediate result was the bursting of the mains in ten places in the "danger zone." There were also marked signs of corrosion in the pipes at all places where there were bursts. An examination of the water mains in Stuttgart showed that they were badly corroded in the neighbourhood of uninsulated return conductors. It is stated that the replacing of bare insulated conductors in Hamburg effectually stopped all electrolytic troubles. The leakage currents, however, were not all due to the electric tramways. In Freiburg they were strongly in evidence at times when the tramway-power station was not working. In this case they were due to the electric lighting network. It is proposed to carry out further experiments in a town which has the usual gas and water systems, but where there is no electric system.

LAW REPORTS.

SUPREME COURT OF JUDICATURE.

July 17th & 18th, 1906.

COURT OF APPEAL.

BEFORE THE MASTER OF THE ROLLS, LORD JUSTICE MOULTON, AND LORD JUSTICE FARWELL.

CRIBER AND WIFE v. HOPE AND CURRIE.

This was an application by the plaintiffs for a new trial of an action tried before Mr. Justice A. T. Lawrence and a special jury. The case was reported in *PUBLIC HEALTH*, June, 1906, Vol. xviii, p. 601. The action was brought by Mr. W. F. Crier and Mrs. Crier, of the Rectory, Greenford, Middlesex, against a firm of medical practitioners practising at Hanwell and East Ealing for alleged negligence on the part of Dr. Currie, of St. James's Avenue, West Ealing, whereby he was said to have communicated scarlet fever infection to the female plaintiff. At the trial a verdict and judgment were entered for the defendants.

The Court unanimously dismissed the application.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.

May 1st, 1906.

BEFORE LORD ALVERSTONE, L.C.J., RIDLEY AND DARLING, J.J.

HARVEY v. BUSBY.

Metropolis Management Act, 1855, Sections 74, 250.—Drain or Sewer Combined System.—Alteration of System authorized.

A local authority in London approved a system of combined drainage for three adjoining houses in a street, and subsequently they approved a system for four other adjoining houses contiguous to the first three. These schemes were not in fact carried out as approved, and one of the second set of houses was drained by the same system as the first three. This was held to make the pipe from that system a sewer and not a drain.

This was a case stated by a Metropolitan Magistrate on the hearing of a complaint against the owner of premises known as 25, Rectory Road, made by Harvey, an inspector of the Hackney Borough Council, and alleging that a nuisance existed on the premises by reason of a defective drain. The defence was that the pipe was a sewer. The following facts were proved or admitted.

The premises known as 25, Rectory Road, are drained by a line of pipes which passes along the rear of Nos. 21, 23, 25 and 27, Rectory Road, and under No. 25 into a public sewer in Rectory Road. This line of pipes takes the drainage of the four houses. The nuisance complained of and above referred to existed in that part of the line of pipes which passes under No. 25. In June, 1878, an application in writing by Henry Antil, the then owner of Nos. 21, 23 and 25, Rectory Road, accompanied by a plan, was made to the Hackney District Board of Works (which was at

that time the proper authority under the Metropolis Management Act, 1855), for permission to drain these said three houses by a combined operation. The accompanying plan showed an intention to drain these three houses into a public sewer in Evering Road, a road at right angles to Rectory Road. The application was approved.

In December, 1878, an application in writing, accompanied by a plan, was made by the said Henry Antil to the Hackney District Board of Works for permission to drain four houses built on land between No. 25, Rectory Road and Evering Road, by a combined operation, in accordance with the said plan. This application was approved.

In August, 1905, a nuisance existed, caused by a defect in the pipes passing beneath the premises, No. 25, Rectory Road, and upon an examination being made it was found that Nos. 21, 23, 25 and 27, were drained together by means of a line of pipes passing along the back of Nos. 21, 23, 25 and 27, and under No. 25, to the public sewer in Rectory Road, and that Nos. 29, 31, and 33 were drained together by means of a line of pipes at the rear of Nos. 29, 31, and 33, Rectory Road, into the public sewer in Evering Road.

The Magistrate held that the pipe under No. 25 was a sewer and not a drain, and was repairable by the Borough Council.

Avory, K.C. and *Beven* appeared for the appellant, and *R. Cunningham Glen* for the respondent. The Court dismissed the appeal.

ALVERSTONE, L.C.J., said: I should be very glad if this case could be subjected to review by a higher authority, because the decisions are very arbitrary, and apparently work injustice, but at the same time in this court, and as between these parties, we are practically bound by the decisions of the Court of Appeal, and I doubt whether the matter can be altered except by a decision of the House of Lords. Having referred to the facts, he said the authorities, more especially *Kershaw v. Taylor* (1895), 2 K.B. 471, were clearly in favour of the respondent.

RIDLEY and DARLING, JJ., concurred.

PRESERVATIVES IN POTTED MEATS.—At Brentford Police Court, on July 19th, Richard Dickeson and Co., Limited, Government Contractors to the Army, were summoned for having sold, at Hounslow Barracks, tinned ham which was injurious to health.

Dr. Herbert Smith prosecuted for the Middlesex County Council; and Mr. F. W. Beck defended.

Inspector Walter Tyler, on June 12th, bought at the Hounslow Barracks canteen a penny tin of potted ham labelled "Finest ham, specially prepared for Richard Dickeson & Co., Ltd., London, Dover, Dublin, Aldershot, Portsmouth, Plymouth, and Gibraltar." The sample was sent to the analyst, who certified "it contained 74 per cent of boracic acid, which was equal to 80 grains of borax per pound. It was also artificially coloured with oxide of iron."

In proving his certificate, Mr. E. Bevan, analyst, said that in many instances he had failed to find boracic acid in tinned meats. It was not necessary as a preservative, and when used was employed to cover up inferior meats. It would arrest putrefaction and remove smell. Good meat, properly sterilized, would keep for any length of time. The late Commission found that 93 per cent of hams contained boracic acid. If it was in the ham it would get into the potted article. When the Commission recommended the use of preservatives they meant, he thought, with fresh meat.

Dr. J. F. J. Sykes, Medical Officer to St. Pancras, stated that the quantity of boracic acid in the sample was injurious to health. Continuous eating of it would produce loss of appetite and impair digestion. Used in meat it would suspend putrefaction, but the ptomaines, once set up, would remain, and odours would be killed. Oxide of iron was used to heighten the colour of the ham. Meat should be sterilized or salted before being potted, and it would keep forty-eight hours after opening.

Dr. William H. Willcox, of St. Mary's Hospital, said that he traced the death of two infants to eating cream containing borax or boracic acid preservative.

For the defence, Professor Otto Hehner, official analyst to several counties and boroughs, said that, generally, makers of tinned meats used boracic acid. Mild-cured hams could not be made without the use of boracic acid. He would not limit it in some cases. For fifteen years 40,000,000 people had been eating boracic acid with food without the finding of one trustworthy case of injury.

Dr. Tunnicliffe, a member of the Commission on Preservatives, said the public would not have strongly salted foods, and it was difficult to give a mild food without preservatives. Boracic acid was the best, and it would neither mask decomposition nor smell. The tinned ham in question would not be injurious to the ordinary adult. It was conceivable that a continued use of it might cause injury to a soldier. He had examined the defendants' reserve stock and could find nothing wrong.

Mr. Beck argued that the sole question was how far preservatives could be used, and whether boracic acid with ham was injurious. The Commission allowed its use, and as a trade custom he was defending it.

The Bench convicted the defendants, and imposed a fine of £5 and costs, which they assessed at £50.

DYED AND DISEASED MEAT.—At Lambeth Police Court, on August 3rd, Mr. J. G. Tyrrell, a provision merchant, Camberwell, appeared before Mr. C. K. Francis on an adjourned summons complaining that a quantity of meat, weighing in all about 106 lb., which was intended for the food of man, was found deposited on his premises, such meat being unwholesome and unfit for food. Arising out of the case there was a summons against Mr. Henry Howard, of Hornsey Road, Holloway, complaining that two tins of beef purchased from him by Mr. Tyrrell were at the time of the purchase diseased, unwholesome, and unfit for food, and in such a state as to be liable to seizure. Mr. George Elliott appeared on behalf of the Camberwell Borough Council; Mr. H. I. Sydney for Mr. Tyrrell; Mr. Daniel Warde for Mr. Howard. Mr. Tyrrell's explanation was that none of the articles seized were intended for sale, but had been put on one side in order that they might be returned to the manufacturers from whom he had purchased them. Inspector Kerslake stated that he saw Mr. Howard on the matter. Mr. Howard told him that on June 11th he received a consignment of 50 tins of beef from Mr. Edmunds, of Wolverhampton, and that on June 12th he sent two of the tins to Mr. Tyrrell. He said he received on an average 52 tons per year at 3½d. per lb. to sell at 4½d. The tins were covered at the tops with gelatin. It was not until the contents of the tins were turned out that he found the meat was diseased. Mr. Howard gave him every possible information in the matter. Dr. E. C. Bousfield stated that in the sample of beef or brawn which he received from Inspector Kerslake for examination he

found an abscess cavity, from which he took a soft, pulpy substance, which he submitted to microscopical examination and found to consist of the ordinary bacteria of suppuration. The animal must have suffered from *ante-mortem* inflammation. The meat had been dyed with aniline dye. This sample of brawn was the first sample of meat he had ever seen dyed. Mr. Howard, giving evidence, said he was a wholesale dealer in preserved provisions and had been in business for twenty-five years. Up to now there had never been any complaint against him. He had bought goods from Mr. Edmunds for eleven years. During those eleven years there had never been any complaint as to Mr. Edmunds' goods. On June 11th he received a consignment of tinned beef from Mr. Edmunds, and the two tins supplied to Mr. Tyrrell were a part of that consignment. The meat was not covered with gelatin, but with a layer of fat, and it was impossible to see the meat until the contents of the tins were turned out. He had no conception that there was anything wrong with the meat when he supplied it to Mr. Tyrrell. Mr. Francis remarked that, if he believed Mr. Howard, there was an end of the case against that gentleman. He had satisfied him that he took every reasonable precaution. Mr. Elliott remarked that, if that was so, he had nothing more to say. Mr. Francis dismissed the summons against Mr. Howard, but said he thought Mr. Tyrrell had shown some amount of carelessness, and ordered him to pay a penalty of 20s. and £10 10s. costs.

THE QUALITY OF MILK.—At Marylebone Police Court, on September 14th, Mr. Paul Taylor dealt with ten summonses taken out by the Paddington Borough Council against the Moreton-in-the-Marsh Farmers' Dairy Company (Limited), Moreton-in-the-Marsh, Gloucester, for sending milk to London deficient in butter fat varying from 4 to 21 per cent, on August 17th. The evidence showed that the defendant company sent a consignment of twenty churns of milk to Paddington Station, addressed to Messrs. Whiteman and Co., on the day in question. Inspector Parker took a sample from each of the churns, and conveyed the samples to Mr. Stokes, who analyzed them. The result was that ten of the samples were found to be correct and ten were deficient in butter fat, varying from 4 to 21 per cent. The defence was that all the milk was bulked at the farm, passed through a cooler, and then put into churns. Mr. Stokes was cross-examined as to the effect of very hot weather on the milk given by cows, and he replied that after a long drought you get abnormal results—a high percentage of fat or a low percentage—you do not know what is going to happen. Had the whole of the twenty samples been bulked and then analyzed, the result would have shown that the amount of fat was slightly above the Government standard of 3 per cent. The Magistrate remarked that it was all very mysterious and past understanding. That there was a marked difference between the quality of the milk in the various churns was quite clear. He ordered the defendant company to pay fines and costs amounting to £13 19s.

PRINTING OF ANNUAL REPORTS.—Mr. C. E. Paget, Medical Officer of Northamptonshire, says he is strongly of opinion that the evident growth of the "public health conscience" in this county during recent years has been stimulated by the greater circulation of health reports and the mutual interests these disclose.

REVIEWS.

PRESERVATIVES IN FOOD, AND FOOD EXAMINATION. By John C. Thresh, M.D., D.Sc., F.I.C.; and Arthur E. Porter, M.A., M.D. Pp. 484, Price 14s. net. London: J. & A. Churchill, 1906.

This is an extremely interesting and useful book, and its appearance at the present time is certainly *opportune*. We have seldom found the arguments *for* and *against* the use of preservatives in food more clearly stated. In fact, we were agreeably surprised to find this was so, as after reading the preface we had a strong impression that the authors rather favoured the use of preservatives. The argument generally brought forward is that by their use many articles are rendered available for food, and thus the people are able to get a greater supply at cheap rates than would be the case if preservatives were not used. Whatever leaning the authors may have had to what we may call the commercial view of the subject, before they began to write the book, it is evident that their review of the pros and cons of the subject led them to adopt conclusions which appear to us fair and sensible. Many useless prosecutions might have been obviated had advice similar to that given here been tendered to the local authorities, and *accepted by them*. A brief account of some 150 cases is given which emphasizes this point.

That the use of smoke, salt, saltpetre, and vinegar for the preservation of food is not protested against by the profession appears to be beyond the authors' comprehension, and they do not lose an opportunity of having a fling at the sanction which long custom has conferred on these preservatives (pp. 9, 15, 94, 96). We have been much amused thereby, although we are sure the authors did not intend their remarks to produce that effect. As regards the use of crude pyroligneous acid, which is sometimes employed instead of smoke, we would have preferred that the authors had discussed the matter and set before us any dangers which had accrued from its use. Is its use dangerous? If so, it ought to be stopped.

After a general introductory chapter, the remaining seven chapters of Part I. are devoted to a consideration of various preservatives. Part II. deals with various foods and the ways in which they are preserved. Part III. contains two chapters, one on colouring matters, the other with mineral poisons in foods. From this method of arrangement of the subject there results a certain amount of overlapping. It might be well in a future edition to provide cross-references.

Part IV. deals fully in ten chapters with unsound food; how to recognize it, and the result of its consumption. Part V. has three good chapters on methods of detecting preservatives, one on legal cases, and another on some of the ways in which articles are made to appear better than they really are, such as by use of saponin. This is a chapter which could easily be extended. In Appendix I. are abstracts from the Report of the Committee on Preservatives, etc., and Appendix II. contains the law of practice in certain foreign countries and the Colonies. There are also eight plates showing moulds, trichina, etc.

While we can thoroughly recommend this work to all interested in the subject, there are some minor points upon which we might comment, although space prevents us dealing as fully as we might. The authors state that pasteurization is carried on to a small extent

in England. Our experience is that a good many dairymen have fitted up plants for dealing with their milk in this way. It is important that customers should know if the milk supplied them has been treated in any way. When it is for the consumption of infants or invalids the continuous use of sterilized milk might have serious consequences. In London there is a company which sells in the streets a large quantity of pasteurized skim milk. Very little is said about separated milk: sometimes it contains large quantities of preservatives. With so many creameries in existence there must be a large amount of separated milk. Where does it all go? We understand that in some creameries it is the custom to add boric acid to the milk before the fat is abstracted; thus the amount of the preservative in the cream, or left behind in the milk, is a variable quantity.

We think it might be desirable under the heading of "Refrigeration" to say something of the methods of thawing. We understand that on this being properly done depends a good deal the subsequent appearance and keeping qualities of meat. We have noticed that certain game birds which have been in cold storage have the outer flesh hardened, and in some cases the flavour is not the usual "high" one which one associates with the condition in game which has not been subjected to freezing. Does the freezing check some part of the process, or allow different organisms to develop? On page 254 the authors say that so far as they are aware, the only occasion on which the *Bacillus typhosus* has been detected in cockles suspected of causing disease was connected with an outbreak of enteric fever in Glasgow in 1903. We believe the Lister (then the Jenner) Institute isolated this organism in 1901 from cockles obtained from Leigh-on-Sea. We should like to have had some further details with reference to tinned goods, means of recognizing defective tins, effect of age, etc. We have noted a few very small errors in the book, and these chiefly mistakes in persons' names overlooked in correcting the proofs. We would draw the authors' attention to the table at the foot of page 179, in which the last three sets of figures appear to have been placed in the wrong columns.

THE MEDICAL ANNUAL SYNOPTICAL INDEX TO REMEDIES AND DISEASES, for the six years 1899 to 1904. Pp. 279. Price 7s. 6d. net. Bristol: John Wright & Co.

This volume is primarily intended as an Index to the *Medical Annuals*, 1899 to 1904, but it also contains most of the facts likely to be looked for in everyday practice. Suggestions as to the latest methods of treatment, the actual formulæ of prescriptions recommended, the nature, dose, and solubility of new drugs, are facts which lose nothing by brevity, and are dealt with in the text; on the other hand, the technique of Operations, views of Etiology and Pathology, are matters necessitating study, and reference is given to the volumes of the *Medical Annual* in which they were discussed, and where further references to original papers may be found.

Those of our readers who know what Dr. Neale did in preparing his "Digest" will appreciate fully the advantages of this Index. We have tested it in several ways, and find that it proves to be a key to modern medical therapeutics; the practitioner who possesses this volume, even if he has no copy of the *Medical Annual* at hand, will not refer to the name of a disease or remedy without finding something suggestive and helpful. We congratulate the Editor on the manner in which he has carried out a by no means easy task.

CONSUMPTION: TREATMENT AT HOME AND RULES FOR LIVING. By H. Warren Crowe, M.D. Price 1s. net. Bristol: John Wright & Co., 1906.

There is a need for a little book of this kind. Enquiries we have made show that the general practitioner does not make the best of his opportunities to enforce the rules which are inculcated so well during a stay in a sanatorium. Yet it should not be difficult, with the aid of this little book to help consumptive patients who must stay at home to a better chance of recovery. It is suggested that medical men might give this book to their patients, and as for individual patients some rules may be omitted and others added, blank pages are appended for the insertion of further instructions. We have read the rules and directions, and find them clear and easy to understand. We should prefer the use of some less poisonous disinfectant than carbolic, and have doubts as to private patients being induced to take their temperatures per rectum; but these are details for the medical practitioner to settle.

REPORT OF THE PROCEEDINGS OF THE NATIONAL CONFERENCE ON INFANTILE MORTALITY. Price 1s. 6d. Westminster: P. S. King & Son.

This is the official report of the addresses and discussions at the Conference held last June, and should be read and studied by every one interested in the subject.

LOCHBOISDALE; OR PHYSICIANS A-FISHING.

How four medical men "spent the blythsome time which forms the subject of this rhyme" is told by one of them in a thorough sportsmanlike style that will make all fishers who read it yearn to have been among them.

Who the author is we have a shrewd guess—the photographs of the "four cronies from the banks of Tyne" adorn the first page. Three of them are evidently engaged in curative medicine, but the remaining member of the quartette is a well-known member of this Society. A description of the men and their work is given, and as it is seldom that the Medical Officer of Health is depicted in anything but sober prose, we venture to quote:—

"Among his peers he stands alone;
For him no private patients groan;
No epidemic him delights,
Nor crowded church on rainy nights;
No consultations his or fees,
Nor vested interest in disease.
But his the hard and thankless task
To thwart his friends in all they ask;
Defective drains to rectify,
On which they for their fees rely;
Preserve food, air, and water pure,
Which elsewhere makes their practice sure;
Check overcrowding—disinfect—
Do all to which they most object!"

That South Uist is the place *par excellence* to catch fish cannot be doubted, for are not the "beauties" shown in photograph, together with other quaint sketches? We only wish we had been one of such a jovial party.

OBITUARY NOTICES.

DR. JOHN HENRY BELL, of Bradford, died suddenly on the 9th September, at the age of 74. Although not connected with the Public Health service, Dr. Bell, in the course of his work in Bradford, where he began practice in 1857, was led to give special attention to Anthrax in connection with the wool industry. He wrote the articles on the subject in Allbutt's *System of Medicine*, and in Oliver's *Dangerous Trades*. In 1892 he contributed a paper on "Artisans' Dwellings in Bradford" to PUBLIC HEALTH. Dr. Bell was consulting surgeon to the Bradford Eye and Ear Hospital, and also to the Royal Infirmary.

DR. FRITZ SCHAUDINN, one of the staff of the German Health Department, died on the 22nd June. He was in his 35th year, but had already made a name for himself as a worker in the fields of zoology and proto-histology. He discovered and established the *Spirochaeta pallida* as the cause of syphilis.

A LADY MEDICAL OFFICER.—Miss Frances M. Harper, M.B., has been appointed lady assistant medical officer at St. Helens. The appointment was decided upon with the idea that her duties should practically place her at the head of the lady sanitary inspectors. She will educate midwives, teach women at mothers' meetings, and give instruction in day schools and to women teachers.

VACCINATION IN SWITZERLAND.—Mr. Lupton asked (July 4th) the Secretary of State for Foreign Affairs whether he would ascertain and inform the House of Commons which of the cantons constituting the Swiss Republic had abolished compulsory vaccination, and which of them still enforced it; and whether the population of the cantons in which compulsion had been retained showed a liability to small-pox greater or less than the liability shown by the population of the cantons which had abolished compulsion. Mr. Runciman (Dewsbury), who replied, said, "Our latest information (1900) respecting the vaccination law in Switzerland represents two cantons as having never passed such law, nine cantons as having repealed a former vaccination law, two cantons as not enforcing their vaccination law, and 12 cantons as having vaccination law more or less in force. Switzerland, in recent years, has not suffered much from small-pox; in the period 1900-4 (inclusive) there occurred in this country some 800 cases only of the disease. These cases were fairly evenly distributed between the 13 cantons not enforcing and the 12 cantons giving effect to vaccination law. But though the disease may be regarded as fairly evenly distributed in the five years in question over the whole population, it affected very differently children under ten years of age. Of the 800 odd small-pox attacks, 180 were of children under ten; and of these 180 children 26 are recorded as vaccinated, while 154 are returned as unvaccinated. Of the 26 vaccinated children taking small-pox, none died; whereas of the 154 recorded as unvaccinated and attacked by the disease 27 died.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

REPORT OF COUNCIL, SESSION 1905-6.

1. YOUR Council are again able to present a satisfactory report dealing with the work of the past session, 1905-6. When the Society was incorporated in 1892, there were 387 Fellows, and there are now 743. The total membership of the Society is 903, and includes 44 Hon. Fellows, 743 Fellows, 64 Ordinary Members, and 52 Associates. During the year under review, 8 Fellows have died, and 2 who have ceased to hold office as Medical Officers of Health have resigned; 4 Associates have resigned. There were newly-elected during the year, 38 Fellows, 13 Members, and 2 Associates—the yearly averages for the previous ten years being 58, 11, and 8 respectively. Dr. Jacques Bertillon of Paris, has been elected an Honorary Fellow of the Society.

2. Your Council congratulate the Society upon the celebration of its Jubilee during 1905-6, and wish to place on record their keen appreciation of the excellent services rendered by Sir Shirley F. Murphy as President of the Society during the Jubilee year, and of his masterly Presidential Address on "The Medical Officer of Health, 1856-1906," delivered at the Jubilee Meeting of the Society, held on May 11th, 1906.

3. Your Council congratulate the Society upon the success of the Jubilee Banquet, held in London on May 11th, 1906; and upon the excellent Jubilee Number of PUBLIC HEALTH which has been published.

4. At the Ordinary Meetings of the Society, the following subjects were dealt with: "The Relation of the Medical Officer of Health to the Medical Practitioner with Respect to the Administration of the Infectious Diseases (Notification) Acts," by Drs. Charles Sanders, M.B., J. Howard-Jones, M.D., and E. W. Goodall, M.D.; "A Comparative Study of the Lincoln, Maidstone, and Worthing Epidemics of Typhoid Fever," by Dr. Christopher Childs, M.A., M.D.; "Disinfection," by Dr. H. R. Kenwood, M.B.; "Infantile Mortality," by Dr. A. K. Chalmers, M.D.; "Some Defects of Public Health Administration," by Dr. Philip Boobbyer, M.D.; "Some Aspects of the Housing Question in Germany," by Dr. John Robertson, M.D.

The Annual Provincial Meeting was held on July 14th, 1906, at Bath, when Prof. C. S. Loch, D.C.L., read a paper on "The Relation of Sanitary Authorities to Charitable Societies."

5. Your Council have received, and accepted with thanks, from several of the Branches offers of framed portraits of Sir Shirley F. Murphy (Jubilee President), Dr. Alfred Hill (first Provincial President), Dr. W. T. G. Woodforde (President 1893-4), Dr. Joseph Groves (President 1903-4), and Dr. T. O. Dudfield (President 1883-5).

6. Your Council report the receipt from Dr. J. F. J. Sykes of a handsome oak reading-desk for the Society's premises.

7. Your Council have approved increased grants for the session for the Scottish and Northern Branches.

8. Your Council have completed the indexing and cataloguing of the books in the Library—a book-plate from the Badge of the Society having been engraved for the purpose; and are considering the desirability of loaning books to members.

9. Your Council are still endeavouring to obtain from the Legislature fixity of tenure for all Medical Officers of Health, and in connection therewith joined the Public Health Committee of the British Medical Association in a joint deputation of selected members to the Local Government Board on November 30th, 1905, with reference to the Public Health (Fixity of Tenure of Office for Medical Officers of Health and Sanitary Inspectors or Inspectors of Nuisances) Bill which has been drafted by the British Medical Association.

10. Your Council report that Dr. T. O. Dudfield, Medical Officer of Health, Kensington Borough, has been re-appointed as the Society's representative on the Sanitary Inspectors' Examination Board for the ensuing year.

11. Your Council have arranged for future Financial Statements of the Treasurer to contain (a) Amount of unpaid subscriptions; (b) The estimated value of the furniture and fittings of the Society's premises; (c) Particulars of outstanding accounts that have not been actually received at the date the Statement is presented to the Council.

12. Your Council decided to dispense with the old Committees of the Society, and to elect in lieu thereof three standing Committees, each to consist of the officers, together with ten members (with power to add to their numbers), to be known as:

- (1) The Finance Committee;
- (2) The House, Library, and Journal Committee;
- (3) The General Purposes, Legal, and Parliamentary Committee.

13. Your Council decided to continue in office the old School Hygiene, Jubilee (1906), and Rural Model By-laws Committees, for the purposes of finishing the respective businesses upon which such Committees are at present engaged.

14. Your Council have recommended that the Articles of Association of the Society should be altered so that paragraph 46 read as follows:—

The Council shall consist of

(1) The Officers of the Society, together with the Hon. Secretaries of the Branches *ex officio*;

(2) Elected representative Fellows, on the direct *pro rata* basis of one representative of each Branch for every completed 50 members or part of 50 (over 25), formally joined to such Branch in accordance with the terms of Article 38, provided that:—

(a) Any Branch, the membership of which includes less than 50 members shall be entitled to one elected Representative, and

(b) Any Fellow appointed by a Branch, as a Representative, shall be a Medical Officer of Health (acting or retired).

15. Your Council are still considering the advisability or otherwise of altering the Articles of Association, so that the travelling expenses may by special resolution of the Council be paid by the Society of Branch Representatives on the Council when attending Council Meetings, or Meetings of Committees of the Council.

16. Your Council have agreed to the principle of the Medical Officer of Health to the Education Committee being the Medical Officer of Health of the district in those districts where the Sanitary Authority is also the Education Authority; and are of opinion that the special duties of any expert, whose services it may be thought necessary to obtain with regard to such matters as defective hearing, sight, or mental deficiency, should not include any duties now performed under statutory direction by the Medical Officer of Health.

17. Your Council have communicated with:—

(1) *The Education Department*—

“With respect to the exclusion from School of all children under five years of age;

(2) *The British Medical Association (Ethical Committee)*—

“Deprecating the practice which obtains in some districts of members of public bodies being called upon to give, and giving, expert advice, thereby assisting to prevent the necessity of appointing expert and responsible officials.”

18. Your Council draw attention to the increasing number of instances in which the advice of the Society is sought by individual members.

19. Your Council report that delegates were appointed to attend—

- (a) The Congress of the Royal Sanitary Institute, at Bristol;
- (b) The Smoke Abatement Conference, in London;
- (c) Le Congrès des Gouttes de Lait, in Paris;
- (d) The Second International Congress of the Association for the Promotion of Hygiene, and Salubrity in Dwellings, in Geneva.

20. Your Council report, with regret, the serious illness of the Executive Secretary (Mr. W. A. Lawton), who was taken ill in May last and has not yet been able to resume his duties as Executive Secretary.

21. No change has taken place in the *personnel* of the Officers of the Society, all of whom were unanimously re-elected by your Council.

HERBERT JONES } *Hon.*
JOSEPH PRIESTLEY } *Secretaries.*

REPORT OF THE EDITOR.

To the Council of the Incorporated Society of Medical Officers of Health.

GENTLEMEN,

The year which has just ended has been a notable one in the history of the Society. Fifty years ago it was little dreamed that Medical Officers of Health would now occupy the high position in public estimation to which they have attained. While PUBLIC HEALTH has necessarily reflected the doings of the members, it has also been the aim of successive Editors during the eighteen years of its existence to promote and encourage the development of the Society along what they conceived to be the best lines. The scope of the Medical Officer's duties has been enormously increased, and, in addition, the hygienist has now invaded the Army and the Navy, and must be ready to act his part in India, the tropics, or, indeed, in any part of the world.

In order that these varied interests should be adequately represented in PUBLIC HEALTH, it appears to me that some reconstruction of the editorial staff is necessary; and to enable the Council to consider this view I have placed my resignation in your hands.

During the period I have held office (since 1901) I have endeavoured to introduce new features, without unduly increasing the cost of the Journal. The demands upon space have been very heavy, and it has been necessary to cut down, or to refuse, articles in a number of cases. Probably, in the future, this function will have to be exercised even more fully. My thanks are due to the many gentlemen who have assisted me. I would especially name Mr. Herbert Jones, the late Dr. Willoughby, my two predecessors—Drs. Newsholme and Reginald Dudfield—Dr. R. K. Brown and the late Dr. Richmond for assistance in the "Current Public Health Literature" section, Mr. C. E. Allan, one of the Editors of the *Justice of the Peace*, for the Law Reports, Dr. Fremantle, for the notes on the "Midwives Act"; I also desire to express my thanks to Profs. M. Hay and Delépine and to Dr. Chalmers, for submitting for publication in PUBLIC HEALTH, original papers prepared on their suggestion, or under their supervision.

Yours faithfully,

FRANCIS J. ALLAN,
Editor.

September 21st, 1906.

LICENSING v. REGISTRATION OF DAIRIES.—At the Congress of the Royal Sanitary Institute at Bristol, Dr. H. Renny, Medical Officer of Health (Sunderland), proposed the following motion: "That in consideration of the insanitary condition of the great majority of dairies, cowsheds, and milkshops, which thereby renders the milk supplied under such insanitary conditions unfit for human consumption, and dangerous to the public health, this section is of opinion that legislation is desirable to secure the licensing of all dairies, cowsheds, and milkshops in lieu of registration as at present, and this section recommends the Council of the Institute to bring the proposition under the notice of the proper authorities." The motion was supported by Dr. Armstrong (Newcastle-on-Tyne), Dr. Eustace Hill, Dr. Kenwood, and others, and on being put to the meeting was carried *nem. con.*

CURRENT PUBLIC HEALTH LITERATURE.

Journal of Experimental Medicine (New York).

1905.

- (August.) Study of Pneumococci; Comparison between the Pneumococci found in the Throat Secretions of Healthy Persons living in both City and Country and those obtained from Pneumonic Exudates and Diseased Mucous Membranes. W. H. Park and A. W. Williams (New York).
Application of the Reaction of Agglutination to the Pneumococcus. K. R. Collins (New York).
Comparative Study of Pneumococci and Streptococci from the Mouths of Healthy Individuals and from Pathologic Conditions. W. T. Longcope and W. W. Fox (Philadelphia).
Study of Pneumococci and Allied Organisms in Human Mouths and Lungs after Death. C. Norris and A. M. Pappenheimer (New York).
Studies on the Pneumococcus. C. W. Duval and P. A. Lewis (Boston).
Studies of the Pneumococcus and Allied Organisms with Reference to their Occurrence in the Human Mouth. L. Buerger (New York).
Comparative Study of Pneumococci and Allied Organisms. P. H. Hiss, Jr. (New York).
Viability of the Pneumococcus after Drying: Study of one of the Factors in Pneumonic Infection. F. C. Wood (New York).
The Growth of Pneumococci and Streptococci in Blood Serum. W. T. Longcope (Philadelphia).
(November) Action of Glycerine on Bacteria in the Presence of all Exudates. J. J. Kinyoun (Philadelphia).

Journal of Infectious Diseases (Chicago).

1905.

- (May.) Report of Committee on Standard Methods of Water Analysis to the Laboratory Section of the American Public Health Association.
Concerning Tests for *B. coli communis* in Water. G. W. Fuller (New York), and C. E. Ferguson (Indianapolis).
Characteristics of Colon Bacilli and the Value of the Presumptive Tests. G. Van E. Stoughton (New York).
Chemical Phases of a Water-softening Problem. A. E. Kimberly.
Typhoid-like Bacilli in the Water Supply of Fredericton. N. B. F. C. Harrison.
Persistence of Agglutinability in Typhoid Bacilli in Water. E. O. Jordan (Chicago).
Chemical and Bacterial Composition of the Sewage Discharged into Boston Harbour from the South Metropolitan District. C. E. A. Winslow and E. B. Phelps.
Number of Bacteria in Sewage and Sewage Effluents Determined by Planting on Different Media and by a New Method of Direct Microscopic Enumeration. C. E. A. Winslow (Boston).
Mode of Action of the Contact Filter in Sewage Purification. E. B. Phelps and F. W. Farrell (Boston).
Determination of the Organic Nitrogen in Sewage by the Kjeldahl Process. E. B. Phelps (Boston).

- Tests of a Method for the Direct Microscopic Enumeration of Bacteria. C. E. A. Winslow and G. E. Willcomb (Boston).
- Report of Committee on Antitoxic and Immunizing Sera.
- Importance of the Paratyphoid Bacilli. W. H. Park (New York).
- Occurrence of *Bacterium pneumoniae* in the Saliva of Healthy Individuals. W. D. Frost, C. B. Divine, and C. W. Reineking.
- Laboratory Methods and Devices. F. F. Westbrook.
- Improvement in the Technique of the Indol Test. J. McFarland and J. Hamilton (Philadelphia).
- Copper Sulphate as a Germicide. G. A. Johnson and W. R. Copeland.
- Metamorphosis of *Filaria* in the Body of the Mosquito (*Culex pipiens*). M. G. Lebrede (Havana, Cuba).
- Possible Cause of the Formation of Gas in Cans of Condensed Milk. C. W. Dodge (Rochester, N. Y.).
- (June.) Blood in Scarlet Fever. W. Tileston and E. A. Locke (Boston).
- Case of Hematochyluria, with some Observations on the Morphology of the Embryo Nematode—*Filaria nocturna*. W. B. Wherry and J. R. McDill (Manila).
- Case of Pulmonary Infection with an Acidfast Actinomyces. E. E. Butterfield (Washington).
- Bacillus Mycogenes* (*Bacterium mucogenum*), Nov. Spec. An Organism belonging to the *Bacillus mucosus capsulatus* group. R. T. Edwards (Baltimore).
- The Nitrate and Nitrite Content of Witte's Peptone, with Special Reference to its Influence on the Demonstration of the Indol and Cholera Red Reactions. W. B. Wherry (Manila).
- Occurrence of Fusiform Bacilli and Spirilla in Morbid Processes. G. H. Weaver and R. Tunnicliff (Chicago).
- Quantitative Study of Hemolytic Serum. W. H. Manwaring (Chicago).
- Role of the Typhoid Bacillus in the Pulmonary Complications of Typhoid Fever. G. C. Robinson (Philadelphia).
- Thermostabile, Hemolytic Precipitate from Nutrient Broth. E. O. Jordan (Chicago).
- Comparison between the Results of Blood Cultures taken during Life and after Death. N. B. Gwyn and N. MacL. Harris (Baltimore).
- Contribution to the Clinical Knowledge of Texas Fever. C. C. Guthrie (Chicago).
- (November 25.) Some Artefacts in Mouse Carcinoma. G. N. Calkins and G. H. A. Clowes (Buffalo).
- Antagonism of Bacteria and their Products to other Bacteria. L. F. Rettger (New Haven, Conn.).
- Relation between Serum Resistance and Virulence. D. W. Day (Chicago).
- Bacteriological Examination of a Plague Rat. W. B. Wherry (Manila).
- Studies of Meningococcus Infections. D. J. Davis (Chicago).
- Study of the Dejecta of Normal Children and of those Suffering from Acute and Subacute Diarrhoea with Reference to *B. Dysenteriae*. K. R. Collins (New York).
- Common Mosquitoes of Bihé and Bailundo Districts, Portuguese West Africa. F. C. Wellman.

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- (No. 19.) (May 9.) Differentiation of various albumins from the same organism by precipitin reaction. G. Forssner.
- (No. 20.) Hæmolysin formation. G. Fraenkel and Baumann. (The research confirms the assumption that the pathogenic staphylococci form hæmolysins and agglutinate readily, while the saprophytic group does neither.)
- Explanation of the toxic action of corrosive sublimate. Bokorny. (From these experiments it would appear that the action is due to the combination with the albumin in definite proportion; for spirogyra about one two-hundredth of its weight was necessary to kill it.)
- (No. 21.) Agglutination of paratyphoid bacilli by typhoid serum.
- Adenoid vegetations as favouring epidemic cerebrospinal meningitis. O. Dorubluth.
- Protection of vaccine vesicles. A. Groth. (He uses a shield made of cotton, which fits over the arm and shoulder like a sleeve, to the elbow, with a band from the top passing round the body under the other arm.)
- (No. 23.) Preservation of milk with hydrogen dioxide. E. Baumann.
- Serum treatment in anthrax. Wilms.
- (No. 24.) Diagnosis in typhoid and paratyphoid by the aid of agglutination tests. Korte and Sternberg.
- (No. 25.) Streptococci found in variola and varicella, differential diagnosis. H. De Waele and E. Sugg.
- Experiments with vaccine. T. V. Wasiewski.
- Antitussin in the treatment of whooping cough. R. Nahner.
- Hot water and alcohol disinfection in obstetrics. O. V. Herff (Women's Hospital, Basle).
- (No. 26.) Celluloid intubation tubes. P. Reich.
- (No. 27.) *Spirochæta pallida* and syphilis. B. Kiolemenoglon and F. V. Cuhe. (Also No. 28.)
- Is lysoform toxic? T. Weylin.
- (No. 28.) Experience of the Gruber-Widal test. P. Manteufel.
- Tuberculosis and pregnancy. F. Reiche.
- An epidemic of measles (2881 cases). Heissler.
- (No. 29.) Spirochæta in syphilis. Rille, H. Ploeger, J. Siegel.
- Suggestions for collective cancer research. K. Koeh.
- (No. 30.) Etiology of croupous pneumonia. H. Schottmüller. (He found a streptococcus (*S. mucosus*) in pure culture in six cases.)
- (No. 31.) Persistence of typhoid bacilli in the gall-bladder. F. Forster and H. Kayser.
- Spirochæta in the blood of syphilitics. C. T. Noeggerath and R. Staehelin.
- (No. 32.) Permeability of the gastro-intestinal walls in new-born animals. A. Uffenheimer. (The mucosa behaves differently in various animals.)
- Red light in the treatment of scarlet fever. Cnopf (Nürnberg Children's Hospital).
- Infant mortality and the survival of the fittest. H. Koepe. (Among the other points brought out in Koepe's study of the lessons to be drawn

from the statistics of infant mortality may be mentioned his statement that a high infant mortality in a given year is always followed by a higher mortality among the surviving children in the second and third years thereafter. The reverse is also true, that the measures which reduce infant mortality serve to strengthen the surviving children, so that more pass successfully through the second and third years.)

(No. 33.) Transmission of foot and mouth disease to rabbits. J. Siegel.

(No. 34.) Action of radium on infectious germs and on infected tissues. B. Werner.

(No. 35.) The typhoid bacillus and the *B. faecalis alcaligenes*. R. Trommsdorff. (Also in Nos. 38 and 39.)

(No. 37.) Inhibition in the growth of bacteria by self-poisoning. H. Conradi and O. Kurpjuweit.

Recurrence of scarlet fever after six weeks. L. Bleibtren.

Public provision for the care of infants in Munich. K. Oppenheimer.

(No. 39.) Symptoms of typhoid fever. G. Treupel. (From the clinical records of sixty recent cases, he finds that anamnesis suggested the possibility of typhoid in only 75 per cent; a typical temperature curve was noted in only 46 per cent; bronchitis at the commencement of the disease in 48 per cent; pulse slow in proportion to the temperature in 86 per cent; tendency to euphoria or remarkably good general condition in 56 per cent; typhoid tongue in only 16 per cent; catarrhal sore throat in 33 out of 60, and follicular sore throat in 1; abdominal symptoms, meteorism, tenderness, etc., in 61 per cent; enlarged spleen in 86 per cent; roseola in 71 per cent; diazo reaction in 73 per cent, and the agglutination test positive in 90.6 per cent of 53 patients, and typhoid bacilli found in the blood by the second or third day in 92.8 per cent of 14 cases.)

(No. 40.) Beri-beri and intestinal intoxications in the Dutch East Indies. H. Dürck.

Malta fever. Roosen-Runge (Hamburg).

(No. 42.) Venereal statistics in the garrison at Metz. M. Müller. (There are 24,000 men. Syphilis has not varied during ten years; it averages about 4 per cent of the cases, but gonorrhoea has dropped from 25.6 to 12 per cent. This is believed to be due to the systematic microscopical examination of the secretions during the official examinations of women.)

(No. 43.) An outbreak of typhoid fever among school children. Tischler. (The public schools at Deggendorf are attended by 1009 children. About 200 of the poorer children are given their lunch at a soup-house established for the purpose. Two of these children were taken sick, and stayed at home, and about ten days later fifty of the others were also affected, the sickness proving to be typhoid fever in all. The children lived in different parts of town, with scarcely any communication between the families. The disease was fatal in two instances. The total number of children affected was 61, while only 43 adults in town and 31 in the adjoining country were affected during the same winter. No children were affected except those who had eaten at the soup-house. A very few scattered cases of typhoid generally occur every year at Deggendorf.)

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THE ADMINISTRATIVE CONTROL OF FOOD.*

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"Wherefore it appears to me necessary to every physician to be skilled in nature, and to strive to know, if he would wish to perform his duties, what man is in relation to the articles of food and drink."—*Hippocrates*, 460 B.C.

THE reasons for the administrative control and inspection of food are three. First, it is necessary to maintain a standard of food of the proper nature and quality. The Sale of Food and Drugs Act, 1875, lays down in Section 6 that "no person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance, and quality of the article demanded by such purchaser." This broad standard is obviously reasonable in its application to all food. It has been held that in order to show that an article was sold to the prejudice of the purchaser, it is not necessary to prove that he has sustained actual prejudice and damage. The "prejudice" is that which the customer suffers who pays for one thing and gets another of inferior quality. The legal injury is that he has been sold a food of quality or substance which he did not demand, and of which notice was not given to him.

Secondly, it is necessary to protect the consumer from eating food which has in it the potentiality to produce disease. This is the popular reason usually furnished for food inspection, and there is, it must be admitted, a large body of evidence in its support. Since the occurrence of the "Welbeck Disease," in June, 1880, there have been not less than 50 somewhat similar epidemics of "ptomaine-poisoning"

* Read at the Annual Meeting of the Society of Medical Officers of Health, October 12th, 1906.

shown to be due to infection through such food as pork pies, boiled hams, tinned meats, etc. The outbreak at Mansfield, in 1896, affected 265 persons; and that at Derby, in 1902, 220 persons. Nor is it alone in epidemic form that "food-poisoning" makes its appearance. Every year the bills of mortality tell a story of deaths from such causes. Milk-borne infection has also impressed the public mind, and more than justified stringent control of the milk supply. Since 1857 not less than 350 epidemics of typhoid, diphtheria, scarlet fever, and sore throat have been recorded as due to milk-borne infection, and this does not include any reference to milk-borne tuberculosis, epidemic diarrhoea, or sporadic disease of one form or another. Typhoid fever has been shown to be communicable by consumption of infected oysters, and other shell-fish have from time to time caused epidemics or individual cases of gastro-intestinal irritation or typhoid fever. Without entering into the question of the transmission of tuberculosis to man by the consumption of tuberculous meat, it is clear that meat so diseased is unwholesome; and as a considerable percentage (10-20) of bovine animals suffer from this disease, it is imperative that as a result of inspection and control such diseased meat should be excluded from the market. And to tuberculosis must be added other diseases, such as anthrax, glanders, swine fever, and the meat of "croakers" and other animals not in health at the time of slaughter. Further, there is unsoundness and unfitness of meat in various forms and preparations, not specifically diseased, but which, owing to unfavourable external conditions, has become more or less tainted or decomposed. To eliminate all such unwholesome foods from the market is one of the main objects of food inspection.

Thirdly, it is essential to a healthy physical life that the food consumed should be both nutritious and palatable. The be-all and end-all of administrative control and inspection is to secure for the community a *pure food supply* and one of high nutritive value, and its contribution in this direction has, without doubt, been very considerable, not only in its influence upon the food industry, but educationally upon the public taste and standard of suitability of food. It cannot, I think, be doubted that a system of vigilant inspection and control raises and maintains the nutritive value of many kinds of food, for example, milk, which without control might be watered down even more than at present; or prepared foods, which without inspection might be composed of even less nourishing constituents than is now the case. Indeed there is evidence to show that even in some kinds of butchers' meat there is still room for a

higher standard of quality than now obtains. In view of the increase in the sale of artificial foods and the enormous growth of the towns, this issue of a pure food supply possesses added interest. It is indeed a question of national importance.

These being the reasons which make administrative control necessary, we may now turn to consider the form that such control should take, and for convenience the foods requiring inspection may be grouped under the three headings of Meat, Tinned and Prepared Foods, and Miscellaneous Foods. It should be added that the question of administrative action under the Sale of Food and Drugs Acts is not considered in the present paper.

I.—MEAT.

1. First and foremost comes vigilant and skilled inspection. This has for its object the maintenance of a high standard of market meat and the exclusion of diseased and unsound meat. It should be of two kinds. First, an inspection at the time of slaughter for the purpose of detecting disease, and, secondly, an inspection of meat deposited or exposed for sale, for the purpose of detecting unsoundness or decomposition. The former method is practicable only in public slaughter-houses, and its chief advantage is that it furnishes an occasion for inspection of the animal while alive, and an examination after slaughter of the whole carcase and all the organs. Any inspection short of this cannot be considered as complete. The latter method is concerned only with the dressed carcase, and therefore the examiner for disease is heavily handicapped, though he may, by careful administration, exclude some unsound or decomposed meat. It is this second or "detective" method which is the one generally in vogue in England.

In relation to the question of inspection, there are two matters which seem to require consideration, namely, (i) the qualification of meat inspectors and (ii) uniformity in method of procedure. In reference to the qualification, I agree with the following requirements suggested by Dr. Collingridge:—

- (a) Practical training as a butcher.
- (b) A fair standard of general education.
- (c) Sanitary Inspector's certificate of the Sanitary Inspectors' Board or the Royal Sanitary Institute.
- (d) The meat certificate of the Royal Sanitary Institute.

Dr. Collingridge recommends the selection of "young men of good education and a sound knowledge of the trade" as assistants on probation, who during their probationary training should be required

to obtain the above-mentioned certificates, after which they might be appointed as meat inspectors on full pay. I think that inspectors appointed for the special purposes of meat work should have had a training as practical butchers. More debatable seems to me to be the qualification as regards food inspection of the ordinary inspector. The present arrangements are not satisfactory. Either there should be instituted a special class of "food inspectors," who should be qualified, properly and specially, and who should undertake all the food work of a district; or, every sanitary inspector working under Article 19 of the Sanitary Officers' (London) Order, 1891 (Section vi.), or who, working outside London, is required to include any form or degree of food inspection within his duties, should be specially qualified in food inspection. On the whole, I think that from an administrative point of view the latter is preferable. If the former proposal, that of "food inspectors," is adopted, it might be possible either to exempt such candidates from some part of the ordinary inspector's training, or furnish an honours standard for food.

At present there is still some lack of uniformity in procedure, not only in respect of disease, but in respect also of administrative methods. Most of the divergence as to disease relates to tuberculosis, though why it should do so is not very clear. The recommendations of the Royal Commission on Tuberculosis, 1898, were surely fairly explicit, and have received the official authority of the Local Government Board in their Circular Letters of 1899 and 1901 addressed to all urban and rural sanitary authorities. "The Board are desirous of impressing upon the local authorities concerned that pending the investigations and report of the Royal Commission there should be no relaxation on their part, or on that of their officers, in the taking of proper measures for dealing with milk from tuberculous cows and with tuberculous meat which may be intended for the food of man. *It is, in the opinion of the Board, of much importance that these measures should continue to be taken, and they rely on this being done.*" Until that standard is modified it should be, broadly, the rule of practice. As far as cattle are concerned, comparatively little difficulty has arisen, but in the case of pig tuberculosis it has been otherwise. This has been mainly due to three circumstances: (a) divergence of opinion as to the importance of seizure for localized tuberculosis; (b) the difficulty of diagnosis of glandular affections of the pig; and (c) the practice adopted by some butchers or salesmen of removing the glands in the neck. The Royal Commission of 1898 recommended that "in view of the greater tendency to generalization of tuberculosis in the pig, we

consider that the presence of tubercular deposit *in any degree* should involve seizure of the whole carcase and of the organs." This, it is clear, was the only safe course, in view of the rapidity of local spread of tuberculosis in the pig. But it is not a course always easy of adoption. At the Metropolitan Cattle Market at Islington, for instance, the veterinary inspectors do not strictly adopt this recommendation. Mr. James King, M.R.C.V.S., the Superintendent, in a letter to the City Corporation, dated June 26th, 1906, writes as follows: "With reference to tuberculosis in pigs the inspection at this market is carried out in accordance with the recommendations of the Royal Commission, 1898, although I consider that we are not justified in confiscating all carcasses that show a minimum amount of localized disease. I am also doubtful as to whether certain conditions as are found in the glands of the throat of pigs are caused by the tubercular bacillus, and I think that the time has now arrived for more accurate enquiry into these lesions than has hitherto been made. Notwithstanding these doubts, it is my practice at this market to condemn all pigs with undoubted tubercular lesions."* In slaughterhouses and butchers' shops in Manchester, Glasgow, Birmingham, Halifax, and some other towns, discretion as to condemnation is also used in pig tuberculosis much as in bovine tuberculosis. In the Central Meat Markets of the Corporation and in the extra-Corporation Markets in Finsbury, however, the instructions of the Board are followed. It is unnecessary to add that in following this rule we are guided by common-sense practice, and only seize pork which is undoubtedly tubercular. For the proper protection of the trade it would seem absolutely essential that there should be as little difference as possible as to standard of seizure, however reasonable some compromise may seem to be, especially in view of the comparatively small degree of communicability of tubercle to man by meat affected with "localized" tuberculosis. In this matter we must await the report of the Royal Commission now sitting, and the sooner such report is issued the better.†

The second cause of difficulty is akin to the first, namely, as to the etiology and significance of glandular affections in the pig simulating tuberculosis. This is referred to in Mr. King's letter, and is a matter of considerable pathological interest.

* Report to the Sanitary Committee of Corporation of London, June 28th, 1906, pp. 6, 7.

† Much valuable information on this question of pig tuberculosis and the methods of inspection adopted in respect of it will be found in Dr. G. S. Buchanan's Report to the Local Government Board, No. 225, 1906.

On January 13th, my meat inspector confiscated in Finsbury a carcass of pork in seven pieces, which was a foreign pig diseased with a glandular affection simulating tuberculosis, and appearing indeed from naked-eye examination to be identical with that disease. On examining the right pharyngeal gland, which was much enlarged, however, I found characters to be present in section which did *not* appear to be ordinary tuberculosis, the new inflammatory tissue of the gland being organized and of a markedly fibroid character. No action was taken against the vendor of this meat. On January 29th and February 14th, other specimens were met with in English pigs, and in each of these cases portions of the affected glands and organs were sent to Mr. Foulerton for bacteriological examination at the Middlesex Hospital. In due course he reported that the specimens sent had been carefully examined by microscopic and other methods. Sixteen animals had also been infected experimentally with material from the two cases, and the result had been to demonstrate conclusively that one of the pigs was not suffering from tuberculosis, but from one of those other diseases which have been termed "pseudo-tuberculosis." The other carcass was characterized by mixed infection.

Now, the carcasses from which the glands referred to were removed were those of English pigs, which were slaughtered in London, and confiscated because they appeared to butchers and inspectors to be tuberculous. The age of the animals would be about four months. The carcasses were in fair condition, and not emaciated. The whole of the glands, but more especially the pharyngeal, lumbar, and inguinal, were greatly enlarged and indurated, and, to the naked eye, were in a condition much resembling tuberculosis, indeed, apparently identical with it. There were no nodules on the parietal pleura or peritoneum. The lungs, livers, and spleens were studded with greyish-yellow nodules resembling tubercles. The mesenteric glands were much enlarged and were also in a condition resembling tuberculosis. There has been a considerable number of similarly diseased pigs slaughtered in London within the last year, and sometimes these pigs have been met with in groups, so to speak, in epidemic numbers. Some well-qualified meat inspectors were of opinion that the disease was ordinary tuberculosis. The disease has usually been found in young animals only. This experience is interesting, and not without its importance in the administration of meat inspection. It is one of those matters concerning tuberculosis in pigs upon which we may hope for some light from the forthcoming Report of the Royal Commission on Tuberculosis.

There is yet a third cause of difficulty, and this arises in connection with the "stripping" of carcasses and removal of glands. As the Royal Commission pointed out, it is impossible to diagnose the condition of a stripped carcass, and all such treatment should be looked upon with suspicion, and should disqualify meat for receiving any inspection mark of good quality.

There remains, unfortunately, a great lack of uniformity in administration—a condition of things which is described by the Royal Commission as "chaos."* In one district there is a meat inspector, in another there is not; in one district one method of practice obtains, in another quite a different method, or no method at all. Surely this is very unfair and inequitable to an important industry. As far as possible we should aim at uniformity of practice. All considerable meat markets should have properly qualified meat inspectors, and all food inspectors, and general inspectors including food inspection in their duties, should not only be similarly and adequately qualified, but should adopt similar methods. Briefly, I suggest our practice should be as follows: Section 47 (8) of the Public Health (London) Act, 1891, should govern the general practice of accepting "surrendered" meat found to be unsound, unwholesome, or unfit for food of man, and Section 47 (i) should govern "seizure." As soon after seizure by the inspector as practicable, diseased meat should be carefully examined by the Medical Officer of Health, and full notes as to its pathological condition taken by him at the time of his examination.† After this it should always be made convenient for the vendor to see the meat, or have an expert to see it on his behalf, if he so desires; and this should be done *before* the meat is submitted to the magistrate for condemnation. It is undesirable that any diseased meat should be seized without medical examination, and it is unfair to the trade that such meat should be condemned or destroyed before the vendor has had ample and reasonable opportunity of having the meat examined on his behalf.

2. To make thorough inspection practicable, the establishment of public slaughterhouses is necessary, and the gradual extinction of private slaughterhouses in the terms of Recommendation A of the Report of the Royal Commission of 1898. In the same year this

* The Select Committee of the House of Commons, dealing with the Tuberculosis (Animals) Compensation Bill in 1904, found these chaotic conditions one of the difficulties in the way of general adoption of mutual insurance.

† This examination should include (a) the carcass; (b) the organs, if available; (c) the mode of dressing; and (d) external circumstances, such as price, exposure for sale, home or foreign meat, etc.

requirement was urged in a special Report by Sir Shirley Murphy to the London County Council.* He also recommended more thorough inspection, accompanied by marking, and the provision in London of a small number of meat inspection stations for the examination, by properly qualified officers, of meat sent up from the country or imported, so that some control would be obtained over the character of foreign meat and some check on foreign inspection. In this way it was proposed to secure that all meat reaching the London public should have passed inspection. It seems to me a matter for regret that this proposal again failed to receive the consideration of the London County Council in July last. I think it is possible that in the country generally in the progress of reform towards public slaughterhouses, and so long as private slaughterhouses exist, meat inspection stations are also necessary. Such places may always be necessary as clearing houses for imported meat,† though they were first proposed as a provisional measure in the Metropolis. In the country, too, it would be well to possess powers for closing private slaughterhouses, if within a given area provision was made for equivalent accommodation at a public slaughterhouse (as in Scotland) and for the licensing of slaughtermen.

3. Thirdly, a rigid system of marking and stamping all inspected meat, home or foreign, which is fit for consumption, is necessary. This will not absolve Sanitary Authorities from supervision in retail shops or of imported meat. It would be an excellent thing if the City Corporation Authorities could see their way to lead in this matter by marking all carcasses which have passed inspection at their new public slaughterhouse at Islington.

4. Lastly, we come to the urgent question of imported meat. Dr. Collingridge has shown that during the last ten years (1896-1905) the home supply of meat has suffered severely by foreign and colonial competition. The sources of origin of meat delivered at the Corporation Markets during this decennium may be stated as follows :—

Home Killed (Country) ..	Decrease from 30·8 to 18·2 % of total
Home Killed (Town) ..	20·4 to 3·6 % "
Foreign Killed (including General Foreign Meat and Produce) ..	Increase from 11·2 to 12·7 % of total.
American ..	20·1 to 42·2 % "
Australian & New Zealand ..	17·5 to 23·3 % "

* Appendix to *Annual Report* for 1898.

† See German Meat Inspection Act, 1900, Section 5.

In 1905 the total amount of meat delivered at the Central Markets was 415,296 tons, of which 324,860 tons, or 78·3 per cent, was of colonial and foreign origin. Owing to this increase in the extent of the gathering ground, there has been an increase of damage due to transit, and hence out of the total amount 2,128 tons, or 512 per cent, has been seized as unsound and unfit for food of man. This is more than double the percentage of meat seized in 1891-1900. But it is not only decomposed meat which is involved. Much imported meat is actually diseased, and especially does this apply to offal and veal, even when it is received from countries such as Holland, where more or less inspection takes place. For instance, from 1901-05 in Finsbury, in addition to a large quantity of damaged and decomposed veal and offal, we confiscated 213 carcasses of veal, 150 carcasses of pork, and 40,486 sheeps' and pigs' plucks, all of which were diseased, and none of which bore evidence of inspection.*

Further, the wide area from which our meat supply is now derived has led to an enormous increase in frozen meat on the English market. The import trade of frozen carcasses of sheep and lambs commenced in 1880 with a small consignment (400) from Australia, followed in 1882 by carcasses from New Zealand and in 1883 from Argentine. New Zealand at once assumed the lead in the frozen meat export trade, and has maintained its position. It now sends to this country four million carcasses a year, the River Plate region sending three millions.

The increased importation of meat, including animals for food, may be stated also by showing the quantity imported per head of the population since 1870,† as follows :—

	Imported Meat per head of population in lbs.
1870-82	14·6
1880-82	30·2
1890-92	41·4
1900-02	56·6

This marked increase is due in part to a decline in the home production, but also in part to an increase of meat consumption. The English working-man is, relatively speaking, a large meat eater, and, as a rule, the more wages he gets the greater quantity of meat he

* In one crate of calves, containing 30 carcasses, 29 were labelled and were good, one was unlabelled and diseased.

† British and Foreign Trade and Industry; Board of Trade Report, Cd. 1761. (1903), p. 109.

eats, expending from 15-18 per cent of his total expenditure on meat, the largest item in his weekly budget.* He consumes more meat than French, German, or Belgian *working-men* (who respectively devote 9·8, 9·5, and 9·2 per cent of their expenditure to meat foods). The urban English workman eats more beef and mutton, and less pork and bacon, than the agricultural labourer.

These facts enable us to see the general trend respecting meat consumption in this country, and we must next consider the exact sources of the supply. The following statement shows the value and sources of the meat imported into the United Kingdom in 1902.†

From the table on page 75, we are able to see the proportion and extent of our import trade in meat, amounting in the aggregate to £39,880,000 per annum.‡

Much of this foreign meat is labelled to the effect that it has been subjected to proper inspection before export. This applies usually to meat coming from Holland, Denmark, New Zealand, Belgium, and the United States of America. With the exception of the two last-named countries, the label may be accepted generally as a fair indication of competent inspection. Possibly the new regulations, which it is said are to be introduced immediately in the United States, will rectify the matter as regards that country. The Belgian divergence from English standards is, I understand, owing to difference of view as to the importance of "localized" tuberculosis. Much of the imported meat has, however, undergone no official inspection whatever, either for disease or for fitness for export, and it must be remembered that much excellent meat is quite unfit for long-distance transit.

In view of this enormous and rapidly increasing foreign trade, the time has surely come for the exercise of some control on importation, in addition to ordinary sanitary inspection here and there. Broadly, I think that foreign meat imported into this country should be required to comply absolutely with English standards, as, for example, in respect of tuberculosis. There should also be some guarantee that the meat has passed a proper inspection; and to obtain this we need much more information than we now possess as to the system and standard of inspection adopted in other countries. Is it not possible for the Government to institute an investigation into this

* British and Foreign Trade and Industry; Board of Trade Report, Cd. 1761. (1903), p. 235.

† Ibid., pp. 114-115.

‡ This sum does not include £8,269,000 for live animals (for food) from Canada, the United States, and the Channel Islands, nor £4,106,000 for fish from across the Atlantic, from the coast of the North Sea, from Portugal, etc.

	Bacon and Ham.	Mutton.	Beef (fresh and salted).	Pork (fresh and salted).	Unenumerated Meat.	Preserved Meat.	Rabbits.	Poultry and Game.	TOTAL.
Australia ..	£ —	£ 544,000	£ 116,000	£ —	£ 5,000	£ 374,000	£ 247,000	£ 9,000	£ 1,295,000
New Zealand ..	—	3,219,000	417,000	1,000	24,000	82,000	173,000	3,000	3,919,000
Canada ..	1,623,000	—	93,000	22,000	8,000	60,000	—	12,000	1,788,000
Total from British Possessions)	1,623,000	3,763,000	596,000	23,000	37,000	516,000	420,000	24,000	7,002,000
Russia ..	91,000	—	—	—	—	5,000	—	218,000	314,000
Sweden ..	58,000	—	—	—	—	—	—	—	58,000
Denmark ..	3,754,000	19,000	271,000	103,000	89,000	—	—	2,000	4,238,900
Germany ..	9,000	2,000	—	10,000	3,000	35,000	—	24,000	83,000
Holland ..	54,000	781,000	94,000	753,000	624,000	9,000	53,000	35,000	2,403,000
Belgium ..	—	9,000	13,000	84,000	16,000	344,000	226,000	281,000	973,000
France ..	—	7,000	—	5,000	49,000	38,000	35,000	225,000	359,000
U.S.A. ..	11,861,000	60,000	5,431,000	759,000	280,000	1,464,000	—	212,000	19,847,000
Argentina ..	—	2,273,000	1,724,000	—	120,000	248,000	—	—	4,365,000
Total from Foreign Countries)	15,627,000	3,151,000	7,533,000	1,714,000	1,161,000	2,143,000	314,000	997,000	32,640,000
Grand Total Imported ...	17,286,000	6,915,000	8,149,000	1,752,000	1,199,000	2,786,000	734,000	1,059,000	39,880,000

Sums less than £1,000 not tabulated.

matter? Further, as Dr. Collingridge has suggested, no boxed, boned, or pieces of meat should be admitted if packed or prepared in such a way as to prevent inspection or the possibility of the detection of disease, or which contravene the recommendations of the Royal Commission on Tuberculosis (as no doubt a certain amount of American boxed pork does at present). Indeed, it would be better to draw a hard-and-fast line and exclude all imported dead meat (other than offal) except in carcase, and then only when properly labelled as having been adequately inspected.*

II.—TINNED OR PREPARED FOODS.

From an administrative point of view there is reason to believe that more adequate inspection of tinned meats and similar foods is urgently needed. In the first place, there is evidence of the existence of unclean and unwholesome preparation of food by no means confined to America. Even in London I have come across tuberculous pus being put into widely advertised sausages, diseased horse flesh into potted meat, and decomposing animal matter into potted salmon and shrimp. Such discoveries have recently drawn attention to the slackness and carelessness of some food manufacturers and the need for much more vigorous inspection and control. In the second place, there has been a marked increase in recent years in the quantity of this kind of prepared food which has been placed on the market. It is a noteworthy characteristic of the present customs of the people that their diet is now largely composed of prepared or semi-prepared tinned foods (including milk, meat, vegetables, fruits, soups, starch foods, tripe, etc.)

There is only one method of effective administrative control of such industries, and that is by *a system of inspection at the time of manufacture*, an inspection which should be concerned with (a) the quality and condition of the original constituents of the prepared food, (b) the manner of its preparation, and (c) the premises where it is prepared. All of these foods, whether imported or home-produced, should bear finally a distinctive mark or stamp as having been produced under conditions which have been inspected and are under supervision. This surely is the only scientific mode of control, working from the centre and the source, though it may well be supplemented, as in examination of fresh meat, by inspection at the circumference, that is, in wholesale and retail shops, on the "detective" principle. But to rely, as we are now doing, only on the latter method is hopelessly inadequate.

* See German Meat Inspection Act, 1900, Section 12.

For convenience the requirements may be expressed briefly as follows:—

1. That the name and address of the manufacturer and the date and place of canning or preparation shall be impressed upon the can or vessel containing the substance.
2. That food intended for canning or artificial preparation in any form shall be inspected at the food factory, and shall be obtained from animals which have already passed inspection. The importance of some control of this kind cannot be overestimated. For instance, Finsbury is characterized by the existence of a number of food factories and workshops, and as a result of some sort of inspection of this kind, we have confiscated considerable quantities of inferior, decomposing, or diseased meat about to be made up into sausages, potted meat, and prepared foods. During 1900-05 we also seized much of this raw material, and prosecuted in fourteen cases, obtaining £383 8s. 0d. in fines and costs, and three imprisonments.
3. That all food premises, vessels, utensils, and apparatus of any kind used in the canning or preparation process, or for storage, shall be regularly inspected, and a high standard of sanitation and cleanliness insisted upon. Of the importance of some provision of this kind there can be no doubt. Indeed, much may be said in favour of treating such food factories with certainly not less restriction or supervision than is now applied to, say, underground bakehouses under the Factory and Workshop Act, 1901, Section 101, or margarine factories (Sale of Food and Drugs Act, 1899, Section 7), or ice-cream making premises (London County Council (General) Powers Act, 1902, Part viii. Sections 42-45). If a certificate is necessary for a bakehouse as to its suitability for that purpose, "as regards construction, light, ventilation, and in all other respects," it is surely not less required for premises used in the manufacture of foods much more liable to deterioration than bread, which are not always cooked or sterilized, and which are composed of a greater variety of constituent parts. The general policy adopted in recent years of protecting the sources of bread, water, butter, and other articles, should now be applied to meat, milk, and shell-fish, and, in this, as in other respects, Sanitary Authorities should endeavour to administer uniformly.

These two provisions respecting the quality of the food and the sanitary condition of the premises, not only go to the root of the

tinned meat and similar industries, but also apply to such foods as pork pies. It will be remembered that in the Derby outbreak Professor Delépine and Dr. Howarth demonstrated that the contaminated meat in the incriminated pies had been exposed to animal pollution, owing to the premises being insanitary and unsuitable for the purpose of food preparation. Experience of such outbreaks leads to the conclusion that poisonous properties are contracted (a) by putrefaction or unsoundness in the meat or gelatine, or (b) by unclean manipulation or storage in insanitary places. In addition to such channels of infection there is, of course, in certain cases of outbreak, failure of sterilization in the cooking process.

4. That imported canned foods shall comply with provision No. 1 in this series, and shall bear a further stamp certifying that they have been produced and prepared under administrative control and inspection. Such a label would not, of course, guarantee that any particular sample had actually passed inspection, but it should serve as a guarantee that the food had been prepared in premises properly controlled. All such imported foods should comply absolutely with English standards. Unequal treatment in these matters is most unjust, and has led to difficulties where no difficulty should arise.
5. That the "detective" system of inspection, as now practised by each Local Authority through its sanitary inspectors, and also by some Port Sanitary Authorities, should be of a much more thorough character, and should be coupled with occasional sampling of such foods, and their subsequent chemical examination (possibly adopting the Board of Trade standard for shipped foods of examining not less than one per brand—which is certainly a minimum). There appears to be evidence of a good deal of laxity in this system of inspection, particularly in rural districts—but not in them alone.

Broadly, I think that these conditions would largely meet the present need, though it may be admitted that they are not sufficiently protective absolutely to guarantee high quality food only. To secure that, some central control of this food industry is necessary, power vested, say, in one Government Department, in order to obtain uniformity of standard and practice in respect of all tinned foods produced in the United Kingdom, and prescribing conditions of importation. But be that as it may, regulations framed by the Local Government Board, under the Public Health Act, 1896, as proposed

in the Public Health (Regulations as to Food) Bill, now before Parliament, are an important and necessary step in the right direction, though much would depend, of course, on the character of the Regulations and their enforcement. It is desirable that reform should proceed by gradations, should seek less to discourage than wisely to control these important industries, and should attempt to increase rather than decrease the responsibility of the trade for the production and sale of wholesome food. Many of these prepared foods are of great value in the diet of the people.

In regard both to carcase meat and to tinned meats, what is required is (i) protection for the consumer; (ii) equal treatment and a fair measure of uniform administration for the whole meat trade throughout the Kingdom, and (iii) control over foreign imported meat. It would appear that these things can be obtained only by new legislation and by administration under a central department of State. The Bill now before Parliament would enable regulations to be made which would largely meet the case and furnish powers already possessed by most, if not all, Continental governments. Not only would it then be practicable to prescribe as to imported meat, including boxed and boned, but also as to imported prepared and tinned foods in which there is necessity both to safeguard the public health and protect the interests of the home trader.

III.—MISCELLANEOUS FOODS.

Meat, in its various forms, is by no means the only food which requires more adequate inspection and control. Fish, oysters, shell-fish, ice-cream, watercress, milk, eggs, and other articles are in like manner sometimes placed on the market in unsatisfactory condition. They are not so readily inspected as meat, but they are not less important. Almost without exception, the scientific and common-sense control should be exercised from the source and in the process of storage and distribution. At present most of the control which is attempted is exercised at the wrong end, and immense labour and expense therefore secure a minimum of benefit. In some cases even the action which is taken does not touch the whole problem, as, for instance, the chemical analysis of milk under the Sale of Food and Drugs Acts, which tells us nothing of the infective properties of the article. There would seem to be ample opportunity for reform, but here we have space to mention only two illustrations—shell-fish and milk.

Many attempts have been made in recent years to obtain statutory

powers for the control of the oyster and shell-fish industry. Ten years ago the Brighton Corporation promoted a Bill giving power to prohibit the supply of oysters from infected sources, but a Parliamentary Committee refused to grant the powers. In 1897 a memorial appealing for legislation was presented to the Local Government Board from twenty-seven of the great towns, and this was supported by an influential deputation. In 1899 the Board introduced the Oysters Bill, which was so modified by a Committee of the House of Lords that the Board subsequently withdrew it.* Since that date no other Bill has been introduced, and the community is protected not so much by statute as by good fortune. What is necessary is legislation which shall require (i) that oyster and shell-fish layings shall be free from gross excretal pollution, and shall be properly supervised and inspected; (ii) that Sanitary Authorities shall have powers of control over oyster layings situated within their district, with powers of closure in the event of pollution; and (iii) that Sanitary Authorities shall be enabled to prevent the sale in their district of oysters and other shell-fish derived from sewage-contaminated sources, or evidently the origin of infection, as was proposed in the Brighton Bill. The casual inspection of shell-fish in retail shops and on stalls does not really touch the problem, though the City Authorities have by this means on more than one occasion made seizures and restricted the sale of shell-fish in their markets. The necessity for effective administrative control has been abundantly proved, and the Local Government Board has evidently accepted the findings as valid. Yet we await powers. If the trade is doing what is necessary it need not fear legislation for future protection of the consumer; if it is not doing so, legislation should be granted.

The milk supply is in much the same position. It needs control from the source, like a water supply; and the gathering ground is to be found in four million milch cows. Here also we are, in practice, attempting control at the wrong end. What is needed is (i) a veterinary and medical service inspection of all cows yielding milk, (ii) thorough sanitation and cleanliness in cowsheds and dairies, and (iii) the annual licensing of all milk-sellers. These and many other reforms could be obtained with comparatively slight amendment of the law,† and indeed the entire problem would assume very different proportions if the present Dairy Order was only properly and uniformly enforced, and Regulations under Section 13 made compulsory instead of remaining permissive.

* *Brit. Med. Jour.*, 1903, ii, 295-297 (Dr. Newsholme).

† *Bacteriology of Milk*, 1903, pp. 471, 472; and also pp. 472-5

It is really astonishing that so little is attempted for the protection of the consumer on the one hand and the trade on the other, and that the dairy industry is allowed to emigrate to the Colonies, or achieve "national" success only in Denmark. As I pointed out in 1904, in the United Kingdom in 1901 there were 4,102,000 milch cows. If we take the generally accepted figure of 2 per cent as having tuberculous udders, it gives us 80,000. The average annual yield of milk per cow may be taken as, at least, 400 gallons, which means that from these 80,000 tuberculous udders 32,000,000 gallons of milk are obtained, the bulk of which, I submit, is open to grave suspicion, if not absolute condemnation.* Such figures have, of course, only relative value but they express in concrete form what is an indisputable fact, that many millions of gallons of milk are put on the market every year in a condition unfit for consumption. Nor is the other issue less surprising, namely, that we allow a magnificent industry, and one which might be of greatest value to the physical and material well-being of the people, to pass out of our hands for the lack of a little co-operation and a common-sense administrative control. We accept instead an importation of 20,000 cwt. of condensed milk per week, and a total dairy import valued at £31,000,000 per annum.

I submit that a consideration of the present position of administrative control of food in the United Kingdom leads to the conclusion that much remains to be done, not alone in the interests of public health but also in the best interests of the great food industries involved, and that the main principle to be adopted is *control at the source*.

DISCUSSION.

DR. COLLINGRIDGE proposed a vote of thanks to Dr. Newman. He said his paper was, without exception, one of the most valuable that had come before the Society. It was practical, and dealt with a question which at all times was of great importance to the community, but which was now especially before the public. For practically the first time, Dr. Newman had brought prominently before the Society the important question of the value of the inspection of the food-supply from the point of view of nutrition. It was constantly brought forward as an objection to the inspection of meat, and its subsequent seizure and condemnation, that that was only dealing with the conveyance of such infection. There was very little evidence of the actual conveyance of infection. That was undoubtedly proved, and the public had exaggerated ideas of infection so far as the conveyance of specific disease was concerned. Sufficient attention, however, had not been paid to the enormous importance of food inspection from the point of view of nutrition, and

* *Bacteriology and the Public Health*, p. 204; also *Brit. Med. Jour.* August 7, 1904.

the keeping up of the stamina of the people. That applied not only to meat, but to the milk-supply and every other kind of food. Another point to which he would like to refer was the difficulty of getting trained inspectors. That was largely brought about by the same causes as those affecting Medical Officers of Health, viz., the insufficiency of the inducements held out to men to adopt such a career. The pay of meat inspectors was far lower than it should be for men who had such responsible duties. Dr. Newman had dealt at some length with the lack of uniformity. He (Dr. Collingridge) could not help thinking that lack of uniformity in meat inspection—except so far as it applied to lack of uniformity due to inefficiency—was somewhat of a bugbear. At the present time, indeed, it was an absolute bogey. If there was absence of uniformity in the standard, it was very difficult to understand why it should exist. The recommendations of the original Royal Commission, confirmed by two subsequent Commissions, were still before the public, and were still the recommendations officially adopted by the Local Government Board, and urged upon local authorities as a standard. Whether from questions of trade interest or, as was unhappily the case sometimes, of municipal feeling, no authority had the slightest right to interfere with those recommendations. They were to be accepted as the standard for the time being. One question which was always cropping up was the removal of glands. Only the previous day he saw a report that in something like 40 per cent of cases, pigs carrying in their throat glands extensively diseased, showed no disease in other parts of the body. Assuming that to be true, it was obvious that if the glands were removed no meat inspector could possibly deal with the carcase on the lines of what was called in Dr. Newman's paper the detective system. With regard to the marking of foreign meat, it had been shown clearly in some cases where carcasses of meat were found to be extensively diseased on arrival here, that the animals had been rejected on the other side. It was the practice for a man to get a healthy carcase labelled, and then transfer the label to a diseased carcase. Unless that were borne in mind injustice might be done to Holland. He believed there was a Bill before the Netherlands Parliament now, to make the inspection of all meat compulsory. He had been reading the resolutions passed with reference to tinned meat, and must say that they were exceedingly interesting, while the suggestion that the sale of unsound meat should be made a legal offence was, in his opinion, most important.

PROFESSOR KENWOOD said he should like to join Dr. Collingridge in his appreciation of Dr. Newman's exceedingly good and practical paper, which was full of good suggestions. He would confine himself to asking Dr. Newman a question with regard to his remark that the milk trade had achieved national success only in Denmark. Three years ago he (Prof. Kenwood) combined business with pleasure, and visited Denmark, where he made himself familiar with the milk-supply. He agreed that on the whole it was a bit better than it was in England, but not very much. He wanted to know whether Dr. Newman, in his statement that the milk-supply in Denmark had reached such a great pitch of perfection, was a danger of their taking the wrong attitude with regard to sterilized milk. The medical profession generally was at war with sterilized milk, and seemed to have got it into their heads that it was likely to cause scurvy in children. They blinded themselves to the fact that if they

had raw milk they ran a great risk and, in fact, were bound to have an enormous amount of suffering and death from diseases carried by milk. The question was whether, in order to save the very few cases of scurvy which ever occurred as the result of drinking sterilized milk, they were going to preach against its use. Where go-ahead and enlightened companies were taking every precaution, the milk was tabooed by the attitude of the general practitioner, and very often by the Medical Officer of Health himself.

DR. CALDWELL SMITH, dealing with Dr. Newman's remarks about oysters and shell-fish generally, said he recently had experience of a small outbreak of enteric, in which it was clearly shown that the shell-fish were at fault. They were traced to a small Scotch loch, where the sewage from a public asylum came right on to the foreshore. Glasgow people would not have these shell-fish, and so, forsooth, they sent them to London. There was not the slightest doubt that in this matter legislation was required.

SIR SHIRLEY MURPHY said he considered the paper especially sound in the argument that they must go to the origin if they wanted to control the food-supply. They must go to the place where the animal was killed, have it inspected at that time, and have the healthiness of the animal vouched by the stamping of the public authority. That was always opposed by butchers—an attitude which one could understand; but it seemed to him that when agriculturists also opposed it, they were adopting a most shortsighted policy. If they had public slaughter-houses it would be open for English cattle-dealers to send their animals there to be killed, and stamped, and vouched for by the sanitary authority, and the carcasses would then come before the public as English-grown and English-killed meat. It was the one system which would preserve the identification of home-grown meat. The question of controlling foreign meat-supplies was exceedingly difficult, and involved a system of inspection instituted by the country where the animals were killed, but he hoped the Government would insist on that some day.

DR. WALFORD said he would like to ask Dr. Newman a question with reference to the qualifications he considered necessary for a meat inspector. He had rather severely left alone the qualification of a veterinary surgeon. He would like to have the advantage of Dr. Newman's opinion as to whether or not it was desirable that a veterinary surgeon should be appointed as meat inspector. In Cardiff—one of the very few places fortunate enough to have all slaughtering done at public slaughter-houses—they had at the head of their staff of inspectors a veterinary surgeon, who was chief meat inspector under the Medical Officer of Health. He (Dr. Walford) had found it a great advantage to have a veterinary surgeon as chief inspector. His appointment was thoroughly appreciated by the butchers, and in fact their Association asked for his appointment. Dr. Newman had justly said that the detective system in many localities should be of a much more thorough character. Speaking in an apologetic manner for the shortcomings of Port Sanitary Authorities, he might point out that they were rather at a disadvantage. Their districts were usually entirely on the water, with no butchers' shops, and when carcasses simply formed the cargo of a ship they could not be seized as exposed for sale and intended for the food of man, under Sections 116 and 117 of the Public Health Act.

DR. NASH said he noticed that Dr. Newman suggested that it was necessary that legislation should be obtained requiring shell-fish layings to be properly supervised and inspected, and free from excretal pollution. That would be a difficult matter round the coast of England. There was hardly any point which did not show some kind of pollution. The point was, how far from a sewer outfall was a safe distance. He had already expressed the opinion that the distance should be at least a mile. They could not lay down a rule that the laying should be absolutely free. That was the ideal, but it was quite impracticable.

DR. BUTLER said the temptation was always to treat the subject under discussion as a mere branch of the Food and Drugs Act, and the fact that Dr. Newman had dealt with food inspection in its entirety was very greatly to his credit. The importance of the subject was one which every Medical Officer of Health constantly felt. Year after year they were presented with a big death roll from zymotic enteritis. That showed the great importance of the inspection of the milk-supply. Every year also most Medical Officers of Health came across cases of enteric fever, more or less distinctly traceable to infected shell-fish. It was certainly a very serious matter that year after year they should get serious outbreaks of enteric fever due to infected shell-fish, which at present underwent no supervision. Then, too, there was also a certain number of deaths ascribed to ptomaine poisoning, which could not occur if the food-supply were properly inspected and controlled. He had tried in his district to arrive at the causes of ptomaine poisoning by making it a notifiable disease. His Council were willing to adopt that course, but the Local Government Board would not consent. The question of inspection largely resolved itself into control over the slaughtering of animals, and they must feel how hopeless it was to pick out diseased meat even. Without a far more extensive system of inspection than at present it was not possible to eliminate the bad food that found its way into the retail market. If they were to control the food-supply they must have public abattoirs. The most rigid detective system would inevitably fail to protect the public.

DR. BOND said public slaughter-houses would be not only an advantage to the consumer, but also to the butcher and home producer. On that point he wished to emphasize the remarks made by Sir Shirley Murphy. He agreed with Professor Kenwood as to the sterilization of milk. They ought to have a proper estimate of proportion. A very small number of deaths was registered from scurvy, but an enormous number occurred from infantile diarrhoea.

DR. RIDEAL said he took it that Dr. Newman wished all food to be so rigidly inspected and controlled at the source of supply that food should be on the same footing as they had tried to put the water-supply. The water-supply problem was one which had engaged attention for many years, and they had not yet succeeded in getting the water-supply to the pure stage they would like. Yet they had that night a suggestion that they should apply the methods of protection of gathering grounds to the meat-supply. They had found that in the protection of the gathering grounds for water, and in the inspection of cows and dairies, the system broke down, and neither the water-supply nor the milk-supply was pure when it reached the consumer. He did not see that it was necessary to apply the same doctrine to things which were going to be sterilized by the consumer. It was, he thought, carrying the idea of

the protection of gathering grounds much too far. The expense would be enormous, and it would be far cheaper for the community to ignore the chance pollution of gathering grounds of food, when it could be rectified by the consumer if he were taught the necessity of the sterilization of all food before consumption. Thus they would get rid of bacterial infection, which might be introduced however efficient they made the protection of the source of supply. He did not himself believe that there had been so many cases of ptomaine poisoning as was suggested. The quantity of food consumed was so small in proportion to body weight, that it was impossible to credit ptomaine poisoning as accounting for the epidemics reported. On examination one found that the majority of cases were due to bacterial infection instead of ptomaine, and the chances were that the infection took place in the consumer's own house. He quite agreed that it was important to see that there was a good food-supply, but it was essential that the consumer should be warned that the danger was likely to arise in his own house, and was not always the fault of the producer.

DR. FREMANTLE said control of the source of supply was theoretically an excellent thing. There was, however, the constant trouble that while London wished to protect its food-supply, and therefore wanted to see the supply in Hertfordshire, that county, being conservative, did not want to be invaded by London. On the other hand, if the work were left to the people of Hertfordshire, they must have a very large staff to control the source of supply. That meant that they would have to incur a large expense in order to purify London's food. He would like to point out one difficulty which was met in Hertfordshire, and that was with regard to watercress. He had tried to inspect the watercress beds, but found that he had no power to do so, and that he was a trespasser.

The PRESIDENT said he had been much interested in Dr. Newman's paper and the excellent discussion. He did not wish to take sides, but he must say it seemed to him that inspection at the source of supply as advocated by Dr. Newman was what they should all aim at. It would be a great pity if they allowed themselves to go to sleep until the supplies came in, and then by cooking and other means try to destroy the harm which might be caused.

DR. NEWMAN, in replying on the discussion, said he agreed with Prof. Kenwood's remarks about sterilized milk. They could not, under present circumstances, in large towns and cities condemn sterilized milk wholesale. It was not the best thing, but it was very much better than other milk in large areas. With regard to Denmark, he meant to say that the people of that country had taken much more interest in the dairy trade than other people. It was true that even there practice did not come up to precept, but, on the whole, the dairy trade in Denmark was much more of a national concern than in England. As to Dr. Walford's remarks, he thought there could be no doubt that it was a great advantage to have a veterinary surgeon as meat inspector, if he also had practical experience as a butcher. He would sooner have an expert butcher as inspector than a veterinary surgeon who had had no experience of the butcher's trade. The value of a veterinary surgeon was chiefly in cases where live stock had to be examined. Dr. Nash was correct in his remarks about the pollution of shell-fish layings. He ought to have put in his paper gross excretal pollution. He was not sure whether Dr. Rideal's remarks were not sarcastic. He was asked to open the

discussion, not on the duties of individual citizens, but on public administration, though he agreed that it was most important that people should cook their food more than they did. Dr. Fremantle's speech raised a very difficult question, but his own idea was that the responsibility of controlling the source of supply should be on the local authority.

THE VALUE OF CORRECT DEATH CERTIFICATES IN STATISTICS.—Dr. John S. Fulton, Secretary, State Board of Health, Michigan, says it is difficult to bring medical men to realize the unreliability of the data which they themselves supply. All mortality statistics are based on the death certificate, and non-medical statisticians generally regard the death certificate with an appreciation of its utility as a contribution to vital statistics.

THE SOURCES OF GOVERNMENT VACCINE LYMPH.—In reply to a letter from Sir William Collins, asking for information as to the original sources of the vaccine lymph now in use, Mr. Burns wrote, on July 13th :—"In view of the Act of 1898, and of the adoption by the Government of glycerinated calf lymph for all public vaccinations, the Local Government Board made an entirely new departure as regards the source of vaccine lymph. Dr. Blaxall, the newly-appointed Director of the Board's Glycerinated Lymph Establishment, obtained as stock for starting his series of calf-to-calf vaccinations lymph from Cologne. This lymph, which had been long in use there, and had originally been obtained, it was believed, by vaccinating calves from the arms of infants, has continued to be employed in the vaccination of calves at Lamb's Conduit Street to the present day. Side by side, however, with this calf-to-calf lymph of Cologne pedigree, other lymph has from time to time been taken into use at the Board's establishment. This other lymph has been partly retro-vaccinated Cologne lymph, i.e., lymph passed from the English infant back to the calf (after glycerination), to the infant again, and partly it has been lymph newly obtained from Continental stations, and passed through a series of calves before adoption for use in the Board's establishment." Sir William Collins pointed out that this information did not reveal the original sources of the vaccine lymph brought from Cologne, or the nature of the disease from which the strain was originally derived. He added :—"Is it really not possible to say whether the lymph supplied by the National Vaccine Establishment was derived originally from the small-pox of man, the pox of the horse, or from an eruption on the teats of a cow, and if the latter, whether it was the true or spurious cow-pox?" Mr. Burns replied, "As to the remote ancestry of the Cologne lymph, whether it was derived from casual cow-pox or induced cow-pox, we do not know. The Department were satisfied, when it was adopted, that it was producing and had long been producing in calves what the German experts regarded as characteristic vaccinia, and that lymph transmitted from such calves to babies protected them against small-pox." Sir William Collins wrote, on July 28th, expressing regret that the Local Government Board could not give any information as to the original sources of the lymph supplied by the National Vaccine Establishment, and asking for the evidence on which the Department were satisfied as to the character of the Cologne stock. To this letter no reply has been received.

ORGANIZED MEDICAL INSPECTION OF SCHOOLS.*

By H. MEREDITH RICHARDS, M.D.,

Medical Officer of Health County Borough of Croydon; Medical Adviser Croydon Education Committee; President Home Counties Branch.

IN a paper read before the Society of Medical Officers of Health in 1902, I pointed out how frequently educational authorities were in need of medical advice, and suggested that the fusion of educational and sanitary authorities offered an unique opportunity for meeting these needs, and at the same time extending the practical applications of preventive medicine. Though there was some slight difference of opinion as to detail, it was agreed, *inter alia*,

1. That the hygienic control of public elementary and of other public schools should devolve on the Medical Officer of Health.
2. That the Medical Officer of Health, or a medical practitioner acting under him, should be given legal power to examine scholars.
3. That schools claiming grants should be required to produce a detailed report from the Medical Officer of Health as to their sanitary condition, on a form to be approved.
4. That the Medical Officer of Health should be required to record the action taken by his department in regard to schools, and to forward annually to the Board of Education such portions of his report as relate to this subject.

Representations to this effect were made to the Government Departments concerned, but did not meet with any great amount of sympathy at headquarters. Neither the Central Authorities nor Education Committees were aware of the vast amount of medical work which required to be done, and the physical needs of the scholars were obscured by the dust and din of party politics.

During the last four years, however, much water has flowed under Westminster Bridge, and the reiterated appeals of our Society, of the Sanitary Institute, of the British Medical Association, and of the National League for Physical Education, have all assisted in educating both public opinion and our legislators. How complete that process of education has been may be judged from the fact that when the Education Bill of 1906 was in Committee, Mr. Tennant's amendment in favour of compulsory medical inspection of children attending elementary schools received enthusiastic support from both sides

* Presidential Address.

of the House, which unanimously accepted the following clause in the Bill as it left the House of Commons.

EDUCATION (ENGLAND AND WALES) ACT, 1906.

Section 24.—The powers and duties of a Local Education Authority under Part III. of the Education Act, 1902, shall include—

(b) The duty to provide for the medical inspection of children before or at the time of their admission to a public elementary school, and on such other occasions as the Board of Education direct, and the power to make such arrangements as may be sanctioned by the Board of Education for attending to the health and physical condition of the children educated in public elementary schools.

Before discussing the general result of this enactment, it is necessary to make one verbal criticism. As drafted, the Clause requires that every child must be medically inspected "before or at the time of their admission to a public elementary school." Now, any such requirement would be found unworkable. In Croydon (population 150,000) we have some 32 schools comprising 90 departments, and children are being admitted to these departments at each of the ten sessions which comprise the school week. Obviously it would be impossible for the Medical Inspector to be present twice a day at each school, and it would be equally impracticable to require parents to present their children for medical inspection at some central station *before* admission. Obviously, therefore, "or" should be substituted for the first "and" in sub-section (b).

I will refer now to a more debatable point. It would seem from the text of the sub-section, and from the discussion in the House of Commons, that some Members of Parliament, and possibly the Minister of Education, consider that medical inspection should, in the main, be of the nature of an anthropometric survey, whereby the physical improvement or degeneration of the race might be gauged and, to quote Mr. Balfour, "form a scientific basis for future conclusions as to the effect of our social system—educational, sanitary, housing—upon the fortunes of our population." Now, there are several weighty objections to this view. In the first place, the necessary physical measurements would have to be correlated with a considerable amount of other information, such as the presence or absence of deformity or of disease; the nationality and home conditions of the child. All this takes time, as those best know who have attempted such work on even a small scale. The scientific analysis of such data

is equally arduous. With sufficient skilled assistance such a physical survey is not impossible; but the same end would be served by selecting from time to time a limited number of representative children, as was done by Dr. Leslie Mackenzie and by Professor Matthew Hay for the Scotch Commission on Physical Training. Undue attention to anthropometry is also likely to divert the attention of the Medical Inspector from the more practical side of his work, on which great insistence was rightly laid by Sir William Collins. If the school doctor is to justify himself in the eyes of his local authority, he must not be a mere collector of statistics for the sociologists of the next generation, but must show that he is actually preventing disease and enabling the normal child to receive education under healthier conditions. It is not improbable that sub-section (b) of Section 24 may be amended in the way that has just been suggested, and the central authority can then direct local activity into the right channel.

The fate of the Education Bill itself is also uncertain, but judging from the unanimity of the House of Commons on this question, it may be taken for granted that the medical supervision of schools will at any rate be made compulsory in the immediate future. It is therefore opportune to consider the extent and scope of the work and the local organization which is most likely to prove efficient.

In England and Wales in 1903-4, 6,047,770 children, or about one in six of the entire population, were attending public elementary schools. It is evident, therefore, that there is an immense field for usefulness, which will demand much spade work and great powers of organization if the best results are to be obtained. Before discussing what that organization should be, we must briefly detail what the medical supervision of elementary education includes.

The Medical Officer must be prepared to advise on the following matters:—

A.—School buildings and furniture.

B.—Health of the teachers.

C.—Health of the scholars.

A.—The duties in connection with the buildings are not, in my experience, very exacting when once a survey has been made of the whole of the schools in the district. Of course there must be a gradual levelling up of the older schools, and improvements can be carried out as occasion offers; but the most pressing need is to secure cleaner rooms and a purer atmosphere. Towards this much can be done under existing conditions, if the co-operation of an enlightened and enthusiastic head teacher can be secured.

B.—Health of the Teachers.—Teachers who are absent from work on account of ill-health produce certificates from their own medical attendant, but consultations with the Education Committee's medical officer are sometimes necessary when questions of premature superannuation or prolonged leave of absence arise. On the other hand, pupil teachers and candidates take up a good deal of the Medical Officer's time at certain seasons of the year. Each candidate has usually to be thoroughly overhauled on two occasions during the period of pupilage, and this has to be done with considerable care, so as to eliminate, as far as possible, those who are unlikely to stand the strain of school work.

C.—Health of the Scholars.—The duties under this head are numerous and varied. They include not only a complete organization for the control of notifiable diseases, but advice as to communicable skin diseases and verminous conditions, from which quite half the children attending elementary schools are found to suffer. Apart from communicable diseases, advice has to be given respecting by-laws as to employment, underfeeding, defective sight, defective hearing, nasal obstruction, and mental capacity. Many children, too, have to be examined because they are thought to be too weakly to attend school, others have to be medically examined before admission into industrial schools, defective centres, or deaf classes. All this is in addition to the anthropometric survey which has already been suggested, and special research work of a physiological or psychological character. At first sight this sounds somewhat alarming, and would appear to demand from the school doctor an intimate knowledge of each and every special department in medicine and surgery. In reality, however, this is not so. Nor do I know how such an Admirable Crichton could be evolved if wanted. Besides, it cannot be too strongly insisted upon that at the present day, and probably for many years to come, it is spade work which is required in elementary schools. Communicable diseases have to be kept in check, children's heads have to be cleansed, the grosser ear and eye defects have to be relieved, before any more special work need, or indeed can be, undertaken.

This leads me to the next point for consideration :—

THE RÔLE OF THE SPECIALIST IN SCHOOL WORK.

Theoretically, every Education Authority should have at its disposal representatives of, at any rate, the chief medical and surgical specialities. In ordinary districts this is impossible. Education Authorities are

not likely to appoint more than one or two Medical Officers, and if the number is thus limited, it is obvious that they should select a man with a good all-round knowledge of his profession rather than a high-and-dry specialist. Even when specialists have been appointed for eye work, only a very limited amount, if any, "special" work has been done. In London, where many ophthalmic surgeons have been employed in the schools, eye work has been limited to the exclusion of children suffering from external diseases and to verifying the vision tests already made by the teachers. Difficult cases that required ophthalmoscopic examination or retinoscopy have invariably and rightly been referred to hospitals or private practitioners.

In my experience there is only one speciality which is absolutely essential in school work, and that is an accurate knowledge of all varieties of communicable disease and of the commoner skin diseases. When a specially difficult eye case presents itself, it is easy to refer the child to an ophthalmic surgeon, but if a case of itch or of nasal diphtheria escape recognition, or be not promptly dealt with, much harm may ensue.

Briefly, then, I would not recommend the appointment of, say, an alienist on the school staff, because one very occasionally has to deal with obscure cases of mental disease, but I would welcome some arrangement whereby the school doctor could occasionally have the advantage of a consultation without unduly trespassing on the charity of hospital staffs.

THE ORGANIZATION OF MEDICAL WORK IN SCHOOLS.

First let us consider what local organization will be required. Now, the Education Authorities in England and Wales (excluding London) are committees appointed by

The Council of every county borough.

The Council of every administrative county.

The Council of every non-county borough with a population of over 10,000.*

The Council of every urban district over 20,000 population.*

In March, 1906, there were

71	Education Committees	appointed by	County Boroughs.
63	do.	do.	Administrative Counties.
146	do.	do.	Municipal Boroughs.
55	do.	do.	Urban District Councils.

* Except that the Councils of non-county boroughs and of urban districts may relinquish their powers in favour of the Council of their administrative county.

Now, every borough and urban district, and many administrative counties, already have Medical Officers of Health, and the question at once arises whether that officer should be entrusted with the duty of organizing medical inspection, or whether Education Committees should be asked to appoint special Medical Officers for schools who would act independently of the local Medical Officer of Health. No one who has had actual experience of both Public Health administration and school work will hesitate to agree with me that the organization of medical inspection should be left to the Medical Officer of Health, and that those counties which do not already possess such an officer should be required to make good the deficiency. In Scotland such an arrangement was specifically recommended by the Royal Commission on Physical Training, and commenting thereon, Dr. Leslie Mackenzie, of the Scotch Local Government Board, says:—

“No distinction is made in the organization necessary for the supervision of schools from the Public Health standpoint and the supervision from the medical-examination standpoint. The absence of such a distinction, and the recommendations contained in paragraphs 157 to 160, seem to imply that the Commission regarded the hygienic inspection of schools as necessarily merging into the more extended individual inspection of children. This view is entirely in accord with what we have formed on other grounds. It is, in practice, impossible to draw any clearly marked line at the point where the Public Health jurisdiction should end and the general medical inspection of children should begin.”*

The Medical Officer of Health must in any case have duties to perform in connection with schools, and by the appointment of the Medical Officer of Health as Education Officer, dual control, with consequent risk of overlapping and friction, would be avoided. As far as the prevention of communicable diseases is concerned, the concentration under one head of the routine work of the Health Department, the supervision of schools, the administration of the infectious hospital, and the direction of the bacteriological laboratory must, and in my experience does, make for the maximum of efficiency.

We must remember, too, what Professor Sadler told us recently at York, namely that “at point after point purely educational questions were implicated with economic and social problems, and we were forced to the conclusion that educational reform involves the intrepid handling of evils which lay outside the classroom, and affected the home life and economic welfare of parents and children alike.”

* *The Medical Inspection of School Children*, p. 111.

Even now medical inspection of school children has frequently to be supplemented by home visits and by the disinfection of houses. These domiciliary visits are now made by the Medical Officer's staff, and the public might well resent the intrusion of another set of inspectors; and the consequent duplication of officers is quite unnecessary.

The disadvantages of dual control are, to take a concrete instance, well exemplified in the case of personal cleansing, as has been pointed out by Dr. Kerr in the case of London.

Some consideration should also be paid to the effect of the proposal on the status of the Medical Officer of Health. Two great advantages are apparent. In the smaller districts the added duties would enable authorities to pay larger salaries and to employ whole-time-men. That future progress lies in this direction cannot be doubted. To Medical Officers of Health who are not engaged in general practice, the addition of school work to their present duties cannot but prove advantageous, if only as a reminder that they are practitioners of preventive medicine and not mere supervisors of the work—excellent though it may be—of a staff of sanitary inspectors.

Central Organization.—With that we are not specially concerned, though, with Mr. Birrell, we may hesitate as to whether the Board of Education or the Local Government Board is the right authority for supervising medical inspection. Primarily, of course, the Medical Officer of Health is subordinate to the Local Government Board, but this would not prevent him being responsible for his school work to the Minister of Education, in the same way that he now administers part of the Factories and Workshops Acts under the direction of the Home Secretary. In any case, the central authority should specify the minimum amount of work that will be required, and by inspection or otherwise satisfy itself that the local authority is providing and paying for the necessary assistance. It would be still better if the central authority would pay the cost out of the Imperial funds by means of a grant-in-aid of so much per 1,000 scholars.

THE PRACTICE OF MEDICAL INSPECTION.

Granted that the Medical Officer of Health should in all cases organize medical work in connection with schools and act as the Education Committee's principal adviser, we have next to consider how the actual work of medically inspecting the children should be carried out. It has been suggested that the work would best be done by appointing a neighbouring general practitioner

to make daily visits to each school. To this there are many objections. In the first place, it would not be easy to find the necessary number of experienced practitioners who were willing to devote the necessary time for the comparatively small pay that they would receive. It is claimed by the laity that such a system would be specially valuable in detecting obscure cases of communicable disease. In my own town obscure cases are usually referred to the Health Department, and even when, under a tentative arrangement, I have asked neighbouring practitioners to diagnose suspicious school cases, I have frequently received a subsequent request to see the case in consultation next day. General practitioners would also be in a difficult position in relation to their own patients, whom they might have to exclude from school for some reason which seemed anything but good to the angry parent. They would also be open to the charge of using the school as a recruiting ground for practice and to the detriment of some neighbouring practitioner. For these and other reasons the employment of the local general practitioner need not seriously be considered except in rural districts where other arrangements might be impossible.

This suggests my next point, viz., that one cannot draw any hard-and-fast line, and that the system must vary with local conditions. Speaking generally, in the smaller urban districts a whole-time officer could do the work himself. In larger urban districts a qualified* assistant would be required, who should be adequately paid, so that he or she was not a mere bird of passage. It has been suggested that this would lead to perfunctory work, as the assistant would always regard school inspection as subordinate to the ordinary work of the Health Department. I do not think there is any force in this argument, as once school hygiene were put on a proper footing the assistant Medical Officer of Health would have every inducement to work at school hygiene, which will naturally tend to bulk more and more largely in the work of the Health Department. Though the assistant would usually be a whole-time officer, it is not essential that this should be so, and if there were a local junior consultant who cared to do the work while waiting for practice, there is no reason that such an one should not be appointed, provided, and as long as, he can undertake to give the necessary time and is willing to work on the lines suggested by the Committee's chief medical adviser. In

* The assistant should not only have the D.P.H., but should have held resident appointments at a general, and at a fever hospital. There is too great a tendency for D.P.H. men to cut short their hospital work. This was always to be deprecated, but is now a fatal mistake.

administrative counties the problem is somewhat more complicated than in boroughs and large urban districts. The organization of the work must remain with the county officer, but the actual inspection of the children must be done locally. In the case of the subsidiary urban districts, and in some rural districts, the local Medical Officer of Health would naturally undertake this work, while in larger rural districts the district Medical Officer or local practitioner would have to be drawn into the scheme.

The School Nurse must not be forgotten in any scheme of organization. She can be usefully employed in detecting cases of ringworm and pediculosis, and in taking heights and weights in school, in swabbing throats during diphtheria outbreaks, and in making *prima facie* reports on children sent home by the teachers. The forms used in Croydon for this purpose are on the table, and have been found satisfactory. Tact and discretion are even more important in the nurse than in the Medical Officer, as she has continually to bear in mind that she must not usurp either the province of the family doctor or of the district visitor and almsgiver. School nurses should of course always act under medical supervision. If properly controlled, and within the limits just referred to, they are valuable auxiliaries.

THE RÔLE OF THE TEACHERS.

If medical inspection is to produce results, we need something more than the sympathy of the teachers, on which we can already rely. We want also their *informed* solicitude, so that they may recognize slight departures from the normal, and enable the medical inspector to concentrate his attention on the cases needing complete examination. Indeed, this is one of the chief reasons why teachers should be compelled to study hygiene in their training colleges.

Had time served, it was my intention to have developed this point, and have discussed with you the instruction in hygiene which should be given to teachers, and the kind of training they should give the scholars. I have, however, already taken up quite enough of your time, and will only make one observation. The teaching of hygiene to children must in the main be indirect. A clean, well-ventilated schoolroom and a teacher who is keen on physical fitness will do more to influence the next generation than the parrot-like repetition of lessons from some little book on hygiene. What the children want is not information, but training and influence, so that the lessons they receive may bear fruit in life-long habits.

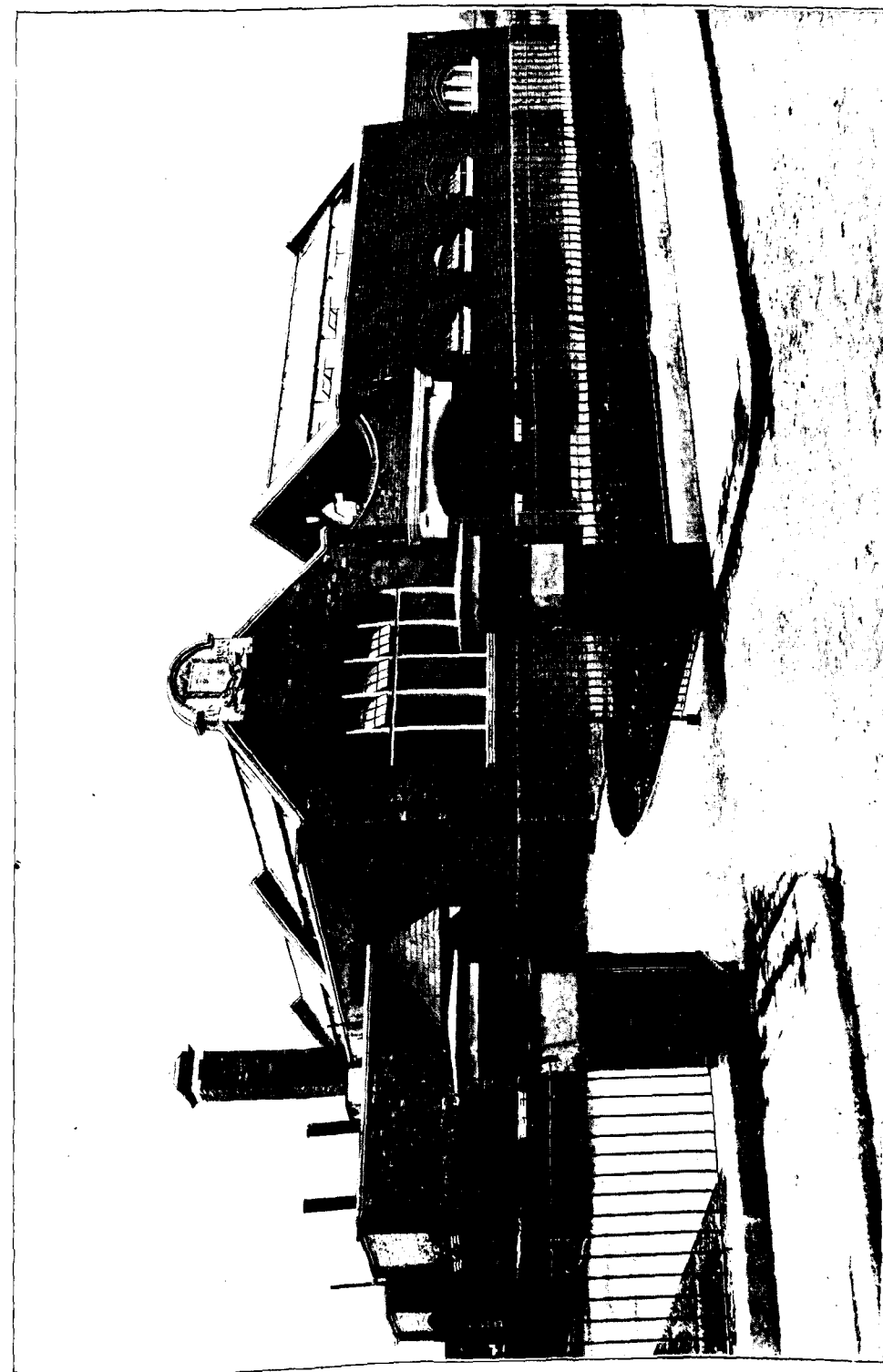
Lastly, what do we hope to gain from medical supervision of schools? We have heard enough during the last few years about the physical degeneration of our race, and though most of us are quite unconvinced that any degeneration has occurred, the suggested anthropometric survey will help to settle the question.

On the other hand, though sceptical about physical degeneration, we are certain that the majority of children are not as physically efficient as they might be. Before the remedy can be prescribed, we must diagnose the disease and investigate the conditions. Having done so, we shall be able in many instances to apply the remedy, either by suitable advice, by undertaking treatment (as in the case of ringworm), or by securing the assistance of local charitable organizations. In other cases we shall find ourselves only at the threshold, seeing that the condition of school children is correlated with questions of feeding, of housing, and of other sociological problems which cannot at present even be stated, much less solved, without further data than we already possess. That we shall greatly increase our power of controlling communicable disease cannot be denied, but more than this, both Medical Officers and their Sanitary Authorities will at length grasp the great principle that the prevention of disease is not limited by the Notification Act or the "seven chief zymotics."

If through our labours some of the blind see, the deaf hear, the halt attend school, and all have the gospel of health preached to them, the medical supervision of schools cannot but affect the health of the next generation to a greater degree than any other preventive measure with which I am acquainted.

One word in conclusion. It is sometimes said that Medical Officers of Health will not welcome the great increase in work which the supervision of schools must entail. Personally I have a higher opinion of my colleagues, and do not believe that any of them will make "the great refusal" and emulate the caitiff "who basely from his calling high withdrew." On the contrary, I believe that both Medical Officers and teachers will gladly accept new responsibilities, provided they increase their public usefulness and are prepared to labour onward in the spirit of the great poet who sang:—

"I will not cease from mental fight,
Nor shall my sword sleep in my hand,
Till we have built Jerusalem
In England's green and pleasant land."



KENSINGTON NEW DISINFECTION STATION

NEW DISINFECTION STATION: ROYAL BOROUGH OF KENSINGTON.*

THE land at Wood Lane, upwards of twelve acres in extent, on which the Disinfecting Station stands, was purchased, in 1898, at a cost of £17,500, for general parochial purposes. About a fourth part of the area was sold in 1900, for £8,000, to the Kensington and Knightsbridge and Notting Hill Electric Lighting Companies.

The site is bounded on the north and north-west by the Hammersmith and City Railway, and by a piece of land about to be used by the Great Western Railway Company for railway purposes; on the south by the electric generating station of the Kensington and Knightsbridge and Notting Hill Electric Lighting Companies, and on the east by the West London Railway generating station, and on the west by the Central London Extension Railway. On the west the land has a frontage to Wood Lane.

The drawings and specification for the building were prepared by the late Borough Engineer (Mr. Wm. Weaver), and Messrs. Hudson & Co.'s tender for the sum of £1,727 was accepted.

Description of the building.—The exterior of the building is constructed to a height of four feet with blue Staffordshire bricks, and the upper part with selected salt-glazed bricks with glazed terra-cotta dressings. The interior is built to a height of four feet with glazed bricks, the walls above being lined with glass tiles. The whole of the structure thus being impervious to water, may be washed down, both inside and outside, with a hose.

The following accommodation is provided:—

A chamber, 30 feet by 15 feet, for the reception of infected articles from a vehicle in the adjacent van-shed.

A chamber, 30 feet by 20 feet, in which the disinfected goods are received.

A laundry, 26 feet by 20 feet, with an ironing and packing-room, 23 feet by 20 feet.

Drying and airing closets.

Store-rooms.

Three van-sheds, and a chamber for the disinfection of infected vehicles. The "store for beds" has been utilized for an airing chamber. Possibly the "van-shed for infected cab" may be utilized for loan bedding, as it is very rarely required for its nominal purpose.

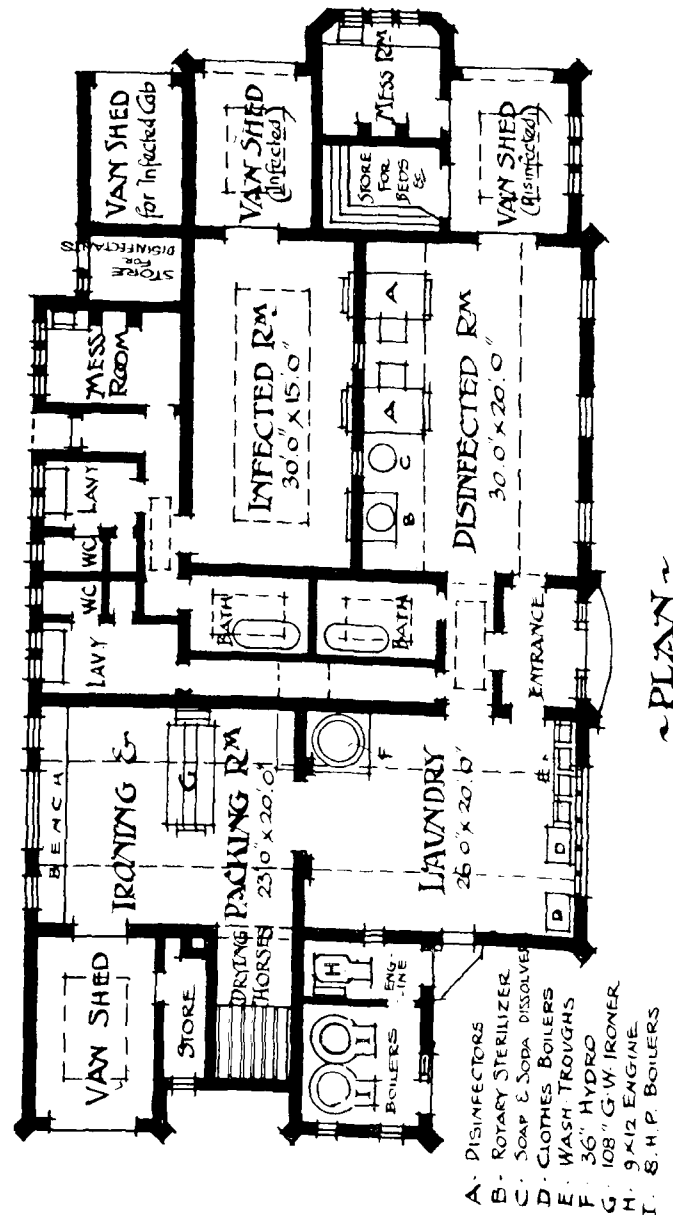
Boiler and engine house.

The staff to be employed on the "infected" side of the station cannot pass to the "disinfected" side, and separate mess-room accommodation is provided for their use, with lavatories, bath-rooms, clothes-rooms, etc.

Machinery and Apparatus.—The machinery and apparatus were supplied by Messrs. Manlove, Alliott & Co. Ltd., Nottingham, to the specification prepared by the Public Health Committee, and at a cost of £1,650.

The type of disinfector is that known as the "Alliott and Paton"

* The blocks showing the plan and elevation have been kindly lent by Dr. T. Orme Dudfield.



pattern. Each of the two machines is 7 feet long, 6 feet high, and 3 feet 7 inches wide internally, and is fitted with a steel framed door at each end.

The process of disinfection consists of: Firstly, extracting the air from the chamber and its contents, and then replacing it with dry high-pressure saturated steam. After the goods have been subjected to the action of the steam at 20 lb. pressure for a sufficient period, the steam is allowed to escape and a second vacuum is created; this in turn is broken by hot pure air, so that when the goods are removed they are not only sterile, but dry and aired also.

Articles wholly or partially made with leather, fur, etc., which cannot be subjected to steam, are disinfected in the machine by formalin vapour introduced through a special appliance.

Each disinfector is fitted with a recording pressure-gauge, by means of which a diagram of each operation is obtained.

Stained articles which, if introduced into the disinfector, would, after steaming, have the stains indelibly fixed, are treated, i.e., sterilized and washed, in a "rotary sterilizer." On removal from the sterilizer the articles are placed in a hydro-extractor, and afterwards dried in a drying closet and finished in a Decoudun ironer.

Two vertical boilers are provided for alternative use, and as a precaution against risk of stoppages through accident or otherwise.

Two specially-constructed vans have been purchased, one for the collection of infected articles and the other for delivering disinfected articles.

The following staff will be employed, tentatively:—

1. A working foreman experienced in engineering and stoking ("Engineer in charge.") 2. A driver. 3. A disinfector, who will assist in collecting infected articles, and in delivering disinfected articles, under the direction of the Superintendent of Disinfection.

It is proposed to erect four cottages on the site, to be occupied by the disinfecting staff.

PROTECTION OF FRUIT ON STALLS.—In Vienna, an order has been given that fruit must not be left exposed to street dust and insects, but must be covered with gauze or kept in well-ventilated premises. Microscopic examination of the skins of plums and pears bought at a much patronized fruit-shop showed that the main source of contamination was dust containing fragments of granite (from the street pavement) and horse dung.

A SANATORIUM AND MARKET GARDEN.—The Open Air League is opening its first sanatorium colony at Great Clacton, Essex. It will accommodate 25 patients, who will be in the incipient stages of the disease, and who will be taught practical market gardening, and who will be kept in residence sufficiently long to enable them to recover their health, and to fit them, either independently, or in association with the work of the League, to earn a livelihood away from the dangers of town life. The arrangements that have been made are of so strictly economical a character that the total expenditure will barely exceed £1500 a year, or an average inclusive cost of 25s. a patient weekly, and it is expected that even this modest figure will be reduced by the value of the work of the inmates.

MEAT AND MILK INSPECTION.*

By PROF. H. A. WOODRUFF, F.R.C.V.S.

QUITE recently, within the memory of everyone, the need for efficient inspection of meat and meat-products had been brought home to us, and the man in the street had been deeply impressed by the horrible scandals and the loathsome disclosures of the meat-packing industry in Chicago. But it was remarkable that this same man in the street, who held up his hands in pious horror at Chicago, appeared utterly unconscious that in this country, excepting a few enlightened cities and towns, there was no regular system of meat inspection at all. Veterinary surgeons knew better than anyone else what this means, how that carcasses of animals affected with tuberculosis, anthrax, pyæmia; with trichinæ and cysticerci; with malignant tumours and febrile diseases; or those of immature or unborn calves, or of animals hurriedly killed to prevent them dying of disease—how that all these, which would be condemned if submitted to an efficient inspection, are dressed and exposed for sale with impunity.

With regard to the Medical Officer of Health as meat inspector, he was far too busy a man to spend much time in this work, and was the first to admit his inability properly to inspect live animals, or to recognize many of the diseases with which animals may be affected.

As for the Nuisance Inspector, or other "duly appointed person," it was only necessary to quote from the report of the Royal Commission of 1898: "There is a total absence of uniformity in the special qualifications required of the persons employed as meat inspectors by the Sanitary Authorities in different places, as may be seen by a return presented to the House of Commons in 1896 showing the previous vocations of those acting in that capacity." The report recommended that, wherever practicable, veterinary surgeons with some pathological training should be employed as meat inspectors, and that all meat inspectors should pass an examination.

In the Public Health (Scotland) Act of 1897 it was specially laid down that a veterinary surgeon may be appointed as meat inspector, and, further, that in any proceeding with regard to a living animal the Medical Officer or Sanitary Inspector must be accompanied by a veterinary surgeon.

A pure milk supply was more important than sound meat. One of the most serious questions for Public Health Authorities was the high rate of infantile mortality. Contamination after the milk leaves the cow's udder is the chief source of danger, but that the cow may be a very serious source of danger admitted of no doubt. It is to be hoped that the recommendations of the last Royal Commission on Tuberculosis might be made the basis of new legal enactments. The important points are: (1) Compulsory notification of all udder diseases; (2) The conferring of powers upon local authorities to inspect, not only cowsheds and byres within their own district, but also any outside cows and byres from which milk is obtained; (3) The substitution of "shall" for "may" in the clause of the Milkshops, Dairies, and Cowsheds Order, which authorizes a local authority to appoint an inspector and make regulations for inspection.

* From an Address given at opening of session of the Royal Veterinary College, October 1st, 1906.

SERIOUS CRITICISM OF THE SANITARY ADMINISTRATION OF A RURAL DISTRICT.*

On the 2nd of March in 1905 the Directors of Convict Prisons called the attention of the Home Office to an outbreak of Diphtheria in the families of certain of the officers of the prison, and the Home Office brought the subject to the notice of the Local Government Board, with a request that the Board would take such action as might prevent extension of the disease. The Directors referred to an alleged relation between the outbreak and defective drainage at Princetown, and on the 11th of March the Board entered into communication with the Tavistock Rural District Council, and requested to be furnished with a report on the whole subject by the Medical Officer of Health. This request was not complied with until the end of May, and the report then furnished was "so meagre and unsatisfactory" that the Board on the 14th of June asked for a further and supplementary statement, giving definite information as to the outbreak. This application produced a short letter from the Medical Officer, dated July 18th, and attributing the outbreak to "a cow in a cowshed which had just calved and the drain close to it choked; the people used the milk from this cow on the second day after calving. Six cases were reported to me having had their milk from this source." The Board wrote again on the 27th of July, expressing dissatisfaction with both of these reports, and requesting the Council to instruct their Medical Officer to prepare a detailed and connected report, stating the number of fatal and non-fatal cases, with the circumstances in which they occurred, and noting any associated prevalence of sore throat. The Report was also to state how far the diffusion of diphtheria might have been due to personal infection or might have been assisted by sanitary defects, and was to contain information as to the measures taken to check the spread of the disease.

The Council replied to this communication on the 10th of August, to the effect that they had instructed their Medical Officer to furnish the further report desired. A reminder sent on the 4th of September produced no effect; another, on the 14th of November, elicited a reply from the Council a month later, saying that the Medical Officer of Health assured them that he had sent a report to the Board, and that he would forward another copy and "explain the matter." In the meantime Mr. Preston Thomas, the Board's General Inspector, at a meeting of the District Council on the 6th of December, had remonstrated with them on the serious delay that had occurred, and had failed to obtain any satisfactory explanation either from the Council or from the Medical Officer, who was himself present on the occasion. The Board thereon, on the 22nd of December, informed the Secretary of State for the Home Department that they had decided to order a sanitary inspection of the district, with especial reference to Princetown; and on the 6th of January, 1906, the Medical Officer forwarded a report, signed by himself, but described as bearing internal evidences of having been written by the Inspector of Nuisances (a conclusion afterwards verified).

* Report on the General Sanitary Circumstances and Administration of the Tavistock Rural District, with special reference to an Outbreak of Diphtheria at Princetown, by Dr. R. Deane Sweeting [No. 240 L.G.B.].

Eventually the Local Government Board instructed Dr. Deane Sweeting to visit the district and to report thereon, which he did. With regard to administration Dr. Sweeting took a very serious view, as may be gathered from the following extract:—

"The Rural District Council, which consists of thirty-six representatives, meets monthly at Tavistock. There is a 'Sanitary Finance Committee,' consisting of nine councillors; but the whole Board sit as a General Purposes Committee to consider sanitary matters. The Minute Book of the Council shows that these matters have engaged considerable attention from time to time.

"The Medical Officer of Health is Mr. C. C. Brodrick, L.R.C.P. and L.R.C.S. (Edin.), who was appointed in 1891 at a yearly salary of £100, half repaid by the county. This was reduced in 1896, after the detachment of Calstock parish, to £70, at which figure it has remained. Mr. Brodrick resides at Tavistock, and is also District Medical Officer and Public Vaccinator in the Tavistock Poor Law Union; surgeon to the Cottage Hospital, and to the Great Western Railway. He does not possess the diploma in Public Health, and much of his time is engaged in private practice.

"In my opinion, formed after a careful investigation of the manner in which he performs his duties, he cannot be regarded as a satisfactory Medical Officer of Health. He does not make systematic inspection of the district; and has, even now, an imperfect knowledge of it. He is almost entirely dependent upon the Inspector of Nuisances for such knowledge as he has. In fact, far from directing or superintending the work of the Inspector of Nuisances, he takes his cue from this officer who is to all intents and purposes entirely independent of him. Such a state of affairs does not represent the true conception of the relations which should subsist between a Medical Officer of Health and the Inspector of Nuisances. His monthly and annual reports are meagre, and his journal imperfectly kept. Mr. Brodrick's procrastination for ten months in forwarding the special report on Princetown diphtheria, asked for by the Board at the instance of the Home Office, and the unsatisfactory character of the reports he eventually presented, have already been mentioned.

"Further, he has not been prompt in visiting houses where infectious diseases have been notified, and does not see that disinfection is carried out thereat. Complaints as to his default in these important matters have been made both to the District Council and the Board.

"On the subject of school closure, representations have been made as to his not having recommended this procedure in some cases where circumstances seemed to point to its necessity; whilst in others he apparently took upon himself to order their closure without reference to the District Council.

"Lastly, Mr. Brodrick has not always been happy in his relations with medical practitioners with whom he is brought in contact. Thus, there have been disputes as to notification certificates, and some of his medical brethren have complained to the Council of his neglect in taking any steps to prevent the spread of infectious disease amongst their patients. Together, I regard Mr. Brodrick, for the reasons I have set out above, to be an unsatisfactory officer. If, at the end of his present term of office, Mr. Brodrick should be reappointed by the District Council, it will be for the Board to seriously consider whether it is desirable that they

should sanction such reappointment with a view to repayment by the County Council."

At a recent meeting of the Tavistock Rural District Council held to consider this report, Mr. C. C. Brodrick presented a long report to the Council, in which he traversed many of Dr. Sweeting's statements, both as they reflected upon the Inspector of Nuisances and himself. In conclusion he said: "(1) That in this district, in order to satisfy to the letter the requirements of the Local Government Board and their Inspector, the Medical Officer of Health should be forbidden to hold other appointments or engage in private practice; (2) That no properly qualified man could undertake the work with these restrictions for the salary now paid, namely, £70 a year. As a matter of fact, the Inspector, during his visit, admitted to me that under existing conditions, and without any restrictions, no Medical Officer of Health could be expected to do justice to himself or the district for the small salary at present paid; (3) That the failure of the Council's efforts to secure an adequate supply of water in some parts of the district is probably responsible for some of the complaints made under the heading of sanitary administration; (4) Lastly, that, if Dr. Sweeting will undertake not to raise the plea of privilege, I will undertake to bring an action for libel against him in respect of the statements made in his report, and I will gladly hand over one half of any damages I may recover from him to the Tavistock Cottage Hospital." The Council had under consideration the question of reappointing Mr. Brodrick as Medical Officer of Health, and Mr. W. J. Mason as Inspector of Nuisances. A letter was received from the Local Government Board drawing attention to Dr. Sweeting's report, and requesting the Council to reconsider both appointments. (In Dr. Sweeting's opinion, Mr. Mason is more fitted for the post of Surveyor than that of Inspector of Nuisances.) In view of this letter, it was decided to appoint a committee to investigate the whole question of the charges contained in the report.

The Council of the County Borough of Sunderland have decided to have water, milk, and other foods examined bacteriologically, and an agreement has been made with the University of Durham College of Medicine, for the execution of the work.

MEAT INSPECTION LAW IN DENMARK.—In the last Session of the Danish Parliament a law was passed regulating the control of all factories killing pigs and cattle for export, under which the Danish Government has appointed one veterinary surgeon to each factory, whose duty it is to inspect all animals immediately after they are killed, and to see that no animals except those that are perfectly sound and healthy are exported. In order to give the purchaser of bacon in this country a guarantee that he only gets meat which has been duly examined, the Danish Minister of Agriculture has given instructions that from October 3rd, 1906, all sides of bacon which have been passed for export shall be stamped with the word "Denmark" in red ink, and no sides that are not thus marked will be permitted to be exported. The Danish exporter is also forbidden to employ any other preservative than common salt in the cure of the bacon. The use of borax or any other chemical injurious to the digestion is strictly forbidden.

LAW REPORTS.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.

May 9th, 1906.

BEFORE LORD ALVERSTONE, L.C.J., DARLING AND CHANNELL, JJ.

SLIGHT v. MAYOR, ETC., OF PORTSMOUTH.

Housing of the Working Classes Acts—Closing Order—House already closed under by-laws.

A Closing Order under the Housing of the Working Classes Acts can be made by Justices on the complaint of the local authority, in respect of a dwelling-house which has already been closed as uninhabitable, under a by-law of the same authority.

This was a case stated by the Justices of Portsmouth on the hearing of a complaint on behalf of the Mayor and the Council of Portsmouth, alleging that a certain dwelling-house, the property of the two appellants, F. and W. K. Slight, was in a state so dangerous or injurious to health as to be unfit for human habitation, and stating that the proceedings were taken for the express purpose of causing the dwelling-house to be closed under and by virtue of the Housing of the Working Classes Acts.

According to the facts proved or admitted, the house had not been occupied since April, 1904, and it was, and had been, in such a state as to be unfit for human habitation, and was not reasonably capable of being made fit. During April, 1904, the Council, acting under a by-law of the borough, since repealed, had declared the house to be unfit for habitation and had ordered it to be closed, and it had remained closed ever since in consequence. It was contended that the effect of this Order was to prevent the Council from proceeding under the Housing Acts, as they had already elected which remedy they would adopt, and they could not proceed under both. It was also said that the house was not a dwelling-house under the Act, as it had been closed. The Justices decided in favour of the Corporation, and made the Order.

J. A. Simon appeared for the appellants, Corthope-Munroe for the respondents. The Court dismissed the appeal.

LORD ALVERSTONE, L.C.J., said that besides the by-law the Corporation had additional and possibly parallel or overlapping powers, of closing houses, with certain consequences. If the powers which the Corporation get under the Housing of the Working Classes Acts were no greater than under the by-law, then no greater burden would be placed on the appellants. On the other hand, if the Order had other consequences which imposed any additional burden on the appellants, and gave the Corporation greater powers, then there was no reason why they should not proceed under the Act of Parliament which gave these additional powers. The fact that there had been an Order closing the house, and involving certain consequences, did not prevent the magistrates having jurisdiction to make an Order under other Acts of Parliament involving other consequences.

DARLING and CHANNELL, JJ., agreed.

May 3rd and 25th, 1906.

BEFORE BRAY, J.

THE CORPORATION OF THE CITY OF WESTMINSTER v. LONDON COUNTY COUNCIL.

Metropolis Management Acts—Construction of Sewer—Pollution of Thames—Duty of County Council.

It is not the duty of the London County Council, as successors to the Metropolitan Board of Works, to construct sewers which would intercept the drainage of every house in the Metropolis that in 1855 drained into the Thames. They have a discretion in the matter. It was therefore held that the plaintiff Council, who had made a district sewer to carry the drainage of such houses into the main sewer of the County Council, could not recover the cost from the County Council.

This was a special case stated in an action by the Westminster City Council to recover from the London County Council £627, the cost of making a sewer to carry off the drainage of certain houses which had since 1849 drained into the river Thames. The plaintiff Council had recently been required, under the Thames Conservancy Act, to prevent this sewage flowing into the Thames, and the sewer had been constructed so as to bring the sewage ultimately into the main sewer of the County Council. It was said that by virtue of Section 135 of the Metropolis Management Act, 1855, and of Section 1 of the Metropolis Management Amendment Act, 1858, it was the duty of the Metropolitan Board of Works, and their successors, the London County Council, to make all the sewers necessary to prevent sewage from falling into the Thames.

Macmorran, K.C., and Colam appeared for the plaintiffs, English Harrison, K.C., and Daldy for the defendants.

BRAY, J., gave judgment for the defendants. He was of opinion that Section 135 of the Act of 1855 did not compel the Board to lay a main sewer so as to intercept this sewage. The Board had a discretion to lay such sewers as in their opinion were necessary for preventing all or part of the sewage within the Metropolis from flowing into the river Thames. They had made a sewer of sufficiently low level in a neighbouring street to take the sewage from these houses. It was for the vestries and district boards, under Section 69, to make the necessary sewers to drain their districts. The Board, in their discretion, had thought the sewer they had laid was sufficient. The effect of Section 1 of the Metropolis Management Amendment Act, 1858, did not in his opinion, fetter the discretion of the Board or of the County Council.

BRADFORD POLICE COURT.

October 15th, 1906.

BEFORE THE STIPENDIARY MAGISTRATE (MR. SKIDMORE).

Shrimps preserved with Boric Acid.

Robert Wright, 106, Sheffield Road, Southport, and Samuel Wright, 108, Sheffield Road, Southport, were summoned for selling adulterated shrimps. The shrimps had been consigned to a Bradford firm.

Mr. Bird, who appeared on behalf of the Health Department of the City

Corporation, said the proceedings were taken under Section 6 of the Sale of Food and Drugs Act. Inspector Warrington took the sample from the Lancashire and Yorkshire Railway Company's dray, as the driver was delivering the goods. The potted shrimps were divided into three parts, and the picked shrimps were also divided. When analysed, one of the samples was found to contain 107½ grains of boric acid, and the other 88½ grains. The persons summoned were carrying on a shrimp business in Southport, and when people thought they were eating Southport shrimps they were, as a matter of fact, eating Dutch shrimps.

Mr. Brighthouse represented the defendants, and contended that the shrimps had been seized after delivery, whereas the Act provided that they must be seized at the place of delivery, and must not be seized after delivery had been completed. The Legislature ought to fix a standard amount of boric acid to be used as a preservative. In Lancashire there was an understanding that the quantity of boric acid to be used should not exceed 35 grains to the pound, and he would be ashamed to try and defend 108 grains being used. The shrimps in question were Dutch, and at the present time shrimp dealers dealt with both Dutch and English shrimps. One of his clients had lived in Holland for some time, but did not deal direct with them. The shrimp was the most delicate fish taken from the water. If the Dutch shrimp was taken out of the water, and had to be shipped to England, it was necessary that it should be treated with a certain preparation to preserve it. His clients did not deal directly with the Dutch firm, but bought from other dealers, and packed them and sent them to other parts of the country. It was impossible to tell by merely looking at the shrimps what amount of boric acid they contained. He appeared for a number of shrimp dealers in Southport, and it was an understood thing amongst them that they should not use more than 35 grains of boric acid per pound of shrimps.

Fines and costs amounting to £9 3s. were inflicted in the case against Robert Wright, the father of the second defendant.

BUTTER—ADULTERATION WITH "LARDINE."—At the Bristol Police Court, on June 26th, Albert H. Williams, trading as the Bridgwater Creamery Company, Somerset, was summoned for having, on February 27th, and again on March 27th, sold margarine to which a false trade description was applied. Mr. F. E. Weatherly represented the defendant, and intimated that the defendant pleaded guilty, and consented to summary jurisdiction.

Mr. Wansbrough said he appeared on the instructions of the Board of Agriculture, and what he had to lay before the Bench was an extremely serious matter, one which he was quite sure would call for severe treatment at their hands. The proceedings were instituted under the provisions of the Merchandise Marks Act, 1887, and the penalty on conviction was imprisonment not exceeding four months, or a fine of £20 for each offence. The allegation was that the defendant sold as butter what could only be described as margarine. So long ago as the early part of last year grave complaints were made to the Board of Agriculture—indeed, they were inundated with complaints from respectable honest traders with regard to the under-cutting of prices and the sale of goods which must necessarily have been mixed with some adulterant. They made numerous

enquiries and took numerous samples, but great difficulty was experienced in detecting the presence of an adulterant, though the authorities were satisfied that adulterants had been used. The adulterant seemed to consist of some substance which could easily be mixed with butter, and if too large an amount was not used analysts found it extremely difficult to detect its presence. Matters having come to the knowledge of the Board of Agriculture with regard to the Bridgwater Creamery Company, of which Albert H. Williams was the proprietor, they communicated with Mr. Simpson, the Inspector under the Food and Drugs Acts to the Bristol Council, who arranged with a Bristol retail provision dealer, Mr. Bishop, to write to the company ordering some butter. Mr. Bishop got a quotation of 11s. 6d. for 12lb., and he ordered that quantity, which arrived in a box, with "Bridgwater Creamery Company" printed in large letters on one side, and "guaranteed pure butter" on the other. Mr. Bishop handed the butter to Inspector Simpson, who sent it to the Board of Agriculture, and they had it analysed. They thought it was fair to the defendant to ascertain whether this was an isolated transaction or the general mode of carrying on trade, and on March 26th Mr. Bishop was instructed to write again ordering the same quantity. He received the stuff in an identically similar box to the first consignment. Analysis showed that at least 20 per cent of this so-called butter was not butter at all. It was stuff known as "nutreum" or "lardine," which was manufactured in London, and prepared in the most skilful way for the purpose of hoodwinking the analysts when they tried to detect its presence in butter. The person who manufactured it had had the impudence to confess publicly that an analyst could not detect it when any quantity up to 17 per cent was used with butter. It was admitted by the defendant company that they employed 1 ton 11 cwt. per week of this foreign substance in the manufacture of their "butter," and the price they paid for it was from 50s. to 59s. per cwt. Taking it all at 59s., it came to this—the purchaser paid 107s. 4d. per cwt., leaving a profit to the company of 48s. 4d. per cwt., or £74 18s. 4d. per week, and £4467 in the fifteen months the practice had been going on. Inspector Cornelius, in company with two police inspectors, visited the factory. In the mixing department they found "lardine" and butter being mixed, and 13 cwt. of "lardine" was found upon the premises. As this was the first prosecution, the Board would be content with a monetary penalty, and they would also ask to be absolved from all costs in the matter; but as £20 was totally inadequate for such an offence, in future the Board would ask that the accused persons should be imprisoned or committed for trial.

Mr. Weatherly, for the defence, said his client did not live at Bridgwater, and took no part in the management of the factory. He had rendered every facility and given every information to the police, and as soon as the offence was brought to his knowledge he ceased it. If "lardine" had a new name it would be as popular as, or more so than, butter, and, as proof of this, counsel said when it was no longer mixed with butter at the Bridgwater factory customers wrote and complained of the quality of the butter. He did not wish to take a technical point, but defendant was summoned for selling margarine. As a matter of fact, it was too good for margarine. Defendant had ceased to use any foreign fat in anything he sold as butter, and he would undertake to continue that course of business in future.

Mr. Wansbrough said that from amended figures of the company's sales he found that the profit on the introduction of "lardine" for the fifteen months was £6550.

The Chairman of the magistrates said they had given careful consideration to the case, which, in their opinion, was probably the worst that had ever been before the court. The question was whether imprisonment would not have been the proper sentence to pass for such an offence. The magistrates were only inclined to hold their hand from that course on Mr. Wansbrough's application on behalf of the Board of Agriculture. They inflicted the heaviest penalty—£20 and costs—on each summons, and 25 guineas costs on each, making £92 10s. in all.—*Brit. Food Journal*.

FLORISTS AND THE FACTORY ACT.—At Marylebone Police Court, on October 1st, before Mr. Paul Taylor, Messrs. Robert Green (Limited), florists, Crawford Street, were summoned by Mr. Charles C. W. Hoare, one of his Majesty's Inspectors of Factories and Workshops, for, at a certain "workshop" within the intent and meaning of the Factory and Workshops Act, 1901, failing to affix the prescribed abstract of the Act as required by law. The summons was in the nature of a test case, and raised the point whether the work carried on at florists' shops brought them within the Factory Act. It was shown that the defendants employed a number of young women all the year round for the purpose of making up bouquets, wreaths, and floral decorations. This work, it was urged, brought the defendants within the Act. Mr. Muir on their behalf submitted that the work done was not "manual labour" within the meaning of the Act, but required a highly artistic sense. He also contended that natural flowers adapted for sale in the form of bouquets, etc., did not mean an "article," which was a thing that had been subject to manufacture. That being so, the defendants claimed that they were not subject to the Act. The magistrate observed that he had already held that the company's workshop did come within the Act by reason of the work carried on there, but, after going more fully into the matter he was now decidedly of a contrary opinion, and that the summons must fail.

THE EMPLOYMENT OF MARRIED WOMEN.—At Guildhall, City of London, before Mr. Alderman Hanson, Lena Grover, of Chapel Street, E.C., was summoned, at the instance of Miss Deane, Inspector of Factories and Workshops, for that she on July 9th was the occupier of a workshop wherein Ada Emma Simmonds was unlawfully employed, contrary to the provisions of the Factory and Workshop Acts—namely, within four weeks after she had given birth to a child. Miss Deane said the defendant was a clothing manufacturer, and employed about fifteen women. On June 15th one of them, Mrs. Simmonds, left for reasons of which Mrs. Grover must have been cognisant. The woman gave birth to a child on the following day, and was not legally entitled to return to work till July 16th. She went back, however, on July 9th, and, being unable to give the baby proper attention, she put it out to nurse. The infant died on August 29th, and there was little doubt that want of a mother's care during the first weeks of its existence was principally responsible for its death. It was most important that this regulation, which was by no means too stringent, should be widely known, as these poor workwomen were strongly tempted to neglect their maternal duties at a critical time

in favour of a wage-earning occupation. Mrs. Simmonds, a needlewoman, bore out the statement of the Inspector. Mr. Myers, for the defence, urged that his client had not broken the law knowingly; she was not, in fact, aware that the woman had not been away from work for a month. The Alderman imposed a fine of 40s. and 6s. costs.

ACTION FOR POLLUTED WATER.—The Borough Council of Basingstoke have had fifty actions in the High Court of Justice entered against them in connection with the recent outbreak of typhoid fever. The outbreak was traced to the town water-supply, which was polluted, and those who suffered from the epidemic claimed compensation, amounting altogether to about four thousand pounds. As a result of a conference between a committee of the claimants and a committee of the Ratepayers' Association, the Borough Council have agreed to pay £1,670 15s. in settlement of the fifty actions brought, without prejudice and with denial of liability.

CLEANSING OF CHILDREN.—At Tower Bridge Court, on Sept. 24th, Mr. E. S. Ayling, divisional superintendent for Southwark, prosecuted several parents for not sending regularly to school certain children who had been excluded from school on account of their unclean and verminous condition. The Magistrate, Mr. Chapman, said he offered no criticism upon the action of the Council; on the contrary, he was prepared to support it. Parents had no right to expect clean children to mix with dirty ones; and if, after due notice and advice as to the best methods of cleansing, they persistently neglected the adoption of the remedies, they must be punished, and, if necessary, their children must be removed from their control. Mr. Ayling said the cleansing scheme, under which nurses were employed to attend the schools, had within three years reduced the number of unclean and verminous children in one school from 250 to three, and in another from 200 to two. In each of the cases before the Court the utmost latitude had been allowed. Penalties ranging from 10s. to 20s. were imposed in each case.

MILK WARRANTIES.—At Old Street, on Sept. 26th, John Roberts, milk dealer, of Wilson Street, Finsbury, was summoned for selling milk below the standard quality. Mr. Ricketts appeared for the defence; Mr. Walton prosecuting for the Shoreditch Borough Council. Mr. Ricketts put in a warranty from Messrs. Marriage and Impey, wholesale contractors for milk supply. The warranty was for pure milk with all its cream, and was still unexpired. Mr. Cluer said that, if there was no warranty with each parcel of milk delivered, the recent decision in the King's Bench of *Watts v. Stevens* made the warranty valueless. In an argument which followed it was made clear that the case quoted (L.J.K.B., June, 1906), over-ruled a previous decision in the case of *Elliot v. Pilcher*, which recognized a general or running warranty as sufficient. *Elliot v. Pilcher* reversed a decision in a case of *Harris v. May*, which required a specific warranty—on a label with each churn delivered to the retailer—and now *Elliot v. Pilcher* is reversed and *Harris v. May* revived. Mr. Ricketts said his client was badly injured by the judgment, because when the offence for which he was now summoned occurred he was protected by the warranty, and, though the warranty was still running, it was abrogated by the law. Mr. Cluer said he could only act on the judgment, and on previous convictions being proved he fined Roberts £3 and 23s. costs.

REVIEWS.

ARCHIVES OF THE PUBLIC HEALTH LABORATORY OF THE UNIVERSITY OF MANCHESTER. Edited by A. Sheridan Delépine, M.Sc., M.B., Director of the Laboratory and Proctor Professor of Comparative Pathology and Bacteriology. Vol. i, 452 pp. Price 22s. net in cloth, 21s. in paper. Manchester: Sherratt and Hughes, 27, St. Ann Street.

We congratulate Prof. Delépine on the appearance of the first volume of the Archives. If succeeding volumes maintain the high standard of this one, the Archives will become a valued addition to Public Health literature. It will be recollected that with the object of bringing the students into direct contact with scientific men whose personal experience and reputation allowed them to speak authoritatively upon certain branches of Public Health, various well-known hygienists gave special lectures in the University. This volume reproduces the lectures given in 1904, together with some original communications. It is unnecessary to do more than mention the names of the lecturers and their subjects. "Poisoning by Phosphorus, by Sulphuretted Hydrogen, and by Carbon Monoxide," by Prof. Thomas Oliver; "Spread of Typhoid Fever and Allied Diseases, with special reference to military life in tropical and sub-tropical countries," by Col. Lane Nutter; "Feeding in Relation to the Health of the Young," by Dr. Niven; "The Role of 'Missed Cases' in the Spread of Infectious Diseases," by Dr. Newsholme; "The Application of Chemical Analysis to the Study of Biological Processes of Sewage Purification," by Dr. G. J. Fowler; "Vaccination," by Dr. Monckton Copeman; "Construction and Application of Life Tables," by the late Dr. Hayward; "Water Filtration," by Dr. Thresh; "Atmospheric Carbonic Acid, its Estimation and Variation," by Dr. John Robertson; "Defective Sanitary Appliances," by Dr. Vacher; "Human Intestinal Parasites," by Prof. E. Perroncito, of Turin. The reports include one by Prof. Delépine on an alleged effluvious nuisance attributed to the use of Yeast in a Tannery, with a Description of the Yeasts, by Dr. Carver; Result of an Investigation of an Epidemic of Fish Poisoning, by Drs. Sidebotham and Sellers; the Brain and Spinal Cord in Chronic Arsenical Poisoning, by Dr. Lawrence; Two Aldehyde Reactions, by Dr. Ramsden; and one on the Nerve Cells in Malignant Disease, by Dr. Lawrence.

The volume concludes with a statement of the general work of the laboratory.

CONSUMPTION, ITS RELATION TO MAN AND HIS CIVILIZATION; ITS PREVENTION AND CURE. By John B. Huber, M.D. Price 15s. net. Lippincott.

Dr. Huber, in the preface of his book, addresses it "both to the physician and to the layman," and to prevent the layman from "imagining vain things concerning himself," as the preface puts it, matters of a purely technical character are put in appendices. The book is written from an American point of view, and since, as Dr. Huber states, "to-day every third or fourth adult dies of consumption," there is every justification for its publication. To the layman it should prove very useful, as it

sets forth methods of prevention and treatment in a very readable form, with gleams of humour here and there, and an appropriate quotation at the head of each chapter. To the physician the particulars of the arrangements and regulations of sanatoria in America and elsewhere will be of much interest; the regulation that "conversations between patients regarding their symptoms is absolutely forbidden" being a much-needed one. Dr. Huber's ideas about Englishmen need readjusting, as passages like the following show:—

"It is said our English brethren take cold tub-baths (at the temperature of running water) on rising, even on the coldest mornings. This practice is probably not so general as we are led to believe; no doubt it is indulged in only by eccentrics, of whom there are not a few on the tight little island."

Dr. Huber has chosen a large subject, and has covered his ground well, although a diffuseness of arrangement rather spoils an otherwise readable book.

INDEX TO THE REPORTS OF THE MEDICAL OFFICERS OF THE LOCAL GOVERNMENT BOARD OF ENGLAND issued during the years 1891-92 to 1903-04, prepared by A. A. Mussen, M.D., D.P.H., Asst. Medical Officer of Health City of Liverpool, and W. Hanna, M.A., M.B., D.P.H., Asst. Medical Officer of Health Port of Liverpool. 1906.

About 10 years ago, upon the initiation of Dr. J. B. Russell, of Glasgow, an Index of the Reports of the Medical Officers to the Privy Council and the Local Government Board of England, extending from 1858 onwards, was prepared by Drs. Marsh and Irvine, and issued by the Police Commissioners of Glasgow. Drs. Mussen and Hanna have now continued the work on the same lines, down to the Report of 1903-4. Those who are fortunate in possessing a copy of the earlier Index will appreciate the value of the work done by Drs. Mussen and Hanna, and the Service should be grateful to them and to the Corporation of Liverpool for thus supplying a want which the Local Government Board should not have allowed to occur. The Public Health Department, Liverpool, have a few copies, which they are willing to dispose of to other Sanitary Authorities at two shillings per copy, and we would advise Medical Officers to secure one.

CLINICAL LECTURES ON NEURASTHENIA. By Thomas D. Savile, M.D. Lond., Physician to the West-End Hospital for Diseases of the Nervous System. Price 7s. 6d. net. London: Hy. J. Glaisher, 57, Wigmore Street. 1906.

The first edition of this work was published in 1899, and since then several editions have been called for. It is now a comprehensive study, and will be found most helpful to all who have to deal with patients suffering from this most modern complaint in any of its phases.

MERCK'S ANNUAL REPORTS.

This, the nineteenth volume of the series, furnishes a brief review of the therapeutic acquisitions of the last twelve months, not necessarily limited to preparations originating from Mr. Merck's firm. The volume, which comprises 260 pages, is worth having, and may be obtained free by medical men on application at 16, Jewry Street, London, E.C.

THE ARMY MEDICAL REPORT.

The most satisfactory feature in the report is the evidence afforded of the steady improvement in the health of the British Army in India. Compared with the figures of 1903 there is a decrease in 1904 of 138.5, 2.05, and 6.03 per 1,000 respectively in admissions, deaths, and numbers constantly sick. Compared with the averages of the ten preceding years these numbers show an improvement of 389.8, 4.35, and 24.42 per 1,000. The loss to India by deaths and invaliding in 1904 was 3,266, or 46.40 per 1,000, an increase of 3.91 per 1,000 on the previous year, but a decrease of 1.31 on the average of the ten preceding years. The increased loss by invaliding is not sufficiently explained in the Report, but is to be accounted for by the fact that tubercle cases are now immediately invalided when diagnosed. There is an idea that the gymnastic training at home is the cause of diseases of the circulation among the large numbers of young soldiers in India.

Enteric fever, venereal diseases, and malaria, are the three chief scourges of the white army in India. The loss by enteric reached its culminating point in 1898, and has since declined. The admission ratio for enteric during 1904 was 19.7 per 1,000, a decrease of 2.7 on the decennial average, while the deaths were 3.76 per 1,000, against 4.18 in 1903, and 5.83 during the previous ten years. There were 14,106 admissions to hospital for all forms of venereal diseases, or 200.3 per 1,000. This figure is lower by 189.1 per 1,000 than the decennial average. The admissions for malaria were 321.1 per 1,000 in 1899, and fell to 172 per 1,000 in 1904 and to 112.4 in 1905.

There has been unremitting attention to cantonments, the application of all the resources of modern sanitation, the destruction of undergrowth, the draining away of stagnant water, the employment of larvicides, and liberal use of prophylactic quinine. The Army Medical Staff have practically added 2,000 men to the effective strength of the white army in India.

"THE LOCAL GOVERNMENT OFFICER."

The *Public Health Engineer* has now been incorporated with the *Local Government Officer* ("L. G. O."), and becomes the official organ of the National Association of Local Government Officers. The main object which that Association has in hand, is the obtaining of legislative sanction to a Bill providing superannuation for all Local Government Officers in an established position, and providing for their freedom from undue influence in the discharge of their duties, which is commonly known as "Security of Tenure."

CANNED HALIBUT.—An innovation in the form of canned halibut will be instituted on the Pacific coast this year. Canned halibut is an invention of Dr. Walter Lamb, of Palmyra, New Jersey, and by him is called "fish cheese." The process also applies to codfish, and it is said that it is adaptable to other food fishes. Fish cheese is salted only to suit the taste, and it is a triumph over former methods of preparing halibut, cod, and shad, because of the elimination of water by the coagulation of the tissues by heat. Heretofore the canning of these fish has not been successful because of the presence of water. Dr. Lamb claims that his process preserves the albumen, which is of the greatest importance in the preservation of fish, but is as a rule impossible where salt is used freely.

to lodge away from home. A comparatively small sum of money, utilized discriminately, and on the same principle as money that is paid to small-pox contacts for staying away from work, would suffice for any special cases that are likely to occur.

The argument used by one speaker, viz., that the reason why isolation hospitals had failed was, "because they had not been general throughout the country, and that until the whole country was provided with proper and efficient hospitals, we had not begun to touch the fringe of the matter," is rather out of date now, and need not be treated seriously except as an admission that isolation hospitals really are a failure.

Another speaker, Dr. Nash, used the argument, which I have heard before, that more doubtful cases of scarlet fever would be notified in a town provided with a hospital than in one without, and thus tend to unduly swell the notifications in the former. Surely, it would be all the other way. Where patients are removed to hospital, and the consequences to the patient of a mistake in diagnosis might therefore be serious, medical men would necessarily be more cautious, it seems to me, about notifying doubtful cases as scarlet fever, than where it was known that the patient would in any case remain at home, and the diagnosis therefore not be called in question.

In conclusion, let me say that I quite admit that isolation hospitals are usually very popular with the masses of the people, in the districts which provide them. It would indeed be strange if it were otherwise, once they became known, considering the pains that have been taken, and the expense that has been incurred to make them popular. It is no doubt a great convenience to the working classes to have their children when suffering from an infectious disease removed to a well-equipped sanatorium, there to be fed and cared for and treated medically all without any charge, and at somebody else's expense. From a socialist's point of view it is all right, and, being somewhat of a socialist myself, I have considerable sympathy with it. It is also a great convenience to the better classes, in the event of a domestic servant getting scarlet fever, to be able to pack her off to the fever hospital; and as they have to pay the rates, I do not grudge them this small privilege. If the ratepayers like to pay for luxuries, let them have them by all means.* Moreover, in some districts, e.g., health resorts, it is no doubt sound commercial policy to provide hospitals, and they may be looked upon as good investments. But let us be honest in this matter and cease to advocate isolation hospitals on the ground that they are likely to produce any tangible or demonstrable diminution in the prevalence of such infectious diseases as measles, diphtheria, or scarlet fever.

Just one word more: Dr. E. D. Marriott, of Nottingham, to whom all honour is due as the first to force public attention to this question, was quite mistaken when he asserted that the isolation hospital was "dead." As a matter of fact, as an established institution it is very much alive. In this socialistic age the isolation hospital is much too great a convenience to the working classes to be allowed to die, where it has once

* The present type of scarlet fever is so mild that the dangers of aggregation are reduced to a minimum; the risks which the patients still have to run from cross-infection, mistakes in diagnosis, etc., may be set off against the advantages of good food, skilled nursing, and lessons in hygiene; so that the isolation hospital as now administered can scarcely be described as a serious danger to the public health.

been called into existence, though it is quite possible that it will be less easy than it used to be to persuade the reluctant ratepayer that he is going to get good value for his money. Dr. Marriott was nearer the mark when he said that "the surest way to perpetuate an error was to municipalize it": in other words, when once an experiment has been materialized in municipal bricks and mortar, it is much easier to go on with it than to discontinue it.

LEICESTER,
October 17th, 1906.

C. KILICK MILLARD.

"THE INFLUENCE OF THE CLOSURE OF SCHOOLS IN THE CONTROL OF SPREAD OF INFECTIOUS DISEASE AMONG CHILDREN."

To the Editor of "Public Health."

DEAR SIR,—The author of the article under the above heading in the October issue of PUBLIC HEALTH states, on page 24: "I think it will be generally agreed that the school exerts but little influence in the spread of scarlet fever." I should like to know the opinion of Medical Officers of Health of rural districts on this doctrine. I believe the question may be more correctly studied in such districts, for there the question of contact in unhealthy surroundings, such as crowded courts and common stairs, is more easily eliminated. My own experience goes, I think, to show that the school is very often the focus from which scarlet fever spreads. If I have a case notified from an isolated house, half a mile from any other, then in a day or two, two cases in another such house more than a mile from the first, followed at short intervals by similar cases from small villages in the neighbourhood; what am I put it down to, and where am I to begin my investigation, if not at the one place that is common to all these children? They have not been in contact at their homes, as in the case of the slum-and-gutter playgrounds of the town. The only common meeting ground is the school. Almost invariably examination proves that there has been a mild case in attendance, and it seems to me the conclusion must follow that the school has exerted a very baneful influence, in spreading the disease.

If closure is followed, after allowing a period for incubation, by the cessation of the outbreak, the natural inference, it seems, must be that the disease was being spread through contact at the school. Such a condition and sequence of events has occurred three times within the last five years in connection with schools in my district. Has any rural Medical Officer a like experience, or is mine the exception that proves the rule?

I am, yours faithfully,

GEO. J. B. CANDLER-HOPE,
M.O.H. Scarborough R.D.

VOLUNTARY NOTIFICATION OF BIRTHS.—Dr. J. F. Sykes, Medical Officer of Health for St. Pancras, has issued a notice informing the public that the Borough Council has resolved to adopt tentatively during three months a system of voluntary notification of births, and to pay the father, doctor, midwife, student, or other person attending upon the mother, the sum of one shilling for notifying to the Medical Officer of Health at the St. Pancras Town Hall a birth within 48 hours of its occurrence in the borough. The notification first received is to be the one accepted.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

ANNUAL GENERAL MEETING.

THE Annual General Meeting of the Society was held at No. 1, Upper Montague Street, Russell Square, London, on Friday the 12th day of October. Present: Sir Shirley Murphy (Retiring President) in the Chair, Dr. D. S. Davies (President), Drs. H. Coates, L. T. F. Bryett, W. Collingridge, A. Sowden, T. Henry Jones, J. J. Clarke, W. H. Symons, C. Sanders, Hy. Kenwood, N. F. MacLeod, Edward Walford, Herbert Jones, George Newman, Sidney Davies, Reginald Dudfield, J. Neild Cook, W. H. Hamer, Wm. Butler, S. C. Lawrence, R. Farrar, P. C. Smith, J. E. Robinson, W. Whitaker, T. H. C. Stevenson, J. T. C. Nash, G. Quinn Lennane, L. C. Parkes, S. Rideal, J. E. Sandilands, R. A. Dunn, W. A. Bond, L. Kingsford, W. Fremantle, W. H. Willcox, D. L. Thomas, A. W. J. MacFadden, E. P. Manby, R. K. Brown, and the Hon. Secretaries.

Minutes.—Sir Shirley Murphy having taken the chair, it was resolved, on the motion of Dr. R. Dudfield, that the minutes of the last Annual General Meeting, having been printed and published in *PUBLIC HEALTH*, be taken as read. The same were then confirmed and signed.

The Hon. Secretary read letters apologizing for absence from Drs. J. Groves, H. Cooper Pattin, and G. S. Buchanan.

The Hon. Secretary submitted the Annual Report of the Council, and the Editor reported that the same had been published in the October issue of *PUBLIC HEALTH*.

Resolved, on the motion of Dr. R. Dudfield, seconded by Dr. S. Davies, that the report of the Council be received and adopted.

Dr. S. C. Lawrence adverted to the paragraph in the Council's report on the subject of the Education Act, and the interests of Medical Officers of Health thereunder, and asked whether that report contained all that the members might expect the Society to do at a critical time to protect the interests of Medical Officers of Health. The report expressed a pious opinion, but was not very useful, and he moved that the subject be referred to the Council to consider whether they can give practical effect to the views of the Society on the matter.

The motion, having been seconded by Dr. W. Butler, was put to the meeting, and declared by the Chairman to be carried.

Resolved, on the motion of Dr. R. K. Brown, that the report of the Editor be received and adopted.

The Hon. Secretary reported that owing to the illness of the Executive Secretary, the reports of the Treasurer and Auditors were not yet ready, and he suggested that at the close of the discussion the Annual General Meeting should stand adjourned until the 9th of November next.

Resolved that the suggestion of the Hon. Secretary be approved.

The Hon. Secretary read the ordinary report of the Council as follows:—

REPORT OF COUNCIL.

Your Council beg to report:—

1. That they have received a communication from the Executive Secretary regretting that he is not sufficiently recovered from his illness to resume his duties, and have granted him an extension of leave.

2. That they have received a communication from the Netherland Consulate General for Great Britain and Ireland, with respect to the appointment of delegates by the Society to attend the International Dairy Congress, at the Hague, in 1907, and have determined to appoint as delegates any members of the Society who propose to be present at the Congress, on their names being sent in previously to the Hon. Secretaries of the Society.

3. That they have received and adopted the following Report from the Finance Committee:—

Your Finance Committee report:—

(1.) That they have received and adopted the following Report from the Finance Sub-Committee:—

(a.) That they have held five meetings.

(b.) That on each occasion they checked all receipts with the subscription receipt book, cash book, and the Society's pass book, and agreed the same.

(c.) That they have checked the cash book with the pass book, and verified the balance at the bank on each occasion.

(d.) That they have checked all accounts that have been presented for payment.

(i.) That the Bank balance at date is £195 2s. 1d.

(ii.) That accounts amounting to £679 6s. 4d. have been paid since the 30th June last.

(iii.) That they have approved the Hon. Treasurer's action in having made an additional payment to Mr. A. G. Warren, the Society's Official Auditor, of £2 12s. 6d. for additional services rendered in connection with the Annual Accounts of the Society for the year 1904-5.

(iv.) That they have arranged for the Treasurer's Annual Financial Statement to be presented to the Society at its Annual Meeting in October.

(v.) That they have approved of increased grants to the Northern and Scottish Branches.

(vi.) That the subscriptions received since June 30th, up to date, amount to £119 3s. 6d.

(vii.) That they recommend that the Council should sub-let the ground floor rooms, with part use of the basement rooms, at a rental of not less than £100 per annum.

(viii.) That the Honorary Treasurer reports that he has received a large amount of subscriptions which were in arrear, but that, having regard to the provisions of paragraph 14 of the special resolution amending the Articles of Association, he has not paid to the Branches the proportion (£42 10s. 0d.) which would have been payable to them had the subscriptions not been in arrear, and he suggests that such proportion of these arrears should be paid to the various Branches as has been the custom in years past; and this suggestion has been approved by us.

4. That they have received, and adopted, the following Report from the House Library and Journal Committee :—

Your Committee report :—

(a.) That they recommend the appointment, *pro tem.*, of Dr. McCleary, as Hon. Librarian to the Society, in place of Dr. H. Meredith Richards resigned, and that the hearty thanks of the Council should be given to Dr. Richards, with an expression of the Council's regret that he has resigned.

(b.) That they have received with great regret the resignation of the Editor (Dr. F. J. Allan), and wish to place on record their very high appreciation of the valuable work he has carried out in connection with the Journal during the five years he has held the position of Editor.

(c.) That they recommend the Council to invite Dr. A. Newsholme to become the Editor of the Journal.

5. Your Council recommend that in future the Society should meet on the second Friday in the months of October, November, January, February, March, and April.

6. Your Council have arranged for the Annual Dinner of the Society to be held on January 11th, 1907, on which day the Presidential Address is to be delivered, and they have left the details in the hands of the Finance Committee to deal with.

7. Your Council submit herewith their Annual Report, and the Annual Report of the Editor.

8. That they have referred the following references from the Society to the General Purposes, Legal, and Parliamentary Committee for consideration and report and will in due course submit reports thereon to the Society, viz. :—

(1.) "That the question of the hygienic supervision of schools be referred to the Council to consider and report upon, with a view to making pressing representations to the Council of the Royal Sanitary Institute, the Board of Education, and the Local Government Board; and that the question of the power of entry into schools for the purpose of testing drains be made a part of such reference to the Council."

(2.) "That the Local Government Board be asked to introduce into Parliament a Bill dealing with :—

(a.) "Security of tenure of office of Medical Officers of Health.

(b.) "The extension to the rest of the country of the requirement at present in force in London, that Sanitary Inspectors must be examined before appointment, and that there should be one portal for this purpose.

(c.) "The institution of special classes of Inspectors :—

(i.) "To act as Health Visitors.

(ii.) "For the Inspection of Food.

(d.) "Extended powers to the Local Government Board to combine districts."

9. That they have considered the following reference from the Society, viz. :—

That a representation be made to the President of the Local Government Board, and to the Secretary of State for the Home Department, urging

that human glanders should be included amongst the occupation diseases scheduled in the Workman's Compensation Bill now before Parliament. And they recommend that no action be taken in the matter.

10. They have still under consideration the reference from the Society that their recommendation as to the reconstruction of the Council (in so far as the financial details are concerned) be sent to the branches for their consideration.

11. They have deferred the consideration of the following resolutions from the branches :—

(a.) From the Northern Branch :—

(i.) The Branch strongly supports the resolution of the Council of the Incorporated Society respecting the payment of first-class railway fares to Branch representatives whilst attending Council and Committee meetings of the Society.

(ii.) With respect to the circular as to the Feeding of Infants, the Branch agrees with the resolution of the Southern Branch, viz., that the distribution of a general circular on that subject by Registrars is undesirable.

(b.) From the North-Western Branch :—

The Branch support the enclosed memorial* on "Medical Inspection of School Children," and that the President of the Board of Education be so informed.

(c.) From the Southern Branch :—

The Branch considers that the distribution of a general circular on "Feeding of Infants," by Registrars, is undesirable.

12. They have considered the following resolutions submitted by

(a.) Northern Branch :—

The Branch considers that the minutes of the Council of the Incorporated Society should be read to the Society at a meeting held the same day as that on which the Council meets.

(b.) North-Western Branch :—

The Branch considers that the minutes of Proceedings of the Council should only be brought up for confirmation, or otherwise, at such meetings of the Society as are held on the same date on which such council meetings are held.

They agree with the views expressed by these Branches, and have resolved accordingly.

13. They have received a report from the Honorary Secretary as to the results of the Elections of Presidents of Branches, and Branch representatives for the ensuing year.

Branches.	Presidents.	Representatives on Council.
Metropolitan ...	Dr. P. Caldwell-Smith (M.O.H. Met. Boro. of Wandsworth).	Dr. W. A. Bond. Dr. R. K. Brown. Dr. L. T. F. Bryett. Dr. S. Davies. Dr. R. Dudfield

* This memorial was drawn up by the Manchester and Salford Sanitary Association for presentation to the President of the Board of Education, and the Branch dealt with it at once, before it was submitted to the Society.

<i>Branches.</i>	<i>Presidents.</i>	<i>Representatives on Council.</i>
Metropolitan(<i>contd.</i>)		Dr. G. F. McCleary. Dr. G. Newman. Dr. O. Field Dr. L. Parkes. Dr. Wellesley Harris. Dr. J. Mitchell Wilson. Dr. J. R. Kaye. Dr. T. W. H. Garstang. Dr. James Wheatley. Dr. Alfred Ashby. Dr. C. Sanders. Dr. Bostock Hill. Dr. George Reid. Dr. J. W. Hembrough. Dr. John Taylor.
Yorkshire	Dr. E. M. Smith (M.O.H. York).	
North-Western	Dr. Alfred Greenwood (M.O.H. Blackburn).	
Home Counties	Dr. J. Meredith Richards (M.O.H. Croydon).	
Midland	Dr. W. J. Howarth (M.O.H. Derby).	
Northern	Dr. W. W. Stainthorpe (M.O.H. Guisborough C.S.D.).	
West of England and South Wales	Dr. J. D. Jenkins (M.O.H. Rhondda U.D.C.).	Dr. F. T. Bond. Dr. J. Howard-Jones.
Southern	Dr. H. Stott (M.O.H. East Sussex C.S.D.)	Dr. L. Stephens. Dr. W. G. Willoughby.
Eastern Counties	Dr. W. G. Savage (M.O.H. Colchester).	Dr. H. C. Pattin. Vacant.
Scottish	Dr. C. Templeman (M.O.H. Dundee).	Dr. A. K. Chalmers. Dr. J. C. McVail.

14. That they have held a special meeting, and received and adopted the following report of the Finance Committee:—

Your Finance Committee report:—

- (a.) That they recommend the payment of £12 14s. 9d. as the balance due towards the expenses connected with the Provincial Meeting held in Bath in July, 1906.
- (b.) That they have received the Hon. Treasurer's Report and the Annual Finance Statement (subject to the Auditor's certificate being received in the latter case).
- (c.) That they have approved for payment accounts amounting to the sum of £322 7s. 0d.

Resolved, on the motion of Dr. R. Dudfield, seconded by Dr. W. A. Bond, that the same be received and adopted.

After the transaction of the formal business, Sir Shirley Murphy said he had now to vacate the chair in favour of his successor, Dr. Davies. It was fourteen years since he was last President, and he came back to hold office for the Jubilee year. It was a great pleasure to him to find the Society not only prosperous in the usual amount of work, but successful in doing what it was intended to do, viz., to promote the efficiency of the Medical Officer of Health as a useful servant of the public. Both the Society and the public were to be congratulated on that. It was desired that the Jubilee year should be a record in the Society's history, and nothing could have been better than the functions which they held.

He thought the Society ought to recognize how very much of the success had been due to the faithful services of Dr. Jones, Dr. Priestley, Dr. Millson, and Dr. Allan. The work of the President was rather formal than otherwise, and it was to the work of the permanent officers that success must be attributed. He had now to ask Dr. Davies to occupy the chair. Dr. Davies was the son of one of the most respected members of the Society, who did some of the best work in Public Health years ago. He was welcome as the son of his father, and he came to them also with excellent qualities of his own. He was one of the most distinguished Medical Officers of Health in this country, and his personal qualities had won him universal affection and regard.

Dr. Davies was then invested with the badge of office. He said that as he would deliver an introductory address next January, it would ill-become him that evening to take up much time in speech-making, but he could not do less than thank Sir Shirley Murphy for his far too kind expressions, and thank the members for the honour which they had placed upon him, and upon the West of England and South Wales Branch of the Society. He recognized the dignity of that chair, representing as it did a Society which had in its hands one of the most important pieces of public work. He felt some difficulty in succeeding so distinguished a member as Sir Shirley Murphy, but he would do all in his power to support the dignity of the chair.

Dr. R. Dudfield moved a vote of thanks to the retiring President. He said it was the third time that Sir Shirley Murphy had held the office. The first time was when the Association was simply one of Metropolitan Medical Officers of Health, and the second time was when the Association was extended to include provincial Medical Officers. The Jubilee year was a peculiarly fitting occasion for Sir Shirley Murphy again to occupy the chair.

Professor Kenwood, in seconding, said the Society was very anxious that in the eventful year of its Jubilee it should be well represented in the chair, and they were fortunate in securing Sir Shirley Murphy as President.

The vote was carried with acclamation.

Sir Shirley Murphy, in reply, said he came back to the chair feeling not altogether fitted for the honour, but he had been so warmly supported by all the members that the year had been one of great pleasure to him.

It was moved by Dr. R. Dudfield, seconded by Professor Kenwood, and resolved unanimously, that the thanks of the Society be awarded to Sir Shirley Murphy for the services he had rendered to the Society as President during the Jubilee year.

ELECTIONS.

The following candidates having been duly nominated, were balloted for and were declared by the President to be unanimously elected:—

AS FELLOWS.

King, Arthur, M.B., C.M., D.P.H., 30, Station Road, Watford, M.O.H. Watford Urban District.
Lennane, G. L., F.R.C.S., D.P.H., Town Hall, Battersea, M.O.H. Battersea Metropolitan Borough.

Paddock, T. D., L.R.C.P., M.R.C.S., D.P.H., Linacre Lane, Bootle, Lancashire, M.O.H. Litherland Urban District.

Robinson, J. Elliott, L.R.C.P., M.R.C.S., D.P.H., 5, Moscow Court, Bayswater, London, W.

Stevens, W. G., L.R.C.P. & S., Renfrew, M.O.H. Renfrew Parochial Board.

Taylor, Gerard, M.A., M.D., D.P.H., 21A, Ledgemere Villas, East End Road, East Finchley, London, N., M.O.H. Berkshire County.

Wilkinson, Edmund, F.R.C.S., L.R.C.P., D.P.H., Major I.M.S., c/o Messrs. Grindlay & Co., 54, Parliament Street, London, S.W., Deputy Sanitary Commissioner, Punjab, India.

Young, A. J., L.R.C.P. & S., L.F.P.S.G., Whitefield, Manchester, M.O.H. Whitefield Urban District.

AS AN ASSOCIATE.

Milroy, A. T., F.R.Met.S., 53, Guilford Street, London, W.C. Proposed by Sir Shirley F. Murphy, seconded by Herbert Jones.

Nominations.—Candidates for election at the next meeting were then duly nominated.

Dr. George Newman read a paper on "Food Inspection."

A discussion ensued, in which the following took part: Drs. W. Colingridge, H. R. Kenwood, Sir Shirley Murphy, Drs. E. Walford, T. C. Nash, W. Butler, S. Rideal, F. E. Fremantle, W. A. Bond, and the President.

At the close of the discussion, on the motion of the President, the Annual General Meeting was adjourned till Friday, November 9th, 1906.

North-Western Branch.—A Meeting of the Branch was held at the Victoria Hotel, Manchester, on Friday, September 21st.

Present: Dr. A. Greenwood, President (in the Chair), Drs. Garstang, Brindley, Buckley, Wilkinson, Hamilton, R. Young, Dearden, Niven, Wheatley, Vacher, Peck, A. E. Thomas, M. Young, and Dr. W. Williams as a visitor.

Letters of apology for absence were read from Drs. J. Fraser, Chronnell, and Jordan.

A letter, dated the 26th of July, from the Hon. Secretary of the Midland Branch, enclosing a resolution in favour of a revision of the Articles of Association, so as to place Provincial members on an equal footing as regards representation and financial adjustment with Metropolitan members, was read to the Branch.

Moved by Dr. Garstang, seconded by Dr. Wheatley, and resolved, that this Branch approves of the resolution submitted by the Midland Branch, and is willing to send representatives to a Conference on the subject. That in the event of a Conference being held, the President and Hon. Secretary, and the two representatives on the Council attend.

The Hon. Secretary then read a paper by Mrs. Sidney Webb, on "The Relation of Poor Law Medical Relief to the Public Health Authorities." After a discussion, in which Drs. Peck, Wheatley, Niven, Garstang, Williams, Greenwood, M. Young, and R. Young took part, it was resolved that the discussion be adjourned until a future meeting of the Branch.

Dr. Herbert Peck then read a paper on "Some Further Experience with the Red-Light Treatment of Small-pox." After a discussion, in which Drs. Vacher, Wilkinson, Wheatley, M. Young, Greenwood, and A. E. Thomas took part, a vote of thanks to the reader of the paper was unanimously carried.

Eastern Counties Branch.—The adjourned Annual Meeting of the Branch was held at Norwich, on October 3rd, 1906. *Present:* Dr. Cooper Pattin (President of the Branch), and Drs. Annington, Beach, Pringle, Richardson, and Savage.

Dr. Savage was elected President of the Branch, and Dr. Cooper Pattin was elected Representative of the Branch on the Council for 1906-7.

Dr. Cooper Pattin opened a discussion on the "Protection and Control of Milk Supplies," giving a resumé of a paper read at the Toronto Meeting of the British Medical Association, which appeared in the Journal for the 22nd ultimo.

All the members present joined in the discussion of the paper, Dr. Savage reading a note on the Examination of Milk, as delivered to the consumer, which showed that a minimum standard of cleanliness based on the results of bacteriological or physical examination was not a sufficient protection against contamination.

The proceedings closed with a vote of thanks to the Mayor of Norwich, for the use of the Council Chamber for the meeting.

Southern Branch.—A Meeting of the Branch was held at the Grand Hotel, Eastbourne, on October 5th, 1906. *Present:* Drs. Stott (President), W. G. Willoughby, and Griffith, with T. Willoughby, A. J. Howard (Manager of Eastbourne Waterworks), and T. B. Rowe (Vice-Chairman of Eastbourne Sanitary Committee).

The Hon. Sec. reported the death of Dr. Ponsford Cann, of Newhaven, and it was agreed to send a letter of sympathy to Mrs. Cann.

A vote of thanks was moved to Dr. Parkinson for his valuable services as President during the past year.

Dr. Willoughby reported that the proposed alterations in the Articles of the Society referring to representation of and payment to the Branches had been again before the Council, and would probably soon be carried into effect.

Dr. Stott then delivered his Presidential Address, on "Diet and the Maintenance of Health," and a discussion followed.

At the close of the meeting the members lunched, by invitation of the President, at the Grand Hotel, and proceeded in carriages over the Downs to Friston, where the pumping station of the Eastbourne Waterworks was visited, the details being thoroughly explained by Mr. Howard. The large reservoirs were visited on the way to Friston, and the return was made over Beachy Head.

PROPHYLACTIC USE OF ANTITOXIN.—An interesting account illustrating the value of antitoxin as a prophylactic in a large school is given by Dr. Shackleton in the *Lancet* for September 15th. Incidentally, he mentions that the diphtheria bacilli were persistently present in one boy's throat for five weeks, at the end of which period he developed small patches of membrane on each tonsil. He had an injection of 2000 units at the beginning of the period, so that the circumstance tends to support the view that the prophylactic effect of the serum lasts about five weeks.

CURRENT PUBLIC HEALTH LITERATURE.

Münchener Medizinische Wochenschrift, Vol. LII.

(No. 44.) An epidemic of paratyphoid. A. Schottelius.

State care of infants in Hungary. A. Szana.

(No. 45.) Prevention of puerperal fever. Lingel. (He would forbid vaginal examinations by midwives.)

(No. 47.) Ants as carriers of typhoid. (G. Mayer describes an experience with some laboratory mice which indicates that ants may carry typhoid infection. Ants had access to the cages of some mice infected with mouse typhoid bacilli, and also to some other cages of sound animals. Soon after the presence of the ants was noticed all the sound animals sickened with an epidemic of mouse typhoid. Plates of culture media over which the ants were allowed to run developed colonies of the mouse typhoid bacilli in a single straight line along the course of the ants, showing that the bacilli must have been retained as bees hold honey material, or else must have been passed in their dejecta. The colonies of other micro-organisms that developed on the plates were in parallel rows, corresponding to the ants' legs. Soon after these experiences Mayer himself developed an acute, brief but quite severe illness from infection with the mouse typhoid bacilli. The latter were found in his stools and urine, and the agglutination test was positive for the mouse typhoid bacilli at 1-250 during the second week. Severe pains in the epigastrium were a prominent feature of the illness, with diarrhoea, chills, slight temperature, and great depression. He was able to be up and about in five days, but the pains did not entirely subside until the sixth week.)

Purification of water. (Hofer states that the water of rivers is purified by the weeds and micro-organisms. He advocates draining organic matters into simple natural ponds. Instead of cementing the bottoms of these tanks the natural-soil bottom should be left, and as large a surface provided as possible. The ponds should be stocked with appropriate plants and fish, and the waters will spontaneously purify themselves without putrefaction of the organic matters. He cites instances where this has been successfully accomplished for isolated establishments or villages. In one the waters from a factory contained 198 mgrams of sugar to the litre, and 100 cm. of such water flowed daily into a pond covering 800 square metres, this residual water being diluted with twice the amount of pure spring water. The sugar was completely destroyed and the nitrogen dropped from 9 to 5 mgram. The supply of spring water was cut off after a time, and the normal biological process was thus suspended. The pool is now scarcely more than a cesspool.)

(No. 48.) Scarlet fever complicated with icterus. O. Gross.

Annales de l'Institut Pasteur (Paris).

Vol. XIX.

(No. 5.) A Variety of Intestinal Infection in Infants. H. Tissier. (The infection was that of *B. perfringens*, which has a powerful fermentative

action. Tissier endeavoured to arrest its growth and action by the antagonistic action of other organisms which by the production of acid check the simple ferments. The organism selected was *B. acidipara-lactici*, an easily cultivated anaerobe; milk is stopped, and glucose, lactose, and starch are given for a few days, when a small amount of peptonized or humanized milk is given. Gradually the normal intestinal flora is re-established.)

Control of Vaccine. C. Guérin.

Attempt to Immunise against Meat Toxins. A. Tchitchikine

Stains for Protozoa. G. Giemsa.

Microbes in Cheese-making. P. Mazé.

Microbes in the Intestines of Infants. A. Rodella.

(No. 7.) Bacteriology of Infective Gastro-Enteritis. H. Pottovin.

Typhoid and Vaccination by means of an Andotoxin. Besredka.

(No. 8.) Ferments of Casein. P. Mazé.

Ammonia in Milk. A. Trillat and Santon.

(No. 9.) Purification of Residual Waters of Towns and Industries. A. Calmette.

Surveillance of Drinking Waters. F. Diquert. (He states that the electric conductivity of a water is a good test for changes in it. This, and the quantitative determination of the colon bacilli, are important points.)

The Prophylactic and Therapeutic Effects on Guinea Pigs of Saline Injections in Cholera and Typhoid. L. Labomondrov (Moscow.)

Bacillus of Eberth. A. Braun.

(No. 10.) The Intestinal Origin of Pulmonary Tuberculosis. A. Calmette and C. Guérin. (The same, H. Vallee, Chief of the Veterinary College, Alfort. They agree that the disease is due to the entrance of virulent tubercle bacilli by way of digestive tract and not by inhalation. Calmette does not agree with Von Behring that the disease of adults is due to infection in infancy. Vallee found in 43,000 tuberculous animals the lungs were affected in 75 per cent of all the localized cases, and in 100 per cent of the general cases, while the liver was intact in 17 per cent. His experimental studies have also shown that ingestion of tubercle bacilli is the surest and quickest way to induce tuberculous infection of the lungs. Also that the germ can pass from the glands connected with the lung. He urges experimenting with young chimpanzees by feeding them with milk from tuberculous cows, in order to estimate the danger of hæmatogenic tuberculous infection of the air passages and connected glands.)

Phagocytosis in the Test-tube. Löhlein.

(No. 11.) Experimental Studies on Syphilis. E. Metchnikoff and E. Roux. (The syphilitic virus probably remains localized for twenty-four hours; rubbing the part inoculated with a salve (10 parts calomel, 20 lanolin) prevented development of infection.)

Experiments by Inoculation of Tubercle Bacilli with the Fat removed. J. Cantacuzene.

Presence of Formic Aldehyde in the Gaseous Products of Combustion, Disinfection by Smoke. A. Trillat. (The amount of the gas generated in the smoke of burning sugar, molasses, damp straw, etc., is sufficient to sterilize objects in prolonged contact.)

Berliner Klinische Wochenschrift.

VOL. XLII. (1905.)

(No. 21.) (May.) Marmorek's anti-tuberculosis serum. (Prof. E. Lewin of Stockholm was sent by the Swedish Government to Paris to examine into the production and action of Marmorek's anti-tuberculosis serum. He spent several months on the mission, and returned convinced that its results justify further trials on a large scale. He states that Marmorek has a record of 400 cases treated by himself or others in various lands, and fully 100 can be regarded as cured. The proportion in 100 cases of surgical tuberculosis was 80 per cent cured or immeasurably improved, without any adjuvant measures. These proportions were about the same as in the numerous cases inspected at intervals by Lewin in Paris, Switzerland, and elsewhere. The serum has no toxic action, as it contains the antitoxins alone. On the basis of this favourable report the serum is being tried now extensively in Sweden, Marmorek having presented him with 2000 vials free of charge. Dr. A. Marmorek was connected with the Paris Institut Pasteur.)

The Red Cross and the prevention of epidemics. Kimmle.

(No. 22.) *Spirochæta pallida* of syphilis and its differentiation. F. Schaudinn and E. Hoffmann. (Also V. Babes and J. Pinea in No. 28.)

Cerebro-spinal meningitis. F. Göppert. (See also Nos. 24 and 25.)

(No. 23.) Preventive measures taken in various countries with regard to poisonous trades. L. Lewin.

(No. 24.) The part played by the bronchial glands in pulmonary tuberculosis. F. Weleminsky (Prague). (Guinea-pigs were infected with tuberculosis at various points. It was found that the infection never occurred through the blood, but always by way of the lymphatics. The bronchial glands seem to be the terminal reservoir, not only for the lung lymph, but also for the lymph from the rest of the body, before it is poured into the blood system. When animals were inoculated in the peritoneum, rectum, or subcutaneously in the groin, at first it seemed as if the infection followed an arbitrary, erratic course, but the discovery of hidden glands showed the regular sequence of the progress of the infection, without an exception, in his last 300 experiments. The bronchial glands are like a kind of heart, into which the lymphatics from all sides discharge their contents, including tubercle bacilli from remote points of entrance.)

(No. 29.) Bactericidal properties of typhoid immune serum. J. V. Elischer and J. Kentzler.

Butter-milk conserve. W. Kassel.

Recent progress in the diagnosis of tuberculosis. De la Camp. (He concludes that the old, classical diagnostic measures are still superior to anything offered in recent years.)

(No. 31.) The bacteriology of fibrinous inflammations of the air passages. (Geshner found *B. diphtheria* in more than three-fourths of his 40 cases of fibrinous rhinitis and in half of 127 fibrinous pharyngitis patients.)

The route of tubercle bacilli from the mouth to the lungs. H. Beitzke.

(No. 32.) Prospects of state measures against trachoma. Greef.

Pathogenesis of pulmonary tuberculosis. F. Weleminsky.

(No. 33.) Interruption of pregnancy in tuberculosis. P. Ruge.

(No. 34.) Tuberculin and immunity. Jurgens.

Bacteriology in the diagnosis of lung disease without sputa. C. A. Bleune.

(He gets such patients to hold a cover glass before the mouth for eight or ten mornings when they cough: the glass is then examined.)

A new test for lactic acid. W. Croner and W. Cronheim.

(No. 36.) *Spirochæta vaccinae*. H. Bonhoff.

Should a mother with scarlet fever nurse her child? B. Salge. (He believes that an ordinary cold in the head, in the mother, is more dangerous for the nursing infant than scarlet fever. Infants under six months are practically immune, he thinks, to scarlet fever, and a preventive serum injection would protect them in case of diphtheria. Breast milk confers the best protection against infections, and there is no reason for taking the child away from the mother in case she exhibits an acute infection. The only disease that contra-indicates nursing is tuberculosis. With this exception, the acute infections are no contra-indication to breast nursing, unless the infection is of an extremely severe type, in which event the secretion of milk would probably cease. He cites a case in detail to prove the correctness of these principles. The milk secretion diminished after the onset of the scarlet fever, but it was easily supplemented by a little artificial feeding, and the amount gradually returned to normal as convalescence approached, and both mother and child were soon in fine condition. He warns expressly against the custom of wiping out the mouths of infants, as this is liable to cause erosions which invite infection.)

Treatment of tuberculosis with Koch's bacillus emulsion. (Pöppelmann has been using this treatment for five years, and his experiences have been invariably favourable. He thinks that it is especially adapted for dispensary treatment of incipient cases. If applied on a large scale he is convinced that it would be a most important reform in the campaign against tuberculosis, stifling the disease everywhere at its inception and at trifling expense, without waiting for the red-tape sanatorium treatment. He combines it with systematic frictions with some preparation of iodine and open-air reclining when possible.)

(No. 40.) Practical value of commercial diagnostic fluids in typhoid. P. P. Klemens (Prague.)

Immunity of the newly born. A. Schutz (Buda-pest). (The protecting power of the child's serum is never higher than that of the mother's serum.)

(No. 41.) Pathology of trachoma. (W. Goldzieher is of opinion that the history of the affection shows an unmistakable connection with gonorrhoea.)

(No. 42.) Behaviour of tubercle bacilli at the point of entrance. P. V. Baumgarten.

Pathogenesis of diphtheria. R. Scheller. (The diphtheria bacillus can survive longer in the nose than in the throat, and apparently healthy persons can harbour the bacilli and be a source of infection to others and to themselves if their resisting powers become reduced from any reason. He has often noticed the development of tonsillitis after operations on the nose and narrates a case in which diphtheria developed after an operation for the removal of a hypertrophied turbinal bone; diphtheria bacilli were found in the nose, almost in pure cultures, during the five days before the operation, on the third day after the operation she exhibited the symptoms of typical diphtheria with false membranes in the throat. It was learned afterward that the patient had been exposed to diphtheria three weeks before the operation. The bacilli had evidently lurked in the nose all this time without causing infection. The operation had increased the disposition to the disease, and infection resulted. This experience suggests that in many cases of throat diphtheria the nose may be regarded as the entering point of the bacilli. Various influences, chemical, mechanical, infectious, or of other nature, might increase the predisposition, as did the operation in this case, and may start a diphtheria process in a bacilli carrier. The practical lessons from this experience are that persons in the environment of diphtheria patients—who are almost certain to harbour diphtheria bacilli in their nose or throat—should avoid all injurious external influences liable to fan the spark into a blaze. Also that the bacilli should be destroyed by diligent disinfection of the nose and throat, without waiting for them to die off spontaneously.)

Prevention of puerperal fever. E. Preiss. (It is suggested that a circular containing information should be given to each pregnant woman.)

(No. 44A.) Four cases of botulism. Collatz.

Determination of lab ferment. U. Blum and E. Fuld.

(No. 45.) Purification of drinking water. (E. Friedemann recommends the Siemens and Halske method of ozonising as the best mode at our disposal.)

No. 47.) Eberth Gaffky bacilli in cerebrospinal fluid in typhoid fever. A. Schütze.

(No. 48.) The bacteriological diagnosis of Weichselbaum's meningococcus. F. Ka'herlach.

(No. 50.) Frequency of primary intestinal tuberculosis in Berlin. Edens.

(No. 52.) Serum treatment in scarlet fever. Campe.

The latest views of typhoid infection. (Kutscher points out that the bacilli may remain in the body for years after an attack. Women seem to predominate among these chronic "bacilli-bearers." Contact infection is assuming more and more importance, and the principles of successful prophylaxis must be the same as for cholera and malaria. The chronic bacilli-bearers should be excluded from such occupations as are liable to spread infection, especially in dairies.)

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THE RELATION OF POOR-LAW MEDICAL RELIEF TO THE PUBLIC HEALTH AUTHORITIES.*

BY MRS. SIDNEY WEBB.

It appears inevitable that the question should shortly come up for public discussion, What is to be the relation of the Poor Law Medical Service to the Public Health Authorities? The two rate-paid medical services already touch at many points. To take first the institutional treatment of disease. In London the infectious diseases hospitals form part of the Poor Law organization, and are paid for out of the Poor Rate. In the provinces these hospitals are provided, if at all, by the local Sanitary Authorities, and are paid for out of the rate under the Public Health Act. In London, these hospitals, though provided originally for paupers only, receive all patients whatsoever, without enquiry as to means, without charge to themselves, and without contribution from relatives. The cost of all patients, who may be of any degree of affluence, is defrayed out of Poor Law funds. In the provinces, on the other hand, the infectious diseases hospitals were not intended for paupers, and these hospitals are, under a recent decision of the Local Government Board, under no obligation to receive paupers. They have in some places absolutely refused to receive them, even on payment by the Board of Guardians. In some parts of the country there is no other institutional provision for infectious diseases than the workhouse, yet no one who is not technically destitute can legally be admitted there, even if he is a positive danger to the community.

Whether or not the "fever" patient is a pauper (subject to all the disabilities of pauperism, and making his relations liable to be sued

* Read before the Incorporated Society of Medical Officers of Health on November 9th, 1906.

by the Guardians for his maintenance) depends to-day partly on whether he lives in London or not; partly on which Authority first gets hold of the case. If the Medical Officer of Health orders the patient into the fever hospital, neither the patient nor his relations have to pay or to become paupers. If the Poor Law Medical Officer (in the provinces) does this, there is often an arrangement for the Board of Guardians to pay the cost of pauper cases, and then the patient becomes a pauper, and his relations are liable to repay. If no such arrangement exists between the Board of Guardians and the District Council, the patient is not a pauper, and his relations are not liable to repay, even if it was the Poor Law Medical Officer who sent him to the hospital. There is a similar conflict as to which diseases entail pauperism and which do not. Lunacy, for instance, is treated in institutions having nothing to do with the Poor Law; yet when a patient is sent thither, even by a non-Poor Law medical man—even against the will of the patient, and against the will of his relations—he automatically becomes a pauper, and his relations are made to contribute. I think it may safely be asserted that this curious anomaly is merely an historic survival. If the provision for institutional treatment of lunatics were being made for the first time now, instead of a century ago, would anyone dream of attempting to recover the cost from the patient's relations, or of making both them and the patient paupers?

This seems complicated enough, but the practice is, as between place and place, even more varied than would be inferred from the law. "We take in *all* such cases," says one Medical Officer of Health, "whether they are paupers or non-paupers; and if they can afford it we expect part payment; but with the paupers we have an arrangement with the Guardians, who pay in full, for their keep and nursing, as well as establishment charges." But what is a pauper? Another Medical Officer of Health reports that he has "always found that the Poor Law authorities refuse to have anything to do with infectious cases," and he frequently admits such cases to the isolation hospital as non-paupers, even from families actually in receipt of outdoor relief. This has to be done, reports a third, because if the Public Health authority attempts to define what is a pauper, when the case is not actually sent by the Guardians, delays occur "in the removal of such patients to hospital, thereby proving a menace to the public health." Moreover, there seems no ground for refusing to the technically destitute, without any stigma of pauperism, that same gratuitous treatment and maintenance which is freely granted,

without the slightest stigma, to those who are better off. For the Public Health authority often—perhaps usually—gives up any attempt to recover the cost of non-pauper cases. "What happens in practice," reports a Medical Officer of Health, "is that wealthy people, or comparatively wealthy people, who desire a private ward, and that sort of thing, are required to pay; and no charge is made in other cases." This course is justified by another Medical Officer of Health on the ground that the very object of providing Isolation Hospitals is to secure "the removal from a community of sources of grave public danger"; and that the policy of gratuitously removing all cases willing to go appears to have so materially reduced the total number infected that an actual saving of public money has resulted."

With regard to tuberculosis—which, by the way, I gather is about the most prevalent of all communicable diseases—in some towns (such as Brighton and Bradford) the patient is encouraged, and even invited and pressed, to enter a Poor Law institution, though this involves his becoming a pauper. I have even heard of a town in which the Poor Law authorities have an arrangement with all the private practitioners in the town, under which these are earnestly requested to telephone to the Union, whenever, in the course of their private practice, they find a case of incipient phthisis in a non-pauper working-class family, in order that such person might, before he becomes seriously ill, be persuaded to become a pauper for the good of the community. In Sheffield, it is not the Poor Law Authority, but the Public Health Authority, which concerns itself with these incipient cases. In that town notification of tuberculosis of the lungs is compulsory, and it is the Medical Officer of Health who has vainly to struggle to improve the sanitation of the homes of these sufferers. But a large number of them pass from time to time into the workhouse infirmaries, and then the Public Health Authority loses all touch with them. Each time they come out temporarily cured they go to a new address, and there seems to be no provision for enabling the Public Health Authority to pick them up again, in order to see that their homes are healthy, until they again fall ill, at a still lower level, when their cases are once more notified. This may happen again and again in the same case. Finally, they pass, in large and increasing numbers, for the last time out of the ken of the Public Health Authority, into that of the Poor Law Authority. Of all the deaths of consumptives in Sheffield, 30 per cent take place in the Workhouse Infirmary.

But it is so obvious that, as one Medical Officer of Health suggests, "phthisis is a disease in which, both for the benefit of the patient and that of the public, medical treatment should go hand in hand with preventive measures," that the Public Health Authority has, in some towns, begun to undertake the burden, without reference to pauperism. At Bristol 20 beds have been provided in a sanatorium expressly for non-pauper cases. In the isolation hospital at Bolton, for instance, there are a few beds for consumptive cases, for which the Public Health rate bears the entire cost. It only adds to the confusion that these beds are, in practice, often filled by persons who have, up to the very moment of admission, been in receipt of outdoor relief, and who, curiously enough, cease to be paupers at the moment when, at about three times the cost to the rates, they become wholly provided for, instead of partially. As a matter of fact, if we want to deal sensibly with tuberculosis, we must provide, at the earliest moment that the disease can be discovered, for a majority of all the patients. "The rational treatment of this disease," writes a Medical Officer of Health, "extending, as it must, over a protracted period, is impossible to any save the well-to-do." This is really incompatible with the ideas of the Poor Law authorities. "If the public dealing with phthisis," says another Medical Officer of Health, "be left entirely to the Guardians, with their test of destitution, any relief afforded will obviously be too late to prevent the progress or spread of the disease. . . . The fact that preventive measures may involve some weeks' stay in an institution arises from the natural history of the disease, and the best-known means of arresting its progress. The object of the stay is not only arrest of the disease in the patient, but, still more, education as to prevention, an education which is to be taken home and disseminated by precept and example. . . . If the destitution test were insisted upon, no cases but destitute cases could be dealt with, and these would be dealt with, if at all," only at an advanced stage, when the patient was incapacitated from wage-earning, and treatment had become nearly hopeless. Even then many would continue to spread the disease. "There is, in fact," a distinguished Medical Officer of Health reports, "a large number of persons who will not go to the workhouse infirmary *even when they have hopelessly broken down*, and when their continued stay at home is a burden and a menace to the rest of the family. When phthisis has once entered a family, if the others are to be saved, it becomes doubly necessary that they should be well fed and cared for, and it is needful that the phthisical member should be isolated. The machinery of

the Poor Law administration does not lend itself well to the colossal task of the suitable isolation and treatment of cases of phthisis, coupled with the adequate care of those dependent upon them." Finally, I may quote the opinion of one of the ablest and most celebrated of all the Medical Officers of Health. "I believe," says he, "that if the treatment of phthisis were . . . deprived of all parochial taint, and the treatment . . . made sympathetic . . . we should be doing more towards the annihilation of tuberculosis than by any other method."

The same confusion between the actual sphere of operation of the Poor Law Authority and the Public Health Authority in the same town; the same variety of practice among different towns; and the same arguments from the public interest in restricting the continuance and the spread of disease, may, of course, be adduced with regard to measles and whooping cough, which account for 6 per cent of our infantile mortality, and no less than one-third of all the deaths of children between one and five years old. These diseases are so often mild, and treated without proper care, and yet so easily communicable in a grave form, even by a case itself mild, that compulsory notification is plainly near at hand. Moreover, as the risk of complications is so great, and as the resulting sequelæ are so serious in after-life, and so detrimental to wage-earning capacity, that the argument for, at any rate, free reception into hospital, if not for compulsory isolation and treatment, is at least as strong as in the case of other diseases. The patients, it must be remembered, are—as these cases are almost always those of young children—not free agents. Somebody other than themselves must decide what is best for them; and in this decision the interests of the public health must clearly have great weight.

With regard to scabies, and other skin diseases—together with affections of the eyes—public opinion has already led to a similar confusion of spheres of operation, and conflict of authorities. In London, children suffering from ophthalmia or ringworm are encouraged and pressed to enter a Poor Law institution, and be maintained and treated out of the Poor Law; and are nevertheless not paupers. At Croydon the Education Committee of the Town Council itself treats all ringworm cases in its schools at the cost of the Education Rate, by the expensive Röntgen Ray process, without distinction of class or stigma of pauperism. Elsewhere in most places, the ophthalmic or ringworm child cannot be institutionally treated anywhere, unless its parents happen to be

technically destitute, even if its state infects all the other children of the school.

Much the same might be said of pediculosis, which is clearly capable of prevention and cure. Under the Cleansing of Persons Act, 1897, the Marylebone Borough Council has treated gratuitously 32,500 patients in seven years. At Hackney, too, the Public Health Department has made a beginning in curing such patients, and the movement, sanctioned as it is by express statute, is bound to grow. "This is a departure from the principle of not treating disease," it is admitted—just as we have seen that the Public Health Authorities have had to depart from this assumed principle in the case of phthisis—"but it has its justification," it is alleged, "in the fact of the contagious nature of such diseases"—a justification to which I shall recur. Meanwhile, it is to be noted that the Boards of Guardians of Holborn and Islington—which places lie just between Marylebone and Hackney—are themselves undertaking the treatment of pediculosis, without attempting to confine their treatment to patients who are technically destitute. I will not attempt to answer the legal conundrum whether persons so treated at the expense of the Poor Rate do or do not become paupers, or whether the cost of such treatment can or cannot be recovered as Poor Law relief from such of their relations as are legally liable for their maintenance.

Passing now to Outdoor Medical Relief, we have a similar chaos. In every district without exception there are now two rate-paid Medical Officers, the one charged to extend his functions gratuitously to as many cases as possible, without reference to "destitution," in order to lower the death-rate—the other forbidden to volunteer his services, bound to confine them absolutely to those who are technically destitute, and urged (very often) to restrict them to as few persons as possible. These two rate-paid officers are, it appears, seldom in communication with each other, even where they might assist each other's functions.

The objection on the part of the Poor Law Authorities to let their Outdoor Medical Officers treat cases that require treatment, but are not technically destitute, is already leading to grave results. I have heard of an instance in a London suburb in which the Sanitary Inspector, finding children suffering from measles unprovided with any medical attendance, because the parents were unable to afford to pay a doctor, advised the mothers to apply for the services of the Poor Law Medical Officer. When such applications were made the Board of Guardians complained, and actually wrote to the Sanitary

Inspector, objecting to such "pauperization." The Sanitary Inspector, I believe, accordingly discontinued the advice; and let the cases remain unattended. This strict adherence by the Poor Law Authority to what it believes to be the "principles of 1834," in the treatment of disease by its Outdoor Medical Officers, is leading to rapid developments, both in the staff of the Public Health Authority and in its practice. The Medical Officer of Health in some boroughs now has under him a considerable visiting staff, having more or less medical qualification, going from house to house deliberately to seek out cases. When the cases are discovered, the Medical Officer of Health is in a difficulty. As one of them says, we find out the cases, and then have nothing to suggest but the parish doctor, "who is so difficult to get hold of"! Sometimes, however, the Medical Officer of Health plucks up courage and goes farther. In the case of small-pox, for instance, which so often "commences in common lodging-houses, and amongst the very poor, the stamping out" of the disease absolutely requires, I am told, the Medical Officer of Health to "take upon himself the rôle of District Medical Officer. . . . When he does not do this, the delay in active measures is so great that the disease spreads amongst other portions of the community." An active Medical Officer of Health reports that he "insisted upon being called in every case, and took the responsibility of determining whether the case should be isolated or not, although," as he says, "it is no part of my duty to diagnose cases for other medical practitioners." It may even be necessary, in the public interest, to provide maintenance for people who are not ill; and this is not infrequently done in London and elsewhere at the cost of the Public Health Department, when families are deprived of the earnings of the bread-winner, removed to hospital; or even when it is necessary temporarily to isolate "contacts," and keep them under observation. Such provision of maintenance, quite apart from what is technically destitution, and without any stigma of pauperism, is expressly authorized by the Public Health Act. This section, indeed, is of far-reaching effect, and would cover a vast extension of Public Health activity. Under it some Medical Officers of Health already supply antitoxin free, on demand, for any diphtheria patient. "There was no hope of the Guardians providing it, and so much of its effect for good depends on its early administration," says one Medical Officer of Health, that the Public Health Authority felt bound to give it, whenever the patient could not afford to buy it. In Blackburn, Manchester, and elsewhere, the Public Health Department supplies bottles of medicine

for certain diseases gratuitously, to all who ask for them. Yet, when the ordinary Medical Officer of Health is asked, he is apt still to reply that there is a clear line of demarcation between prevention, which is his business, and treatment, which is that of the private medical practitioner or of the Poor Law!

But it will be said, the extension of Public Health Authorities from the prevention of disease to the treatment of individual cases, is confined to such diseases as are "infectious,"* or, as some say, "preventable." Even this modification of the old shibboleth takes us a long way. "There is," writes to me a well-known medical authority, "no arbitrary distinction between the diseases which are now regarded as preventable and those which are not known to be preventable; and every year the number of the former will increase at the expense of the former." But I suggest to the Medical Officers of Health that even this shadowy limit to the expansion of their department is about to disappear. Under recent legislation Sanitary Authorities are already finding themselves compelled to provide gratuitous medical attendance for an illness which is neither infectious nor contagious, and, curiously enough, one which it is not desired to prevent. I mean the illness incident on maternity. The Liverpool Medical Officer of Health already pays out of the Borough rate for medical attendance on confinements, where such attendance is ordered by the Midwives Board, and the patient cannot pay for it.† Public Health Authorities are everywhere considering the dilemma in which the Midwives Act has placed them, by not expressly providing who is to pay for the doctor compulsorily called in. Is it likely, in view of a rapidly declining birthrate, that we shall refuse to provide medical attendance for those women who accept the burden and the risk of motherhood?

Exactly the same reasoning, combined with an enormous infantile mortality which is demonstrably "preventable," is inducing Public Health Authorities to give gratuitous medical advice for ailing babies. In town after town, the Medical Officer of Health is getting a staff of Health Visitors, who go from house to house, instructing mothers how to treat their babies, *especially those that are ailing*—how to treat them, how to feed them, how to wash them, how to clothe them, in fact, how to cure them of their ailments. At Huddersfield, at least, some of these Health Visitors are qualified medical practitioners.

* The powers of the Public Health Act—even including the provision of hospitals—are in no way limited to infectious or contagious diseases. The Public Health Authority is legally empowered to treat all diseases.

† This, I am told, is under the powers given by a local Act.

Moreover, in some cases the Medical Officer of Health actually provides sustenance for the starving infants, rather than let them die, or go through the rigmarole of the Poor Law. The most common way of keeping them alive, however, is for the Public Health Department to run a sterilized milk depôt, where the milk is retailed far below cost—perhaps no more than the bare wholesale price, without expenses, is charged—and then the active Medical Officer of Health insists on the babies being produced to him for regular inspection, in order that he may be able gratuitously to advise how the ailing ones should be treated.

Here ends my exposition of the facts. I could give innumerable other cases. In all directions the so-called Poor Law principles in the treatment of disease are being undermined. We still meet otherwise educated persons who declare that the gratuitous treatment of illness at the public expense should be strictly limited to persons who are technically "destitute"; that its cost should, whenever possible, be recovered from relations legally liable, or be made a loan to the patient; and that it should be stigmatized and penalized as pauperism. It would follow that the Public Health Authorities ought to be restrained in all their new activities. On the other hand, it has been suggested that the new departures of the Public Health Authorities are indispensable, and that their action has no "pauperising" effect.

It is, in fact, experience which is compelling the Public Health Authorities every day to extend their functions, advancing from the mere removal of nuisances to the treatment of individual cases, both in hospital and at the patient's home. To quote the epigram of a distinguished Medical Officer of Health, "We have pretty well removed the filth from outside the human body; what we have now to do, in order to lower the death-rate, is to remove the filth from inside." It must, in fact, seem ridiculous, in the campaign of preventing diseases, to take so much trouble to remove muck-heaps and prevent defective drainage, if we leave persons full of phthisical germs, breathing, coughing, expectorating in the midst of densely packed populations, merely because they are living sources of disease, instead of dead. And what is true of phthisis, is true of measles, whooping cough, scabies, ophthalmia, ringworm, pediculosis, and how many more?

Finally, it has been very forcibly claimed that the Public Health view leads to a method of treatment of the individual which is superior to that of the Poor Law Medical Officer—substituting, in

fact, a training in better habits of life for the mere dispensation of physic. The Poor Law Medical Officer, having ascertained that the patient is technically destitute, regards it as his duty to do no more than treat the disease—not to prevent its occurrence in other persons, nor, by securing an alteration in habits or environment, even its recurrence in the same person. In practice, as we know, the treatment too often consists of a “bottle of physic.” The Medical Officer of Health starts out by assuming that his duty is only partially with the particular disease of the particular patient at the particular time. His business is both to remove the disease and to prevent its recurrence, either in the particular person or in any other. To him, therefore, it is vital to secure better habits of life and a more healthy environment; anything that is called Poor Law relief, whether in money or in physic, can hardly achieve so different a point of view.

The question indeed arises, whether two conflicting public medical services, both rate-paid, overlapping, working on diametrically opposite lines, and sometimes positively hindering each other's work, can possibly continue to co-exist. I venture to suggest that the time has come for the establishment in each Local Government district of convenient area and population, of one principal Medical Officer of Health; invariably salaried, and giving up his whole time to his duties; having under him, not only the local Registrars, and the Sanitary Inspectors and Vaccination Officers, but also a qualified staff of Health Visitors, some of whom should be nurses, and others (as at Glasgow and Huddersfield) qualified medical practitioners, finally responsible for the administration of all the local hospitals and infirmaries for different diseases and classes of patients, all having their own several staffs; and controlling also, working in conjunction with these indoor staffs, an adequate staff of visiting practitioners, who should visit all such persons as desire their professional aid and who are reported as physically needing it. All this comes to little more than what is actually being done to-day in those cities which enjoy both an active Public Health Department and an energetic Poor Law Medical service. What seems wanted is concentration of responsibility and direction in the Medical Officer of Health, provided with a competent and duly differentiated staff of salaried assistants. Only by some such machinery can we hope to enforce in all districts the extensive prevention of, and varied provision for, ill-health and disease, now existing in one or two favoured parts of the United Kingdom.

DISCUSSION.

DR. J. GROVES (Isle of Wight) said that if Mrs. Webb were a Medical Officer of Health she would know that, although from the outside it might seem ridiculous that there should be two officers for the public, the matter had no difficulties. He did not, of course, speak for all districts in the kingdom, because the concentrated populations in towns were different from what they were in the rural districts, but he maintained that in the south of England generally there was no friction between the Medical Officer of Health and the Poor Law Medical Officer, and the Board of Guardians and the Sanitary Authority. One of the principles upon which a Medical Officer of Health and the Sanitary Authority, by his advice, act was that the Public Health Authority had to safeguard the public health; and that the public had to pay for that safeguarding. A duke's child might be just as much a danger to the public health as a peasant's child; and if a case of infectious disease occurred in a palace, a Medical Officer of Health would send his disinfectors to the palace as he would to the cottage. If he were told by the owner of that house that it was his own castle, the Medical Officer of Health would reply that the servants, tutors, and governesses were part of the public, and it was with the public that he was concerned. Dr. Groves thought that principle was one which was acted upon generally by the sanitary authorities. They had no regard to persons. Of course, they treated cases when removed to isolation hospitals, and if not removed but simply isolated at their homes they were not treated by the Medical Officer of Health; the ordinary medical man did that, or it might be the Poor Law Medical Officer. If Mrs. Webb had emphasized the importance of establishing isolation hospitals in every district, he thought she would have been a little more practical in the matter. It seemed to him that the Poor Law Officer's duties were altogether distinct from the Medical Officer of Health's duties. The Poor Law Medical Officer had to treat his cases, but directly those cases became a menace to the public health, then they passed over to the supervision of the sanitary authority. He did not think that medical practitioners should go into the isolation hospitals, and, as a rule, the Medical Officer of Health should treat those cases. They had no more than touched the fringe of phthisis, and they were not going to. They might be able to teach every case of phthisis how to live and how to protect his family. To build sanatoria was absurd, and to think of the money wasted in that direction was almost distasteful. It would be a great stride in advance of the present position of phthisis—for these people could be taught about the phthisis—for they would become missionaries to the community. The ordinary Medical Officer of Health did not know about Poor Law and persons being made paupers in order to treat them medically. If there was that difficulty, if they had to make a person a pauper in order to isolate him, then more pressure ought to be brought to bear upon the Local Government Board to deal with the question.

DR. FRANCIS BOND (Gloucester) thought they would all feel that the subject of the paper was a problem surrounded, permeated, he might say, by difficulties of all kinds. Placed as he was very largely in a rural district, he ventured to envy his brothers in the populous districts—where there were more intelligent and liberal-minded people to deal with—the much greater facilities they had to face these problems. Although it might be desirable to place the matter before others, he thought it might be a considerable time before Mrs. Webb's excellent ideal would be realized.

Before they could expect to realize the ideal they must go through a process of education in their own districts. That was absolutely indispensable before they could get those responsible in dealing with these matters to appreciate their importance. It would be a great misfortune if so excellent a paper did not lead to some definite result, which should be the initiation of a comprehensive enquiry into the whole circumstances; and he ventured to suggest that it would be desirable for the Society to place before the Government the importance of the whole subject, with the view to getting it exhaustively inquired into.

DR. COOPER PATTIN (Norwich) said the point he urged was to have the children in the schools taught the dangers of infection by phthisis, and the methods by which it could be prevented. No system of State education was of any value which did not include instruction of that kind. In practice he never concerned himself whether a man became a pauper or not, and he imagined that was the rule with most of them. They must have a co-ordination of the Medical Officers not only in each individual community, but throughout the whole State, and it must be definitely associated with the one centre, a centre as a part of the governing body, a centre in the capital of the county in each district, a principal Medical Officer and a number of assistants, all paid. As to the providing of antitoxin, he re-supplied the Poor Law Medical Officers with the quantity they had used, and he also gave it himself. That was a very economical method of preventing the spread of the disease. It was a broad issue that had been raised by Mrs. Webb, and he congratulated her and the Society on having had it brought so clearly before them.

DR. LOUIS PARKES (Chelsea) expressed the opinion that that was an important matter, because it was going to affect the whole system of Poor Law administration. There was great dissatisfaction with the administration at the present time; everybody said it was unsympathetic. He suggested that the paper should be considered by the Council or Committee, and certain views should be drafted for the approval of the Society as a body, and then, with the approval of the Society, representatives ought to be heard before the Royal Commission on the Poor Law, of which Mrs. Webb was a member. He sympathized very much with Mrs. Webb's points. He thought most of them looked forward to the adoption of the system of health visiting as one likely to have an enormous effect on the death-rate, especially infantile mortality. If necessary, he would move that the paper be referred to the Council, with a view to its consideration and the preparation of evidence to be laid before the Society for adoption, and subsequently to be laid before the Royal Commission on Poor Law.

DR. GROVES remarked that all sorts of charlatans had taken up the question, and the proposal would be a good thing. The question ought to be looked at in all its bearings, and they should not rashly approve of all that was suggested in Mrs. Webb's paper. He thought Dr. Louis Parkes' suggestion was the best one.

DR. REGINALD DUDFIELD (Paddington) said that although they all agreed with much that Mrs. Webb had said, they could not go all the way with her. The functions of the two bodies were totally distinct—those of the Sanitary Authority were really prevention, and not cure. The Sanitary Authority had to do with the mass rather than with the individual, and those two lines were theoretically opposed to each other. There was no relation between the individual and the Sanitary Authority unless the

former was doing something which was dangerous or injurious to the health of his neighbours. That there had been a good deal of overlapping of recent years they could not deny, but that was partly due to our curious system of legislation. If the Sanitary Authorities had been in force when the Registration Act was passed they would have been the Registration Authorities. Personally he considered that treatment was, strictly speaking, outside the duties of the Sanitary Authority. There would be an enormous saving of public expenditure if the two authorities were amalgamated, and although that was against his views—he would like to see the Borough Councils or County Councils, the Poor Law Authorities—he thought it would work exceedingly well in practice.

DR. WILLIAM BUTLER (Willesden) contended that Medical Officers of Health found it impossible to dissociate their work from the treatment of disease. What had they to do in the way of the prevention of typhoid fever if they abstracted from it treatment, because the actual prevention carried with it the implication of effective treatment? In regard to scabies, ringworm, ophthalmia, and other skin diseases which had no natural tendency to cure but tended to grow worse, he had found that over 60 per cent of the cases he had treated had no medical attention when they were excluded from school on account of their infectiousness. How were Medical Officers of Health to deal with such cases? There was a great social loss in the fact that children were losing the good of their school education, for which the people were paying, only because they did not get medical treatment. It was such a scheme as Mrs. Webb had sketched that was wanted, and Dr. Parkes' proposal was the one suited for the Society.

DR. SIDNEY DAVIES (Woolwich) said that he thought Mrs. Webb had shown them that they were all necessarily going in the direction of Socialism. The practical question for them was their connection with the Poor Law, and Mrs. Webb had come at a time when many of them were feeling very greatly disappointed with the Poor Law. They found in enactments that the Poor Law establishments were meant to assist them in the work of Public Health, but Medical Officers of Health found in practice that they did nothing of the kind and almost hindered them. The system may have been a very good one sixty years ago, but it was "rotten" at the present time. Some time ago the legislature had enacted that any person who had Poor Law medical treatment should not be a pauper, but that was not known at the present day, and Guardians in well-administered areas kept that secret, rather confusing the people who did not know that that was the case. It was the greatest difficulty for him to persuade people to take medical treatment, because they thought they would become paupers. He did not think he could go as far as Mrs. Webb did. Instead of abolishing the Poor Law altogether he should like to see something like the Elberfeld system adopted.

DR. MCCLEARY (Hampstead) said in discussing the question they ought to disregard entirely theoretical considerations. The prevention of disease and the physical well-being of the people was their aim. If that was granted it seemed to him that the development of Mrs. Webb's suggestion was so inevitable and so obvious that it was a matter of surprise and regret that the idea should not have been put forward by a member of the Society. They had gone on from the consideration of matters of environment to deal with the hygiene of the person. It was impossible to separate prevention and cure. The most promising development in recent years was the teaching of hygiene. In cases where a mother did

not call in a doctor unless her child was very ill, and where the Medical Officer of Health had to stand by, he (Dr. McCleary) would go and treat the child and say nothing about it, disregarding those theoretical considerations. The work of the Medical Officer of Health at no distant date would be extended so as to include the treatment of measles, whooping cough, and diarrhoea. The Cleansing of Persons Act, 1897, which was a very important Act, was a case in point; it was purely for treatment. Marylebone in the last seven years had treated 30,000 persons suffering from pediculosis, and it was now merely a matter of extending what already existed.

MR. SIDNEY WEBB said it was interesting to notice that every reform was always a long way off until the Bill was brought in, and then it seemed quite near. The Public Health Authorities at this day had any amount of power which they did not utilize. He did not know that the Local Government Board had called attention to the fact that Public Health Authorities were enabled to provide hospitals for anybody, and for any disease whatsoever.

DR. J. R. KAYE (West Riding) suggested that Mr. Loch's very excellent paper at Bath,* akin to Mrs. Webb's paper, should also be taken into consideration.

DR. C. SANDERS (West Ham) expressed the belief that the subject was closely bound up in the amalgamation of the amendments to the Public Health Acts. He was delighted to hear that there was a Bill in a pigeon-hole of the Local Government Board. It was absolutely ridiculous that such a question as Public Health should require one Act for London and one for the country, for their circumstances outside London were exactly the same as in London, and their relations were very much akin to each other. In regard to the 1875 Act, enabling Authorities to provide hospitals, he said that his Authority some years ago took the question to the Local Government Board, and received a biased opinion that although the sections of the Public Health Act were headed "Epidemic Disease in Hospitals," the legal advisers held that those words between the sections formed no part of the Act, and therefore might be unconsidered, and that possibly it might be held that those sections applied to any disease whatsoever. At that time they had considered entering into treatment, but circumstances had altered. He was converted, if he needed conversion, and he agreed with what Dr. McCleary had said, that the dividing line between prevention and cure was a point; that is, it had no parts.

DR. HERBERT JONES (Hereford) said he must protest against one remark Dr. Sanders had made—that the Public Health Acts in London would do for the whole country. That was a mistake they had fallen into nearly all through their Public Health legislation. They had assumed that the same Acts would suffice for rural districts as for towns. They must start, believing that that was absolutely incorrect. It would be utterly useless and absurd for them to have in rural districts the same regulations they had in large towns. Possibly they might have the same regulations in large towns as in London, but they could never administer the London Public Health Act in a rural district. It was only during the last few years that the Local Government Board had realized the difference between a rural and an urban district. It must not be assumed that all Officers of Health agreed with Dr. Sanders that they wanted to abolish the 1875 Act and reintroduce the London Act.

* Vide PUBLIC HEALTH, vol. xviii, p. 673, 1906.

DR. SANDERS remarked that he had been trying to think of any section of the London Act which could not apply to a rural district.

DR. MUSGRAVE CRAVEN (Kendal) said they would find that the London Act was just the Public Health Act of 1875, the Prevention Act, and the Amendment Act of 1875 boiled down together. It was not for the Officer of Health or the District Council to say who should or should not be admitted to the rate-provided hospitals; if a man were refused admission he should send in his bill for maintenance outside.

DR. J. J. CLAUDE said he did not agree with the conclusions arrived at by Mrs. Webb. He was rather surprised that no Medical Officer had referred to the fact that no Local Government Board could over-ride an Act of Parliament. Any patient could go to an infectious hospital provided by the Local Authority, in spite of the Local Authority or Local Government Board.

MAJOR WILKINSON stated that the state of affairs as Mrs. Webb would have it, almost existed in India. There was a State Medical Service and there was no Poor Law, but treatment was provided for all and every, free. The Medical Officer who provided that treatment was called the Civil Surgeon and the District Sanitary Medical Officer, and it was his duty to look after the general sanitary condition of the district, and to supervise the vaccination. In fact, he was almost everything that Mrs. Webb would have him except the Registrar, that being the function of the police. When the question was being considered it might be worth while turning to India to see what was done there.

DR. MEREDITH RICHARDS (Croydon) said he fully endorsed the paper on general principles. He thought it would be better to attempt to organize the present medical service rather than attempt large developments; to unify the work already done rather than enter into a larger scheme. He did not think the present-day medical service was worth having. Sixty per cent got no education at all, and the other forty per cent who paid fees got a pennyworth of advice. It might be said that by suggesting that that work ought to be undertaken by the State they were robbing their medical brethren. On the contrary, as at present organized, the medical work carried out in the poorer parts of England was a disgrace to the profession, and it was absolutely impossible to carry out the work with credit to themselves.

DR. TEW (Tonbridge) drew attention to the fact that there were already such appointments as police and factory surgeons.

THE PRESIDENT (Dr. D. S. Davies) said Mrs. Webb's paper had proved most interesting and suggestive. Her main point seemed to be that the Poor Law was somewhat too unsympathetic and that there was a little overlapping, but he thought that the Poor Law Authority and the Public Health Department did not tend to overlap, and the persons who suffered were those just above the pauper classes. The paupers were attended by Poor Law officers, but there was a class just above the paupers who were left out in the cold, unless they were attended by the Poor Law Medical Officer, which they were very often unwilling to do. Personally, he did not think it was difficult in the majority of cases to draw a distinction between treatment and prevention. The Public Health Department ought not to undertake treatment unless that treatment had the idea of prevention underlying it. Undoubtedly some unification, some alliance between the Public Health and Poor Law Departments was needed; but for the present and for some time, they would have to remain distinct and

separate. If a hospital provided by the Public Authority had fewer beds than were required, the policy of demanding admission would be absolutely fatal, because the first cases which might probably occur in the houses of people perfectly able to pay for attention would fill up the hospital and prevent the admission of persons unable to be isolated at home. This would spread the disease, and the funds paid for the hospital would be wasted. Mrs. Webb had omitted to mention the very important work which all of them had been engaged in—the prevention of epidemic disease, which was neither concerned in the majority of cases with the removal of patients, nor was it the treatment of individual cases. He thought Dr. Parkes' resolution was one they should most certainly adopt. If the Medical Officer were to be any judge of and superior to the private hospitals and infirmaries in his district, it would put him in a very invidious position indeed. So far as there were medical duties and public responsibilities allied to the authorities, and so far as some co-ordination could take place, they must look forward to it in the near future.

MRS. WEBB, in replying to the discussion, said it was practically not her paper but that of the members of the Society, because she had strung together the most epigrammatic opinions which the Medical Officers had written in answer to her queries. Other services had passed through exactly the same evolution that she had suggested for the Medical Officer of Health. She suggested that they should throw over the whole notion of destitution with regard to the treatment of illness. They had already thrown over the whole question of destitution as regarded 60 per cent of the diseases which at present obtained—in regard to lunacy, infectious diseases, infantile mortality to a very large extent, and now to phthisis—and it seemed strange that they should take up a collective position on chargeability, without any stigma of certain diseases, while other diseases brought the stigma of pauperism if they were treated at the public expense. The theory that one could really distinguish between treatment that was not prevention and prevention that was not treatment, was rather old-fashioned. She attached her faith in the future to the Medical Officers of Health, because she believed they had the right end of the stick. The notion of paying by fees for individual cases of illness was all nonsense. What they ought to pay medical men for was to keep them well, and not to pay when they were ill.

The following resolution, proposed by DR. PARKES, seconded by DR. GROVES, was adopted: "That the conference of this Society be requested to consider the propriety of taking evidence before the Royal Commission on the Poor Laws, and, if considered desirable and invited by the Commission, to arrange for such evidence to be given."

A vote of thanks was accorded to Mrs. Webb.

ESCAPE FROM FIRES IN FACTORIES.—Section 15 of the Factory and Workshop Act, 1901, empowers every district council to make by-laws providing for means of escape from fire in the case of any factory or workshop, and by-laws so made are subject to the confirmation of the Local Government Board. Model by-laws have been drawn up after consultation with the Secretary of State. In view of provisions made in Section 14 of the Act of 1901 for factories and workshops in which more than forty persons are employed, the model by-laws have been confined to cases not coming within the limits of that section.

A MILK EPIDEMIC OF DIPHTHERIA ASSOCIATED WITH AN UDDER DISEASE OF COWS.*

By ALFRED ASHBY, M.B. (Lond.), F.R.C.S. (Eng.),
Medical Officer of Health of Reading, Rural District of Wokingham, etc.

In the Rural District of Wokingham, in the county of Berks, there lie two adjoining parishes, in one of which is the compact village of Twyford, in the other the smaller and more scattered village of Ruscombe.

At the census of 1901 there were in Twyford 270 inhabited and 4 uninhabited houses, with a population of 1,106. The corresponding figures for Ruscombe were 74 inhabited and 2 uninhabited houses, and 323 inhabitants. Those numbers probably still hold good for Ruscombe, but Twyford in 1904 had 281 inhabited houses, with an estimated population of about 1,150.

There was a severe epidemic of diphtheria in both those places in 1904. Between February 12th and April 21st of that year there were 17 cases in 13 houses at Twyford, and 8 cases in 5 houses at Ruscombe: 17 of the patients were children from one to thirteen years of age, the other 8 were aged from eighteen to sixty-two. Three of them died, a child aged three on March 24th and a youth aged nineteen on May 2nd at Twyford, and an infant aged one on March 28th at Ruscombe. On May 31st a sister of the young man who died at Twyford, aged seventeen, was ill with diphtheria, but recovered. Up to the end of May, therefore, there had been 18 cases in 13 houses at Twyford.

There was then an interval when the two villages were quite free from the disease until the major epidemic commenced on July 31st, when a lady living in Twyford was attacked with it; then on August 1st her sister, who was staying in the house, on the 2nd her daughter, on the 3rd her husband, and on the 4th her cook fell ill. Thus, within four days five inmates of the house, which is rated at £32, were attacked. The first and three of the other patients were adults, the daughter was six years old. Two other adults living in the same house were not affected.

* Read before the Home Counties Branch of the Incorporated Society of Medical Officers of Health.

The first case of this outbreak in Ruscombe commenced on August 6th, in the person of a man aged thirty-five, living in a house just outside Twyford. The number of houses primarily invaded, and the number of persons attacked by the disease from day to day, to August 26th, are given below :—

Date.	Number of Houses first invaded.	Number of Persons attacked.
July 31	1	1
August 1	0	1
" 2	1	2
" 3	3	4
" 4	2	3
" 5	1	1
" 6	3	4
" 7	3	5
" 8	1	4
" 9	3	3
" 10	4	6
" 11	0	0
" 12	0	2
" 13	4	5
" 14	0	1
" 15	1	3
" 16	4	4
" 17	1	2
" 18	2	3
" 19	5	8
" 20	2	5
" 21	0	1
" 22	0	0
" 23	0	2
" 24	1	3
" 25	0	1
" 26	1	1
	<u>43</u>	<u>75</u>

The patient who was attacked on August 25th had been staying for three weeks in a house at Twyford in which another case commenced on the 24th; he returned to his home in Reading on the first-named day, and was found to be suffering from diphtheria on the 26th.

There were multiple attacks, that is to say, two or more persons

fell ill at the same time, or nearly so, in the same households when the houses were first invaded, in the following fourteen instances :—

Date.	Number of cases.
July 31-August 4	5
August 3, 7 and 8	3
" 3 and 6	2
" 6 and 7	2
" 7 and 8	2
" 7 and 8	2
" 10 and 12	2
" 10	2 and 1 on Aug. 14
" 13, 2 cases—Aug. 15, 2 cases	4
" 16 and 17	2
" 16 and 19	2
" 17 and 18	2 and 1 on Aug. 21
" 20	2
" 24 and 25	2

So far, the average number of cases per infected household was 1·74, and there had been only one death, that of a patient, aged sixty-three, who lived in Twyford, but was in bad health before she was attacked with diphtheria.

The next Table shows the age and sex of the patients and the fatality of the disease :—

Ages— Years.	Attacks.			Fatality in each age-group per cent.
	Males.	Females.	Total Attacks.	
0-5	6	—	6	—
5-10	6	5	11	—
10-15	5	5	10	—
15-20	4	8	12	—
20-25	4	6	10	—
25-30	2	4	6	—
30-35	3	2	5	—
35-40	5	1	6	—
40-45	1	2	3	—
45-50	—	1	1	—
50-55	—	1	1	—
55-60	—	—	—	—
60-65	1	2	3	33·33
66	1	—	1	—
All ages	38	37	75	1·33

Only 36 per cent of the patients were under fifteen years of age, whilst 64 per cent of them were over that age; and of those 43·75

per cent were males and 56·25 per cent were females. One male and two females were sixty-three years of age, and one male was aged sixty-six. Of the total number 38 were males and 37 were females.

Thirty-eight, or just over half of the patients, lived in houses rated at from £10 to £56, whilst 37 lived in houses rated at less than £10.

Twenty-one of the houses invaded were rated at from £10 to £56, and 22, or just over one-half, were rated under £10.

The proportion of the total number of houses rated at £10 and upwards which were invaded amounted to 13·6 per cent, whilst only 10·9 per cent of the total number of houses rated at less than £10 were invaded.

Of the total number of inhabited houses 12·1 per cent were invaded.

Up to August 26th I had received notification of 75 cases in 43 houses. They were distributed as follows :—

	In Twyford.	In Ruscombe.
Number of houses invaded ..	35	8
Number of persons attacked ..	63	12
Average number of cases per house	1·8	1·5
Houses invaded per cent of total houses	12·4	10·8

Although the proportion of houses of the cottage class is greater in Ruscombe than in Twyford—the percentage of houses rated under £10 being 75 in Ruscombe and only 46 in Twyford—the proportion of the total houses invaded was less in the former than in the latter place.

Milk was supplied to the two villages by three dairymen, who may be designated by the letters X, Y, and Z. A few houses in Ruscombe had milk from three farms in that parish.

One of the houses invaded by diphtheria was supplied by X, 15 of them were supplied by Y alone, 17 were supplied by Z alone, and 10 were supplied by both Y and Z.

Of the total number of houses supplied in the two places by X, 3·1 per cent were invaded; of the total number supplied by Y alone, 6·8 per cent were invaded; and of the total number supplied by Z alone, 42·5 per cent were invaded, the mixed supplies of Y and Z being left out of count altogether.

On August 12th, with the consent of Y and Z, I sent a sample of their milk to the Clinical Research Association, Limited, London, for bacteriological examination, for the purpose of ascertaining whether the diphtheria bacillus could be isolated from either milk; and on the 19th I sent up a sample of milk from another of Y's herds of cows for a similar examination to be made.



FIG. 1 is from a photograph of the left side of the udder of one of the worst two cows. It shows that all four teats were badly ulcerated.



FIG. 2 represents the right side of the udder of the same cow.



FIG. 3 shows the left side of the udder of the other of the worst two cows.



FIG. 4 is from a photograph of the right side of the udder of the same cow. FIGS. 3 and 4 together show that all four of the teats of this cow were badly ulcerated.



FIG. 5 shows the right side of the udder of another cow whose teats were affected in a less degree.



5 represents the right side of a cow's udder with the teats slightly affected.

Meanwhile, as a result of my investigation of the behaviour of the epidemic, having become very suspicious that the infection was milk-borne, I had a leaflet printed to the following effect:—

"While it has not been proved that the infection of diphtheria is being spread by milk which is drunk, the present outbreak in Twyford and Ruscombe possesses some of the characteristics of a milk epidemic. It is, therefore, most desirable that all cow's milk, even if taken only in tea or coffee, should be thoroughly boiled before it is drunk. After boiling there need be no hesitation in partaking of milk."

On August 18th I made arrangements for a copy of the leaflet to be distributed by hand to every inhabited house in the two parishes, and that was done on the 19th.

On that day I received reports from the Clinical Research Association to the effect that the diphtheria bacillus could not be found in either of the first two samples of milk which I had sent.

I obtained permission from Y and Z to see their cows with their veterinary attendant, and saw some of Y's on the 19th and the rest of them and Z's on the 20th.

I found that all the teats of two of Z's cows were badly ulcerated, and that teats of three other cows were affected in a slighter degree. I told Z's wife that I considered the milk from the worst two cows, at any rate, ought not to be sold. She said it should not be, and said she would not make any butter at present.

I obtained permission to see all the cows again with the veterinary attendant and Mr. Mitchell, veterinary surgeon of Reading. On August 21st we examined Z's cows in his presence. Mr. Mitchell agreed with me that the supply of milk from those five cows ought to be stopped. I told Z so, saying that I had no power or authority to stop the supply, but that I strongly advised him to do so. He endeavoured to arrange for a supply of milk from an entirely different source. I ascertained that the milk from the worst two cows had been kept out of the supply, but that up to the 22nd the milk of the other three had been used. On the 23rd he began to obtain milk from another place.

On the 20th and 21st I took swabs from the ulcers on the teats of the worst two cows (Figs. 1, 2, 3, and 4), and forwarded them to the Clinical Research Association for bacteriological examination on the 22nd. On the 24th I received reports to the effect that suspicious organisms had been cultivated from all the swabs, and I gave directions that everything necessary to fully identify the nature of those organisms was to be done.

On August 22nd I again examined Y's cows, with the veterinary attendant and Mr. Mitchell. We found six cows affected with an ulcerative condition of the teats, and agreed that they ought to be kept by themselves, and that their milk ought to be kept out of the supply. I saw Y's wife, and strongly advised that that milk should not be sold, and that butter should not be made from it.

I received a report from Mr. Mitchell, of which the following is a copy:—

"On the 21st August, in conjunction with Dr. Ashby, I inspected a herd of cows* at . . . Farm, Twyford. I found five to be affected with an 'infective ulcerative' condition of the teats; two cows were badly affected, and three moderately.

"Also, on the 22nd August, in conjunction with Dr. Ashby, I inspected a herd of cows† at . . . Farm, Twyford, and found two cows to be affected with an 'infective ulcerative' condition of the teats, and also on the same day inspected another herd of cows‡ at . . . Farm, Twyford, and found four cows to be affected with an 'ulcerative (infective)' condition of the teats.

(Signed) "LOUIS MITCHELL, M.R.C.V.S.
"per WHEATLEY & SON."

On the 27th of August I had the udders of four of Z's cows photographed by Mr. Alfred Eustace, of Oxford Road, Reading. The photographs, which are herewith reproduced, give a very good representation of the ulcers on the teats when they were in a healing condition. The ulcers on the other cow had so far healed that I thought the morbid condition would not be shown well in a photograph; but when those of the rest proved to be so distinct, I regretted that I did not have that cow's udder photographed.

The following is extracted from a report on the epidemic which I made to the Rural District Council of Wokingham on Aug. 29th, 1904:

"I have to-day received a report from the Clinical Research Association stating that they have isolated a suspicious organism from the second sample of Y's milk which I sent to them, and I have instructed them to identify definitely the nature of the organism.‡

"Swabs from the throats of some of the patients have been examined bacterioscopically, and the diphtheria bacillus has been found in

* Belonging to Z.

† Belonging to Y.

‡ The report stated: "We have isolated from this milk an organism which shows the morphological appearances and staining reactions of the diphtheria bacillus. The above organism is in pure condition, ready for inoculation into an animal, if further culture tests give positive results."

them. That proves conclusively that the disease which has been epidemic was true diphtheria.

"Taking into consideration all the circumstances of the outbreak, and its unusual behaviour in many respects, there can, I think, be no doubt that it has been a milk epidemic; but whether the infection has been derived from a cow disease remains to be definitely decided.

"I believe the milk influence has now come to an end; and if due care is taken by the public thoroughly to boil all milk before they consume it, and by the dairymen not to supply any butter or cream from the milk of any suspicious cows, there should be no fear of its being revived; but we must expect that in so many infected houses there will be some further contact cases for a little time to come, while it will not be surprising if a few more dwellings are invaded amongst such a nest of houses as exists in The Grove, Twyford, in four of which the disease has already appeared.

"All school influence, which so frequently is responsible for the spread of diphtheria, can be entirely eliminated, as the schools were shut up for the holidays before the outbreak commenced, and during all the time it has lasted.

"The following conclusions may be deduced from the facts and figures I have given:—

"The outbreak was sudden and continuous, was widely distributed throughout the two parishes, without limitation to any particular parts of them, and appeared to have been due to some common cause acting with scarcely any intermission, while the only thing in common between the two villages and between some of the invaded houses which could be imagined to have carried infection, appeared to have been the milk supply. One of the patients was stated not to have gone outside her garden for twelve months; another had not left his house for five weeks before infection. Two or more persons in the same household were taken ill at the same time, or nearly so, on the first invasion of fourteen houses. That is quite unlike the behaviour of diphtheria when spread through ordinary channels, but is frequently observed in milk-borne epidemics.

"Diphtheria is in the main a children's disease; but in this outbreak only 36 per cent of the patients were under fifteen years of age, and 64 per cent, or not much under two-thirds, of them were above that age, 4 having been over sixty.

"The social position of many of the patients, and the rateable value of the house first invaded, and of many other of the invaded houses, were higher than is often the case when diphtheria is the disease

concerned. Larger quantities of milk are consumed, and milk is often stored for a longer time in such houses than in those of the purely cottage class, while cream is often taken in them, so their inmates are more likely to be affected by milk-borne infection.

"The incidence of the disease upon the houses supplied by one of the dairymen was especially high.

"Very many of the cases were extremely mild, and the fatality, so far, has been remarkably low, only 1.33 per cent of the attacks. This is quite in keeping with milk-borne diphtheria, which is less severe and less fatal, in most cases, than the usual form of the disease. The early and general use of diphtheria antitoxin which has been practised must, however, have been partially accountable for the extraordinarily low death-rate.

"Thus it will be seen that so many of the characteristics of milk epidemics, which have been so well worked out by Mr. W. H. Power, C.B., F.R.S., the Medical Officer of the Local Government Board, and other observers, are to be found in connection with this outbreak as to warrant the conclusion I have come to concerning its nature.

"Mr. Power was the first to show, in 1878, that diphtheria might be spread by milk, when he clearly proved that that was the channel of infection in an outbreak of diphtheria in North London, but he was unable to discover how it became infected.

"Since then, as stated by Drs. Swithinbank and Newman in their *Bacteriology of Milk*, more than thirty milk-borne epidemics of diphtheria have been recognized, but there have been recorded only four authentic cases of actual detection of the diphtheria bacillus in ordinary milk, two in 1899, one in 1900, and one in 1901."

After the above was written, an additional reason for assuming the epidemic to have been milk-borne was afforded by its abrupt cessation, with the exception of a few lingering cases, after milk from suspected cows had been withheld from distribution, and printed advice to drink only boiled milk had been distributed throughout the parishes concerned, which advice I had good reason to believe, from numerous enquiries I made personally, was practically universally acted upon; whilst subsequent experience yielded positive assurance of the nature of the disease, inasmuch as six of the patients were affected with various forms of paralysis after their illness, one of the earliest of them in the major epidemic having suffered from very severe general paralysis for over six months. Thus clinical and bacterial proof alike went to show that the disease we had to deal with was true diphtheria.

On September 24th I received from the Clinical Research Association a report from the Lister Institute of Preventive Medicine, signed by Dr. Alfred MacConkey, on inoculations into guinea-pigs of cultures of the suspicious organisms which had been isolated from the second sample of milk from Y's cows, which I took on August 19th, and from a swab from the ulcers on the teats of one of Z's cows, seen in *Figs. 1 and 2*, which I took on August 21st.

The inoculation of the culture of the organism from the sample of milk was without any ill-effect upon guinea-pigs. This negative result showed that the growth was not the genuine diphtheria bacillus.

The inoculation into a guinea-pig of 1.5 cubic centimetres of a twenty-four-hours broth culture of the organism which had been isolated from the ulcers on the cow's teats proved pathogenic for guinea-pigs, causing death in forty-eight hours. That the toxicity of this organism could be neutralized by antidiphtheritic serum was shown by the facts:—

1. That 4 cubic centimetres of a twenty-four-hours broth culture mixed with 1 cubic centimetre of antidiphtheritic serum, and injected subcutaneously, gave rise to no ill effect, except a small local swelling; and

2. That an injection of 3 cubic centimetres of antidiphtheritic serum protected against the subsequent inoculation, twenty-four hours later, with 4 cubic centimetres of a broth culture of the organism.

These results led to the conclusion that the organism from the ulcers on the cow's teats was identical with the diphtheria bacillus, and fully corroborated the conclusion I had arrived at, that the outbreak of diphtheria in Twyford and Ruscombe was a milk-borne epidemic.

Dr. George Dean, Bacteriologist, Serum Department, Lister Institute of Preventive Medicine, has drawn my attention to a paper entitled, "Experiments on the Relation of the Cow to Milk-Diphtheria" by himself and Dr. Charles Todd, late Assistant Bacteriologist in that department, which was published in *The Journal of Hygiene*, for April, 1902, in which they describe how they isolated virulent diphtheria bacilli from an eruptive disease of the udders of two cows whose milk had been consumed by persons who suffered from diphtheria, and by others who suffered from sore throat, probably diphtheritic. On September 28th, 1904, he wrote to me from that Institute as follows:—

"I was greatly interested recently by receiving from the Clinical Research Association two cultures of bacilli from milk and udder. They were sent to have the diagnosis of diphtheria bacilli confirmed by animal experiment. . . . The matter is of especial interest to me,

because Todd and I were the first to isolate the diphtheria bacillus from the udder of cows," as described in the above-named paper, "and this is the only definite confirmation of our observation. It is curious that it should have found its way into my hands. The fact that in the case of the udder it is the genuine diphtheria bacillus was independently arrived at both here and at Chelsea."*

Whether the eruptive disease of the teat was a specific diphtheritic infection of the cow, or whether there was present a specific contagious eruptive condition apart from the diphtheritic infection, cannot now be told; but certain it is that the diphtheria bacillus was present in the pathological lesions of the cow.

That there was a chance of such an infection having taken place would appear possible from the fact that the cowman who milked Z's cows lived in the house in which the first case of the first outbreak of diphtheria at Twyford occurred in February; for, as Dr. Dean remarks, we now know that apparently healthy individuals are not uncommonly the hosts of the diphtheria bacillus. On the other hand, a bad condition was found in one of the cowsheds, where a water-closet cesspool with a loosely fitting stone cover was discovered hidden by the bedding.

After the milk influence seemed to have been arrested a few cases of diphtheria happened from time to time, as I had anticipated. There were 7 cases in 6 houses at Twyford, 2 on August 27th, 2 in the first week of September, 1 in October, an infant aged two months, who died on the 15th of that month, 1 in November, and 1 on December 13th. The last of those cases and another happened in houses in which there had previously been cases of diphtheria.

There were also 7 cases at Ruscombe, which occurred in 3 houses; 3 of them were in September and 4 were in October.

With a view to preventing spread of infection, 45 London children who had gone to Twyford for a holiday were sent home on August 9th; a flower show and a Band of Hope meeting, which were to have been held on August 10th and 11th respectively, were abandoned; acting on my advice, the Rural District Council gave notice to the managers of the elementary schools in Twyford requiring them to close the schools for three weeks from August 30th, on which day they would have reopened in the ordinary course after the summer holidays; proper disinfection was carried out in the houses on the termination of the cases, by Mr. Street of Reading, who disinfected

* Klein had, however, previously inoculated milch cows with the diphtheria bacillus and recovered that growth from eruptions on their udders which followed the inoculations.

all the bedding, etc., in his steam disinfecter; the Council directed Z to discontinue keeping cows in his sheds, and since then he has kept them at a farm outside the village.

I was told that a few of the London children developed diphtheria after they returned home, but I did not succeed in tracing them.

I am much indebted to Drs. King and Young, of Twyford, Dr. McCrea, of Wargrave, and Dr. Robinson, of Sonning, who attended the patients, for much valuable information respecting the cases which they freely gave me.

The evidence showing that the bacillus isolated from the udder of the cow was a true diphtheria bacillus was obtained by Drs. Dean and MacConkey, of the Lister Institute, working independently, the one at Chelsea, the other at Elstree. It is here given in the form in which they have very kindly supplied it to me, and I tender them my sincerest thanks for their most searching and convincing investigation.

For convenience, the experiments are classified together according to the object of the experiment.

Broth and serum cultures marked "953/8 from milk";

Broth and serum cultures marked "992/8 from udder"

were received from the Clinical Research Association for further report. The bacilli in both cases had the morphological and cultural characteristics of the diphtheria bacillus.

TESTS ON THE MILK ORGANISM.

The broth culture received from the Clinical Research Association was used for inoculation.

Guinea-pig. No.	Dose of culture injected.	Result.
1.	1 cc. of "953/8 from milk" sub-cutaneously.	No ill effects.
2.	1 cc. of "953/8 from milk" sub-cutaneously.	No ill effects.

An emulsion of a serum culture made from the broth culture "953/8 from milk" was used.

Guinea-pig. No.	Dose of culture, injected.	Result.
3.	2 cc. subcutaneously.	Scarcely any local reaction.
4.	2 cc. intraperitoneally.	No ill effects.
5.	2 cc. alkaline broth culture.	Animal lost no weight; had a local reaction.
6.	2 cc. alkaline broth culture + 1 cc. antitoxin mixed.	The same result; local reaction perhaps somewhat smaller.

TESTS ON THE UDDER ORGANISM.

The broth culture received from the Clinical Research Association was used for inoculation.

Guinea-pig. No.	Dose of culture injected.	Result.
7.	1.5 cc. subcutaneously.	Died second day.
8.	1.5 cc. subcutaneously.	Died sixth day.
9.	Subcutaneous injection of an emulsion of a serum culture of the organism recovered from the local lesion of guinea-pig 7.	Died second day.
Tubes inoculated from heart-blood remained sterile.		

EXPERIMENTS SHOWING THE PROTECTIVE EFFECT OF ANTITOXIN AGAINST INFECTION WITH THE LIVING CULTURE.

A twenty-four-hours broth culture made from the original serum culture (992/8 udder) received from the Clinical Research Association was used for inoculation.

Guinea-pig. No.	Dose of culture injected.	Result.
10.	2 cc. subcutaneously.	Died second day.
11.	4 cc. subcutaneously.	Died third day.
12.	2 cc. culture + 1 cc. serum subcutaneously.	Very slight local reaction.
13.	4 cc. culture + 1 cc. serum.	Very slight local reaction.
14.	3 cc. serum and 20 hours later 4 cc. culture (24-hours broth).	No ill effects.

Six cc. of diphtheria antitoxin were injected into a guinea-pig, and two days later 2 cc. of an alkaline broth culture (udder 48 hours) were injected into this prepared guinea-pig and into a control guinea-pig. The prepared guinea-pig lived, the control died on the third day.

Guinea-pig. No.	Weight in gms.	Dose of culture injected.	Result.
15.	300	6 cc. antitoxin, 17. ix. 04 + 2 cc. alkaline broth culture 19. ix. 04	Lived.
16.	300	2 cc. alkaline broth culture	Died third day.

PREPARATION OF TOXIN.

Estimation of the minimal lethal dose, and neutralization of toxin by antitoxin.

The bacillus isolated from the cow's udder was planted on alkaline

broth, grown for ten days, and filtered through a Berkefeld filter. The filtrates tested on guinea-pigs gave the result shown in the Table :—

Guinea Pig No.	Weight in grammes	Quantity of Toxin injected.	Weight and results on successive days.				
			24 hours.	48 hours.	3 days.	4 days.	5 days.
17	250	$\frac{1}{10}$ c.c. ...	235s	+			
18	265	1 " ...	250L	+			
19	275	2 " ...	260L	+			
20	260	3 " mixed with 1 c.c. antitoxin ...	270	285o	289o	293o	lived
			? T				

A further test was carried out with a second filtrate of the bacillus from udder, with the result shown in the Table :—

Guinea Pig No.	Weight in grammes	Quantity of Toxin injected.	Weight and results on successive days.					
			24 hours.	48 hours.	3 days.	4 days.	5 days.	6 days.
21	245	$\frac{1}{20}$ c.c.	220M	+				
22	245	$\frac{1}{40}$ "	220M	+				
23	225	$\frac{1}{80}$ "	210s	210M	210M	210L	200L	200L
24	220	$\frac{1}{160}$ "	210M	200M	235M	240M	235M	240M
25	225	$\frac{1}{320}$ "	220s	235M	230M	240M	240M	250M

S = small local reaction.
T = trace of local reaction.
M = medium local reaction.

L = large local reaction.
O = no local reaction.
+ = death.

The post-mortem appearance in the case of all the animals dying as the result of inoculation with the udder bacillus or its toxin presented in a more or less marked degree the characteristics usually associated with diphtheria toxæmia; subcutaneous cedema, in certain cases hæmorrhagic, at the site of inoculation; congestion of viscera, especially of the suprarenal glands, and fluid in the pleural and peritoneal cavities.

From these experiments we see :—

1. That the bacillus isolated from the milk was a diphtheroid bacillus, perhaps an avirulent diphtheria bacillus.

2. That the diphtheria-like bacillus isolated from the udder of the cow was virulent for the guinea-pig.

3. That the post-mortem changes were characteristic of diphtheria toxæmia.

4. That the bacillus produced a toxin of which $\frac{1}{40}$ cc. killed a guinea-pig of 245 grammes in 48 hours. The bacillus was, therefore, of moderate toxigenic power.

5. That diphtheria antitoxin, when given along with, or even 24 to 48 hours before, inoculation with single or multiple lethal doses of living culture, protected the guinea-pigs.

6. That diphtheria antitoxin was capable of neutralizing at least 30 minimal lethal doses of toxin.

We are, therefore, justified in concluding that the bacillus isolated from the udder was a true Klebs-Löffler bacillus.

December 7th, 1905.

Contiguous to the two parishes already dealt with is the extensive parish of Hurst St. Nicholas, which at the census of 1901 had a widely distributed population of 1,006 persons, living in 235 houses.

Hurst suffered badly from diphtheria, in a lingering fashion, from the latter part of April, 1904, to January, 1905.

On April 25th two cases were notified in one of two semi-detached cottages standing quite by themselves; on the 26th there was a case in the other of those two houses; on May 2nd there was a third case in the first-named house, and on the 12th there was a second case in the other. There was then not another case until June 5th, when there was a third case in that house. Ten days later another house was invaded, but, be it observed, not until fifty days had elapsed since the disease first appeared in the second house. Then followed invasions of houses at irregular, and in many cases prolonged intervals, right on till January, 1905. From the beginning to the end of the outbreak there were 31 cases in 23 houses in the parish. Two of the patients died, a girl aged four on August 13th, and a girl aged eleven on August 17th.

A glance at the following table will show at once how different was the behaviour of this Hurst outbreak, as regards suddenness and continuity of attack, from that of the Twyford and Ruscombe outbreak:—

Date. 1904.	Number of Houses first invaded.	Number of Persons attacked.
April 25	.. 1	.. 2
" 26	.. 1	.. 1
May 2	.. 0	.. 1
" 12	.. 0	.. 1
June 5	.. 0	.. 1
" 15	.. 1	.. 1
" 24	.. 1	.. 1
" 28	.. 1	.. 1
July 15	.. 2	.. 2

Date.	Number of Houses first invaded.	Number of Persons attacked.	
Aug. 4	.. 2	.. 2	Schools
" 6	.. 0	.. 1	closed from
" 8	.. 1	.. 1	July 19th to
" 25	.. 0	.. 1	Sept. 4th.
Sept. 28	.. 1	.. 1	
Oct. 14	.. 0	.. 1	
" 26	.. 1	.. 1	
" 28	.. 1	.. 1	
Nov. 1	.. 1	.. 1	
" 9	.. 1	.. 1	
" 16	.. 1	.. 1	
Dec. 20	.. 1	.. 1	
" 24	.. 1	.. 1	
" 28	.. 1	.. 1	
" 31	.. 1	.. 1	
1905.			
Jan. 7	.. 1	.. 1	
" 12	.. 0	.. 1	
" 15	.. 1	.. 1	
" 16	.. 1	.. 1	
	<u>23</u>	<u>31</u>	

With the exception of five adults, all the patients were children under fifteen years of age; so 83.9 per cent of them were under that age, whilst only 16.1 per cent were over fifteen; the corresponding numbers in the Twyford and Ruscombe outbreak having been 36 and 64 respectively. Most of the patients were living in houses of the cottage type. There was no marked incidence of the disease on houses supplied with any particular milk. There was a multiple attack in the house first invaded, but there was only one other multiple attack, and that was more than three months later. The outbreak throughout the parish was not sudden, nor was it continuous; it did not end abruptly, but lingered on, with several prolonged intervals, into the early part of 1905. Most of the children attacked when the houses were first invaded were attending Hurst girls and infants' school. In addition to that, children living in a house on the extreme edge of the parish of Ruscombe, in which the disease broke out in October, and others living in two houses at Winnersh, in which it appeared in November, there being no other houses invaded in that parish, were also attending school at Hurst. All the early

cases occurred amongst young children; no adults were attacked until one was on August 4th, and one on November 1st, and it was not until the fag end of the outbreak in January, 1905, that the other three adults, one of whom was a district nurse, fell ill. The schools were closed on July 19th, and remained so during the summer holidays, until September 4th, 1904; the girls and infants' school was thoroughly disinfected. Three fresh houses were invaded in August, but none were during the fifty days between the 8th of that month and the 28th of September.

All this was unlike, and did not suggest the idea of, a milk-borne epidemic. The outbreak appeared rather to have been due to a succession of cases caused by contact, in some way or other; and I strongly suspected that that was brought about in many instances—though not of course in all—through the attendance of children at the girls and infants' school. Probably there were unrecognized mild cases of diphtheria which escaped medical treatment but were capable of imparting infection.

I have given this brief outline of the Hurst outbreak, because it seems to me that the contrast it affords brings out in bold relief the exceptional behaviour of the Twyford and Ruscombe epidemic.

NOTE.—From recent experience, gained by extensive bacterioscopic examination of swabs from school children during prevalence of diphtheria elsewhere, I now feel convinced that the lingering continuance of the disease at Hurst was mainly due to convalescents and contacts having been carriers of the diphtheria bacillus for prolonged periods.

THE COMMITTEE ON INDUSTRIAL DISEASES.—The Departmental Committee which was appointed to "enquire and report what diseases and injuries, other than injuries by accident, are due to industrial occupations, are distinguishable as such, and can properly be added to the diseases enumerated in the Third Schedule of the Workmen's Compensation Bill, 1906," has begun its enquiry. The Committee proposes to investigate the following diseases and injuries which have been suggested for its consideration, viz., gradual poisoning from the vapour of carbon disulphide, dinitrobenzol, dinitrotoluol, and anilin; gradual poisoning from carbonic oxide gas, sulphuretted hydrogen gas, and chlorine gas; alkaloidal poisoning from African boxwood in shuttlemaking; illness set up by nitrous fumes, hydrochloric acid fumes, ammonium chloride fumes, and sulphur fumes; compressed air illness (caisson disease); chrome ulceration of the skin; various trade eczemas; fibrosis of the lungs from inhalation of silicious or metallic particles (potter's asthma and grinder's phthisis); pneumonia from inhalation of basic slag dust; miner's nystagmus and miner's "beat knee" and "beat hand"; neurosis due to vibration; cardiac dilatation in slate quarries; and glanders. Correspondence relating to the enquiry should be addressed to Frank Elliott, Esq., secretary to the Committee, at the Home Office, Whitehall, S.W. Anthrax, ankylostomiasis, and poisoning by lead, mercury, phosphorus, and arsenic are already included in the Third Schedule of the Workmen's Compensation Bill, and are not, therefore, within the Committee's terms of reference.

THE USE OF PRESERVATIVES IN FOOD.*

By W. ARNOLD EVANS, M.D. (LOND.), B.Sc. (VICT.),
Medical Officer of Health, Bradford.

At the outset it is useful to ask, Why should preservatives of any kind be used at all? I shall not refer in these few remarks to such well-known methods of preserving food as sterilization, pasteurization, smoking, or refrigeration, but confine myself simply to the compounds of boric acid, salicylates, formic aldehyde, sulphurous acid, and the sulphites, etc., in fact, to those substances usually known as chemical preservatives. Speaking in a general sense, the object of adding preservatives to food is to prevent what is commonly described as decomposition or putrefaction, and so to keep foods for a greater time in an apparently fresh condition. That the appearance of freshness is accomplished by addition of so-called preservatives is beyond question, and firmly established by evidence given before the Departmental Committee to enquire into the use of preservative and colouring matters in the preservation and colouring of foods. For instance, the analyst to the Aylesbury Dairy Company showed that milk at a temperature of 60° F. without any preservative would turn sour in fifty hours, whilst with the addition of 4·4 grains of borax per pint it would be sweet at the end of over eighty hours, and that if the boric preservative were increased to double this amount it would not become sour for 110 hours.

Although, as pointed out by Thresh and Porter, chemical preservatives may inhibit the action of enzymes and bacteria, and so prevent such phenomena as the souring of milk, they may be, and are, quite powerless to prevent the growth of many micro-organisms, pathogenic or otherwise. Their use may therefore lead to a false sense of security, by making the ordinary changes of decomposition detected by the sense of taste or smell, and causing the consumer to believe that he is swallowing fresh food, but one which may contain large quantities of micro-organisms, such as the *Bacillus enteritidis* and others known to be concerned in the production of zymotic diarrhoea.

Prof. Delepine has shown that *B. typhosus*, *enteritidis*, and *coli communis* will multiply at a temperature of 65° F. in the presence of 140 grains per gallon of a mixture of borax and boric acid. So that,

* Read before the Yorkshire Branch of the Incorporated Society of Medical Officers of Health at Bradford, October 19th, 1906.

owing to the absence of curdling, a consumer might take a quantity of really stale milk in which pathogenic organisms may have been multiplying for thirty or forty hours, in which if the ordinary signs of acidity and curdling had been present he would have rejected as unfit for consumption. The explanation of the fact that boric preservative delays the production of acidity and curdling in milk appears to be that the activity of the lactic and bacillus which acts on the carbohydrates is affected earlier, or is more sensitive to the presence of boric acid than are those pathogenic bacilli of the typhosus type, which multiply more rapidly in the presence of proteid matter.

But apart from the fact that chemical preservatives inhibit decomposition, and so allow food purveyors to sell as fresh something that is really not fresh, the ingestion of the preservative itself is attended with deleterious consequences. Some observers, viz., Annett, Rideal, Foulerton, and others, have experimented on animals, using rabbits, kittens, dogs, and pigs for the purpose, and all have found that the administration of repeated doses of boric acid and borax have produced temporary disturbances of the function of the digestive organs, as evidenced by loss of bodily weight, and in the case of one set of kittens by emaciation. The evidence given by witnesses who attended before the Departmental Committee prove that a similar effect is produced in man. Some witnesses, e.g., Dr. Wild and Dr. Tubb-Thomas, testify as to the effect upon themselves of the ingestion of boric acid (Thresh and Porter); the former administered to himself doses of 15 to 20 grains of boric acid a day, with the result that after a few days he experienced discomfort after food, loss of appetite, flushing of the skin, and general *malaise*. After three or four weeks there was a severe eruption spreading from the palms of the hands to the body, face, and head. The hair fell off, and nearly the whole skin was reddened and covered with scales. This condition was ameliorated as soon as the drug was discontinued; subsequently the treatment was adopted again, with similar results. Dr. Thomas gave himself boric acid to the extent of 15 grains a day, with the result that vomiting, diarrhoea, headache, and almost complete suppression of urine took place. Mr. Reginald Harrison also, in a letter to the *Lancet* of March 21st, 1903, describes the disturbing effect of boric acid on the digestion of healthy persons and invalids when taken internally, and states it is the only thing he knows of capable of giving him indigestion at almost a moment's notice. The most complete research, however, on the action of boric acid on man is that of Dr. Wiley, chief of the Bureau of Chemistry of the United States Board of Agriculture. He

experimented on twelve men, and his operations extended over 196 days, during which he took careful observations and adopted means to ensure that all the men lived under exactly similar conditions; he sums up his conclusion as follows: "It appears, therefore, that both boric acid and borax, when continuously administered in small doses for a long period, or when given in larger quantities for a short period, create disturbance of appetite, of digestion, and health."

It seems to me not improbable that many cases of indigestion, loss of appetite, and various forms of dyspepsia the cause of which may not be apparent, may be accounted for by the continued administration of preservatives taken with food. It should be borne in mind that only three years ago there was an unusual incidence, chiefly in the North of England, of a malady characterized by skin eruption and peripheral neuritis, which proved on investigation to be arsenical poisoning. Now that the attention of the medical profession has been markedly called to the extent of the use of chemical preservatives in food, perhaps the cause of some apparently inexplicable cases of gastric and intestinal disturbances will be brought to light.

"Rideal and Foulerton found that milk curdled on being heated to 100° C. as soon as the acidity expressed as lactic acid reached the proportion of 0.25 per cent, and they took this figure as the point at which the milk ought to be considered sour and unfit for sale. They found that by adding 35 grains of a mixture of boric acid and borax to a gallon of milk (=to 0.05 per cent), the souring point was delayed, and the milk so treated would remain uncurdled for more than 24 hours at 75° F., whilst without such addition souring took place within that period. Apparently this is the smallest quantity which can be relied upon to keep milk sweet for 24 hours in hot weather."

My experience is that boric acid is only contained in milk produced in cowsheds known to be filthy.

The prevalence of the practice of using preservatives for food is indicated by the evidence given by analysts before the Departmental Committee. Dr. Hill, of Birmingham, found that in milk, out of 1,537 samples, 135, or 8.9 per cent, contained some kind of preservative, whilst Mr. Williams, of Liverpool, discovered only 2.1 per cent preservative milks out of a total of 862 examined; and in Cardiff, 8.5 per cent of the samples of milk taken in 1898 were reported to contain boric acid.

Of the samples of milk examined in Bradford during the past year, only some three or four were reported by the analyst to contain boric acid or borax. However, on two occasions milk purveyors have been

found to introduce a varying amount of borax into the empty milk cans, which are filled from the churns of milk received by train at the railway stations.

In butter, the evidence before the same Committee showed that in Cardiff 44·5 per cent of the samples contained some preservative; and the experiment of the Government Laboratory showed that over 50 per cent of the samples obtained by them from home and abroad were preserved with boric acid.

The question remaining for consideration is, whether or not the Sale of Food and Drugs Act of 1875, as amended by subsequent Acts, is sufficient to cope with the ever-increasing use of food preservatives. In the description of offences in Sections 3 and 6 in the Act of 1875 there is no mention of the word "preservative." The words used being "mix, colour, stain, or powder"; and legal proceedings that have been taken under these sections, with the object of preventing the addition of preservatives, have met with varying results, but it appears to me that generally, when chemical preservatives of any kind, beyond an infinitesimal amount, are discovered in liquid foods action under these sections should be taken.

In reference to milk, the recommendation of the Local Government Board in their circular of July of this year appears to be a good one. The Board recommend that local authorities should notify milk traders by circular, or otherwise, that action will be taken in instances where preservatives are reported in milk, and afterwards treat such practices as actionable.

The treatment of solids, such as hams and bacon, by boric acid is not apparently so serious as the addition of preservatives to milk, for the reason that they are applied externally, and probably to a large extent removed before consumption. In some other solids, however, the preservative may be intimately mixed, in such cases, for instance, as potted shrimps, potted meat, etc., and should preservatives in these be found above the limit allowed by the Departmental Committee, action should certainly be taken. Recently penalties to the extent of over £9 were recovered in the Bradford City Court from shrimp dealers, whose shrimps were certified to contain 88 and 108 grains per pound.*

It may, perhaps, not be a waste of time if I read over the recommendations of the Departmental Committee:—

(a). That the use of formaldehyde or formalin, or preparations thereof, in foods or drinks, be absolutely prohibited, and that salicylic

* See report of case, PUBLIC HEALTH, November, 1906, p. 104.

acid be not used in a greater proportion than 1 gr. per pint in liquid food and 1 gr. per pound in solid food. Its presence in all cases to be declared.

(b). That the use of any preservative or colouring matter whatever in milk offered for sale in the United Kingdom be constituted an offence under the Sale of Food and Drugs Act.

(c). That the only preservative which it shall be lawful to use in cream be boric acid or mixtures of boric acid and borax, and in amount not exceeding 0·25 per cent expressed as boric acid. The amount of such preservative to be notified by a label upon the vessel.

(d). That the only preservative permitted to be used in butter and margarine be boric acid or mixtures of boric acid and borax, to be used in proportions not exceeding 0·5 per cent expressed as boric acid.

(e). That in the case of all dietetic preparations intended for the use of invalids or infants, chemical preservatives of all kinds be prohibited.

(f). That the use of copper salts in the so-called greening of preserved foods be prohibited.

(g). That means be provided, either by the establishment of a separate Court of Reference, or by the imposition of more direct obligation on the Local Government Board, to exercise supervision over the use of preservatives and colouring matters in food, and to prepare schedules of such as may be considered inimical to the public health.

DISCUSSION.

DR. SCATTERTY, while deprecating the introduction of preservatives of any kind in milk, disputed the suggestion that boric acid was injurious to health. He had given, he said, boric acid in considerable doses in cases of cystitis with beneficial effects.

DR. SPOTTISWOODE CAMERON said that that argument could not be considered valid. In certain cases amputation of a leg was highly beneficial to a man, but to a healthy man the amputation of a leg was by no means harmless, and was not to be recommended.

FRUIT GROWING ON SEWAGE FARMS.—Mr. H. H. Marks having asked the representative of the President of the Board of Agriculture in the House of Commons whether any action had been taken, or was contemplated, with reference to the recommendation of the departmental committee on the fruit industry that an enquiry should be instituted in to the alleged practice of growing fruit on sewage farms, and the effect of such a practice on the public health, Sir E. Strachey replied: We have been in communication with the Local Government Board on this subject, and we are informed that no instance of disease attributed to fruit grown on sewage farms is known in the Medical Department of the Board. The information in the possession of the Board indicates that fruit is seldom grown on sewage farms in this country, and there is no confirmation of the suggestion that injury to health is caused by fruit so grown.

DIET AND THE MAINTENANCE OF HEALTH.*

BY HUGH STOTT, L.R.C.P., M.R.C.S., D.P.H.,
Medical Officer of Health, East Sussex Combined Districts; President of the
Southern Branch.

I WISH to-day to bring to the notice of this branch a few notes on the means of preventing the early decay of health or mental vigour, and loss of life from diseases other than infectious diseases, that is, prevention of deaths arising chiefly from errors in diet.

I am aware the subject is a wide one, but if it awakens an interest and discussion it will amply repay me.

I can only briefly refer to this matter in skeleton form, leaving you to discuss and clothe the dry facts. Dr. Osler must have had this subject in his mind when he stated—if there is any truth in the report—that a man is no good after forty.

There is no doubt to some extent he was right. When one studies the annual reports of the Registrar-General, it is absolutely appalling to notice the extraordinary number of deaths due to one disease alone, apoplexy, which deaths in one year numbered 23,507 between the ages of 45 and 65, giving a death-rate per million of 654 for males and 756 for females.

I take the term apoplexy to include all hæmorrhages of the brain due to breakage of a diseased blood vessel.

Now we know the causes of apoplexy are alcohol, syphilis, and uric acid (gout), while in the young, such infective diseases as rheumatism and endocarditis may cause apoplexy.

As Medical Officers of Health, I maintain it is our duty, prescribed by the Local Government Board Order, Section 3 (referring to the duties of a Medical Officer of Health, "He shall enquire into and ascertain, by such means as are at his disposal, the cause, origin, and distribution of diseases within the district, and ascertain to what extent the same have depended upon conditions capable of removal or mitigation") to enquire into all diseases, and not infectious diseases only.

Thus in apoplexy, which is, as it were, a final wind-up of the neglect of precautions with regard to eating and drinking, we have a disease, call it a symptom of disease if you will, which is preventable.

Should dietary be beneath our dignity? I think dietaries for all periods of life are as important as for the early period of life.

* Presidential Address.

Not many years ago it was considered beneath the dignity of a doctor to refer to the infant's food, now it is an all-important factor: each Medical Officer of Health runs his own little book or card on how to feed infants. Why not diets for all ages, pointing out the danger of eating too much proteid matter and drinking too much alcohol?

My own observations lead me to believe we all eat too much; personally, the smallest amount of food suits me best on my long journeys on bicycle or train.

The effect of over-eating proteids causes excess of uric acid, and finally apoplexy. Do we eat too much? What quantity of proteid matter would keep us sound in health and prolong our life? Is our food the best we can get for our money?

Would less adulterated alcohol and purer food tend to prolong life? There is a feeling abroad that the food we eat, or our diet, and what we drink, is not sufficiently considered from a scientific standpoint.

In other words, are we not indolent in the matter of dietary, and ready to believe any experiment, or take the results as granted, of another person's work, rather than take the pains to work out results for ourselves? Should the Medical Officer of Health start a crusade against eating and drinking, as was started with regard to tuberculosis?

If we refer to the experiments by Chittenden on the economy in nutrition, many truths are brought home to us; and, to my mind, his experiments should form the basis of any plans we might suggest with regard to dietary in health.

It is unfortunate these experiments have not been repeated in England, because the difference in climate and temperament might alter some of his results from these experiments.

Chittenden tries to prove that health and vigour are maintained by the reduction of proteid matter taken in the diet from one-third to a half of the usual amount, namely, 118 grains per diem.

With these few notes I think I have shown the need there is for the Medical Officer of Health to take more scientific interest in the matter of diets.

ADMISSION OF TRADE EFFLUENTS INTO PUBLIC SEWERS.—We understand that the whole question of the establishment of a properly equipped Central Board, capable of acting as referees or arbitrators between local authorities and manufacturers in matters of dispute, such as the admission of trade effluents into public sewers, is now receiving the Local Government Board's consideration, and that the Department hope, when an opportunity arises for amending the Public Health Acts, to find it practicable to deal with the subject in the amending Bill.

LOCAL GOVERNMENT BOARD (MEDICAL OFFICER'S) REPORT, 1904-5.

THIS Annual Report, the arrival of which is always welcomed by Medical Officers of Health who desire to be in the first row, preserves both its old form and its customary high standing. The Introduction by Dr. W. H. Power summarizes very clearly the leading features of the volume, and, as such an Introduction should always aim at doing, stimulates readers to dip into the body of the volume itself for further details.

Of the reports of the Board's Assistant Medical Officers, probably the most striking is that relative to the administration of the district of Preesall-with-Hackinsall, a district with an area of 2,900 acres and a population of less than 1,500, which was in 1899 elevated by the Lancashire County Council from a parish in the Garstang rural sanitary district to the character of a separate urban district. This aspiring parish prevailed upon the County Council to promote them, it would appear, by arguments that the district suffered from lack of sanitary supervision, having, for example, no proper water-supply and no sewerage system, and the local magnates promised to put these matters right if the County Council would constitute them an urban district with, of course, a corresponding advancement in statutory and other powers. Dr. Spencer Low, however, on visiting this urban district, found that five years of existence had passed by, and practically no improvement whatever had been made in its sanitary condition. Dr. Low indicts this Council most strongly, and cites a number of instances in which they have seriously failed to carry out the duty of safeguarding the public health. The remarks of the Chief Medical Officer of the Board on the creation of small urban districts are decidedly worthy of consideration by all far-seeing County Councils. It will doubtless be a matter of surprise to many to learn that in the Census year 1901 no fewer than 215 urban districts (about one-quarter of the whole of those in the country) had a population under 3,000. Frequently in such small districts the salaries offered are such as will not command competent officers, and the rateable value is such that the expenditure necessary for water-supply, sewerage, disinfection, hospital accommodation, etc., is more than it can afford, with the result that these unproductive works are relegated to second place, and such things as electric lighting, tramways, and even road-making are put in front of them. Of course the constitution of a separate urban district by the County Council does not mean that the County Council thereby throws the reins on to the horse's back, and it is therefore with all the greater surprise that one learns that in a county so well administered as that of Lancashire, conditions such as these should have been allowed to exist for so long a time.

On the subject of public vaccination it will be gratifying to learn that the numbers showing acceptance of vaccination have steadily advanced year by year since 1898, to the present figure of 75.4 per cent of the registered births. This is all the more satisfactory in view of the fact that during the last couple of years the stimulus usually exerted by the presence of small-pox has been more or less absent.

All those who are concerned in any way with the administrative control of populous areas containing a small-pox hospital will read with interest Dr. Reece's report on the outbreak of small-pox in Liverpool, and that by Dr. Buchanan on a similar epidemic near Gateshead, for in both of these reports the ever-recurrent question of "aerial convection" is dealt with, and what is coming to be known as the Local Government Board's view receives further confirmation. But the arguments used will by no means carry conviction to all, and this is particularly so in the Liverpool case. One really must look for some stronger proof of such diffusion of disease than is afforded by the mechanical construction of spot-maps. In the preparation of the spot-maps contained in these reports, one would like to know whether every case which had been traced to any other reasonably applicable source of infection has been excluded. If not (and it would appear that such cases have not been excluded), one would like to know why they should go to prove the case for aerial convection. The fallacy of relying upon spot-maps at all is clearly shown by Dr. Hope's contra-report, in which such a map is given, showing the incidence of the disease around Netherfield Road Hospital, an institution which has not for many years been used for the isolation of small-pox, but which, nevertheless, on the spot-map basis, would appear to have been responsible by "aerial convection" for quite as many cases as the other hospitals directly indicted in the Local Government Board Report. Apart from the spot-maps, the evidence as to aerial convection is distinctly thin. One would really think that the repeated failures in the courts to establish this theory to the satisfaction of judges accustomed to weigh and sift evidence would have not merely scotched it but killed it years ago. *Post hoc ergo propter hoc* will always be bad logic.

The auxiliary scientific investigations are the kernel of the Report. Dr. Klein submits a further report on the transmission of plague in the rat, and at the outset combats Hankin's theory, that the flea is a real intermediary host of plague, in much the same fashion as that in which the mosquito is host to malaria; such a theory indeed seems unnecessary in view of the frequent occurrence of cutaneous inoculation of *B. pestis* both in human beings and in the rat, accidentally and otherwise. Dr. Klein does not deny to the flea some part in the transmission of plague, but appears to restrict it to a mere carriage of bacilli from one rat to another, or from them to man, and his article is therefore one which aims at assigning their proper rôle to the different modes of transmission. Commencing with the discovery of the bacilli in the small intestine, kidney, and lung of rats, Klein goes on to state that the bowel discharges, urine, exudations from the air passages and lungs, are naturally found to be infective. In regard to the lungs, it would appear that in the case of rats dying rapidly of acute plague, the evidence of the presence of bacilli in the discharges is in the main negative; but it is quite the other way in the case of rats which do not succumb for five or six days. Carrying these facts further, Dr. Klein has proceeded to apply them to every-day conditions. First, in the matter of the transmission of infection by food, Dr. Klein alludes to the negative results obtained by himself and others, on feeding susceptible animals with plague cultures, and with the fresh organs of animals dead of plague. Suspecting that these failures were due to the destruction of the *B. pestis* by the stomach juices (a parallel instance of which occurs

in the case of fowl cholera), Klein performed a series of experiments, feeding rats on a mixture of well-dried glycerin and agar cultures, and with wheat and rice mixed with minced-up plague organs and with gelatin cultures, all being allowed to become thoroughly dry. Of animals fed thus a considerable percentage become infected in the ileum, at or about Peyer's glands, and Klein concludes from these experiments that the protection afforded to the bacilli by the outer dried shell of material in which they were enclosed was the cause of this infection.

If it will be remembered that Hankin, when experimenting for the Indian Plague Commission, found that the vitality of *B. pestis* in soil was of very short duration, and thus led to the framing of the theory that the persistence of plague infectivity in rooms and streets after infected persons, etc., had been removed, was due to the retention of the contagium by rats and fleas. Dr. Klein discounts Hankin's experiments, as having been made with *B. pestis* distributed in soil in the form of a broth culture, and has determined the vitality of the organism under conditions more nearly approaching those in which it would naturally find access to soil, viz., in blood, bubonic discharges, mucous expectorations, etc., and has further investigated the vitality of the organism when distributed in the same manner amongst wheat, rice, etc., under conditions which would naturally occur in food stores, granaries, larders, etc. His experiments show that *B. pestis* may remain virulent in earth and sand for more than seven or six weeks respectively. His main conclusion is that transmission by fleas is, under natural conditions, the exception rather than the rule.*

Dr. Houston has continued his enquiries into the bacteriological contents of water, with a view to determining whether *B. coli* when present in water owes its existence therein to human or other contamination. In the case of deep-well waters drawing their supply from distant and pure sources, typical *B. coli* and other organisms of the same class are stated to be so rare as to be practically negligible. In the case of upland surface water, where possibility of human contamination may to all intents and purposes be excluded, and the only source of pollution is that by means of the excrement of birds, fish, etc., he again found *B. coli* and coliform microbes to be practically absent. Of samples taken from Loch Ericht, which is practically free from sewage pollution, or any other source of contamination apart from the excreta of birds, sheep, and deer, but which contains trout in very considerable numbers, 80 per cent of samples, each consisting of 100 c.c., were proved to be free from *B. coli* or similar organisms. Therefore it may be concluded that the fear of vitiation of bacteriological results owing to the presence of fish in such waters is one which need scarcely be entertained. So far as Dr. Houston's results go up to the present, given a water relatively free from external sources of pollution, the continued existence in such water of fish would not be likely to cause it to contain any proportion of *B. coli* such as might lead the bacteriologist to pass an unfavourable opinion upon it, judging by the results of his analysis.

In previous years Dr. Houston has investigated the bacteriological contents of human faeces, from the point of view of contamination thereby of water-supplies. These investigations he has now carried forward, in order to determine whether it is possible to distinguish between

* In this connection the experiments and conclusions of the Plague Commission recently published in a special number of the *Journal of Hygiene* should be studied.

organisms such as *B. coli*, *B. enteritidis*, *sporogenes*, etc., as present in human excrement and in cow dung. In reference to the first two organisms named he is unable to distinguish between the human and bovine varieties, but as regards streptococci he is able, by the use of raffinose and mannite media, and by the production or not of fluorescence in neutral red broth, to distinguish clearly between human and bovine pollution. In comparing the bacterial contents of cow dung with those of milk, he finds that many of the streptococci of cow dung differ considerably from the streptococci otherwise present in milk, and that there is also a small difference between the *B. coli* of cow dung and of milk. He therefore cautions bacteriologists against drawing wrong conclusions from the quantitative results of milk examination.

Dr. Mervyn Gordon has devoted special attention to the examination of particles of human skin and scurf, with a view to determining whether these contain any organism so specifically identified with human epidermis as to enable one to detect in the air, skin particles detached from the human body. He had previously found a number of staphylococci present in particles of skin and scurf, that which occurred in the greatest abundance being the *Staphylococcus albus*, which he believes to be identical with the organism described under that name by Dr. Welch, of Boston, U.S.A. This organism is so frequently present in the skin of the cheek, forearm, hand, and scalp, that it may be regarded as characteristic of these parts: it is, moreover, one which is absent from air not subject to contamination derived from human beings. Indeed, the exposure of six agar plates in three different districts of the Metropolis, whilst no person except the observer was in the locality, gave negative results as regards this skin staphylococcus. In the case of the air of a barber's shop, samples being taken during working hours, the skin staphylococcus was obtainable. In the case of an operation theatre control tests made immediately before the theatre was used gave negative results, but yielded positive results when the theatre was in use. The number of experiments made was only small, but Dr. Gordon regards them as tending to show that the staphylococcus test is applicable for the purpose of detecting the presence in air of particles shed from human skin. It would be interesting to have observations of this character carried out in the vicinity of small-pox hospitals. The particular staphylococcus referred to is not only an occupant of the surface layers of the epidermis, but is also present in the deeper layers, and has frequently been found present in operation wounds, sometimes causing suppuration of a drainage canal or a stitch abscess, and in one case of laparotomy was apparently the cause of a peritonitis which started from a part of the peritoneum adhering to the inner edge of the wound. A much more minute examination appears to be necessary, however, before it can be asserted that the staphylococcus which is normally resident in the skin is responsible for these diseased conditions, and it is sincerely to be hoped that experiments will be conducted to differentiate them.

The final portion of the Report is devoted to a record of Dr. Alan Green's experiments on the preparation of calf lymph with glycerin and chloroform. Dr. Green finds that it is preferable to use chloroform in the beginning, to remove extraneous bacteria, and only to add glycerin after the complete removal of the chloroform. Fifty-six vaccines have been prepared and issued to public vaccinators, yielding in the vaccination of over 56,000 persons a high proportion of case and insertion successes.

NOTES ON THE MIDWIVES ACT.

THE Central Midwives Board met, for the first time since the summer vacation, on October 11th, at Caxton House. Dr. Champneys took the chair; Miss Paget, Miss Wilson, Mrs. Latter, Mrs. Fordham, and Mr. Parker Young were also present.

The report of the August examination showed that out of 245 candidates, 192 passed, and 53 failed—124 passed out of 148 from London schools, 27 of 33 from provincial, 5 of 7 Scotch, 5 of 6 Irish, and 31 of 50 private tuition.

One midwife is appealing to the High Court, against the decision of the Board to remove her name from the roll; the Board will be represented at the hearing of the appeal.

In five penal cases, midwives were cautioned as to their future conduct. In one the midwife had been censured by the coroner for failing to call in medical aid to a child, which died shortly after birth. In another the Infant Life Protection authorities had reported a midwife for allowing a child to be placed out to nurse within 24 hours of birth; this being held to infringe rule E 11, which makes the midwife responsible "for securing the comfort and proper dieting of the mother and child during the lying-in period." Twenty-three other charges were to be heard on November 8th.

The recommendations of the Standing Committee, in reply to a letter from the clerk of the Privy Council, as to amendments proposed by the Council to the new draft of rules proposed by the Board, were unanimously carried:—

1. That the Board do not see their way to acquiescing in the amendments suggested by the Privy Council with respect to the Poor Law institutions.
2. That the resolutions referring to the number of cases qualifying institutions or teachers for approval by the Board were framed merely for their own guidance, and were of a tentative nature only. The Board did not wish them to be stereotyped in any way, and do not consider that they are "Rules" within the meaning of the Act requiring formal approval by the Privy Council.
3. That the suggestion that a new Rule should be made imposing upon midwives the duty of notifying to the local supervising authority every birth occurring in their practice has already been considered by the Board, who thereupon resolved that in their opinion the matter was one for legislation, and not for a Rule of the Board.

These recommendations are in accordance with our note on page 47 of the October number.

In reply to a letter from the Secretary of the Royal Commission on the Poor Law and Relief of Distress, the Board considered, inasmuch as their Rules were at present under revision, that the time was inopportune for nominating a witness to give evidence as to their attitude toward Poor Law institutions. This may be so; but, if no other occasion offers, it would be better to seize an inopportune chance, than none, of preventing the damage likely to be done if the Commission uphold the above views of the Privy Council, which appear to them and to us so undesirable.

One hospital in Madras and two medical men were approved for instruction in midwifery; five applications were refused.

ANNUAL REPORTS.

County Borough of Derby, Dr. W. J. Howarth.—Number registered in the year, 58; certified by practice, 37; records of sending for medical aid 58; notices of still-birth 33; notices of death of child before arrival of medical man, 4; death of mother 0; midwives reported to the Central Midwives Board, 0. The Act is administered by the Sanitary Committee, acting through the Medical Officer of Health. Neither the Sanitary Committee, nor, except in special cases, the Guardians, will hold themselves responsible for payment of fee when medical aid is summoned.

City of Manchester, Dr. Niven; Executive Officer, Miss M. M. Smith, M.B., D.P.H., under a Midwives Supervising Committee, appointed by the City Council.—Number registered in the year, 174; certified by practice, 74; births attended by midwives only, 10,233; cases of puerperal fever out of above, 51 (13 attended by midwives certified by practice); deaths from puerperal fever out of above, 14; suspensions on account of puerperal fever, 27; records of sending for medical aid, 769; notices of still-birth, 263; notices of death of child before arrival of medical man, 34; death of mother, 0; reported for negligence to the Central Midwives Board, 2; suspensions *sine die*, 3; retirements from practice, 9; unregistered women practising as midwives, 6. Of 82 women notified as suffering from puerperal fever, 39 were removed to Monsall Hospital, 14 to other institutions, and 29 remained at home.

The treatment at Monsall Hospital is thorough in the extreme, as described in an interesting sub-report by Dr. Knyvett Gordon. On admission patients are taken to the theatre and examined, swabbed for bacteriological examination, and in 34 out of 39 cases forthwith curetted, the raw surface being thoroughly disinfected with pure Izal. Antistreptococcic serum in large doses was then injected in 26 cases, anticolic in 4, the colon bacillus being not infrequently found, and now by a new method detected within twelve hours. No untoward symptoms have resulted. Patients are not discharged until fit for house work. Most of the cases attended primarily by medical men developed within three days of confinement; those by midwives not for four days, and often longer, pointing to infection after delivery.

Apart from Dr. Merry Smith's extremely interesting sub-report, Dr. Niven, in a valuable discussion of the Act, makes the following useful suggestions:—

1. Publication by the Board, and local control of institutions and officers authorized to give instruction.
2. A statement to the Local Supervising Authority by the Board of the grounds on which their decisions are made in penal cases.
3. Less reluctance to report cases to the Board (a suggestion with which we do not entirely agree, holding it better for the Local Supervising Authority and its officers to exercise their considerable moral powers and to reserve the extreme but limited powers of the Board to the last).
4. Authorization (as given in Manchester) to the Medical Officer of Health to exercise suspensory powers in the intervals between meetings of the Midwives Supervising Committee.

5. Notification of all still-births registered by the Parks and Cemeteries Committee and the Registrars of Cemeteries.

6. Application to the Local Government Board for sanction (as given to Manchester) to a payment by the City Council of a £1 fee for medical aid, summoned by midwives in the case of poor persons, as strictly defined under Sect. 133 of the Public Health Act, 1875.

7. The definition of puerperal fever, as drawn up by a sub-committee, including Sir W. J. Sinclair, of the North-Western Branch of our Society, as follows:—

“For the purpose of the Notification Acts, 1889 and 1899, the term ‘puerperal fever’ shall include all cases in which, within seven days after the birth of a child, alive or still-born, the mother shall have a rise of temperature exceeding 100·4 F., with quick pulse, maintained for a period exceeding twenty-four hours, without any obvious cause other than the puerperal state. It shall also include all cases in which, within seven days after the birth of a child, there has been the occurrence of a rigor (with attendant illness) without any obvious cause other than the puerperal state.”

It will be noted that this definition includes most cases of puerperal eclampsia. But there is much evidence to show that these are at least in danger of imparting infection, and so should require disinfection and quarantine for forty-eight hours of the attendant midwife.

We venture to suggest the use of the word *quarantine*, for the action taken with midwives in these cases, rather than suspension, which conveys a suspicion of negligence, not always deserved.

In the issues for August and October we have analysed all but section E of the revised Rules of the Board, now under consideration for issue next February.

Section E.—The sub-heading is now amplified as follows: “Directions to midwives concerning their person, instruments, etc.; their duties to patient and child, and their obligations with regard to disinfection, medical assistance, and notification. (*For explanation of medical terms, see page 41.*)” To this explanation or glossary we have already referred. For properly trained midwives it is mostly superfluous, whereas those certified by practice probably do not understand how to interpret an unknown meaning by the use of a glossary; and for these it is probably best, as done at Portsmouth and elsewhere, to issue with the Rules a simple account of their duties in plain language. The original Rules were practically the old London Obstetrical Society rules, and so fitted for trained, not for untrained or illiterate, women. They have been revised to some extent, and represent a not wholly satisfactory compromise.

The following quotations are from the revised draft, the words in italics being new to the present draft. Words from the old Rules, now omitted, are given in brackets.

1. As to dress: “A midwife who is attending any case *which is septic or in which there are foul-smelling discharges*, must not go (direct) to another case without” changing, etc. This will prevent nurses going direct from a case of ulcerated legs to a confinement. Several suggestions to specify the material of dress and apron were negatived.

“Such appliances (2 [a] below) as she may have had occasion to use (and is obliged to take with her). *For list of appliances see 2(a).*”

2. “Must take with her *in a bag or basket furnished with a washable lining*:—

(a). “An appliance for giving vaginal injections, a *different* appliance for giving enemata, a catheter, a pair of scissors, a clinical thermometer, and a nail-brush.”

“The Local Supervising Authority may, in the case of untrained midwives, use its discretion with regard to insisting upon the carrying of a catheter, and appliances for giving vaginal injections.”

This meets the objections of those who fear the danger of encouraging vaginal douches, and the use of catheters by incompetent hands, and those who see the uselessness in many cases of insisting on a thermometer. But it still allows a Higginson syringe to be used for vaginal douches; and suggests that douches may be given in normal cases.

“(b). An efficient antiseptic for disinfecting the hands, etc.”

“(c). An antiseptic for douching in special cases.”

[(d). An antiseptic lubricant] is omitted. Despite expert opinion to the contrary, this omission seems to us unfortunate. Lubricants are practically always used in general midwifery; an antiseptic lubricant should be carried, preferably in a collapsible tube; otherwise untrained midwives will often use lard or septic vaselin.

These paragraphs do not carry out the suggestions made for full and definite instruction as to antiseptics and methods of disinfection, which are better left to the Local Supervising Authority, if, as should be the case, that authority makes proper arrangements for the carrying out of the Act. A suggestion that vaginal apparatus and nail-brush should be disinfected before use has been similarly negatived.

3. As to disinfection of hands, this paragraph is re-arranged. It does not include a suggestion made as to disinfection, after, as well as before, touching the genital organs. The same omission applies to 4.

4. Instruments are to “be (properly) disinfected, *preferably by boiling.*”

5. As to disinfection of a midwife after attendance on a case of puerperal fever, the only change made is, that the disinfection is to be done “to the satisfaction of the Local Supervising Authority,” not “of the Local Sanitary Authority” as hitherto. This avoids some possible conflict of authority, and does not remove the duty of the Sanitary Authority to take action under the Notification Acts. The following objections were over-ruled:—

That all washable clothing cannot be boiled.

That it was unsatisfactory to specify stoving and exposure to the air.

That it would be well to give power to place a nurse in quarantine, a power which, it may be pointed out, is expressly suggested by Section 8 (3) of the Act, and practically secured by the above rule so far as is fair to the midwife.

That disinfection should extend over at least a week.

That puerperal fever should be defined. As to the last point, the definition given in the glossary at the end of the new Rules, although useful for midwives, is too far-reaching for accuracy, viz., “Fever in childbed of lying-in; blood poisoning.” This certainly will not be adopted by medical men and trained nurses, despite its official sanction. We have already given the definition which seems to us most accurate, and has been adopted in Manchester.

In our next issue we will discuss the rules for “Duties to patients.”

INFANTILE MORTALITY.

DEPUTATION TO THE PRIME MINISTER AND PRESIDENT OF THE LOCAL GOVERNMENT BOARD.

A DEPUTATION representing the National Conference on Infantile Mortality, held last June, waited on the Prime Minister and the President of the Local Government Board on the 22nd of November, at 10, Downing Street, to urge the necessity of Government action in reference to infantile mortality.

Bailie W. F. Anderson, of Glasgow, submitted the resolutions passed by the Conference.

Sir H. Campbell-Bannerman, in reply, said that as the question was one on which all were agreed, he hoped the Government would not be found to fail in any effort they might make to face, and, if possible, to overcome the monstrous evil which the Conference had revealed. He hoped that whatever the Government could do, it would not be slow to do it.

Mr. Burns said that as President of the Conference which appointed the deputation, he was pleased to welcome its members. It was in the responsible position of President of a Department which had promised to assist them, and intended to adhere to its word, that he responded to the invitation given by the Prime Minister to deal with the practical and administrative points that had been embodied in the excellent speeches which had been made. After referring to the excellent educational results of the June conference on the public mind, he said that, with regard to the suggestion about instruction in hygiene and kindred matters in the public elementary schools, increasing attention was being given to the matter, not only in the secondary schools, but in the Universities. He would communicate the views that had been expressed to Mr. Birrell. As to supply of sterilized milk by the sanitary authorities, incalculable good had been done in those districts which had adopted the system. In one district the infantile death-rate within the range of the special milk supply was 58 to 100, as compared with a rate of 150 to 273 among a similar class of children outside the area. He had decided to introduce a Bill sanctioning what was doubtful and illegal in the action of the local authorities in establishing such depôts.

In regard to the notification of still births, the general subject would be considered at the end of the year from the point of view of the Huddersfield Experimental Act. He would call the attention of the Home Secretary to the proposal to enquire into the question of insurance of infant life. As to the proposed restrictions in regard to mothers working in factories, we were only just beginning to find out the amount of disease due to prenatal causes. The question of infant feeding would be further enquired into and dealt with by a Departmental Order or legislation if necessary.

Infantile mortality often sprang from other causes than those which the Factory Inspector could prevent. He believed that one of the chief contributing factors towards the high mortality rates in districts where housing was relatively good, and where wages were fairly high as compared with other districts, was the tendency on the part of the people to spend

on beer what they should lay out on food for their children and that leisure which should be given to the expectant mother. He should be false to the position he held in the Government and with his past if he did not tell working men and women that if they wanted healthy children who should be a credit to them in after-life the less the mothers spent on drink and the husbands on betting, the better, and they would thus help the local authorities in their excellent work. Apart from housing it was necessary, in order to get the desired improvements, to raise the whole level of the unskilled labourer's life.

THE TEACHING OF HYGIENE AND TEMPERANCE.

DEPUTATION TO MR. BIRRELL.

MR. BIRRELL received at the Board of Education on Nov. 12th a deputation from the Committee of the Medical Profession formed in 1903 for the Teaching of Hygiene and Temperance, the British Medical Association, the Advisory Board, and the International Association for the Prevention of Tuberculosis, who submitted a memorandum on the following points: namely, (1) The recasting of the general science teaching, so that the principles of hygiene and temperance can be embodied in the curriculum without constituting a new subject; (2) The teaching of hygiene and temperance in all training colleges and to all student teachers; (3) The inclusion of hygiene and temperance among the subjects concerning which the inspectors must report.

The deputation was introduced by Sir Thomas Barlow, and he and Sir Victor Horsley spoke for the Medical Profession, Dr. James Macdonald and Dr. Langley Browne for the British Medical Association, and Mr. A. Pearce Gould for the Advisory Board, on these points in the memorandum. Dr. Clifford Allbutt and Dr. G. A. Heron spoke for the International Association for the Prevention of Tuberculosis, and other speakers were Sir T. Lauder Brunton, Mr. T. C. Horsfall, Dr. John Robertson, Miss Hoskyns-Abraham, and Miss Alice Ravenhill.

Mr. Birrell, in reply, said that he supposed they would all agree that if they could utilize our elementary system of education, which was originally intended simply to teach reading, writing, and arithmetic, for the purpose of implanting into the children's minds and into the minds of their parents the principles of health and temperance, it was impossible to exaggerate the benefits that would result. Of course, they had to bear in mind about hygiene and temperance that they were talking upon subjects upon which every one thought he knew something, and therefore they could not deal with them in the same authoritative and academic manner as with ordinary subjects. Now he entirely agreed, roughly, as to the importance of teaching the teachers. They could not expect to make much impression upon the children in the school unless they could approach them through the teachers, who had not only been well instructed, but who had the art of teaching, and who were able to enforce their views and really to reach the minds of the children. The teacher had a curriculum already very full, and they could only really affect that curriculum by getting people at large to see the relative importance of subjects. For instance, their best teachers were all anxious to

obtain degrees from the Universities. Whether they were wise or foolish in that enthusiasm he did not know. It was one of the painful consequences of examinations that people would read what would pay rather than perhaps what was most important. Therefore, unless they could get the Universities to take up those subjects it would be most difficult to make them compulsory subjects in our training colleges, not because they were unimportant, but because the curriculum was already so full. The Board of Education had a most excellent scheme for the teaching of hygiene and temperance for the scholars attending the public elementary schools, and the teachers themselves might take up hygiene and temperance as an optional subject.

Mr. Morant: They must do some hygiene.

Mr. Birrell said he understood that it was compulsory at the training colleges to take up some branch of hygiene and temperance. That was an important step. They had to remember that if the Bill now before Parliament became law there was a medical inspection and, consequently, there would be a greater number of visits of doctors at their public elementary schools, and the teachers would be more competent to learn from them. But it did not do to be too sanguine or to speak too generally about matters like hygiene and temperance, because they never would be mastered till the world came to an end. They must make the parents interested in open windows, in cleanliness, and in good food. They must teach the children the importance of these things, and get the teachers eager and anxious to teach them that vital side of education. How far that could be done by schemes and plans of examinations, how far it would result from the general elevation of study, it was not, perhaps, for him to say. Upon the particular point addressed to him—viz., the recasting of the general science teaching, so that the principles of hygiene and temperance could be embodied in the curriculum without constituting a new subject—there he entirely agreed with them. The thing was to avoid a new subject, and to introduce into the general science teaching those principles of health and temperance. The new Code had tended to begin the way by inserting under the head of moral instruction health and temperance as things which were to be enforced; and any assistance the Board could get from doctors to enable them to accomplish that resolution would be very gladly received. The thing was to avoid technicalities, to avoid all the jargon, and to make children see that health and temperance were things that could be taught in simple language without repulsive and long words; and he did not see why that could not be done. It had to be done cautiously, owing to the fact that public opinion had not quite made up its mind. Sir Victor Horsley and he might agree (he did not say that they did) as to the danger of alcohol in any shape or form, but yet he could imagine some disturbance might arise in a school which was largely supported by the local brewer if it was laid down as an axiom that the partaking of intoxicating liquors was a breach of the laws of hygiene and temperance, and was calculated to do grievous bodily harm. They must wait a little while before they could enforce doctrines in their extreme form in that way. But he quite agreed that they should do all they could to introduce the teaching of hygiene and temperance in all training colleges and to all students. These principles of health and temperance were at present taught in all training colleges; and he certainly quite agreed that these training colleges should be visited by competent and skilled medical lecturers. As to the inclusion of hygiene

and temperance among the subjects which the inspectors must report, they already did so, and were anxious to take a part in this important matter. The Board looked to the medical profession for assistance in this question, and he warned them not to be carried away by too high or enthusiastic notions. They must gradually reorganize their system of teaching, and get it into a humane and general form, so that the principles of health and temperance might be enforced in our schools.

THE EDUCATION (PROVISION OF MEALS) BILL.

A BILL for feeding school children is now before Parliament. Its object is to enable local education authorities to provide, as part of the educational system of the country, cooking establishments with the necessary service for the supply of dinners, and, under certain conditions, to expend from the rates up to a halfpenny in the pound on food.

We have received from Prof. Loch a series of resolutions arrived at by a representative meeting held in London.

The first resolution would prevent the harm anticipated from State feeding. It is this:—

1. That it is contrary to the interests, not only of the general community, but also of the parents of children and of the school children themselves, that school children at public elementary schools should be maintained by the State, as some ask, or that, as others demand, they should be provided with meals at the cost of the rates.

The second resolution suggests the alternative—the right course—to promote the proper bringing-up of children at home and at school. It is this:—

2. That it is of great importance to the community, and to both parents and children:—

(1) That Medical Officers should examine and supervise children at school from the point of view of health, sanitation, and cleanliness.

(2) That there should be a representative school relief committee for each school or group of schools, acting in co-operation with the medical officers, teachers, and attendance officers, and with health visitors and other voluntary agencies, who should make inquiries into the home circumstances of children who appear to require aid.

(4) That, wherever possible, with assistance to the children should be combined such assistance to the family as would lead to better home conditions.

(5) That any children who require meals should be selected by the school relief committee in conjunction with the teachers and the medical officer.

(6) That where it is found necessary to provide meals they should be furnished from voluntary sources exclusively.

(7) That the number of day industrial schools should be increased, or that day schools of a similar type should be established in districts where the "circumstances of the population" make them desirable with a view to "the proper training and control of the children."

LAW REPORTS.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.

October 29th, 1906.

BEFORE LORD ALVERSTONE, L.C.J., RIDLEY AND DARLING, JJ.

SANDERS v. SADLER.

Sale of Food and Drugs Act, 1875, Section 6—Milk Warranty—Sale in same condition as received—Place of receipt when consigned from a distance.

In answer to an information for selling milk not of the nature, substance, and quality demanded, the defendant set up as a warranty an agreement under which she agreed to buy the milk from a person at a distance as pure new milk "delivered daily, carriage paid, to Wanstead Park Station," and that she had not tampered with the milk since she received it. It was held to be a good defence, and that it was not necessary for the defendant to prove that the milk was not tampered with on the journey, as the place of receipt was Wanstead Park Station.

This was a case stated by the Stipendiary Magistrate for West Ham, on an information by the appellant, Charles Sanders, against the respondent, Emily Sadler, for unlawfully selling at 83, Neville Road, West Ham, to the prejudice of the purchaser, milk not of the nature, substance, and quality demanded.

The milk was bought from a servant of the respondent, who was found by the magistrate to have sold it in the same state as he received it. It was certified as being deficient in fat to the extent of 11·6 per cent. The defence set up was that the milk was bought by the respondent under an agreement which amounted, with the label, to a warranty, and that she had sold it in the same state as she had received it. The point in the case was as to the place where she had received it. The appellant's contention was that the respondent should have shown that it had not been tampered with on the journey or at Wanstead Park Station. The agreement was one by which the respondent agreed to buy from one, E. R. Warth, of Notts, "about 16 barn gallons of pure new milk, with all its cream, delivered daily, carriage paid, to Wanstead Park Station properly cooled and in good condition." The invoice or label was as follows: "February 5th, 1906. Three churns, Nos. 6, 18, 11. Containing 23 B. gallons warranted pure new milk with all its cream (pursuant to contract). Signed Audinwood. To E. Sadler, Wanstead Park." The words "To E. R. Warth, Oak Farm Dairy," originally appeared after the signature Audinwood, but had been struck out, and "To E. Sadler, Wanstead Park," substituted.

The facts as stated in the case were as follows. On February 6, 1906, four churns of milk arrived at Wanstead Park Station at 4.20 a.m. The churns were consigned to the respondent from Chellaston Station in Derbyshire, and were labelled as above. The carriage of the milk was paid by the senders. The churns were removed from the train by one Edward Bell, a servant of the Midland Railway Company, assisted by the guard

of the train, and were placed upon the station platform. Edward Bell then went downstairs to book tickets to passengers and to do other business until their removal from the station. The churns were removed from Wanstead Park Station by Thomas Burrows, a servant of the respondent, somewhere between 5.5 and 5.10 a.m. on February 6. The churns were handed over to Burrows by Bell, he (Bell) not having tampered with them in any way. The churns were thereupon taken by Burrows to the respondent's dairy at East Ham. The respondent then, in the presence of Burrows and one George Johnson, measured the milk from one of the said churns and put it into a receptacle on a barrow in the same state as it was received from the railway station. Johnson then took the milk on the barrow, and it was from this that the sample was taken. The Magistrate dismissed the summons.

Danckwerts, K.C., and *Sturges* appeared for the appellant, *Alex. Cairns* and *Menzies* for the respondent.

The Court dismissed the appeal.

LORD ALVERSTONE said the case depended on the meaning of the contract. He thought that it was clear that the place of delivery was Wanstead Park. There was no other place of delivery mentioned. The purchase was completed by delivery at that station. As to the argument that because the milk was some time at Wanstead Park Station, the respondent ought to prove that it was not tampered with there, the finding in the case practically amounted to this, that Bell, though he had other duties to perform, and it was not his duty to watch the churns the whole time, practically did look after them, and did not allow them to be tampered with. The burden suggested was an impossible one for the respondent to discharge, and to hold that she was liable to be convicted unless she negatived the possibility of the churns being tampered with during the short time they were at Wanstead Park Station would not lead to substantial justice or to a fair application of the Act.

RIDLEY and DARLING, JJ., concurred.

November 5th, 1906.

BEFORE LORD ALVERSTONE, L.C.J., RIDLEY AND DARLING, JJ.

DAWES v. WILKINSON.

Sale of Food and Drugs Act, 1875. Section 6—Rum—Added water—Notice that strength not guaranteed.

On proceedings under Section 6 of the Sale of Food and Drugs Act, 1875, for selling to the prejudice of the purchaser, rum diluted so as to have 3·7 parts water in addition to being 25 under proof, the defence was set up that a notice was conspicuously displayed in the shop stating that all spirits sold "will not be of any guaranteed strength." It was held (DARLING, J. dissenting) that this notice did not amount to a notice that the rum was diluted, and was not therefore a good defence.

This was a case stated by the Justices of Derby on an information preferred by the respondent, William Wilkinson, under Section 6 of the Sale of Food and Drugs Act, 1875 (38 and 39 Vict. c. 63), against the appellant, Richard Dawes, for selling, to the prejudice of the purchaser, one quartern of rum which was not of the nature, substance, and quality demanded, being not rum, but consisting of 96·3 parts of rum of 25 under proof, as mentioned in Section 6 of the Sale of Food and Drugs

Act Amendment Act, 1879 (42 and 43 Vict. c. 30) and 3·7 parts of added water. Upon the hearing the following facts were proved or admitted:

The appellant was a licensed victualler and kept the Green Man Inn, Derby. The respondent was the chief inspector of nuisances appointed by the Derby Town Council. On April 26, 1906, one Laver, an assistant inspector of nuisances for the borough, acting on behalf of, and on the instruction of, the respondent, went to the appellant's inn, and there asked to be supplied with one quarter of rum. The said rum was placed in a bottle by the appellant's wife without any label thereon, and Laver then paid the sum of 7½d. for such rum and took possession of the same. At the time of the purchase a notice in large print was hung up in a conspicuous position. The notice was as follows: "Notice. All spirits sold in this establishment are of the same quality and strength as heretofore, but, in order to comply with the Food and Drugs Act, will not be of any guaranteed strength. Also all brandies sold here will be of the same superior quality, but not guaranteed to be solely derived from the juice of the grape. Issued by the authority of the Derby and District Licensed Victuallers' Association." The above notice was so hung and so printed as to be clearly visible to all persons going up the passage to the serving window, at which place Laver purchased the rum.

The certificate of the public analyst was as follows: "I am of opinion that the said sample contained the parts as under, or the percentage of foreign ingredients as under: Rum of 25 under proof as mentioned in Section 6 of 42 and 43 Vict. c. 30, 96·3 parts; added water, 3·7 parts = 100." On the part of the appellant it was contended that the sale was not to the prejudice of the purchaser, inasmuch as the said notice was posted in a conspicuous position, and was clearly visible to the appellant's customers and to any purchaser of spirits, and that the appellant had taken sufficient steps to inform Laver that the rum was diluted, and that he had sold the rum without any guarantee as to the strength thereof, and that no offence had therefore been committed within the provisions of the Sale of Food and Drugs Acts. On the part of the respondent it was contended that the notice was not sufficient, or words to that effect; that the purchaser was not thereby notified that the rum was diluted; and that the rum was not consequently of the nature, substance, or quality demanded by him. The Justices convicted, holding that the absence of the word "diluted" or words to that effect was fatal to the appellant's contention. Section 6 of the Act of 1879 enacts that, in determining whether an offence has been committed under Section 6 of the Act of 1875, by selling to the prejudice of the purchaser, spirits not adulterated otherwise than by the admixture of water, it shall be a good defence to prove that such admixture has not reduced the spirit more than 25 deg. under proof for such admixture has or rum, or 35 deg. under proof for gin.

H. A. McCardie appeared for the appellant, *Etherington Smith* for the respondent. The Court dismissed the appeal.

DARLING, J. said the Court were not agreed. In his opinion the stuff in question, although diluted, was still rum as was shown by the case of *Gage v. Elsey*, 10 Q.B.D. 518. The question was whether the notice was sufficient to prevent the sale from being to the prejudice of the purchaser. He thought it was, and that no offence had been committed. If the notice had only meant that the rum was 25 under proof it need not have

been given at all, because there would have been a good defence without any notice. The notice seemed to mean that as the stuff might be more than 25 under proof it would be to the prejudice of the purchaser if the appellant did not tell him so. He therefore thought that no offence had been committed.

RIDLEY, J. said that in *Gage v. Elsey* an offence had been committed as far as Section 6 of the Act of 1879 was concerned, but the Court held that the appellant there was protected from conviction because the notice which had been given in that case was sufficient to prevent the sale from being to the prejudice of the purchaser. The notice there was that the spirits were sold as diluted spirits. That gave the exact information, which was not given in the present case. There was a broad distinction between the notice in that case and in this one. The notice in this case meant anything or nothing, and did not bring to the mind of the purchaser that anything had been done to reduce the article by dilution below the limit mentioned in Section 6 of the Act of 1879. In order to protect himself from conviction the seller must give a notice such as to bring home to the mind of the purchaser that there had been such a tampering as was expressed by the word "dilution," and it was not sufficient to put up a notice that the spirits would not be of any guaranteed strength.

The LORD CHIEF JUSTICE said that he was of the same opinion as Mr. Justice Ridley. The strength of the spirit was one thing and the dilution of it another. The Legislature had recognized that by passing Section 6 of the Act of 1879, which in other words meant that rum was not to be treated as diluted if the admixture of water had not reduced it more than 25 degrees under proof. That was what the purchaser was entitled to believe he was getting. They would be opening the door to a dangerous practice if they held that the use of the words of this notice "not of any guaranteed strength" included dilution to more than 25 degrees under proof.

CHANCERY DIVISION.

November 1, 3, 5, and 10, 1906.

BEFORE SWINFEN EADY, J.

ATTORNEY GENERAL (on the relation of the Rural District Council of Staines) *v.* SQUIRE & SONS.

Nuisance—Pigs kept so as to cause a public nuisance—Abatement before action—Injunction.

This was an action brought by and on the relation of the Staines Rural District Council to restrain the defendants from using the Home Farm at Sipson, in the parish of Harmondsworth, Middlesex, for the keeping of pigs or other animals, or for the disposition of house refuse, so as to occasion a public nuisance. The defendants' premises, occupied by them since October, 1904, are situate on either side of the main street of the village of Sipson, and consist partly of stabling, barns, and other covered buildings converted into piggeries, the number of pigs kept at the farm varying from time to time, but sometimes, by the defendants' admission, reaching 400 or 500. About 80 bullocks are also kept. They are fed respectively on wash and vegetable refuse brought from London hotels, the wash being boiled in London and mixed at the farm

with flour, bread, and barley meal. The drainage from the farm passes into a sewer in the road, and thence into an open ditch, the effluent being treated by filtration at the outfall.

Eve, K.C., and *Tomlin* appeared for the Staines Rural District Council, *McCall, K.C.*, *Micklem, K.C.*, and *Wurtzberg* for the defendants.

Evidence of residents was called to prove the existence of sickly smells. The surveyor and sanitary inspector gave similar evidence, stating that the defendants' filter tanks were very foul. Mr. G. R. Strachan, civil engineer and specialist in sewers and waterworks, corroborated. The expert witnesses found no fault with the way the pigs were kept, but considered the number was too large for the place, and that the buildings and other conditions were unsuitable.

For the defence it was said that there was no nuisance, and counsel commented on the fact that neither the Medical Officer of Health for the district or for the county had been called as witnesses. The two defendants gave evidence as to the cleaning and feeding of the animals, and the disinfection of the premises with carbolic acid and sanitas. The refuse removed from the hotels consisted of bread, green stuff, dripping, and waste, the latter being boiled in London, so as to be fit to keep for a fortnight, though it was generally used up daily. The manure was now removed daily; but it was admitted that the previous contractor for the removal took it away when he liked, and there were often accumulations.

Mr. Phillips, a surveyor, said the place was well drained and paved, and beautifully kept. The only objectionable smell was in the road and proceeded from one of the catch-pits and from a ventilating pipe, 22 feet high, belonging to the sewer, but this, in his opinion, was not due to the foul state of the defendants' filter tank as described by a former witness. He was corroborated by Dr. Collier, Medical Officer of Health for Hammersmith, and Dr. Parkes, Medical Officer of Health for Chelsea, and by Mr. Strutt a member of the Royal Sanitary Institute, who had visited the premises and neighbourhood at all hours for a considerable period since August last. Dr. Collier found great fault with the sewer, which, he said, had been converted from an open watercourse and was quite unsuitable for its present purpose. It was usually half full of sewage, and constituted an undoubted nuisance. The defendants' pigs were admirably kept and the space sufficient. He had known of 2,000 pigs being kept at Hammersmith. He described the process of boiling the wash in closed vats by the defendants. At first a noxious vapour might be given off, but it was passed into a furnace and burnt. The wash after boiling had only a brothy smell. To feed pigs on decomposed wash would be futile, for they could not thrive.

SWINFEN EADY, J., in giving judgment, said the question in the action was whether the existence of a public nuisance by the defendants had been established—whether the smell from the pigs arising from their number, the place and the manner in which they were kept, and the food on which they were fed, was such as to occasion annoyance to all members of the public coming within their sphere. It appeared the defendants had acquired the Home Farm about two years ago, and shortly afterwards began to keep pigs there. The numbers largely increased, but varied so much from time to time that it was difficult to arrive at an average, but it was clear that at times over 500 were kept. Now, it could not be said that at first the conditions were such

as the defendants could justify. The manure was allowed to accumulate, and the quantity produced was so great that 41 loads per month were removed within the first eight months, whilst the quantity rose in January and February last to 138 loads per month. The younger defendant, who estimated the *maximum* accumulation at 80 loads, made admissions in cross-examination which showed that to be an understatement. That pointed to a very large accumulation, and it was common ground that with so large a number of animals, unless the most scrupulous care was employed in the way they and the farm were kept, a nuisance must arise; in fact, Dr. Collier admitted that although the number might be doubled if the pigs were kept clean, half could not be maintained without that condition. That state of things continued down to January last, and in a lesser degree during the following month. The evidence was such as to show that a grievous nuisance existed at the date when proceedings were commenced. It was, however, right to mention that the defendants had adopted the suggestions made to them by the local authorities, and certainly during the time covered by the expert evidence the premises were not so kept as to occasion a public nuisance. Taking the whole of the defendants' expert evidence, and having regard to the care now shown in dealing with the manure and in keeping the farm and animals, his Lordship was of opinion that no public nuisance now existed in connection with the Home Farm. The conclusion was that a public nuisance existed at the date of the writ and of the motion for injunction, but that it had since been remedied. That being so, it would not be proper to grant an injunction, nor even to give liberty to apply for one in this action, because any future nuisance would require to be proved, and that could as well be done by means of a fresh action. There would therefore be no order except that both parties should pay their own costs, for the relators were right in that a nuisance did exist when they commenced proceedings, but wrong in having insisted that it continued to the present time. One further point his Lordship thought it right to mention, though he had not to deal with it, it being outside the claim on which he had to give judgment. It was that a serious public nuisance existed in the state of things at the outfall of the sewer, a matter as to which it was for the local authorities to take proceedings. (See *Times*, November 12th, 1906, for fuller report.)

COCKLES AND TYPHOID FEVER.—At a recent meeting of the Common Council of the City of London a report was made in relation to a recent outbreak of enteric fever caused by eating cockles sent from Leigh-on-Sea, near Southend, and sold at Billingsgate Market. A prohibition was made by the Fishmongers' Company of the sale of cockles. It was stated that the fishermen had only themselves to blame, as they seemed determined to evade the regulations of the Company. However, Dr. Williams, the Medical Officer of the Port, and Mr. J. Wrench Towse, clerk of the Fishmongers' Company, after visiting the Maplin Sands, where the cockles came from, and inspecting the places at Leigh where they were cleansed and cooked, had seen the men, who expressed a hearty desire to fall in with any fresh regulations which might be necessary. The result had been that the prohibition to send cockles to Billingsgate had been withdrawn, and now each parcel sent to the market would contain a certificate as to the purity of the contents.

REVIEWS.

INFANTILE MORTALITY REPORT BOOK, AND INFANTILE MORTALITY POCKET BOOK FOR THE USE OF MEDICAL OFFICERS OF HEALTH AND HEALTH VISITORS. Arranged by D. Lechmere Anderson, Medical Officer of Health, Doncaster. Elsworth Bros., Leeds, and 10, High Holborn, London, W.C. 1906.

This book is intended for entering the names and addresses of infants who have died, the dates and causes of death, together with particulars regarding the milk and water supply, the sanitary condition of the house, the method of feeding adopted, and the family history. The general arrangement, which is excellent, is that the particulars should be entered in columns under the various headings. We have only a few suggestions to offer. Having kept a similar register, we think it would have been more convenient had the column headed "Milk Supply" been placed next those devoted to "Methods of Feeding." It might have been useful under the heading "Sanitary Condition of House" to have a column provided for stating in what place and under what conditions it was accustomed to keep the infant's food. The importance of noting this is obvious, as perfectly good milk may be obtained, and yet it may rapidly deteriorate if kept in an unsuitable place; and it must be remembered that many dwellings, whose sanitation is otherwise satisfactory, have no place whatever where food can be kept sweet during the hot summer months. Additional columns would have been useful under the following headings: "If Child Premature," "Cause of Premature Birth," "Mother's Age," "Cause of Premature Weaning," "Mother's Work," "If Work Entails Absence from Home." It might be difficult to crowd particulars such as these into the "Remarks" column, and it would be a matter for regret if any information obtained on these points were lost.

The Pocket-Book is similarly arranged to the Register. Personally, we prefer the card system.

CLINICAL STUDIES IN THE TREATMENT OF THE NUTRITIONAL DISORDERS OF INFANCY. By Ralph Vincent, M.D., M.R.C.P., Physician to the Infants' Hospital, London. Pp. 83. Price, 3/6 net. London: Baillière, Tindall & Cox. 1906.

This book furnishes the clinical illustrations of the principles laid down in the same author's work on *Nutrition of the Infant*, which deserves the careful study of all who are interested in infant feeding. Abstracts of typical cases of infantile malnutrition are given in the "Studies." One is astonished at the precise and often minute dietetic adjustment which is necessary in order to find exactly the right proportion of ingredients of milk which a baby can digest. The prescriptions are given right through the course of each of the twenty cases, and the points of each case are very briefly brought out. We hold that the provision of a substitute food should be under the control of the medical man, but how many could write a prescription specifying the exact proportions of fat, of caseinogen, of lactose, or of whey proteid? If many children who are difficult to rear are to survive, there must be careful feeding on scientific lines.

CORRESPONDENCE.

HOSPITALS AND SCARLET FEVER.

To the Editor of "Public Health."

DEAR SIR,

Our sympathies are due to Dr. Millard if he really regards as portentous and unintelligible, Sir Shirley Murphy's statement that "the statistical method is inapplicable." My paper discussed six statistical methods used by Dr. Millard and his backers to prove the failure of isolation hospitals. It pointed to the existence of additional factors, some known, some unknown, incapable of statistical presentment, which showed that the statistics given represented only part of the case. Unless the margin of error is negligible, statistics are useless. Given their true relative proportion, they are swamped by the non-statistical facts.

Dr. Millard cites afresh the equal prevalence of infectious disease in *a* and *b* towns, those with and those without hospitals. But, as an obvious fact, no town erects a hospital until it has suffered sore and long from infectious disease. In comparing towns with, and towns without hospitals, he is therefore comparing susceptible and insusceptible towns. Not even good isolation will of itself make a susceptible town insusceptible. The same with *a* and *b* districts in a county. The same with *a* and *b* groups of towns. The *a* series is doomed by statistics, quite apart from its hospitals.

Moreover, as Dr. Nash said, the mere existence of a hospital tends, at least in Herts, to hospital isolation and notification of mild cases, which otherwise would often escape both isolation and notification.

Let Dr. Millard be content with the useful results he has attained. He has checked the exaggerated promises made for hospital isolation by its supporters. Indirectly he has cleared the air of vain statistics and brought us back to clear reasoning. Let him admit that a case of infectious disease is infectious. The value of a proper isolation hospital is a logical corollary.

In either case the fight is over, and the hospital has won the day. In a conclusion of truly Shavian merit, Dr. Millard unmasks his real socialistic self, red tie, squash hat, and all. "The hospital is much too great a convenience to the working classes to be allowed to die." Why should he struggle against these, his natural sympathies? He and we admit it is come to stay. A convenience in one place, it is a convenience everywhere. Let us link arms, Dr. Millard as a socialist and we as scientific epidemiologists, and do our best to promote the general provision of isolation hospitals, honestly recognizing that in discussing their value the statistical method is inapplicable.

Yours faithfully,

FRANCIS FREMANTLE.

GUY'S HOSPITAL,
November 21st, 1905.

A JUNIOR research Fellowship in Public Health in the University of Manchester has been awarded to Mr. H. D. Howarth, M.B., Ch.B. The Council have decided to offer a second Fellowship in Public Health in January.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

ADJOURNED ANNUAL GENERAL MEETING.

The adjourned annual general meeting of the Society was held at 1, Upper Montague Street, on Friday, the 9th day of November, 1906. Present: The President (Dr. D. S. Davies) in the Chair, Drs. H. Cooper Pattin, F. J. Allan, S. E. Lawrence, W. Butler, E. Sergeant, J. W. Hembrough, Herbert Jones, A. Griffiths, A. Sowden, J. Musgrave Craven, J. S. Tew, R. A. Dunn, J. Groves, F. T. Bond, J. R. Kaye, J. E. Robinson, W. H. Symons, S. Davies, G. Hope, G. McCleary, J. F. Clarke, H. Meredith Richards, C. Sanders, L. C. Parkes, R. Dudfield, W. M. C. Wanklyn, G. Wilkinson, George Newman, H. W. G. McLeod, D. J. Thomas, and W. Arnold Evans.

The HON. SECRETARY read the following Report of the Council.
Your Council beg to report:—

1. That they have received and approved the Annual Financial Statement and the Report of the Auditors, which they submit herewith (see pp. 191-7).

Resolved, on the motion of Dr. F. J. Allan, seconded by Dr. Butler, that the same be approved and adopted.

ORDINARY MEETING.

An ordinary meeting of the Society was held at No. 1, Upper Montague Street, W.C., on Friday, the 9th day of November, 1906. Present: The President (Dr. D. S. Davies) in the Chair, Sir Shirley Murphy, Drs. F. J. Allan, S. E. Lawrence, W. Butler, E. Sergeant, J. W. Hembrough, A. Griffiths, A. Sowden, J. Musgrave Craven, J. S. Tew, R. A. Dunn, J. Groves, F. T. Bond, H. C. Pattin, J. R. Kaye, J. E. Robinson, W. H. Symons, S. Davies, G. Hope, G. F. McCleary, J. J. Clarke, H. Meredith Richards, C. Sanders, Louis C. Parkes, R. Dudfield, W. M. C. Wanklyn, E. Wilkinson, George Newman, H. W. G. McLeod, D. J. Thomas, W. A. Evans, and Herbert Jones. The following visitors were also present: Dr. and Mrs. Arthur Downes, Dr. Winifred Thorp, Dr. Louisa Woodcock, Miss E. Berry, Miss B. Gardiner, Miss G. Brooks, Mr. P. E. Harvey, L.C.C., and Mr. and Mrs. Sidney Webb.

MINUTES.

The Minutes of the meeting held on May 11th, 1906, having been published in *PUBLIC HEALTH*, were taken as read, and were approved and signed by the President.

CORRESPONDENCE.

Letters, regretting inability to be present, were read from Drs. A. Newsholme, J. Howard Jones, Alfred Greenwood, Meredith Young, Herbert Manley, A. K. Chalmers, John Robertson, Andrew Fuller, and others.

REPORT OF COUNCIL.

The HON. SECRETARY read the following Report of the Council.
Your Council report:—

1. We have received a letter from the Incorporated Institute of Hygiene,

asking the Society to appoint two delegates to act upon a Committee to be appointed to consider the question of canned goods, but recommend that no action be taken in connection therewith.

2. We have received letters from Dr. Newsholme and Dr. McCleary, accepting the positions of Editor and Hon. Librarian, and thanking the Council and the Society. (Dr. Newsholme stated that Dr. Allan had kindly consented to continue as Editor until the end of the year.)

3. We recommend that the three Standing Committees shall each consist of not less than ten members, with power to add to their numbers.

4. We recommend that the following members be appointed to act on the committees as follows:—

Finance Committee.—The President, Treasurer, Editor, Hon. Secretaries, W. A. Bond, R. Dudfield, J. Groves, H. Statt, Alfred Greenwood, E. M. Smith, J. W. Hembrough, A. Bostock Hill, J. Howard Jones, H. Cooper Pattin, Oliver Field, W. G. Savage, L. T. F. Bryett.

House, Library, and Journal Committee.—The President, Treasurer, Editor, Hon. Secretaries, Hon. Librarian, R. K. Brown, L. Stephens, Louis Parkes, W. J. Howarth, G. Newnman, G. Reid, P. C. Smith, E. C. Seaton, J. F. J. Sykes, W. W. Stainthorpe, F. D. Jenkins, C. Templeman, H. M. Richards.

General Purposes, Legal, and Parliamentary Committee.—The President, Editor, Treasurer, Hon. Secretaries, A. Ashby, Francis T. Bond, A. K. Chalmers, Sidney Davies, T. W. H. Garstang, J. R. Kaye, G. W. Harris, J. C. McVail, Charles Sanders, John Taylor, James Wheatley, J. Mitchell Wilson, W. G. Willoughby, W. T. G. Woodforde, and Sir Shirley Murphy.

5. We have decided to continue in office during the ensuing year the *Model By-laws (Rural) Committee*.

6. We have had before us the question of school hygiene, particularly with regard to possible future legislation on the subject, and have appointed a Special Committee to watch the progress of education legislation, and to consider and report on any urgent matters that may arise in connection therewith.

We have appointed the following members to serve on such committee: Drs. J. Groves, A. Newsholme, G. Reid, H. Meredith Richards, and J. F. J. Sykes.

7. We have received the following resolutions from the Branches.

(a) Northern Branch.

1. The Branch strongly supports the resolution of the Council of the Incorporated Society, respecting the payment of first-class railway fares to Branch representatives whilst attending Council and Committee meetings of the Society.

2. With respect to the circular as to the Feeding of Infants, the Branch agrees with the resolution of the Southern Branch, viz., that the distribution of a general circular on that subject by Registrars is undesirable.

(b) Southern.

The Branch considers that the distribution of a general circular on "Feeding of Infants" by Registrars is undesirable.

8. We have had before us the question of the advisability of individual Branches approaching public bodies upon questions of principle which have not been discussed and approved (or disapproved) by the Parent Society, and we have resolved to call the attention of the Secretaries of

the Branches to the following resolution of the Council, dated January 18th, 1892:—

"That the Branches be requested to transmit any resolution intended for the Local Government Board through the Society."

We have also considered the propriety of the Parent Society approaching the Branches on all questions of principle, and have called the attention of the Hon. Secretaries of the Society to the following resolution of the Council, also dated January 18th, 1892:—

"That so far as may be practicable, any important matter affecting the interests of public health generally be remitted to each Branch before final decision by the Society."

9. We have had before us the question of the postage payable on the Society's Journal, *PUBLIC HEALTH*, and have decided to ask H.M. Postmaster-General to receive a Deputation on the subject, with a view to securing permission to transmit the publication at newspaper rate, and we have appointed the following members to act on such deputation: The President, Dr. F. J. Allan, Dr. A. Newsholme, and the Hon. Secretaries.

Resolved unanimously that the same be received and adopted.

ELECTIONS.

The following candidates, having been duly nominated, were balloted for, and the President declared them to be unanimously elected.

AS FELLOWS.

Emtage, Edmund Walter, M.R.C.S., L.S.A., Bradworthy, Holsworthy, N. Devon. M.O.H. Bideford R.D.

Flint, T.B., L.R.C.P., M.R.C.S., 22, Hardwick Street, Buxton, M.O.H. Buxton U.D.

Stokes, Edward Sutherland, M.B., Ch.M., D.P.H., 341, Pitt Street, Sydney, N.S.W., Medical Adviser and Bacteriologist for Water Supply and Sewage, Sydney, N.S.W., late Assistant M.O.H. Sydney.

Williams, D. Llewellyn, F.R.C.S.Ed., L.R.C.P., Wrexham, M.O.H. Wrexham U. and R. Dis.

Watson, Robert H., M.D., B.Sc., Oakwell, Cults, Aberdeen, Assistant M.O.H. Aberdeen.

AS MEMBERS.

Rees, Morgan James, M.D., D.P.H., 7, Lorne Street, Reading.

Edwards, W. Lloyd, L.R.C.P., M.R.C.S., D.P.H., 142, Holton Street, Barry, Glam.

Several candidates were then nominated for election.

A Paper upon "The Relation of Poor Law Medical Relief to the Public Health Authorities" was then read by Mrs. Sidney Webb.

A discussion ensued, in which the following took part: Drs. J. Groves, Francis T. Bond, H. Cooper Pattin, Louis Parkes, Reginald Dudfield, W. Butler, Sidney Davies, J. F. McCleary, Mr. Sidney Webb, J. R. Kaye, C. Sanders, Herbert Jones, Musgrave Craven, J. J. Clarke, Major Wilkinson, Meredith Richards, J. S. Tew, and the President.

It was moved by DR. LOUIS PARKES, seconded by DR. JOSEPH GROVES, and unanimously resolved:—

"That the Council of the Society be requested to consider the propriety of tendering evidence before the Royal Commission on the Poor Laws, and, if considered desirable, and invited by the Commission, to arrange for such evidence to be given."

REPORT OF THE HONORARY TREASURER.

To the Council of the Incorporated Society of Medical Officers of Health.
GENTLEMEN,

I have to report that in regard to the Revenue Account for the year ending June 30th, 1906, there has been an excess of Income over Expenditure of £24.14s. 8d. So far, this must be considered satisfactory. The ordinary working expenses of the Society, with its increasing usefulness, are hardly likely to be less in future; indeed, we may safely say they will year by year be more. It is therefore necessary for the Council to keep in view two things, viz. (1) economy in working, and (2) other reasonable means of increasing the income of the Society. With care, I see no difficulty in adding considerably to the annual credit balance, provided that the amount now paid to the Branches, as a grant, is not exceeded by that paid under any new arrangement. The sum received in respect of subscriptions has been exceptionally large this year. During the current year the Council will be called upon to provide additional expenditure on the Journal. I believe the Council may look with confidence to the future satisfactory financial condition of the Society.

I may say that, in addition to the assets set out in the balance sheet, there are a number of subscriptions outstanding, amounting to about £300.

The value of the Stock Investments has been taken, as hitherto, at cost. At the actual market value on the 30th June last, the India 3 per Cent Consolidated Stock would have realized only £3,854, and the Metropolitan 2½ per Cent Consolidated Stock, only £400.

The principal expenditure under the various heads for the last four years is here compared:—

COMPARATIVE FINANCIAL STATEMENT, YEAR 1905-6 & THREE YEARS 1902-5.

	1902-3.	1903-4.	1904-5.	Average 3 Years, 1902-5.	1905-6.
<i>Principal Receipts.</i>	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
SUBSCRIPTIONS ...	742 0 3	739 0 9	654 10 3	711 17 3	826 3 3
JOURNAL ACCOUNT—					
Publishing ...	42 13 9	54 8 10	81 4 5	59 9 0	106 11 8
Advertisements ...	180 0 0	236 11 3	295 0 0	237 3 0	305 0 0
RENT ...	5 5 0	5 5 0	35 5 0	15 5 0	158 5 6
<i>Principal Expenditure—</i>					
Rent ...	49 8 6	53 12 6	126 11 0	76 10 0	241 0 1
Rent (net) ...	44 3 5	48 7 6	91 6 0	61 5 0	82 14 7
Stationery ...	9 0 2	15 19 5	14 12 5	13 4 0	46 16 2
Printing ...	54 1 5	50 9 4	33 17 8	46 3 0	75 9 1
Salaries ...	46 10 0	100 3 0	181 1 6	109 5 0	220 5 0
Dinner ...	25 17 0	5 5 6	11 6 4	14 3 0	10 6 8
JOURNAL—					
Editorial ...	83 12 1	96 14 9	93 14 7	91 7 0	111 11 6
Printing and Postage ...	444 17 0	474 7 8	496 12 4	472 0 0	467 14 8
PETTY CASH—					
Office Expenses ...	57 10 0	80 6 2	71 13 10	69 16 0	56 17 6
BRANCHES ...	241 12 6	250 10 0	203 2 6	232 0 0	251 15 0

I am Gentlemen,

Yours faithfully,

GEORGE B. MILLSON,
Hon. Treasurer.

THE INCORPORATED SOCIETY OF

Revenue

1st July, 1905,

EXPENDITURE.	1904-1905		1905-1906	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
o Rent—				
9, Adelphi Terrace ...	39 6 0			
Fuel „ ...	1 11 0			
Removal Expenses ...	1 17 6			
1, Upper Montague Street ...	87 10 0			
Rates, Taxes, and Insurance ...	4 14 0		168 0 0	
Repairs ...	46 17 7		32 19 7	
Fuel and Lighting ...	3 15 9		5 5 0	
Maintenance ...	4 8 6		28 11 0	
		190 0 4	6 4 6	
			241 0 0	
, Furniture and Fittings—				
Electric Lighting ...	28 0 0			
House ...	94 5 7½			
Office ...	35 19 3			
Library ...	14 15 0			
		172 19 10½		
		9 15 6		
, National Telephone				
, Salaries—			12 10 0	
Executive Secretary ...	150 0 0		150 0 0	
Clerical Assistance ...	1 17 10		18 0 0	
Caretaker ...	29 3 8		52 5 0	
		181 1 6	220 5 0	
, Journal Account—				
Printing ...	376 6 7			
Engraving ...	29 7 1		373 4 9	
Editorial ...	93 14 7		111 11 6	
Postages ...	90 18 8		94 9 11	
		590 6 11	579 6 2	
, Reprints—Printing—				
Non-Members ...	49 19 0			
Members ...	47 7 2	97 6 2		
General Printing ...		33 17 8	37 18 6	
Stationery ...		14 12 5½	75 9 1	
			46 16 2½	
Carried forward ...		£1290 0 5	£1213 5 0	

MEDICAL OFFICERS OF HEALTH.

Account,

June 30th, 1906.

INCOME.	1904-1905		1905-1906	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
By Subscriptions ...		654 10 3		826 3 3
„ Dividend on £4099 17s. 5d.				
India 3 per cent Consolidated Stock ...	116 17 0		116 17 0	
„ Dividend on £514 16s. 0d.				
Metropolitan 2½ per cent Consolidated Stock ...	12 4 8		12 4 8	
„ Interest on £100 on Deposit at Union of London & Smith's Bank ...	1 6 10		0 1 5	
„ Interest on Loan to Sanitary Inspectors' Board ...	2 4 0		2 4 0	
		132 12 6		131 7 1
„ Rent—				
Metropolitan Branch ...	7 15 0		10 0 0	
Home Counties „ ...	2 10 0		5 5 0	
Advertisement Department ...	25 0 0		100 0 0	
Miscellaneous Lettings ...			0 10 6	
W. A. Lawton ...			42 10 0	
		35 5 0		158 5 6
Journal Account—				
Publishers ...	56 4 6		71 5 2	
Sales—Central Office ...	24 19 11		34 17 7	
Advertising ...	295 0 0		305 0 0	
Contribution to Cost of Articles ...	6 17 0		21 0 0	
		383 1 5		432 2 9
Reprints—Sales—				
Non-Members ...	71 15 6			
Members ...	17 19 6			
		89 15 0		32 18 2
Library ...				
Southern Branch—Donation ...			5 0 0	
Sundry ...			0 1 0	
				5 1 0
Sale of Linoleum ...		1 10 0		
Carried forward ...		£1296 14 2		£1585 17 9

EXPENDITURE.	1904-1905			1905-1906		
	£	s.	d.	£	s.	d.
Brought forward ...	£1290	0	5	£1213	5	0½
To Central Office—						
Guarantee Premium ...	1	5	0	1	5	0
Addressing or Typewriting ...	5	10	6	1	1	3
Travelling Expenses ...	2	18	4	0	12	11
Press Cuttings ...	1	1	0	6	6	0
Postages and Telegrams ...	23	17	6	20	7	0½
Miscellaneous ...	3	0	7	5	1	9
			37 12 11			84 18 11½
„ Petty Cash—						
Hon. Sec. Dr. H. Jones,						
Postages ...	3	9	0	3	5	7
Cambridge Meeting ...	5	4	11			
Reporting „ ...	2	2	0			
„ „ Provincial „ ...	2	5	0			
Travelling Expenses ...	21	0	0	18	18	0
			34 0 11			
„ Grant to Mr. Kent ...			10 10 0	22	3	7
„ Annual Dinner ...			11 6 4			
„ Hon. Solicitor's Disbursements			17 10 6	10	6	8
„ Bank Charges ...			1 0 1			
„ Travelling Expenses—				1	4	10
Fixity of Tenure Deputation						
„ Library—Cataloguing, etc.				7	14	0
„ Auditor's Fee (Mr. A. G.				10	15	0
Warren) ...			5 5 0			
„ Hire of Lantern ...				7	17	6
„ Proportion of Subscriptions				1	7	6
paid to Branches—						
Eastern ...	5	12	6	8	5	0
Home Counties ...	29	10	0	31	5	0
Metropolitan ...	24	10	0	25	17	6
Midland ...	23	17	6	27	0	0
North-Western ...	26	2	6	32	7	6
Northern ...	17	10	0	18	15	0
Southern ...	8	17	6	18	5	0
Scottish ...	14	0	0	21	10	0
West of England ...	22	12	6	26	17	6
Yorkshire ...	30	10	0	46	12	6
			203 2 6			251 15 0
			1610 8 8			1561 3 1
Balance June 30th, 1904	873	0	9			
Less Excess of Expenditure						
over Income ...	313	14	6			
			559 6 3			
Balance June 30th, 1905				559	6	3
Plus Excess of Income over						
Expenditure				24	14	8
						584 0 11
			£2169 14 11			£2145 4 0

INCOME.	1904-1905			1905-1906		
	£	s.	d.	£	s.	d.
Brought forward ...	£1296	14	2			
„ Balance June 30th, 1904—						
Brought forward ...	873	0	9			
„ Balance June 30th, 1905—						
Brught forward ...						
						559 6 3

Sheet.

1906.

LIABILITIES.	1904-1905		Balance 30th June, 1905-1906	
	£	s. d.	£	s. d.
	£	s. d.	£	s. d.
o Capital Account—				
Mr. Berridge's Bequest ...	4000	0 0	4000	0 0
Furniture and Effects ...			310	0 0
Sundry Creditors—				
Wright & Co. ...	70	18 7	283	5 2*
Shoolbred & Co. ...	48	5 0		
Library Supply Co. ...	11	3 3	2	14 3
Grantham & Son ...	5	18 2		
J. Defries, Ltd. ...	7	0 0	1	2 4
	143	5 0		
Press Etching Co. ...			1	14 0
Anthony Bros. ...			13	8 2
Merser & Co. ...			1	19 0
Specialist Press, Ltd. ...			35	8 7
J. Collard ...			2	10 7
Library Bureau ...			0	13 6
Taylor & Co. (Rent) ...			48	15 0
Holborn Council (Rates) ...			5	19 0
Auditor—A. G. Warren ...			7	17 6
Durrant & Co. ...			1	1 0
Gudgeon & Co. ...			3	2 6
Met. Electric Supply ...			2	10 0
Gas Light & Coke Co. ...			2	6 10
Proportion of subscriptions due to Branches ...			251	15 0
Petty Cash—due to Dr. H. Jones, Hon. Sec. ...			10	16 1
Subscriptions paid in advance	5	15 6	671	18 6
Balance on Revenue A/c ...	559	6 3	2	12 6
			584	0 11
	£4708	6 9	£5568	11 11

* £56 17s. 0d. not yet paid.

ASSETS.

1904-1

£ s. d.

By Investments—			
Value of £4099 17s. 5d.			
India 3 per cent Consoli-			
dated Stock at cost ...			4
Value of £514 16s. 0d.			
Metropolitan 2½ per cent			
Consolidated Stock at cost			
Loan—			
To Sanitary Inspector's Board			
Sundry Debtors—			
Publishing A/c ...	70	16 2	
Metropolitan Branch ...	7	15 0	
Home Counties ...	2	10 0	
Advertisement Dept. ...	25	0 0	
Reprints ...	19	15 5	
Executive Secretary ...	1	1 1	
Water Rate—paid in advance	1	12 10	
Journal A/c Advertisements			
Furniture and Effects as			
valued by the Society and			
now brought into Account			
Petty Cash in hand—			
Hon. Sec., Dr. J. Priestley	10	0 0	
Executive Secretary ...	3	7 3	
Hon. Sec., Dr. H. Jones ...	1	7 6	
Telephone Deposit ...	1	0 0	
Cash on Deposit at Union			
of London & Smith's			
Bank—net ...			
Cash at Bank—Current A/c			

£4

We have examined the foregoing Accounts

23rd October, 1906.

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Yorkshire Branch.—A meeting was held at the Town Hall, Bradford, on October 19th, 1906, when there were present the following:—

Drs. A. Anderson (Wortley), H. Angus (Bingley), F. E. Atkinson (Settle), J. Spottiswoode Cameron (Leeds), W. A. Evans (Bradford), R. Forsyth (Birstall), T. Gibson (Wakefield), H. Hebblethwaite (Burley-in-Wharfedale), J. Jackson (Denholme), F. W. Martin (Brighouse), L. J. Milne (Mirfield), S. G. Moore (Huddersfield), J. T. Neech (Halifax), C. Porter (Leeds), F. Robinson (Wakefield), W. Scatterty (Keighley), W. Sisam (Wakefield), E. M. Smith (York), H. Stansfield (Clayton), B. Stedman (Selby), J. A. Sutherland (Cleckheaton), R. E. Williamson (Otley), and J. R. Kaye (Wakefield, Hon. Sec.).

The Annual Report was presented in print, and adopted.

Dr. Smith (the President) then delivered his Presidential Address on "The Programme of Future Public Health Reform."

Dr. Spottiswoode Cameron moved a vote of thanks to the President for his address. Referring to the controversy with respect to the effects of the work of isolation hospitals, he said he should like to remind those who criticized, that isolation was not expected by the most intelligent part of the medical profession to stamp out scarlet fever all at once. To stamp out such a disease as scarlet fever was practically impossible, but the isolation hospital had done this—it had postponed the age at which patients took scarlet fever, it had diminished the number of those who took the disease, and it had enormously decreased the death-rate from the disease. In reference to some of the proposals for fresh work which the President had suggested, Dr. Cameron thought if all these new departures were adopted, it seemed as if large towns would require a staff of about a dozen Medical Inspectors to assist the Medical Officers; it might be some consolation to think that the Medical Officers would have to take them into service as assistants.

Dr. Scatterty seconded the resolution. He pointed out that a great deal might be done without any further extension of the law. For instance, he learnt that in the Administrative West Riding, Keighley was the only place where a veterinary inspector regularly inspected dairy cows. In his case every cow was inspected at least four times a year.

Dr. Arnold Evans discussed the question of "The Use of Preservatives in Food" (see p. 161).

At the close of the meeting the Mayor of Bradford, Mr. W. A. Whitehead, provided light refreshments. A very cordial vote of thanks was given to the Mayor for his kindness, which he acknowledged in an interesting little speech on the importance of public health.

Metropolitan Branch.—A meeting was held on October 26th, 1906, at the Society's Offices.

Physical Deterioration.—The Report of the Public Health Committee of the London County Council on this subject was discussed. Sir Shirley Murphy pointed out the great advantage which would result if records could be obtained of the occurrence of sickness in public institutions, and the Branch passed the following resolution:—

"Resolved, that the Metropolitan Branch are of opinion that weekly returns of sickness occurring in public institutions in each district should be supplied to the local Medical Officer of Health."

The Branch appointed a Sub-Committee to consider in what form the particulars desired should be supplied.

Disinfection after Measles.—Dr. R. K. Brown read an interesting paper on this subject, pointing out the many difficulties which have been experienced.

The Branch are of opinion that disinfection after measles has not proved a success.

North-Western Branch.—An ordinary meeting of the above Branch was held on Friday, October 26th, 1906, at the Victoria Hotel, Manchester. Present: Dr. Alfred Greenwood, President (in the Chair); Drs. Garstang, Barlow, Buckley, Wilkinson, Hitchon, Dearden, Edlin, Vacher, Sergeant, and M. Young.

Drs. Garstang and Barlow reported as to the business transacted at the last Council Meeting of the Society.

The President (Dr. Alfred Greenwood) then delivered his Presidential Address on "The Cotton Industry of Blackburn." A cordial vote of thanks, proposed by Dr. Garstang, seconded by Dr. Barlow, and supported by Drs. Wilkinson, M. Young, Sergeant, and others, was carried with acclamation.

An ordinary meeting of the Branch was held at the Chemical Club, Victoria Hotel, Manchester, on Friday, November 16, 1906. Present: Dr. Alfred Greenwood, President (in the chair), Drs. Sergeant, Garstang, Barlow, Brindley, Hancock, Buckley, Martin, Goldsmith, Margaret M. Smith, Wilkinson, Coutts, Pilkington, Thomas, and M. Young.

Letters of apology for absence were read from Drs. Kenneth Fraser, Wheatley, Vacher, and Chronnell.

Mr. Lomax gave a demonstration of a special cement joint for sanitary pipes.

Dr. G. Granville Buckley then read a paper on "The Resistance of Some Pathogenic Organisms to Drying." And an interesting discussion ensued.

Dr. Sergeant mentioned the fact of a book canvasser having been found in a number of his districts palming off on midwives a large and expensive book, a very small proportion of which dealt with their duties and training, and inducing them to purchase this book by false representations, and he warned Medical Officers of Health to be on the lookout for such a thing as this, and to take prompt steps to stop it.

It was resolved that the next meeting be held on Friday, December 14th, instead of on the 21st.

CURRENT PUBLIC HEALTH LITERATURE.

Zeitschrift für Hygiene und Infektionskrankheiten.
VOL. LIII, PART I.

1. Tuberculosis in infants. A study by Dr. P. Geipel (Dresden). (This is a very interesting contribution to the pathology of tuberculosis in infants. It is based on post-mortem examinations of thirty-two cases of infants, ranging from 8 weeks to 12 months old. The author first gives the details of each individual case, including the microscopical and bacteriological examination, together with the conclusions as to diagnosis. This is followed by a long review of the general results, with the author's deductions and theories. He finds that there is a great tendency to generalization, the probable cause being the want of resistance in the infantile tissues, including the delicate formation of the intestinal epithelium. Bacilli in infants pass easily through the walls of the blood

vessels, so that an obliterating exudation either does not occur at all or does so insufficiently. On account of this tendency to generalization the author did not come across any anatomical foci of the so-called "latent tuberculosis." It must be assumed that once tubercle bacilli gain a foothold they spread uninterruptedly till the infant dies. This is supported by observation on infants who have died of some other disease and showed circumscribed foci. The death-rate is approximately 100 per cent. His examinations do not confirm the theory of a latent tuberculosis in the sense spoken of by Behring and Weichselbaum. Coming to the point of entry, he finds that the lungs are the most important. Systematic examination shows a preponderance of infection through the thorax, the intestines and mesenteric glands being almost always secondary. The source of the bacilli is the sputum of phthisical patients.)

2. Endemic prevalence of colpitis gonorrhoeica. By Dr. Ernst Harmsen (New General Hospital, Hamburg-Eppendorf).
3. A contribution to our knowledge of the phenols in combination with acids, and in mixtures with soap, from a chemical and bacteriological standpoint. By Dr. Hans Schneider (Berlin). (Cresol has a higher disinfecting value in presence of a watery solution of a free mineral acid. The nature of the fatty acids in soap has considerable influence on the disinfecting power of cresol.)

Deutsche Medicinische Wochenschrift. VOL. XXXII.

- (No. 8.) Malachite-green agar as a culture medium for typhoid faeces, earth, and water. F. Loeffler. (After several years' experience, he regards the use of malachite green as a distinct advance for the differentiation of typhoid and allied organisms.)

- (No. 9.) Health of the Prussian Army in 1902. Werner.

The paths of infection in pulmonary tuberculosis. A. Fraenkel. (He discusses the relative importance of the three possible routes by which tubercle bacilli may travel to the lungs—namely, the blood stream, the lymphatic system, and the respiratory tract. He thinks that the danger of hæmatogenous infection through the placenta is commonly underestimated, and points out that Schmorl, in an examination of the placentas of 20 tuberculous women, found tuberculous nodules in 9 cases, or 45 per cent; and a fact of particular significance is that these nodules were found not only in cases of miliary tuberculosis or advanced lung disease, but also in a case of incipient phthisis. Infection of the lungs by way of the lymph channels appears to be particularly common in infancy; in infantile tuberculosis the bronchial glands are almost invariably affected. In a considerable proportion of the cases the infection has been introduced by the alimentary tract, and has been carried thence to the lungs by the lymphatic system; he does not go so far as to advocate the extreme view that the infant's lungs may not, in a certain proportion of cases, be directly infected by inhalation; and in the adult, where the bronchial glands are frequently less affected than in the child, the occurrence of direct infection by the respiratory tract is undoubtedly common.)

- (No. 10.) Contagious disease law (Prussia) of August 28, 1905. M. Kirchner.

PUBLIC HEALTH:

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THE COTTON INDUSTRY OF BLACKBURN.*

By ALFRED GREENWOOD, M.D., D.P.H.,

Medical Officer of Health for Blackburn; President of the North-Western
Branch of the Incorporated Society of Medical Officers of Health.

THE first duty which I have to perform is to thank you for the great honour you have paid me in electing me as your President for the next twelve months. It is an honour which has come to me somewhat early, for I have only been a member of the Society of Medical Officers of Health for seven years. As many of you know, our Branch had its inception in the North-Western Association of Medical Officers of Health, which was the first society of this kind to be founded in the provinces after the passing of the Public Health Act of 1875. In 1888 this Association became the North-Western Branch of the Incorporated Society of Medical Officers of Health, which has frequently supported many important Public Health measures. When I read the long roll of illustrious men who have filled the office of President of this Branch, I am even more sensible of the great honour of having my name added to the list. Many of these can now actually see successful results of their work, and are still rendering most valuable help not only to our own Branch, but to the Public Health service of the country. In support of this statement it is only necessary to mention such former Presidents as Sergeant, Hope, Niven, Vacher, Garstang, Wheatley, Berry, Wilkinson, and Barlow. Many other names might be mentioned, but I have limited this list to men who are still active members of our Branch, and without whose help we could not maintain our position as one of the most important Branches of the Incorporated Society.

* Presidential Address, October 26th, 1906.

My second duty is more difficult than my first, viz., the delivery of a Presidential Address. In spite of the numerous fields of enquiry and potentialities of certain Public Health measures, it is not easy for a Medical Officer of Health who is engaged in much routine work continually, and whose duties and responsibilities tend to increase rather than diminish, to carry out much original work, and so offer the results of such, in preference to a mass of well-known facts and opinions. However, I have chosen a subject about which much has already been said, but which is always full of interest, affecting as it does the lives of a large proportion of the population of many towns in Lancashire.

My reasons for selecting this subject are three :—

1. That the cotton industry, especially the weaving branch, is the staple trade of Blackburn.
2. That very marked improvements have resulted in the health and conditions of work of cotton mill operatives during recent years.
3. That very useful mortality statistics of these operatives have been compiled with great care since 1891, i.e., a complete period of fifteen years.

These three headings will now be considered seriatim.

I. THE COTTON INDUSTRY OF BLACKBURN.

I believe that a Medical Officer of Health should know the conditions under which the citizens of his town are employed, in order that he may calculate and interpret death-rates, etc., with accuracy and interest.

Blackburn is one of the most northern of the various Lancashire districts which play an important part in the industry, and this town also takes the lead probably in the whole world with regard to its importance as a manufacturing town.

The classes of goods made are chiefly of a plain character, principally shirtings, mulls, jaconettes, and their sub-varieties. Other Lancashire towns, such as Oldham and Stockport, are more especially concerned with spinning.

In 1901 a larger number of cotton-mill operatives were employed in Blackburn than in any other borough in the United Kingdom. In that year 38,551 cotton-mill operatives were employed, representing about 38 per cent of the total population from the age of 10 upwards. This number consisted of 14,518 males and 24,033 females. Of the total number of cotton operatives about 70 per cent were employed in weaving, 18 per cent in winding and warping, 6 per cent in spinning, and 5 per cent in carding.

The climatic conditions favour the weaving industry of Blackburn. The average rainfall varies from 35 to 38 inches, and the relative humidity averages from 84 to 86 per cent.

At the present time there are 128 cotton mills in Blackburn, 86 engaged in weaving and 42 in spinning, containing 74,157 looms, and 1,238,584 spindles. Moreover, several new mills are being erected at present.

A brief description of cotton manufacturing, which is divided into spinning and weaving, or manufacturing, strictly so-called, may be of interest to those who are not acquainted with it.

The various processes :—mixing, blowing, carding, drawing, roving, and spinning, are included under the head of cotton spinning.

Cotton manufacture includes the processes of winding, warping, sizing or tapping, and weaving.

I have brought a number of samples showing the effect upon the cotton at certain stages from the raw material to the finished cloth.

The raw cotton arrives at the mill from the United States, Egypt, Brazil, and India, in large packages or bales, each weighing from 150 to 800 lb. In the heaviest bales the cotton is very tightly pressed together by hydraulic pressure, and held by iron bands, while in the smaller bales it is loosely kept together by twigs or ropes. It is graded as being better or worse according to the amount of impurity, such as leaf, sand, soil, etc. The quality of the yarn depends on the staple and grade of cotton, which it is desirable should be regular and even running.

The first process is mixing (this was formerly done by hand, but machinery is now used extensively). The cotton is now generally placed into a machine which breaks up the large lumps of cotton, causing the heavy dust to fall out. The cotton then passes on to the exhaust, or first scutcher, through a long pipe or grated trunk. This machine breaks up the cotton still more, the dust being extracted by the powerful fans of the machine. The cotton leaves this machine in the shape of a lap, or roll, and is passed into an intermediate or second scutcher, and then to a finisher or third scutcher, leaving each in the shape of a lap or roll. The air of the blowing room is usually not very dusty, owing to the influence of the fans with which each machine is provided, but when the machines or scutchers are being cleaned large quantities of dust arise. In this process the attendants are adult males.

The next process is called carding. This is the last of the cleaning processes, and it is here that the fibres are combed parallel, in order to

facilitate the formation of a thread. This process and the cleaning of these machines produce much dust. Men and boys are employed on these machines.

By the drawing, slubbing, intermediate and roving processes, the thickness of the thread is gradually diminished, so as to prepare it for spinning. Females are employed for these processes, and where the floors are wooden, boots and stockings are discarded. If these processes were carried out in a room by themselves very little dust would be given off, in fact, nothing but fluff. But in general practice, the carding, drawing, etc., are carried on in one room. This subjects the females engaged on the drawing processes to the dusty atmosphere of the card room.

Spinning.—In spinning the thread is drawn out to the required thickness, or counts; the fibres are twisted to give the required strength, and a suitable cop, or spool, is formed, from which the thread may be drawn without undue breakages or waste of material. There are two kinds of yarn produced, twist and weft. The twist is the yarn which forms the warp or lengthway substance of a cloth. The weft is that which intersects the twist and forms the transverse portion of the cloth. Male labour is employed in the mule spinning rooms and female labour on the ring spinning frames.

The cotton manufacturer receives his material, now called yarn, from the spinner in the shape of cops, which are transferred by the winders to bobbins, and further by warpers or beamers to beams.

A custom is growing up of the winding and warping being done by the spinners, especially in the case of ring yarn, and the manufacturer then receives the twist on beams.

As many as 500 bobbins may be wound on one beam. Winding and warping are performed by females.

The next process is the sizing, by means of which the threads are strengthened for weaving and the required weight is imparted to the warp. Such substances as flour, China clay, farina, sago, magnesium chloride, muriate of zinc, are used in the preparation of size. Adult males are employed in this process.

The drawing-in, or looming, consists of attaching healds and reeds to the warp. This is very fatiguing for the eyes, especially when artificial light is used, as a small hole is focussed at a distance of $1\frac{1}{2}$ to 2 feet from the head. It is a common thing to see drawers-in, who are generally males, wearing spectacles.

The foregoing processes culminate in weaving, in which the twist and weft are interlaced to produce a firm texture. Weaving is carried

on in a shed, on a ground floor, and there may be as many as 1,000 looms in one shed. The work of weaving is carried out by both sexes, from half-timers to elderly people, but the female element predominates. Warmth and moisture are required to obviate brittleness of the threads.

There appears to be some danger in the custom of weavers sucking the weft through the shuttle when the thread breaks, or on replenishing the shuttle. This custom would seem to favour the production of sore throats and bronchitis, and also phthisis, if the shuttle became infected with tubercle bacilli of a sufferer from that disease; but as the shuttles are not changed from loom to loom, the latter would probably only affect employees at the same machines.

Various devices have been placed upon the market which would avoid the necessity of putting the shuttle to the mouth; but I understand that many of the workers do not care to use them, or, in their own words, "they can't be bothered." Also many of these devices necessitate extra grooving of the wood, shorten the life of the shuttle, and add to the initial cost.

In connection with this mention of shuttles, and as Blackburn is one of the principal centres for shuttle-making, it is very interesting at this point to refer to an important investigation by Professor Harvey Gibson, of Liverpool, last winter respecting poisonous wood used in shuttle making, and in which he attributed illness from which certain workers in this trade had been suffering, to the absorption of an alkaloid discovered by him in a wood imported from the Congo. The alkaloid was extracted from the sawdust, and tested in its chemical and physiological aspects. Briefly, the result of numerous experiments showed that the alkaloid was a cardiac poison, inducing a gradual slowing of the heart-beat and diminution of vigour in the contractile tissue of the heart, that its effect was cumulative, finally producing a cessation of the beat under long exposure to its influence.

The wood was known as "yellow-grey box."

The chief wood-working processes in shuttle-making are: (1) Sawing the logs across; (2) cutting the blocks to length; (3) dressing up the edges; (4) boring and tipping; (5) bodymaking (viz., sawing out the interior of the block); (6) turning so as to form a pointed end; (7) rubbing with sandpaper—known in Blackburn as "hustling."

All these are performed by machinery, with the production of much dust. The chief symptoms, as ascertained by Dr. Legge, complained of by the sufferers were, headache, feeling of sleepiness, running of eyes, running of nose, difficult breathing, nausea, and faintness. Two deaths were attributed to the dust of this wood. A conference with

representative manufacturers of shuttles was held in Blackburn on November 22nd, 1905, at which it was agreed that exhaust ventilation by hoods and ducts, so arranged as to catch the dust as near as possible to the point where it is produced, should be applied to the sawing, dressing up, boring, and sandpapering of the seasoned wood.

The above is an illustration of a brilliant piece of research work carried out by co-operation between a Professor of Botany and a Medical Officer of the Home Office in detecting the cause of poisoning from a form of industrial dust, indirectly connected with the cotton trade, and in the application of a successful remedy.

Many statements were made years ago to the effect that the conditions under which cotton operatives worked were very dangerous to health. In the Medical Reports to the Privy Council for 1861 the following statement appeared: "The great prevalence of pulmonary diseases among the inhabitants of Blackburn has not escaped the notice of the resident practitioners. Mr. Wraith, of Over Darwen, certifying factory surgeon and also parochial medical officer for that district of the Blackburn Union, had observed for more than twenty years the great prevalence of bronchitis and phthisis. He had especially noticed that operatives employed in the carding rooms suffered from these diseases, and he attributed the circumstances to their inhaling dust and fluff. In Dr. Grime's opinion, inhaling dust and fluff diffused through the atmosphere of the card rooms is the primary cause of the prevalence of pulmonary diseases among this class of operatives, being out of all proportion more frequent among those who work in card rooms than among other occupied persons."

In 1883 a report was prepared by direction of the Secretary of State by Dr. Bridges and Mr. Osborne, on "The Effects of Heavy Sizing in Cotton Weaving upon the Health of the Operatives Employed." Certain recommendations were made in this report.

In 1887 some very strong remarks were made by Dr. Stephenson, a former Medical Officer of Health for Blackburn, who stated that the high death-rate of the borough was due to a wholesale slaughtering of the inhabitants by effusing steam into the factories, and polluting the atmosphere with dense black smoke from the chimneys; and he recommended the entire cessation of steaming in sheds.

Many statements were made at this time which appear to have been exaggerated.

The Blackburn Corporation appointed a committee, who examined over 100 witnesses, and then concluded that ventilation in mills was inefficient, that the heavy steaming was injurious to the health of the

weavers, but that steaming, if lightly performed with proper attention to ventilation, was not injurious.

The Cotton Cloth Factories Act became law on August 30th, 1889, in which occupiers of weaving sheds where artificial moisture was produced were required to provide hygrometers, to keep records of temperature and humidity, and maintain the latter within certain limits to avoid unnecessarily raising the heat beyond 70° F., and to provide means for ventilating and carrying off dust.

II. IMPROVEMENTS IN CONDITIONS UNDER WHICH THE COTTON OPERATIVES OF BLACKBURN ARE EMPLOYED.

Very marked improvements have been effected by engineers in ventilating and humidifying apparatus during recent years.

Every effort is being made by manufacturers to comply with the requirements of the Factory and Workshop Act of 1901, which requires that the air of any room or shed shall not contain more than 9 volumes of CO₂ per 10,000, or not more than 5 volumes over the outside air. It seems quite practicable to conform to this standard, in spite of the suggestion from a Departmental Committee in 1902 that 12 volumes of CO₂ per 10,000 should be allowed when gas is not burning.

So much has been said regarding the ventilation and humidity of weaving sheds that I will confine my remarks on these two points to a few recent developments.

The method of ventilating which is being employed most frequently at present in the weaving sheds of Blackburn is a modification of the Plenum system. A 14-inch air propeller is fixed on a beam, with steel trunking fixed above and below the fan. As the air is brought in it strikes a cone-shaped dripper below the fan to distribute the air evenly without draught, in order to prevent condensation.

In winter the incoming air is heated by a copper coil, supplied with steam at high pressure, and fixed inside the trunk. The air leaves the shed by doors and other openings.

Improvements in ventilation are frequently being carried out in other parts of the cotton mill, such as the spinning and carding rooms.

There have also been distinct advances in methods of sizing. The fibre is now sized in an approved scientific manner, so that the size adheres more firmly, and this means less dust, as there is less disintegration of the sizing material.

Under Section 94 of the Factory and Workshop Act of 1901, it is enacted that the water used for the purpose of producing humidity in every cotton cloth factory shall either be taken from a public supply

of drinking water or other source of pure water, or shall be efficiently purified to the satisfaction of the inspector before being introduced in the form of steam into the factory, and all ducts for the introduction of humidified air shall be kept clean.

I believe that the Home Office now allow water to be used for this purpose, the oxygen absorption power of which is not greater than 0.5 grain of oxygen absorbed per gallon. This allows the use of ordinary canal water.

A firm is now placing upon the market an apparatus which is intended to obviate steaming in weaving sheds. It consists of a trough which is placed under the yarn near the beam. Pure water is supplied to the trough, in which a spiral brush revolves, causing the air locally to be moistened. The tests which have been made appear to be satisfactory as regards the amount of CO₂ present, but I do not know whether this method will come into general use as a substitute for the present method of humidifying the air of weaving sheds.

Warmed and ventilated cloak-rooms have been provided in many mills for the use of the weavers, in order that their outer garments may be dry when they go home.

Electric light has replaced gas in many of the mills, and its extension will undoubtedly further diminish impurities in the air of the rooms, while the great improvements in incandescent mantles have made the atmosphere much better in many mills continuing the use of gas.

Since 1903 extensive improvements have been carried out in the sanitary conveniences at many mills in the borough. The cost has ranged from £10 to £500 in single mills. Since the beginning of 1904, 227 water closets have been provided in lieu of privies, old iron trough closets, pails, etc., which frequently communicated directly with the rooms of the mill. The type recommended is the separately trapped, wash-down pedestal w.c., of white glazed earthenware, and automatically flushed. Care is also taken to disconnect the sanitary conveniences from the mill by the provision of an intervening ventilated space. Advantage has been taken of the exceedingly prosperous condition of the cotton industry to get this work carried out.

Corresponding with the improvements in the conditions of work, I have learned from several people who have had much experience that there has been an improvement in the habits and mode of living of cotton operatives in Blackburn. Formerly large numbers of workers went direct to the nearest public-house before going home to tea. Now I understand this is the exception rather than the rule. Instances of an overlooker tyrannizing over his subordinates, if they

did occur, are now unknown. There is no doubt that the home conditions generally of the people have improved concurrently, although there is still much to be desired in this respect.

Moreover, there are now distinct improvements locally in the scientific teaching of the various branches of the cotton industry, and most successful classes are held at the Blackburn Technical School, under the thorough guidance of teachers with high attainments.

III. THE COTTON TRADE MORTALITY STATISTICS OF BLACKBURN.

It is now possible for the first time to compare the death-rates of various workers in the cotton mills of Blackburn in detail for a complete period of fifteen years, namely from 1891 to 1905 inclusive. And here I wish to pay a high tribute to my predecessor in office, Dr. Wheatley, for his energy and originality in obtaining a trade census for Blackburn, and in placing these statistics upon a sound basis. He has thus made it possible to refute certain incorrect figures and statements regarding the unhealthiness of the cotton industry, particularly the weaving branch. As a whole, Medical Officers of Health have not availed themselves of opportunities for calculating the effect of various trades on the health of the workers in this way. Much excellent work still remains to be done along the line of occupational statistics, and this subject is well worthy of your future consideration. It is unnecessary to state before a meeting of Medical Officers of Health that very great care indeed is required in compiling these figures.

I have divided the fifteen years 1891 to 1905 into three quinquennial periods, namely, 1891 to 1895, 1896 to 1900, and 1901 to 1905. The death-rates in the first period have been calculated from the 1891 census, and in the third period from the 1901 census figures. In the second of these quinquennial periods, that is, from 1895 to 1900, the death-rates have been calculated on populations in the respective age-periods obtained from the mean of the 1891 and 1901 census figures. It is especially in an enquiry of this kind that a quinquennial census would be of the utmost value; but it has been recommended so often by leading Medical Officers of Health throughout the country, that one despairs of this important measure ever becoming law.

Instances of the difficulties caused by the long intercensal period at present existing are numerous. For example, in estimating the annual death-rates at Blackburn, between the ages of 15 and 25, amongst the various classes of cotton operatives from 1891 to 1900, the 1891 census figures must be used for each of those years. After the 1901 census the average of the two census populations may be

taken, but it is not possible to obtain the exact number of weavers at each age-period every year. Again, in the period 1889 to 1904 the death-rate from all causes amongst spinners was 12 per 1,000, and the total number of deaths at ages 25 to 35 was 80. The annual rate, however, for most of the individual years has generally been from 6 to 8 amongst spinners at ages 25 to 35, but the rate seems to have increased in later years.

This apparent increase may be due to the fact that the number exposed to risk has been calculated at too low a figure; for during the period 1889 to 1894 (six years), there were actually 37 deaths among spinners at ages 25 to 35, while from 1895 to 1905 (eleven years) there were 45 deaths. A study of the two census tables 1891 and 1901 shows that while in 1891 there were 806 spinners at ages 25 to 35, in 1901 there were only 415 spinners at that age. In other words, there seems to have been a rapid decrease in the number of spinners at this age, which may possibly be due to certain changes in the methods of spinning. A quinquennial census would obviate difficulties of this kind to a great extent.

Also there is a difficulty in dealing with retired cotton operatives. Dr. Wheatley has pointed out that district registrars should ascertain more carefully the length of time a deceased cotton operative had not followed his occupation before death, so that a more accurate classification might be obtained. The figures for age-period "65 and upwards" are of less value than those for the other age-periods. Also the figures referring to weavers are more valuable than those referring to the other classes of cotton operatives, since they deal with much larger numbers.

I have prepared six tables as follows:—

Table I indicates the populations at the 1891 and 1901 census years, and also the mean between these two. All have been grouped in age-periods of 10 years, and also have been divided into the four main groups of cotton operatives, namely: weavers, spinners, winders and warpers, and card-room hands. A comparison may be made between these numbers and the total populations of the borough at the same age-periods.

Table II shows the distribution of weavers according to sex for the same periods.

Table III shows the average death-rates amongst the above four groups of cotton operatives in three quinquennial periods from 1891 to 1905, and also a comparison with the average deaths for the whole of the borough during the same periods. The only figures which I

have employed for detailed conclusions are those relating to weavers, as the figures for the other branches of the cotton industry are still somewhat small for anything except a general conclusion.

Table IV shows the average death-rates amongst male and female weavers from 1891 to 1905, and a chart accompanies this table.

Tables V and *VI* indicate respectively the deaths and death-rates from phthisis and other respiratory diseases amongst weavers from 1891 to 1905. Charts also accompany these tables.

TABLE I.
POPULATIONS AT 1891 CENSUS.

Age-Period.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,176	769	2,261	516	23,621
25-35 ...	5,467	806	1,531	581	19,739
35-45 ...	2,625	499	863	368	14,299
45-55 ...	1,253	216	387	184	10,076
55-65 ...	436	145	141	58	6,088
65 and upwards	125	46	46	13	3,521

MEAN POPULATIONS BETWEEN 1891 CENSUS AND 1901 CENSUS
(NOT INCLUDING THE EXTENSION OF NOV., 1901), BUT
INCLUDING THE RETIRED OPERATIVES TAKEN AT THE
1901 CENSUS.

Age-Periods.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,130	705	2,340	575	25,000
25-35 ...	5,799	607	1,600	500	20,461
35-45 ...	2,994	508	964	402	15,700
45-55 ...	1,329	274	489	196	10,926
55-65 ...	543	145	174	67	6,531
65 and upwards	204	64	69	27	3,857

POPULATIONS AT 1901 CENSUS, INCLUDING RETIRED OPERATIVES,
TAKEN AT 1901 CENSUS, AND THE EXTENSION OF
NOV., 1901.

Age-Periods.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,213	655	2,442	647	26,693
25-35 ...	6,202	416	1,692	433	21,451
35-45 ...	3,394	522	1,075	446	17,296
45-55 ...	1,418	340	596	209	11,908
55-65 ...	653	146	211	76	7,197
65 and upwards	284	84	93	42	4,228

TABLE II.

POPULATION OF MALE AND FEMALE WEAVERS AT THE 1891 CENSUS.

Age-Periods.	Males.	Females.
15-25	3,472	6,704
25-35	1,669	3,798
35-45	983	1,642
45-55	617	636
55-65	272	164
65 and upwards ...	101	24

MEAN POPULATION OF MALE AND FEMALE WEAVERS BETWEEN 1891 CENSUS AND 1901 CENSUS (NOT INCLUDING EXTENSION OF NOV., 1901), BUT INCLUDING THE RETIRED WEAVERS TAKEN AT 1901 CENSUS.

Age-Periods.	Males.	Females.
15-25	3,170	6,960
25-35	1,737	4,062
35-45	1,117	1,877
45-55	658	671
55-65	352	190
65 and upwards ...	142	62

POPULATION OF MALE AND FEMALE WEAVERS AT THE 1901 CENSUS (INCLUDING THE RETIRED WEAVERS AND THE EXTENSION OF NOV., 1901).

Age-Periods.	Males.	Females.
15-25	2,900	7,313
25-35	1,832	4,370
35-45	1,266	2,128
45-55	708	710
55-65	434	219
65 and upwards ...	184	100

TABLE III.

AVERAGE DEATH-RATES AMONGST COTTON OPERATIVES FOR THE YEARS 1891-1895.

Age-Period.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Average Death-Rate for whole of Borough.
15-25	4'3	7'5	4'8	4'2	4'9
25-35	6'4	7'7	8'6	7'9	7'1
35-45	11'9	13'2	12'5	12'5	14'2
45-55	14'0	34'2	25'8	21'7	23'7
55-65	53'2	48'2	42'5	34'5	48'5
65 and upwards	187'2	278'2	186'9	230'7	113'5
1896-1900.					
15-25	3'7	3'7	5'4	3'1	4'2
25-35	4'9	7'2	6'1	4'0	6'3
35-45	9'6	10'2	10'8	7'9	12'3
45-55	15'3	23'3	21'6	16'3	20'0
55-65	38'6	23'4	35'6	23'9	45'0
65 and upwards	155'9	193'7	139'1	37'0	107'3
1901-1905.					
15-25	2'7	2'7	2'6	2'8	3'7
25-35	3'9	7'7	4'7	2'3	5'6
35-45	6'9	6'9	5'9	5'8	9'5
45-55	13'7	22'3	10'7	16'2	19'2
55-65	34'6	42'4	20'8	15'8	38'9
65 and upwards	106'3	121'4	55'9	19'0	100'7

TABLE IV.
AVERAGE DEATH-RATES OF MALE AND FEMALE WEAVERS
FOR THE YEARS 1891-1895.

Age-Periods.	Males.	Females.
15-25	6'1	3'4
25-35	7'3	6'0
35-45	14'0	10'7
45-55	19'1	9'1
55-65	69'1	26'8
65 and upwards ...	196'0	150'0
1896-1900.		
15-25	4'6	3'3
25-35	6'2	4'3
35-45	12'1	8'1
45-55	23'7	7'1
55-65	43'7	29'4
65 and upwards ...	204'2	45'1
1901-1905.		
15-25	2'9	2'5
25-35	4'2	3'8
35-45	7'4	6'5
45-55	16'1	11'2
55-65	39'6	24'6
65 and upwards ...	129'3	64'0

TABLE V.
NUMBERS AND AVERAGE DEATH-RATES FROM PHTHISIS
AMONGST WEAVERS DURING THE LAST THREE QUIN-
QUENNIAL PERIODS.

1891-1895.

Age-Periods.	Number.	Death-Rate.	Average Phthisis Death-Rate for the Borough.
15-25	54	1'0	1'1
25-35	57	2'1	1'9
35-45	28	2'1	2'4
45-55	7	1'1	1'9
55-65	6	2'7	1'5
65 and upwards	0	0'0	0'7
1896-1900.			
15-25	55	1'1	1'1
25-35	43	1'5	1'6
35-45	35	2'3	2'5
45-55	16	2'4	2'0
55-65	8	2'9	1'8
65 and upwards	2	1'9	0'6
1901-1905.			
15-25	48	0'9	1'0
25-35	34	1'1	1'4
35-45	29	1'7	1'8
45-55	11	1'5	1'8
55-65	6	1'8	1'1
65 and upwards	1	0'7	0'6

TABLE VI.

NUMBERS AND AVERAGE DEATH-RATES FROM RESPIRATORY DISEASES OTHER THAN PHTHISIS, AMONGST WEAVERS DURING THE LAST THREE QUINQUENNIAL PERIODS.

1891-1895.

Age-Periods.	Number.	Death-Rate.	Average Death-Rates of whole Borough from Respiratory Diseases.
15-25	39	0.7	0.8
25-35	30	1.1	1.2
35-45	40	3.0	3.7
45-55	37	5.9	7.6
55-65	36	16.5	15.9
65 and upwards	41	65.6	35.6

1896-1900.

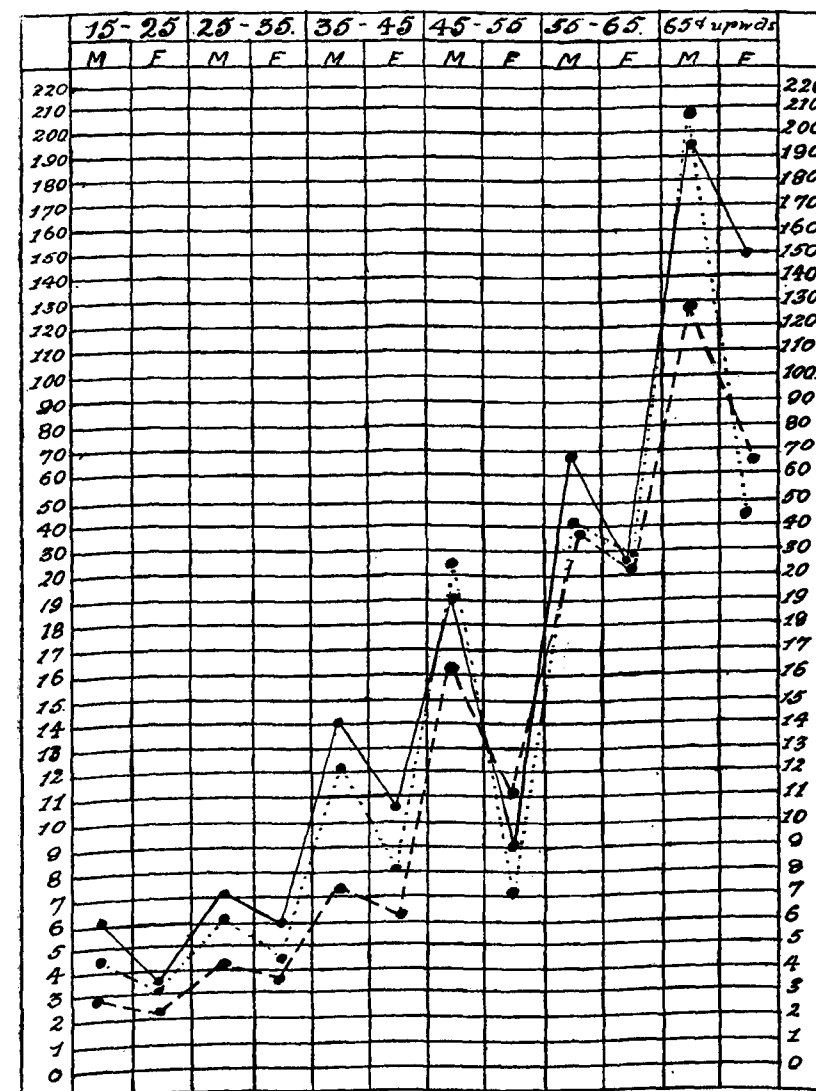
15-25	21	0.4	0.6
25-35	18	0.6	1.0
35-45	28	1.8	2.4
45-55	27	4.0	5.0
55-65	39	14.3	12.8
65 and upwards	35	34.3	27.1

1901-1905.

15-25	10	0.2	0.4
25-35	12	0.4	0.7
35-45	12	0.7	1.4
45-55	28	3.9	4.7
55-65	35	10.7	10.1
65 and upwards	25	17.6	23.8

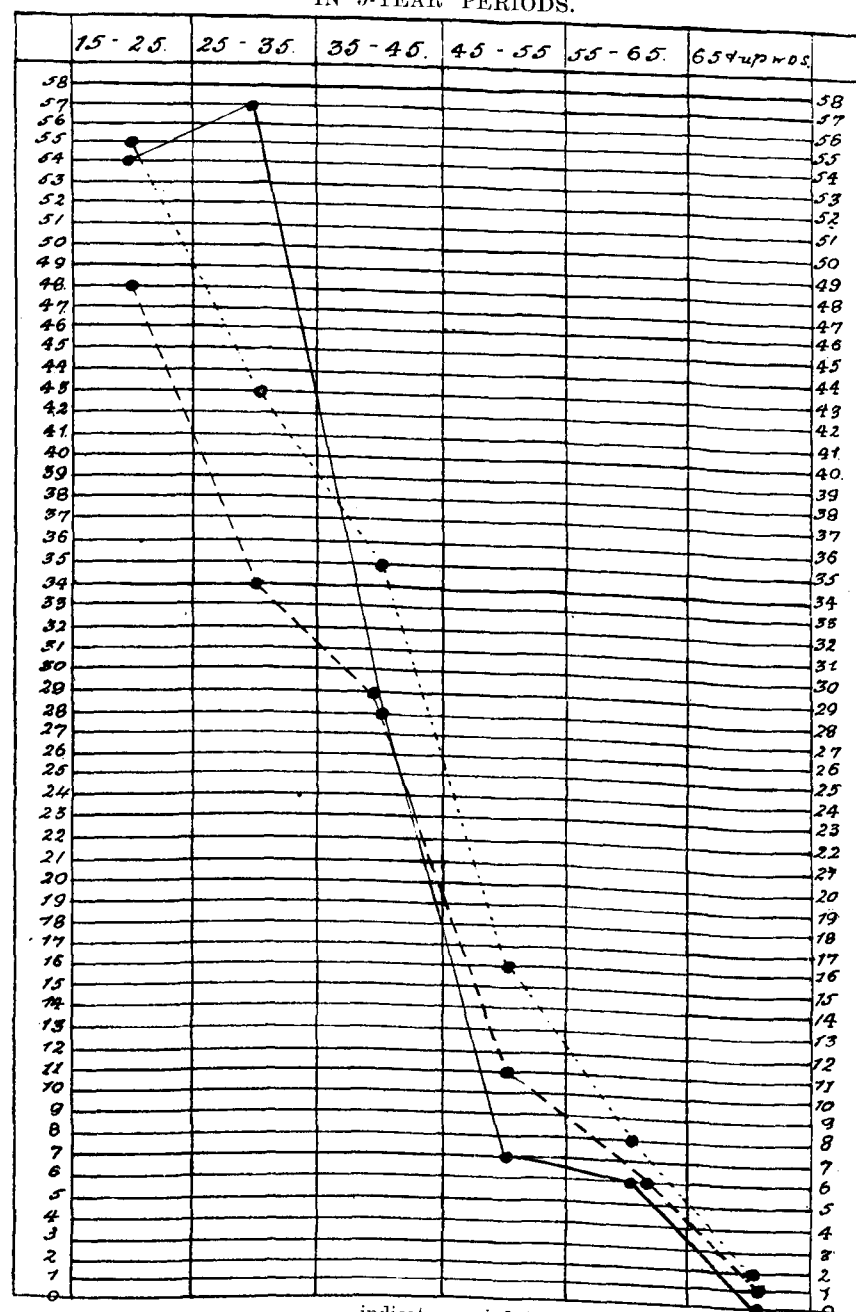
CHART I.

CHART SHOWING DEATH-RATES OF MALE AND FEMALE WEAVERS IN THE 5-YEAR PERIODS, 1891-1895, 1896-1900, 1901-1905.



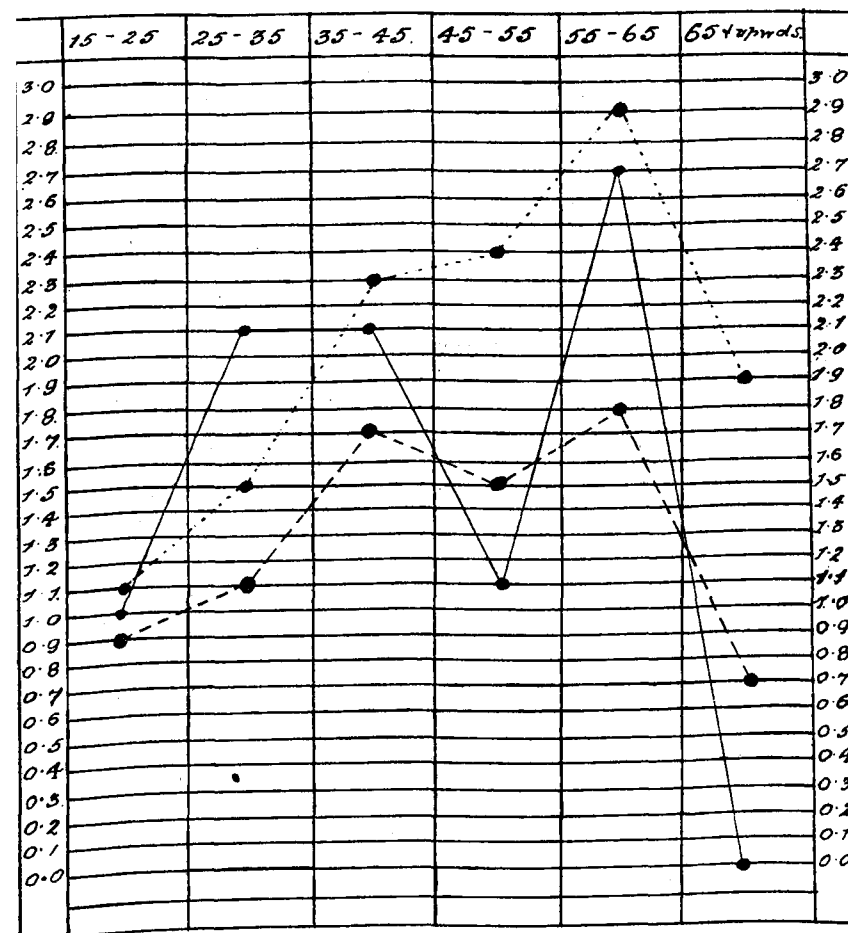
— indicates period 1891-1895.
 " " 1896-1900.
 - - - " " 1901-1905.

CHART II.
DEATHS FROM PHTHISIS AMONGST WEAVERS FROM 1891-1905
IN 5-YEAR PERIODS.



— indicates period 1891-1895.
 " " 1896-1900.
 - - - " " 1901-1905.

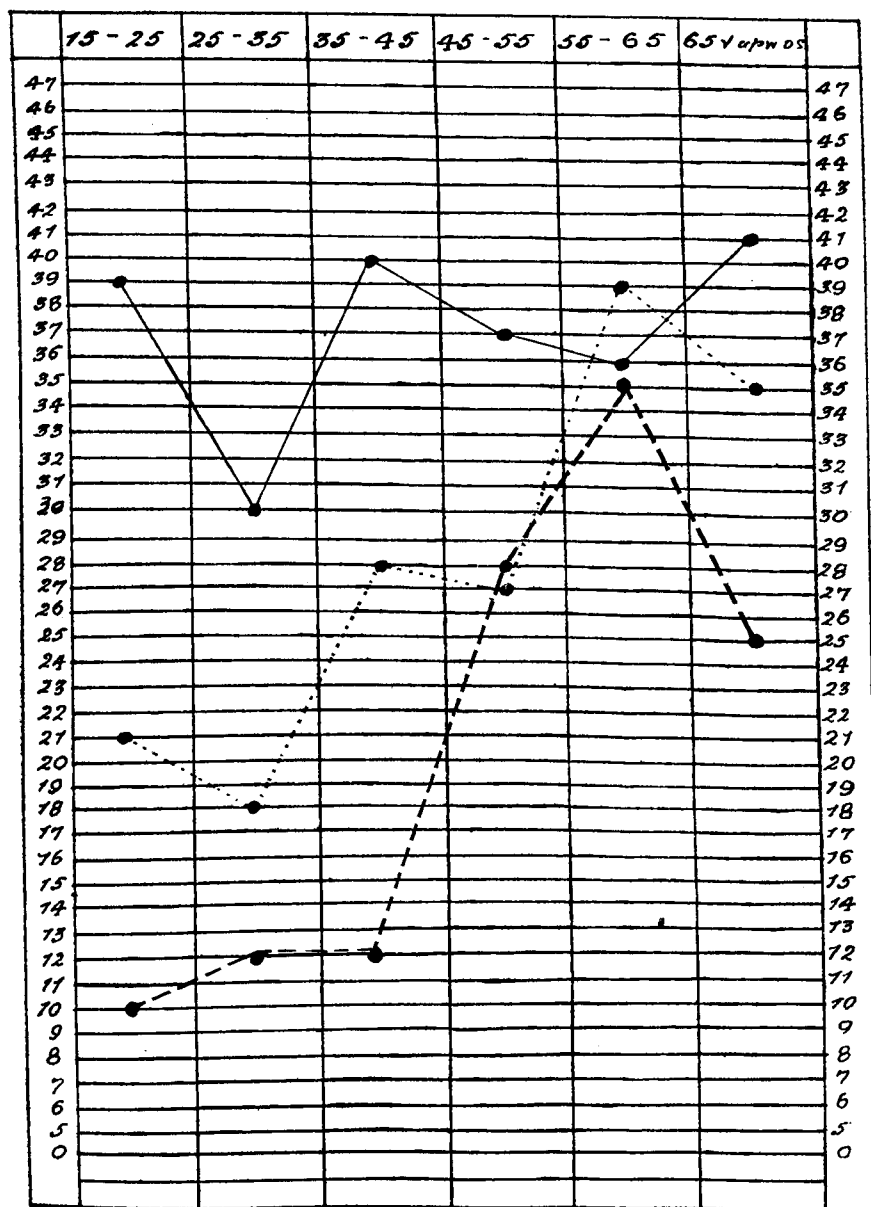
CHART III.
AVERAGE DEATH-RATES FROM PHTHISIS AMONGST WEAVERS
FROM 1891-1905 IN 5-YEAR PERIODS.



— indicates period 1891-1895.
 " " 1896-1900.
 - - - " " 1901-1905.

CHART IV.

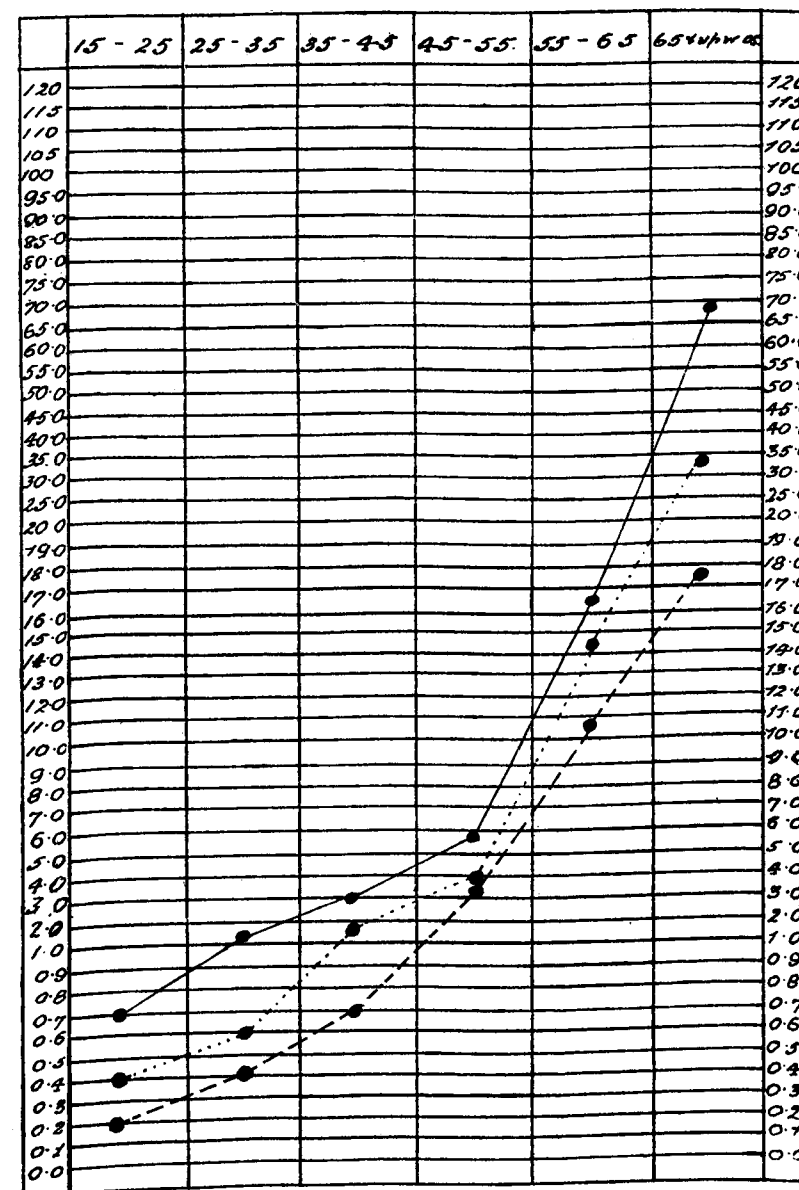
DEATHS FROM RESPIRATORY DISEASES OTHER THAN PHTHISIS
AMONGST WEAVERS FROM 1891-1905 IN 5-YEAR PERIODS.



— indicates period 1891-1895.
 .. " 1896-1900.
 --- " 1901-1905.

CHART V.

AVERAGE DEATH-RATE FROM RESPIRATORY DISEASES OTHER
THAN PHTHISIS AMONGST WEAVERS FROM 1891-1905 IN
5-YEAR PERIODS.



— indicates period 1891-1895.
 .. " 1896-1900.
 --- " 1901-1905.

From the preceding tables and charts the following conclusions may be drawn :—

1. That the death-rates amongst the four main groups of cotton operatives in Blackburn at all the age-periods have diminished between 1891 and 1905.
2. That the death-rates amongst weavers from the ages 15 to 55 have been lower than the average death-rates for the whole borough since 1891.
3. The death-rates since 1891 amongst male and female weavers have diminished at each age-period except one, namely amongst female weavers from 45 to 55 years of age. This rate has increased by 2·1. It is also interesting to note that the death-rate at this same period from phthisis amongst weavers increased by 1·3 and 0·4 in the quinquennial periods respectively ending 1900 and 1905 compared with the quinquennial period ending 1895.
4. The death-rates from phthisis amongst weavers have shown a steady decline, with the exception named above. This improvement has been most marked between 25 and 45 years of age.
5. The death-rates from other respiratory diseases amongst weavers have also shown a very marked improvement.
6. The above death-rates have improved progressively during each of the last three quinquennial periods.

The foregoing facts and figures therefore enable one to state that the conditions under which cotton operatives work in Blackburn have improved enormously, and that the death-rates amongst them improve continually. This has involved less sickness amongst the operatives and an increased output in manufactured goods.

Finally, I would thank you for listening to these remarks, which I trust have illustrated the main points in a fifteen-years history of an important industry, in which energetic sanitation and carefully compiled statistics have produced very encouraging results.

SALE OF DISEASED MEAT.—At a meeting of the Western Counties Veterinary Association, held at Plymouth recently, it was stated that a very large number of diseased animals, both living and dead, found their way into the large towns for human consumption, especially into Plymouth, Devonport, and Stonehouse. It was suggested that this traffic was assisted by the large number of private slaughter-houses which exist in these towns. The Association urged the Authorities to take steps to put an end to this traffic.

THE PROGRAMME OF FUTURE PUBLIC HEALTH REFORM. *

By EDMUND M. SMITH, M.D. Edin.; D.P.H. Camb.;

Medical Officer of Health, City of York;
President of the Yorkshire Branch of the Incorporated Society of
Medical Officers of Health.

IN assuming the Presidency of this important Branch of the Society, I beg first to thank you most heartily for the honour of election to the office and for your confidence, and secondly to plead for your support in maintaining the importance and usefulness of the Branch.

Permit me to express the pride which I feel in succeeding, not only those who have more recently preceded me, but, *in particular*, my honoured predecessor in my municipal office, the President for the first ten years of the original Society (the Yorkshire Association of Medical Officers of Health), and its founder, or one of its founders—the late Dr. Samuel William North. I had the privilege of his acquaintance only for two brief years, but it was impossible to come into contact with him without being greatly impressed by his profound learning, his incessant zeal in study and in office, and his masterly initiative in sanitary administration, of which he had claim to rank amongst the pioneers. Had I had the time at command, I should have liked to have made a review of his life-work the theme of this address; such a review may be undertaken, perhaps, another day.

This Association was founded—in Dr. North's house in York, I believe—on September 17th, 1875; it was only the third of such Associations in England in the chronological order of establishment, and was amongst the first to become a Branch of the amalgamation now known as the Incorporated Society of Medical Officers of Health. The history of the Branch, as related in the excellent Jubilee Number of *PUBLIC HEALTH*, proves, I think, that in usefulness and zeal it has been second to none. Long may that honourable history be maintained.

This leads me to remind you that we are still in the Jubilee year of the Society, and to utter a note of congratulation upon its attainment. We rejoice in the extent and power to which the Society has attained, and in the achievements of its past, and equally, I think, we may rejoice in its prospects for the future.

* Presidential Address delivered to the Yorkshire Branch at Bradford, October 19th, 1906.

The mental search for a theme for an address on such an occasion as this is one of difficulty, not that there is a dearth of themes, but that the superabundant activities of so many of our colleagues, and the absorption of one's own mental and physical energy, in these days of rapidly increasing administrative duties, is so complete, that it is only given to a few to be able to offer anything new and original to their fellows, however zealous they may be, and proud and delightful as it is to be in such a position.

Standing, however, upon a Mount Pisgah, as we may be said to do this year, it appears to me that it may be profitable for us briefly to ponder over some of the scenes which lie before us in the promised land of Public Health reform.

First, then, let me point out that an extensive vista of reform has recently been spread before us by the National Conference on *Infant Mortality* held in London last June. Looking back upon this Conference, I regard it as one of the most important of recent years; and if its conclusions and recommendations are acted upon as they should be, its influence for good should be immense. The published transactions are worthy of the careful study of every sanitarian, and also of every medical practitioner, for there is much work for him to do in connection with this subject.

The Conference set forth the following prominent requirements and aims urgently calling for achievement:

(a). The inculcation amongst all classes, upper as well as lower, of a much higher sense of *the duty and sanctity of child-bearing*, and of the preciousness of human life before and after birth. As Dr. Sykes (St. Pancras) eloquently said, "If we intend to remain an imperial race, we must restore to its imperial place the dignity of motherhood." Dr. Cooper Pattin, of Norwich, suggests, in his recent Report on the Conference, that "for the largely prevalent ignorance, carelessness, and disinclination to take trouble," we require to "substitute a civic religion which will make the loss of a child something of a social stigma as well as a racial sin."

I specially commend to those who were not present at the Conference, and have not read its transactions, the papers by Dr. Sykes, on "The Teaching of the Hygiene of the Expectant and Suckling Mother," and by Dr. Ballantyne, of Edinburgh, on "Antenatal Causes of Infant Mortality, Including Parental Alcoholism." These papers were full of instruction and suggestion. They strongly emphasized the fact that we have hitherto paid an insufficient amount of attention to the mother ante-partum—in the direction of the maintenance of

a maximum of her health, in her preparation for her paramount duty of suckling (that crux of the whole question), in the prevention of her and her child becoming victims of alcoholism, and in other directions which I need not mention here. There is decided need that she should apply for, and receive, more medical attention and supervision during pregnancy, and that she should be made to realize that abortions, premature births, and still-births are *catastrophes*, which must be avoided by every effort possible. "We must, as a profession," said Dr. Ballantyne, "fight against the paralyzing conclusion that recurrent abortions are incurable, and against that dangerous popular belief that an abortion does not matter."

Another important point was, that "in some of our large manufacturing towns the separation of mother and suckling infant cries out loudly for prevention." For the solution of this difficult problem several methods were suggested at the Conference, the ideal one, of course, being that the only right place for the advanced pregnant or suckling mother is altogether in the home. Once get that method of solution generally recognized, there should not be insurmountable difficulty in getting it adopted in practice.

(b). The second aim demanding attention is *the education of the mothers of the present and of the future* in the hygienic care and feeding of infants. For the carrying out of this requirement two methods are prominently recommended, with which we have already become familiar, viz., the teaching of the senior girls in our schools, and the instruction of mothers in the homes, and in mothers' meetings, etc., by lady health visitors or lady sanitary inspectors. (Call her which you like, only call her a lady, as she should be a lady in order to do most good.)

I need hardly say that *the lady sanitary inspector* has come to stay, and that she has already abundantly proved her peculiar and special usefulness, in those now numerous districts which have had the enterprise to recognize her rôle in Public Health work. It is a pity that that rôle has not as yet been recognized by all. In the next Public Health Act she will surely receive such recognition as will establish her status and compel universal admission of her value. It needs no words of mine to emphasize that value. Not only in connection with infantile mortality and the diseases of young children, but in relation to domestic hygiene and workshop hygiene, and in the inspection of midwives, etc., there is a vast field of work to which women are so obviously called and fitted, and which is certain to yield so rich a harvest, that we shall regret that they were not called to the work long before.

The value of *the teaching of infant hygiene* to the senior girls in our elementary schools (why not in our secondary schools as well?) was ably stated to the Conference by Dr. Niven; the accomplishment of the proposal does not appear to present any great difficulties, and we should do well to urge it upon our local educational authorities. Undoubtedly, it will be necessary, however, first to teach the school teachers, upon whom this duty would devolve, as their strenuous work in school leaves them, I believe, little time and energy in which to gain acquaintance with domestic work and the rearing of young infants, even if they always had opportunity. This need not add work to the already burdened teachers, for, as Dr. Niven emphasized, there would be much sense and wisdom in substituting the teaching of these subjects for others in the curriculum of school girls which are of much less practical and vital value; and I agree with him in the belief that the teachers, as a whole, would be glad to learn, and then to teach.

Crèche schools and nursing dispensaries, in addition to infant milk depôts, are suggested accessories in all this educational work which are worthy of consideration, and which would be of undoubted value.

(c). The promotion of breast feeding, and of the proper methods of artificial feeding, where that is unfortunately unavoidable, and the *safety of mothers and infants* involve an urgently needed reform in the suppression of all harmful *patent foods*, medicines, abortifacients, etc., and of all such swindles as tinned separated milk. It is one of the most scandalous things in our national life that such wickedly mischievous things should be allowed by the Government—which is surely the protector of the ignorant majority against the unscrupulous and fraudulent minority of its subjects, and which has ample expert advice at command—to be advertised and commended in our streets and in our press—in our religious and philanthropic press, worst of all—and to be sold to the extent which is existent to-day.

Along with it, equally evil and scandalous, is the looseness of the law in permitting the existence, and the possibility of the existence, of *unqualified practitioners* and druggists, and of quack doctors and charlatans of both sexes and of all kinds—all freely deceiving, to their mischief, our deplorably and notoriously “gullible public.” It is high time that legislation against these evils was insisted upon by sanitarians and by the more intelligent classes. At present, the latter are neglecting their duty in passing this question by, in merely sneering or laughing at the so-called “gullible public.” We ought not to allow them to be “gulled,” and, as the advisers of the public

in the promotion of their health and longevity of life, I feel very strongly that *we* and other sanitarians ought to urge stringent legislative reform upon these matters, upon which the general public has proved itself unfit to judge and sadly needing guidance and protection.

(d). Another requirement, strongly emphasized at the Conference by Alderman Broadbent (Mayor of Huddersfield), Dr. Kaye, and others, is the need for *the amendment of the present system of the registration of births and deaths*. Upon this matter we ought not to let the Government rest until amendment has been achieved. The necessity for reform upon this subject has exercised my thoughts for some time past, and I hope to deal more fully with it at another meeting of the Yorkshire branch.

Milk Supply.—Another matter, inseparably connected with the health of infants and of young children, is the problem of pure milk supply. Next, perhaps, to the housing question, there is no problem so urgently demanding and yet so difficult of practical solution. We have had innumerable conferences upon both subjects—I confess I am weary of perusing their reports—and yet we seem little nearer, and make but little progress. And it seems to me that that is largely inevitable with *both* questions until we have obtained:

1. Consolidation, simplification, and extension of the law upon these matters.

2. More education, not of the general public merely; but what is more particularly needed is the education of those whom these laws affect—of the property owner and the milk dealer; the inculcation of the unselfish “*public health conscience*,” and a strong conviction of their *moral* as well as legal responsibilities.

If we could succeed in convincing the milk purveyor of the truth about the manner of pollution and the consequent dangers of milk, and how comparatively easy it is to avoid pollution, and to sell clean, good milk, without the use of preservatives—if we could convince him that this is not all a “fad,” but that it is truth, the truth of reason and of science, and awaken his sense of moral responsibility in practice, the pure-milk problem would surely be largely solved. Without this awakened “*public health conscience*” in the milk trader, it seems to me that we shall never be able to make even the strongest of dairy by-laws operate successfully; no sanitary authority that I know of has a staff adequate for the incessant inspection which the strict administration of mere by-laws otherwise involves. And, even if it had, how could it adequately control such

things as the addition of poor, polluted, or separated milk to pure, good milk? Perhaps it would be a good thing if we had a universal resuscitation of the *milkmaid* as milker; she could not be more stupid than the men of the present; surely she would be cleaner and more teachable. But could we not do more to arouse the milk dealer's conscience? I think we could, and I think we ought to try, discouraging as is his general unteachableness. Good has resulted, I believe, from conferences between milk traders and representatives of sanitary authorities (Medical Officers of Health, educated laymen, Sanitary Inspectors, Analysts, etc.), and from lectures and demonstrations by Medical Officers of Health, by lecturers from Agricultural Colleges, and others. These could be multiplied, and the educational work furthered by simple and sensible leaflets. If their unteachableness or unwillingness remain obdurate, then the present milk producers will be extinguished by the indirect pressure of the increasing number of model dairy farms, which we now welcome on almost every hand, by the possible development of municipal milk depôts, and through reforms, which in any case are urgently required, and some of which I will briefly enumerate:

(a). We require consolidation and extension of all the legislation relating to milk, for at present it is in a most chaotic and incomplete state. The best in the Dairies and Cowsheds Orders, in the model by-laws, and in the public and private Acts of Parliament, requires to be combined, amended, simplified, completed, and extended in a *Pure Milk Supply Act*, the whole to be made compulsory throughout the kingdom, in rural districts as well as in urban districts. Is there anything in all our Public Health Acts more cumbersome and unworkable—one might reasonably think it to be deliberately so—than Section 4 of the Infectious Diseases Prevention Act of 1890 (*re* prohibition of sale of milk in infectious cases)? The adoption and operation of the model by-laws should not be optional, when we think how greatly and vitally the towns are at the mercy of rural milk producers; in my opinion, the by-laws should be embodied in a compulsory Act, or, at least, made compulsory as by-laws throughout the kingdom, and under stringent supervision, independent of, or all-powerful over, rural authorities.

(b). It is high time that in the *Dairies Order*, as Dr. Chalmers, of Glasgow, so ably argued at the Infant Mortality Conference, the diseases of animals involved by the Article 15 should be extended to include every general disease accompanied by fever, all acute gastrointestinal affections, and inflammatory affections of udder and teats.

As it has been naively said, "We do not want pus as a beverage." We ought to have power to stop the sale of milk, which is likely to be injuriously affected, which has been obtained from any diseased or doubtful animal, or from animals under treatment by drugs; also, to stop the sale of dirty milk, or milk from premises generally insanitary, or with a dangerous water-supply; and we ought to have distinct authority to seize and destroy such milk, without Justice's Order, so as to secure its not being sold. Moreover, we require definite power to seize and destroy any animal which proves to be affected with tubercular udder, or any other disease which would affect its milk permanently. What is the use of mere isolation of such an animal? It does not recover, and we have no security that its milk is not being used. These powers should be included in such consolidated Order or Act, with power to compensate in justifiable circumstances.

(c). I am of opinion, however, that whatever legislation we have, its satisfactory administration would be greatly facilitated, and the teachableness of the milk dealer and the purity of milk would be greatly increased, if we had a system of *annual licensing of all milk producers and purveyors*, the licence to be granted and re-granted only upon the condition that all the legislation (Orders, by-laws, etc.) had been fully obeyed during the previous year, and that the milk had always proved satisfactory upon bacteriological and chemical analysis. I do not think that this method need raise the price of milk, or increase the use of preservatives, if there be proper organization and management; and, with its general adoption, by law or otherwise, I do not think we need be driven to municipalization of the milk supply, which some think to be the only ultimate solution of the whole problem.

Of course, we ought also to have power to refuse the annual licence, or to remove the names of "incorrigibles" from the register.

(d). Other useful additions to the law should provide for: The registration, or, better still, the annual licensing of the buildings—cowsheds, dairies, and milkshops—if sanitary; the closure of these, if grossly insanitary, in the same manner as we close a dwelling-house under the Housing Acts; the prohibition of the common little provision shop being used as a milkshop, with its mixed effluvia of onions and herrings and soap, its exposure to dust and flies and maggoty hams, its dirty dippers, and its limited trade and variable supply, which baffle the tracing of infectious disease. *We must aim at the abolition of this form of milkshop, and substitute the nice clean dairyshop, so common and so admirable in the cities of Scotland. Such special*

milkshops (limited to the sale of dairy produce) should help the solution of the difficulty of enforcing another much-needed reform in our milk distribution. For we must also abolish the street can, and endeavour to secure the transport of milk—cooled, strained, or centrifugalized, unsterilized, unpreservatized—*direct from producer to consumer, in sealed bottles or cans*, without the dangerous intervention of middlemen, railway churns, cart churns, street sale, or mixing, etc. It is time we abolished the house-to-house milk pail, as an insanitary abomination no longer to be tolerated. The poor should be able to buy their pennyworths from clean milkshops of the Scottish type; the larger consumer should receive his supply in sealed bottle or can.

And, lastly, all consumers should be able to receive their milk free of all chemical adulterants. Chemical preservatives are proved to be unnecessary and harmful, and their use in dairy produce should be prohibited by legislation, as in Denmark.

Failing all improved legislation and education, there will be nothing for it but municipal milk farms and milk depôts—at any rate, for the safe supply of municipal institutions and of the poor. These would serve as model teaching centres, and would possess several other marked advantages which I have no time to discuss.

The Prevention of Tuberculosis.—Thanks largely to the *Practitioner*, under Mr. Malcolm Morris (whose splendid services in this direction have never been fully recognized), to the establishment of the National Association for the Prevention of Tuberculosis, and to the influence of the great Tuberculosis Congress in London in 1901, there has been very considerable development of the active campaign against this great scourge. Notwithstanding the very partial character of *voluntary notification*, and the consequent limitations of direct effort, a great deal of preventive work has been carried out in many towns (in investigation, advice, disinfection, and education), which cannot but yield good fruit; I am quite sure that we have done much good in York, and the pity is that the field of work remains so limited for want of information, that the field is not forthwith legally extended so as to comprise the whole range of tubercular depredation and deterioration.

No work lies before us more important, more full of hope. All those of us who have had any experience, even of the present limited field of work, must have been sufficiently encouraged to call now for the adoption of *compulsory notification* of all forms of tuberculosis; and I fail to see any valid reason why we should delay making that a national measure, unless we are to wait to see the success of the Sheffield

Act and its administration. The question of cost ought not to weigh for a moment in connection with the matter; it would be trivial in comparison with the vital, and even financial, benefit to be gained. Procedure after notification need be no barrier; the procedure taken to-day after notification of the compulsorily notifiable diseases varies between one disease and another, and that taken after notification of a case of tuberculosis would necessarily also vary, according to the different character of the disease. It is stated, and even objected, that compulsory notification would lead to the serious practical discussion of the provision of *hospital isolation and treatment for phthisis*. Of course it would; let that be so. The sooner that question is brought into the range of practical politics the better; for we urgently need provision, not only for the cure of early cases *amongst the poorer classes*, but also for the isolation (with cure, if possible, or comfort and safety, at least) of *advanced cases*, which cannot be left in present housing conditions without grave danger to household, friends, and neighbours.

The whole question of the prevention of tuberculosis is bound up—as much of our other work is, we only too truly know—with the great problems of *poverty*, insufficient employment, housing, alcoholism, and all the other factors which contribute to physical deterioration; but that must not make us downhearted, but all the more determined, not only to play our part in the solution of these great social problems, but also to do the very utmost in such direct preventive work as lies near to hand, and which, in the light of our present knowledge, it is almost criminal to neglect.

Until we have a sufficient number of specialized institutions we must persevere, therefore, in stimulating the utmost use of our dispensaries, our out-patient departments, our infirmaries, our empty fever hospitals, and our workhouses, for purposes of diagnosis, treatment, isolation, education, and other assistance. As Dr. Newsholme has demonstrated, at the Paris Congress, the last-named institutions have done great service in diminishing the prevalence and mortality of tuberculosis in this country. Our *Friendly Societies and Insurance Companies* have yet to make headway in emulating the splendid example of those in Germany. *Labour Colonies* for Consumptives have been commenced, I believe, in a small way in Norfolk, and their development, in connection with sanatoria and allied institutions, would be a boon the value of which, I think, is obvious.

The recent *Paris Congress* on Tuberculosis brought forth some

stimulating facts and suggestions, besides others calling forth anxious consideration and vigorous effort. France and Germany are not asleep on the question, and it behoves Britain to keep to the front of the fight.

We are assured by the Congress that we still have *bovine tuberculosis* to reckon with as a source of human infection, and when we learn that the researches of Rabinowitch and others "have demonstrated the virulence of the milk of certain cows attacked with visceral tuberculosis, without any lesions of the mammary glands,"* we are confirmed in the belief—some of us at any rate—that it is a mistake for preventive action in relation to tuberculous milk to be limited merely to tubercular disease of the udder, as is practically the case to-day.

The dangers of *tuberculous sputum and dust* are not diminished by the researches which go to show that, even with tuberculosis of the lungs, infection takes place more by swallowing the *materies morbi* than by the inhalation of it, in other words, "the most accessible route is by way of the intestines."*

"In the battle against tuberculosis in France," we are told in the Report of the Paris Congress by Dr. Timbrell Bulstrode and Dr. Theodore Williams,* "the dominant idea is *the security of the infant*," there being evidence, in France at any rate, that acquired (not congenital) "tuberculosis is present in a *latent form* in infants and young children, and that it is prone to remain thus latent, until, in later years, the soil of the human organism becoming altered by school life, by poverty, by alcohol, or by other adverse conditions, the potential or latent infection becomes an actual infection," manifesting itself at adolescence or during adult age. Adult tuberculosis is said to be "more frequently a tuberculosis of infancy which has remained latent and unrecognized." At the ages of one to six years, infants are most exposed to contract tuberculosis, especially of the "closed" type (i.e., minus infectious discharges), and that is attributable to tuberculous milk, tubercular contamination of the mouth (per fingers, food, etc.), tubercular predisposition, or residence in an infected household.

If these facts are generally true, they are extremely important and, "consequently, France is now employing all means at her disposal to improve the resistance of the child against disease in general, and tuberculosis in particular,"* and to diminish the chance of its infection, by seeking out predisposed children (the

* Vide Report of Government Delegates to the Paris Congress.

"pretuberculous"), or latent or "closed" cases, or children living in infected households, and sending them into the country, to holiday colonies, or to marine sanatoria, or other similar institutions, which abound in France, and where splendid life-preserving work is being carried out, especially in cases of tubercular joint disease, "closed" cases which are cured without being made "open" cases.

"The general opinion was, that *infection at school* is far less common than in the home";* that school cases are mostly of the "closed" type, that tuberculosis is more curable in childhood than in later life, and that if the latent case of childhood, if not cured then, can be kept "closed" until adult age, it proves much more likely to be conquered altogether.

These facts and opinions emphasize the paramount importance of preserving and saving child-life; and in addition to the measures for that object already referred to, they call forth two other great lines of preventive work amongst children, viz., the teaching of general and special hygiene in our schools, and the medical inspection or supervision of the children attending the schools.

The first-named line does not present any great difficulty.

The second, *the medical inspection of school children*, we rejoice to say, has already been largely instituted in this country, and with such success that, not only is it rapidly becoming recognized as an essential part of Public Health work, but it is probably about to be made compulsory as a vital part of our educational system.

I am glad to be able to report that I have just made a beginning in York. The extent, variety, and difficulty of the work presented is almost appalling; but long ago we have felt that this work ought to be faced, notwithstanding its undoubted difficulties; and now it seems pitiable, almost unintelligible, that it was not systematized universally and even compulsorily a quarter of a century ago. I look upon it as being probably the chief missing link in our work of circumventing the infectious diseases of children, the results of which work have hitherto been so largely disappointing. At any rate, I have hope and faith that it will prove to be so in my own city.

I do not propose to inflict you, even if I had the time, with any discussion of the now somewhat hackneyed arguments alleging *the failure of hospital isolation of scarlet fever*. They have already been ably discussed and largely controverted in this Society. Much that was ill-considered and limited in outlook has been written and spoken in favour of the allegations, and in a manner against which

* Vide Report of Government Delegates to the Paris Congress.

I most strongly protest, as being unwise, unjust, and *really* purposeless.

What is really to be gained by these allegations? By all means let us have truth; but I do not think that any man has a right to try and overthrow a method of prevention which even he admits does some service, without at the same time endeavouring to show the way to a more effective substitute. The ideal, of course, is for every household in the realm to have a house and income large enough to isolate and nurse their sick at home. But, until that millennium comes, we cannot, for a hundred reasons, do without our isolation hospitals. It may not be necessary to send every case of scarlet fever to hospital, or even a large percentage, but the hospital remains, and for long years will still remain, one of our greatest sheet anchors in the prevention of such diseases as scarlet fever and diphtheria.

I will not say more upon the controversy, which, by the way, is ably dealt with by Dr. Fremantle in *PUBLIC HEALTH* for October, except to requote and endorse Sir Shirley Murphy's words, that, on this subject, "the statistical method is not applicable; mere isolation could not be expected to influence laws of nature or prevalence of disease." If isolation hospitals were expected to extinguish infectious disease, as vaccination, with pardonable pride and hope, was expected to extinguish small-pox, then we must confess to having been considerably disappointed with the results; but in neither case is the remedy condemned, and such expectations and hopes have not been the first in the world to be too optimistic, and thus to have led to some disappointment. Those expectations failed fully to appreciate or even foresee, and the recent or present controversy has largely ignored, three vital considerations, viz.:

(a). The utterly mysterious etiology of scarlet fever, and the still largely mysterious etiology of diphtheria.

(b). The diminution of parental care, and of the parental sense of responsibility for the health and even general welfare of the children, which our seniors credibly inform us has followed the undertaking of free education by the State.

(c). Concurrent with the establishment of our isolation hospitals there have developed, undreamed of twenty-five years ago, our present vast elementary schools, with no provision until to-day for skilled medical supervision of the thousands of children, of all classes, compelled to give a maximum attendance therein.

The controversy will have done some good, however, if it compels us to reform some points in the *arrangements and administration of our isolation hospitals*, some of which, based upon my own experience,

I will mention, viz.: It is disastrous to overcrowd our hospitals, and to mix acute with convalescent cases of scarlet fever or diphtheria; for the successful treatment of both diseases, of scarlet fever especially, and to prevent "return" cases, we require that every case should be able to pass through three separate blocks, viz., (a) A separate block for the acute stage; (b) a separate block for the convalescent stage (free of complications), from which the case is discharged, free from all discoverable infection, after a final bath in a discharge section, into (c) a discharging block, from which it should be sent home, in two to five days, if remaining clear, without any further hot bath or other disinfection which would tend to resuscitate discharges from nose or ears. I have here referred to a weakness in our administration which I believe accounts for a large number of our vexatious so-called "return" cases. I think, also, that there is much to be said in favour of the removal of such microbic hiding-places as adenoids and enlarged tonsils before discharge from hospital.

If these reforms were strictly provided for, I do not think we need go to any such extremes as separate cubicles.

The prevention of diphtheria is one of the most baffling problems of the day; and when new forms, manifestations, or freaks of the bacillus are announced by the bacteriologists almost every week, and when we are advised to obtain swabs from nose and throat prior to discharge from isolation, amounting to half a dozen or more per case, and to swab every case of scarlet fever during and after the attack, the solution of the problem does not become less troublesome or costly. Although, fortunately, I have not had a great experience of this disease, I do not doubt that it is directly contagious from person to person, as is scarlet fever, but I do protest against the tendency, so common at present, to ignore other possible factors in the causation of the disease. On the etiology and prevention of both diphtheria and enteric fever, not to mention scarlet fever, we have, as we only too well know, a very great deal yet to learn. I think that we need to-day, therefore, to beware of the folly of limiting our outlook and our lines of enquiry to only one or two aspects of the causation, prevalence, and prevention of infectious disease. In particular, I would protest against ignoring or discounting the *influence of foul emanations* from drains, sewers, privy-middens, and polluted soil, in the production of diphtheria and enteric fever. Rightly or not, we do not nowadays consider these things to be capable of the direct causation of these diseases, but my experience—short as it has been, it has been pretty full—has convinced me that the insidious

poisoning of such emanations has most certainly a predisposing and even exciting influence, the reality of which it is most unwise to ignore. And, if the diphtheria bacillus is more or less omnipresent in our atmosphere or in our systems, as some would now believe, and is so frequently found in healthy throats, as the bacteriologists inform us, and if some form of *Bacillus coli* should prove, after all, to be capable, under unknown conditions, of manifesting itself as what we now call the *Bacillus typhosus*, then the part which such poisonous air can play, in lowering the resistance of the system to invasion, surely becomes more obvious and more vitally important.

Another factor I would mention. Amidst our various efforts to suppress such diseases as diphtheria, phthisis, ophthalmia, and zymotic diarrhoea, I am of opinion that we require to direct our serious attention to the very probable *influence of road dust*, particularly in our towns.

The extent of that influence in the past we cannot estimate, we can only suspect, but the question is now becoming acute, owing to the almost incessant and overwhelming raising of the dust by the rapidly increasing motor-car traffic. We know something about the contents of that dust; whether it possesses extensive pathogenic properties or not is a matter for the bacteriologists to work out, but we know it does contain all manner of organisms, and we cannot but suspect that, in these days of mixed animal and motor traffic and other sources of pollution, it has more capacity for mischief, either as a predisposing or exciting irritant, or as directly pathogenic, than we have yet debited it with. I particularly suspect *this* influence in connection with the production and prevalence of diphtheria; whether it operates through the spicular character of the dust, or its contained organisms, or both, I am not now able to say, but we know how common inflammatory or septic conditions of the throat are, and how readily these pave the way for the invasion of more serious disease. I need not say that we are bound to acknowledge that the motor-car has come to stay. It seems to me that improvements in its construction should be possible, whereby it would prove to be much less of a dust raiser. Dust-laying substances can only be regarded as costly and inconvenient temporizers. But, apart even from the consideration of the motor-dust nuisance, we are bound to acknowledge that we shall have to face the permanent improvement of our roads; that is a problem for road engineers and road authorities; but, where we can help them, as advisers on sanitation and the public health, with such special knowledge of disease and its causation as we possess, it will clearly be our duty to do so.

It is obviously impossible for me to exhaust the subject indicated by the somewhat ambitious title of my address—or, to resume my metaphor, to point out all that lies before us in the panorama of Public Health reform. And even if I could, more lies beyond the misty horizon that we know not of, cannot even guess, and shall probably never see. But time forbids me to do more than *mention* a few points which are possibly still within our range of view. Such are the following:

(a). The extermination of small-pox, through the transference of the administration of fortified vaccination laws to the sanitary authorities, the compulsory re-vaccination of children at the age of twelve years, and the compulsory re-vaccination of vagrant contacts, whose liberty is altogether excessive and mischievous, and who should be compelled to give to the community some security in return for their freedom.

(b). The universal establishment in towns of public abattoirs (in lieu of private slaughter-houses), and of the skilled inspection and certification of all meat about to be sold as food.

(c). The co-ordination of effort as to the purification and preservation of our water supplies.

(d). The extermination of such insect carriers of contagion as the common house-fly and the mosquito.

(e). The closer relationship between Poor Law and Public Health administration—perhaps the complete organic union of the two.

(f). The education of the public in general hygiene, and on such special questions as the prevention of infant mortality, the prevention of tuberculosis, the abuse of alcohol, the evil results of tobacco-smoking by growing boys, etc., etc. Here lies a work which, to my mind, is one of the most important, although unprescribed, duties of the Medical Officer of Health, one which is by no means sufficiently recognized, either by the sanitary authorities, the public, the Medical Officer of Health, or the Local Government Board, viz.: We should seize every opportunity of educating the people, by *lecture*, as well as by leaflet and report.

(g). Greatest of all present and future problems is the Housing question. It does not seem to grow less difficult and less despondent—and I do not see how its solution is to be furthered under the present condition of our laws. We are grateful for the Act of 1903 and other amendments of the Housing Act, but we still need a great simplification of the procedure regarding the abolition of insanitary areas, under Part 1 of the 1890 Act, and a simplification of the procedure

regarding the demolition of closed dwelling-houses, under Part 2. Instead of having to face the paradox of proving that a closed dwelling-house is a nuisance, or a recurring nuisance, we ought to be able easily to obtain the demolition of a house which has remained *closed* (by Justices' Order) *and unimproved for twelve months*. Moreover, we need legislation that will prevent such exorbitant values being placed upon insanitary areas, and the insanitary property thereon, to which our present land and property laws conduce.

(h). Above all, we should earnestly pray for the statesman who will undertake the consolidation and improvement of the whole of the present confused mass of Public Health legislation.

And lastly, not merely for our own sake, but for that of Public Health progress in general, we must never rest until we have obtained security of tenure of office for the Medical Officer of Health and the Sanitary Inspector, and until we have compelled the practical admission that we, too, when we can no longer sustain the fight, are as worthy of a handsome pension as the officers of either the Police Force, the Civil Service, or the Army.

THE PROTECTION OF MILK.—In view of the many sources of pollution to which milk is frequently exposed before it reaches the consumer, and of the extent to which it may become a cause or vehicle of disease, the Royal Institute of Public Health appointed a committee, composed of Medical Officers of Health, bacteriologists, and representatives of the milk trade, to consider what steps should be taken with the object of securing purity of the supply. The report of this committee has just been published in pamphlet form, and it points out that the chief means of legal control of the milk trade are now obtained under the clauses of the Dairies, Cowsheds, and Milkshops Order of 1885 and the subsequent amending Orders. While the powers contained in these Orders are not nearly so stringent as those in operation in many of the British Colonies, the Committee are of opinion that, if they were carried out firmly and uniformly, sufficient control of the trade would be obtained. In the course of the enquiry an endeavour was made to obtain information as to the enforcement of the existing Orders in different parts of the kingdom; and it was found that in a large majority of rural districts they are practically inoperative. In these circumstances, the Committee were of opinion that, where the local Sanitary Authority is in default, the obligation to enforce the Orders should devolve upon the County Council, and that the power to make regulations should be compulsory and not permissive. With this view the Committee have republished the existing Order as amended, and have printed in italics or within brackets the various omissions, alterations, and additions which have appeared to them to be required in order to render it really protective to the consumer.

DISINFECTION AFTER MEASLES AS A PREVENTIVE MEASURE AGAINST ITS SPREAD.*

By R. K. BROWN, M.D.,
Medical Officer of Health, Bermondsey.

DISINFECTION of rooms, bedding, clothing, etc., after measles, has been carried out in Bermondsey since April, 1903, and the interval which has elapsed since then seemed to me of sufficient length to be able to form some idea of its value in preventing the spread of the disease.

On looking over the various records available in the shape of school notifications, mortality from this disease, and some notes of special outbreaks, I early realized that none of the usual methods of finding out the value of disinfection were of the least use in coming to a conclusion. For instance, in 1895 there were 136 deaths in the borough from measles, in 1896, 129, and in 1897, 103. From this date until the end of 1901 the average deaths were 88. In 1902 there were 154 deaths; in 1903, 50; in 1904, 136 (the same number as in 1895, but with a much smaller population); in 1905, 59, and the first three quarters of 1906, 74.

These figures only show that the disease continues in a precisely similar manner both before and after the disinfection period, their use for or against disinfection not being permissible. After disinfection had been carried out for fifteen months I thought some light might be thrown on its value by finding out the number of secondary attacks after this had been performed. In this case I found that two had occurred out of 1,141 disinfections, but a little consideration shows that this method is of little or no value. The practice here was to disinfect in three weeks from the appearance of the first symptom. This interval was chosen because the patient would probably have recovered in this period, and other members likely to have the disease would have contracted it *before* the disinfection took place. In other words, we always made sure that the steed was gone before we shut the stable door.

In the absence of information regarding the nature of the infective agent, its location in the body, the channels by which it leaves this, and the various stages it passes through before it infects a new case, it is extremely difficult to form any reliable opinion as to the value

* Read at a meeting of the Metropolitan Branch, October 28th, 1906.

of disinfection, and the only course seems to be to fall back on clinical observation and analogy with other diseases about which we know more.

Measles is an acute infectious disease, the first symptoms of which show themselves in inflammation of the mucous membrane of eyes, nose, pharynx, buccal mucous membrane, larynx, trachea, etc. In other words, it attacks, in the first place, the mucous membranes of the respiratory tract and those in immediate connection with it, and from this I think it would be fair to assume that it is here that the poison enters (i.e., that it is inhaled), and that it is here it works the first mischief, and from these surfaces spreads through the system. Clinical experience amply supports this view, for it is beyond dispute that the disease is highly infectious in the pre-eruptive stage and while the membranes only are inflamed. The probability is that the particulate infective matter is spread during the act of coughing, sneezing, or even quiet breathing, and exists in the innumerable droplets which are exhaled during this and subsequent stages of the disease. It is probable that the exanthem later is an indication that the infective agent has spread through the whole body, and, were our methods suitable, that we could find it in the characteristic spots in a similar manner to typhoid.

These considerations bring us to its method of spread. Every one knows that if a case of measles is introduced into an unprotected community with what rapidity it spreads in schools, households, etc., and general experience seems to point to direct contact, i.e., where the particulate poison spoken of has only a short intervening space of air to pass through after it leaves the patient before it becomes inhaled by some one else. In no other way can you account for its extremely rapid spread. This would seem to be by far the commonest method of spread, and though I would hardly venture to suggest a figure, still I daresay one would be under the mark if this method were said to take place in 99 per cent of the cases.

Another method by which measles is spread is through the medium of clothes and similar articles. It does not appear to be nearly so important a method of spread as the first mentioned, but it is accepted by all authorities. I endeavoured to obtain some information on this point, and addressed a circular letter to all practitioners residing in the borough, asking them among other questions if they knew of measles being spread by clothes under circumstances in which other methods of spread could reasonably be excluded. Out of a dozen answers, six stated that they knew of measles being carried in this manner, but only one gave a specific instance.

In this he stated that while attending several cases of measles he had brought the disease home to his family in his clothes under circumstances when other sources of conveyance could be excluded. I was unable to get any precise information as to how long the infection may be retained in articles of dress, but on consulting the writings of a number of high clinical authorities they all state, with singular unanimity, that the poison is active a very short time only, is easily destroyed by free ventilation, sunlight, disinfectants, etc. On what this opinion is based I have not been able to ascertain. It is possible that parasites may play some part in the spread of the disease, especially in very poor quarters, but, if so, it must be insignificant, and in the presence of the other more obvious methods of spread need not be taken into consideration. As to the period of infectivity in measles, one may assume that it begins within twenty-four hours of the first symptoms (I should not think it begins at the first onset) and continues at least until the rash has quite disappeared; but in nine cases out of ten the mischief is done before the rash appears, and all susceptible persons who have been near the patient during this period have become infected.

The object of disinfection is to prevent the disease spreading, and from the above considerations it is obvious that it is absolutely useless in protecting those who have already come in contact with the patient, viz., other members of the family, schoolmates, etc. Its object must then be to prevent the infection being carried to a distance by some person who is not himself ill but may bring it in his clothes. Now, this method of spread would seem to be of very secondary importance, especially in cities, where the opportunities of personal contact are illimitable—though in country villages and small outlying communities it may be more important, since infected clothes may be the means of starting an epidemic. The question, therefore, as far as London is concerned, resolves itself into this: whether it is worth the trouble and expense, for the sake of preventing the spread of the disease in a few doubtful cases, to continue general disinfection. In Bermondsey in 1903, 53 premises; in 1904, 917; in 1905, 379; and in 1906, 406, were disinfected, together with beds, etc., for measles alone. The comparative cost has been estimated by taking the total number of disinfections, and dividing the cost between measles and the other infectious diseases. In this way, from April, 1903, to September, 1906, measles cost £602, and other infectious diseases £1,485. These figures refer to men's time and the materials used, and repairs and apparatus. Of course this £602 does not represent the

actual cost, because it is quite evident that doing away with disinfection after measles does not mean a saving of this amount in three and a half years, but it shows that measles takes up about one-third of the time and expense of disinfecting all infectious diseases; and what do we get for it?

I addressed a circular letter to the Metropolitan Medical Officers of Health on the subject, and out of twenty-five replies received only one in which it was stated that disinfection after measles was not carried out. In the remaining twenty-four there is more or less disinfection carried out, but in only thirteen is there any attempt, judging from the number of disinfections, to carry it out extensively. In no case could the Medical Officer of Health suggest the cost. The replies to the question whether the Medical Officer of Health had formed any opinion as to its value were instructive and extremely diverse. In seventeen instances there was either no opinion as to its value expressed, or various reasons why it was not of much use. In eight opinion was in its favour, but in five of these the opinion was qualified by the word "educationally"; in other words, only three Medical Officers of Health thought there was a real value in disinfection as a prophylactic measure in measles. Another point in this connection that may be mentioned is that no matter how much we may desire it, under the present system of school notification we can never disinfect more than a small proportion of cases occurring in our district. This partial disinfection produces a great deal of annoyance among those families in whom we insist in carrying it out, and they very naturally resent a visit from our disinfectors when they see that many of their neighbours are exempt from our interference, mostly through having no children attending school. A worse effect, and one which, if carried on to any extent, would not only annul any good disinfection might do, but would actually conduce to the spread of the disease, is the concealment of cases. I have recently heard of instances where, when a case of measles occurred in a house, the real cause of illness was either concealed from, or a different cause given to, the school visitor, so as to avoid disinfection. In cases of this sort we are quite powerless to act in the absence of notification by the doctor (if there is any) in attendance.

Another factor to be taken into consideration in any disinfecting scheme is the number of cases of German measles reported as measles. Sometimes they come in by the hundred, and on investigation they were found to be r6theln, of which the mortality is practically nil.

To sum up. What are advantages and disadvantages of disinfection as a prophylactic measure in measles? The former appear to be:—

1. The prevention of the spread of the disease by infected articles in a very small and problematical percentage of cases.
2. Its educational effect, i.e., inculcating on parents the serious nature of measles.

Among the disadvantages may be mentioned:—

1. The very small part it plays in preventing the spread of the disease.
2. The small return for the labour and expense of carrying it out.
3. The piecemeal method in which it can be done at the best.
4. The annoyance which this latter causes.
5. The difficulty of diagnosis, and lastly,
6. Its leading to concealment of cases.

As regards its educational advantage, it seems to me a very expensive and ineffective method of education, and this can be much better done by our method of forwarding in every case precautions to be taken in the disease, as well as an extract from the Public Health Acts bearing on the prevention of infectious diseases, followed by a visit from the Sanitary Inspector.

On the whole, the disadvantages appear to me to outweigh the advantages, and probably the best method would be to do it on request by the medical man in attendance and in those special cases where circumstances point to its utility.

THE PRESERVATION OF FRUIT PULP BY THE USE OF SULPHUR.—H. W. Lawrence and B. C. Aston (*Ann. Report Dept. Agr. New Zealand, 1904*) give an account of the present status of the canning and evaporating industry in New Zealand, with the results of analyses of a number of samples of sulphured pulp, showing the percentage of sulphur dioxide contained in them.

Investigations were made to ascertain the best method of disengaging the sulphur dioxide from the pulp when required for jam making and other purposes. It was found that when the sulphured pulp was brought to a boil in a wide-mouthed vessel and then kept constantly stirred for 20 to 25 minutes the sulphur was practically all evolved. Sugar was then added and boiling continued for 20 minutes longer.

The jam made by this method was of an excellent bright colour, and when cold very stiff and firm. Further experiments showed that when sugar was added to the pulp before boiling, and the mixture of pulp and sugar boiled together, the sulphur was very difficult to drive off, and even after boiling under these conditions for an hour or more a considerable amount of sulphur was still present. The prolonged boiling with the sugar caused the colour of the jam to deteriorate considerably. In preparing fruit for shipment it is believed that a moderate excess of sulphur may be used, as this is easy to get rid of on boiling.

COPPER SULPHATE TREATMENT OF RESERVOIRS.*

BY J. HOWARD JONES, M.D., D.Sc., C.M.,
Medical Officer of Health, County Borough of Newport.

WE have been troubled annually at Newport during the spring, from April to June usually, with an objectionable fishy smell in the drinking water. This originates at the reservoirs, which are now four in number, with a storage capacity of 685 million gallons.

This smell was most marked in the mains which have a sluggish flow, particularly those with no terminal circulation. In past years the smell has been greatly reduced by liberal flushing of the mains, and by sluicing away the lower layers of the reservoir waters.

On account of the favourable reports in the American Journals in respect to the satisfactory results to be obtained by treating reservoirs affected by objectionable "algae" with very minute quantities of copper sulphate for the prevention and cure of the above evil, it was decided after consultation with the Waterworks Committee to try the process, in the first place at Ynis-y-fro reservoir (81,000,000 gallons). The treatment was carried out by the Waterworks Engineer, Medical Officer, and Chief Waterworks Inspector on May 15th, 1905.

To produce a uniform solution of 1 in a million of cupric sulphate in the laboratory was an easy matter, but to do likewise when dealing with 81 million gallons in a "scoop-shaped" reservoir, with a maximum depth of 36ft., was naturally a matter requiring very careful consideration. To produce a solution of 1 in a million, 10 lb. of copper sulphate are required for every million gallons of water.

The plan adopted with the first reservoir was to divide the cupric sulphate into 28-lb. bags and tie them to a large raft 30ft. wide, which was towed over the surface of the reservoir. There were 28 bags; 5 were used at a time and replaced by new ones as the cupric sulphate disappeared in solution. Great care was taken to give the deeper parts of the reservoir a due proportion of the treatment. The process occupied about four hours.

A day was selected when the reservoir bank and neighbourhood were least liable to be frequented by visitors. This precaution was a wise one; for when we were treating the third reservoir (Pant-yr-eos) a picnic party appeared on the scene, and great curiosity prevailed on their part as to the nature of the work which was going on. Some thought we were trawling for fish, whilst others suggested we were dragging the reservoir for a corpse; but no one knew we were charging the reservoir with that which is considered poisonous when found in bottled peas.

The motion of the raft, which was towed by a boat manned by the Waterworks Engineer, the Waterworks Inspector, and the Medical Officer of Health, caused the cupric sulphate to dissolve fairly rapidly. The deep bluish-white solution and precipitate produced, sank very rapidly and diffused laterally to a considerable extent. Every care was taken to cover the whole surface of the reservoir by systematic navigation.

* Annual Report for 1905.

Within half an hour of the treatment a large quantity of small white flocculent coagulum was observed in the water, which gradually sank. This was evidently vegetable albumin coagulated by the cupric sulphate solution.

Within twenty-four hours there was a marked improvement in the water, both on the surface and at a depth of ten feet, when examined in a two-foot tube. In a few days the water was brilliantly clear, and the staff informed me they had never seen the reservoir look so well.

Samples of water were taken at varying depths during the days following the treatment, with the result that in less than a week the water was again turned on and was delivered to the public free from any appreciable traces of cupric sulphate.

We next dealt with the subsiding reservoir, which contained 9,600,000 gallons, i.e., one quarter of its total capacity. The contents of this reservoir were so turbid that it was not intended at the time to use it for drinking purposes. The greatest depth in this case was not more than ten feet, and for the most part of its area the depth did not exceed three feet.

The margin of the reservoir was treated by means of 7-lb. bags of cupric sulphate tied to a large edition of a poacher's "otter," which was manipulated by means of a rope from the bank by a man walking round the pond, whilst the deeper portions were charged by dragging behind the boat 7-lb. lots of cupric sulphate wrapped up in three layers of thick canvas. The results were so good that we were able to use the water for drinking purposes.

The same trouble existed at Pant-yr-eos reservoir, which contained at the time 78,000,000 gallons, with a maximum depth of 70ft. at the centre. It was decided to treat it with a solution of 1 in ten million of cupric sulphate, and to repeat the experiment if this small amount was not effectual in removing the smell, which was very manifest when the sluice pipe at the bottom of the reservoir was opened. In this case we abandoned the use of a raft and used long poles fixed on either side of the boat. Three 7-lb. lots of cupric sulphate, each wrapped in three layers of canvas bag, were dragged behind and on either side of the boat, and renewed by others as the copper sulphate disappeared. We found that better diffusion was obtained by retarding the solution of the copper and spending more time at the work. The results here again were very satisfactory.

The copper sulphate disappeared very rapidly, for the upper layers of the water, which received nearly all the treatment, contained only 1 part in $7\frac{1}{2}$ millions of copper sulphate four days after treatment.

The Waterworks Inspector, Mr. Grove, found as the result of the treatment that the deposit in the tower screens decreased to such an extent that there was less deposit in three weeks than there was in three days in previous years, in spite of the fact that much less sluicing had been done on account of the limited quantity in store.

The above results show that the method is worthy of the consideration of all waterworks officials who have had to deal with objectionable "algae" in open reservoirs.

Up to the time of writing this report we have been entirely free from the trouble this year, so there is every prospect of immunity during 1906.

THE VALUE OF THE WIDAL REACTION IN THE DIAGNOSIS OF TYPHOID FEVER.*

In enteric fever the typhoid organism chiefly leaves the body in the excreta from the bowels and in the urine, and while it is very difficult of detection in the stools it is present in the urine in a minority of cases only, variously estimated at from 22 to 37 per cent. Examination of the stools for the bacillus is impracticable, and to examine the urine involves much delay and an amount of work out of proportion to the value of the results obtained. For these reasons this method is not adopted for the systematic identification of enteric fever, though it is used in particular instances when it is especially desired to know whether the urine is still capable of spreading infection. The method actually adopted consists in applying a specimen of blood to a culture of an organism known to be that of enteric fever, and judging from the subsequent behaviour of the latter bacteria whether the suspected case from which the blood specimen was taken was one of enteric fever.

In the following table a comparison is instituted between the laboratory results from the application of this test and the final opinion of the medical attendant with regard to the cases from which specimens were sent:—

Final Diagnosis ascertained after the lapse of three months	Results of Serum Reaction		
	Positive	Negative	Doubtful
Enteric	127	34	16
Not Enteric	1	103	16
No Return	22	31	1
Totals	150	168	33

Excluding from consideration all cases with regard to which no return as to final diagnosis was made, it will be observed that of the 128 positive reactions in all instances but one the case was regarded as one of enteric fever. Laboratory results and clinical opinion coincide here in an unusual degree, as it is recognized that a positive reaction may at times occur under conditions not attributable to enteric fever. Of 137 negative results, in 34 instances the final opinion was that the case was one of enteric fever. Probably in some of these 34 cases this conclusion was not free from error, as the evidence offered with regard to the diagnosis of enteric fever appeared rather to point in other directions. In some cases also the specimen was furnished at too early a date for the development in the blood of the power to produce the reaction. Further, the absence of the Widal reaction does not necessarily imply that the suspected ailment is not enteric fever, and it is estimated that it does not occur in more than 90 or 95 per cent of the cases. Speaking generally,

* From the Seventeenth Annual Report of the County Medical Officer for the West Riding of Yorkshire.

however, in the great majority of cases this test is a very valuable aid to diagnosis, and there is the great advantage that it is capable of rapid application, a matter of considerable importance as regards the prevention of spread of infection.

Between a typical positive reaction and an undoubtedly negative one there are a number of occasions on which the reaction occurs in an incomplete and unconvincing manner. Such results are classified as doubtful or incomplete reactions, and in interpreting them there is some scope for individual opinion. In the above table where 32 doubtful reactions were reported the final clinical opinions were evenly balanced, half of the cases being regarded as enteric fever and half as due to other causes. It is always advisable, in the event of a doubtful reaction being reported, to send a further specimen after the lapse of a few days. The same observation applies to negative reactions, at any rate when obtained during the first seven or ten days of illness.

Among other particulars asked for with each specimen is the information as to whether the patient is said to have previously suffered from enteric fever. A positive reaction might in such an event be due to the previous illness, and, if accepted as evidence as to the recent attack, might be misleading as to its nature. During 1905, in 10 instances a previous attack was recorded. In six of these specimens the reaction was negative after intervals of 2, 3, 10, 17, and 26 years, and "years ago" respectively. In two cases in which both reaction and final diagnosis were doubtful 12 and 14 years had elapsed respectively since the previous attack. In two cases also a positive reaction was obtained, the previous attacks having occurred 12 and about 30 years ago respectively. In both of these latter cases the recent illness was considered to be enteric fever, so that the reactions obtained cannot be regarded as due to an influence persisting from the earlier attack. It will have been noted that a positive reaction was not obtained in either of the only two cases in which the earlier attack was at all recent, two and three years ago respectively. The evidence afforded by the cases above quoted does not tend to show that the property of producing the Widal reaction persists in the blood for any length of time.

An extremely interesting example of the value of the serum test was this year afforded by its application to an outbreak of enteric fever in a rural district. An epidemic on a much larger scale occurred in a closely adjoining area in 1890, and an exhaustive enquiry was made by Dr. Whitelegge and the local Medical Officer of Health without the advantage of the aid of the Widal test, which had not then been introduced. One prominent feature was that while many cases were from their symptoms undoubtedly enteric fever, yet a large number, though suffering from fever, did not present typhoid characteristics. It was concluded that these were cases of a fever other than enteric, and the outbreak therefore a mixed one, but it was not found possible to identify the cases with any known infectious disease. In the outbreak of 1905 a similar feature was present, and at the time of investigation by this Department about half of the 17 or 18 cases isolated in hospital presented characteristic signs of enteric fever, while the other half were by no means easy to identify as such. Specimens of blood were taken from these cases, and with two exceptions gave the Widal reaction for enteric fever in a very typical and convincing manner, thus demonstrating that the whole outbreak was one of enteric fever pure and simple.

STOCKPORT CORPORATION ACT, 1905.*

DURING the year 1905 the Stockport Council obtained some most valuable powers from Parliament, many of which have already been enforced by the Health Department with excellent results. A short summary is here given of those specially concerning the administration of the Health Department :—

1. Rainwater pipes not to be used as soil pipes.
2. Water or stack pipes not to be used as ventilating shafts.
3. All soil pipes to be ventilated to satisfaction of Corporation.
4. Definition of private drain amended.
5. Sanitary conveniences to be provided by contractors and builders for workmen engaged on new buildings.
6. All sanitary dust-bins to be of such size and construction as Corporation may require.
7. Blowing or inflation of carcasses prohibited.
8. Cleanliness of milk vessels used by street hawkers to be to satisfaction of Corporation.
9. Children from infected houses prohibited from attendance at school.
10. Medical Officer given power to enter public elementary schools and examine children therein, and exclude any from attendance, etc.
11. Corporation may pay expenses of persons in hospital.
12. Corporation given power to frame by-laws for regulation of hospitals.
13. Power given to Medical Officer of Health to medically examine inmates of common lodging-houses where dangerous infectious disease is supposed to exist. This Section was granted only after most careful consideration by the Police and Sanitary Committee of the House of Commons, who allude to it in their report to the House thus :—
“The Stockport Corporation produced evidence that they had successfully carried on a system of voluntary medical inspection of the inmates of common lodging-houses, where infectious diseases were suspected to exist, and asked for compulsory powers. After careful consideration your Committee consented to give special powers in this direction, which, however, might only be exercised for a limited period on the direct resolution passed by the Corporation, that such an emergency existed owing to an infectious epidemic in the neighbourhood.”
14. Power of entry and inspection in respect of ice-cream premises, etc., given.
15. Penalty imposed on persons withholding information from, or furnishing false information to, the Medical Officer.
16. Power given to remove and disinfect any “contacts” with infectious disease though not themselves suffering.
17. Penalty imposed on person wilfully sending infected clothes, etc., to any laundry.
18. Any filthy or unwholesome bedding, clothing, etc., in a dwelling-house to be purified or destroyed on order of Medical Officer of Health.
19. Driver of infected person conveyed in any public vehicle to give notice to Medical Officer of Health.
20. Dealers in ice-cream or other similar commodity to have name and address painted on cart, etc.

* Dr. Meredith Young—Annual Report.

THE PREVENTION OF FRAUD IN BUTTER IN HOLLAND.

MR. H. S. J. MAAS, Consul-General for the Netherlands, has forwarded a synopsis of a Government Bill recently introduced in the Parliament of the Netherlands for the better prevention of fraud in the butter trade. Among the provisions are the following :—

Commercial butter must contain a certain percentage of fat, to be fixed by Royal decree.

Margarine shall not indicate a higher saturation figure than 10 for the volatile fatty acids contained in it.

The manufacturers of margarine, and of margarine and butter together, are registered.

Manufacturers of margarine shall not deliver or forward butter, or store butter, for the purpose of being forwarded.

In the places where butter is made, and in spaces communicating therewith, no margarine may be present, nor any other fat which could be mixed with butter.

Those who manufacture margarine as well as butter are made subject to special and continual Government supervision as regards the places where butter is made and stored. They have themselves to pay the expense of this supervision.

The places where butter is made and stored shall be separated from those where margarine is made and stored.

Traders and shopkeepers who make mixtures of butter with any other fat are considered to be manufacturers of margarine.

The officers whose special duty is to see that this law is duly observed are authorized at all times to enter the places where butter, margarine, and other foreign fats are manufactured, and also the places used for storage by the manufacturers concerned. They can also take samples in all such places.

The same authority is given as regards shops, auction rooms, places used for storage, and other spaces where butter, margarine, or other fats are present or are supposed to be present, and also as regards the means of conveyance.

A similar authority is given as regards places where the said fats are manufactured to chemists entrusted with the making of analyses for judicial purposes.

Wilful contraventions of the principal provisions of this law are punishable with imprisonment only.

NOTIFICATION OF ERYSIPELAS.

AN enquiry has recently been made among Metropolitan Medical Officers of Health with reference to erysipelas by Sir Shirley Murphy. From the replies it appears that disinfection of rooms and of clothing is not generally practised except in special cases.

Notification has been useful in leading to the remedying of drainage defects and to the improvement of the sanitary conditions of houses, but in two or three boroughs a negative answer has been given.

Except puerperal fever, no connection with other notifiable infectious diseases has been traced; but as the replies were to a question asking only if observations were made, there may have been other diseases such as infantile diarrhoea and other septic infections in houses in which erysipelas has occurred.

Opinions vary as to the usefulness of notification. One medical officer considers it is not worth the money paid for it, another considers it essential as tending to maintain the health of the borough, another points out that in 26.6 per cent of the cases various insanitary conditions in the homes of the patients have been dealt with. Generally the conclusions are in favour of the retention of notification. The replies give the impression that full advantage is not always taken to enquire into the conditions existing; in one district it is stated that "When the Act first came into force enquiries were made, but as the results were mostly negative, no enquiry is now made." Apparently in this borough the majority of the cases are derived from common lodging-houses, shelters, and Poor Law institutions, but in another borough the number so derived was only 20 per cent of the total.

The fees payable for the notification of erysipelas in the whole of London probably does not exceed £500 a year.

REPORT OF HOUSING OF THE WORKING CLASSES COMMITTEE.

SIR J. DICKSON-POYNTER'S Committee appointed in May last to examine the provisions of Mr. Mackarness's Working Classes Acts Amendment Bill, with a view to confirming or improving it, and to making alternative or additional recommendations, has laid their report upon the table of the House of Commons. The Committee recommend that the administration of the Public Health and Housing of the Working Classes Act should be transferred from the Rural District Councils to the County Councils, the concurrent power to build under Part III of the Housing of the Working Classes Act, 1890, being retained to the Rural District Councils subject to confirmation by the Local Government Board. For the purpose of carrying these statutes into execution, it is suggested that the County Councils should be required to appoint a Medical Officer, or Medical Officers, of Health, and a sufficient number of Sanitary Inspectors; proper qualifications as prescribed from time to time by the Local Government Board to be insisted upon; officers to devote the whole of their time to the duties of their office, to hold their appointments during good behaviour, and to be removable only with the consent of the Local Government Board; the Local Government Board to issue a more specific memorandum of instructions to Medical Officers of Health, and to require compliance with the same; and the County Councils to appoint annually a statutory Public Health and Housing Committee, to which, they should be enabled to add men or women outside the Councils who are known to be specially interested or well informed on the question of housing. It is suggested that County Councils might delegate their powers to such Committees.

In regard to the details of administration the Committee adopt the

view that a register of survey of all buildings intended for human habitation should be compiled and revised periodically, owners of dwelling-house property being required to make an annual return of the sanitary condition of every dwelling-house, and a penalty being imposed for making a false return; that the sections of the Public Health and Housing Act which deal with sanitary defects should be widened in their meaning so as to include not only houses "dangerous or injurious to health," but houses in a bad state of repair or neglect; that the law for acquiring land compulsorily should be simplified, and the County Council should be empowered alone or in conjunction with the council of an adjoining county to construct impounding reservoirs; that County Councils should be required to frame by-laws for every district, subject to the approval of the Local Government Board; and that the law under the Public Health and Housing Acts should be simplified and codified.

After emphasizing the desirability of giving to every Rural District Council, Parish Council, or Parish Meeting, or to any four householders a statutory right of complaint to the Local Government Board of default of a County Council, so that the Department may hold an enquiry and make an order enforceable by *mandamus*, and of requiring the Local Government Board to appoint a special Housing and Public Health Department with a staff of travelling Sanitary and Housing Inspectors to supervise the administration of the Public Health and Housing laws by the County Councils and their executive officers, the Committee recommend that the Treasury should be empowered to lend money for the purposes specified in the report at the lowest rate at which the Treasury can themselves borrow (a) to Local Authorities (County Council and Rural District Council) up to the full amount of the security upon the *minimum* terms, and (b) to public utility societies up to 75 per cent of the security upon the *minimum* terms. Finally it is advised that the period of redemption of loan should be lengthened; that the system of increasing the rates of interest in proportion to the length of the period of loan should be abolished; and that grants from the Exchequer should be administered by and allocated to County Councils at the discretion of the Local Government Board.

EAST INDIAN WOOL AND ANTHRAX.

A CIRCULAR has been issued by the Home Secretary in which he says that his attention has been called to the danger of anthrax which appears to attend the use of East Indian wool, and that he has under consideration the question of bringing it under the Regulations—so far as they are applicable—which have already been made for other classes of dangerous wool. Between January 1st, 1900, and November 20th, 1906, out of a total of 126 reported cases of anthrax in the woollen, worsted, and felt industries, there were twenty cases in which the possibility of the disease having arisen from East Indian wool could not be excluded, and in seventeen of these the manipulation of wool classed as East Indian was the most likely cause. Statistics issued by the Indian Government show that anthrax is very prevalent in that country, and since August, 1901, the handling of hides from the west coast of India has been placed under special rules. Moreover, there is reason to believe that occasionally

small quantities of wool may be brought down to the coast from Persia, and eventually, at the ports of shipment or elsewhere, be incorporated in the bales classed as East Indian.

In applying the wool-sorting and wool-combing Regulations to East Indian wool, the preliminary sorting and washing to which wool of that class is usually subjected before shipment would be taken into account. Thus, East Indian wool might be scheduled separately as "Wool or hair not needing to be opened over an opening screen or to be sorted," so that Regulations 1, 2, 3, 4, and 7 would not apply at all, and several others only in so far as they relate to the processes of willowing and carding. East Indian wool, however, often contains much sand, despite the preliminary sorting and washing, and in the dust-extracting processes Regulations 5, 8, and 11 to 16 appear as necessary in the case of East Indian wool as in that of the classes already scheduled. At present it is reported to be the exception (1) for the dust from the willow machine to be drawn away by a fan, other than that attached to the spindle of the machine, or (2) for it to be collected in properly constructed receptacles, or (3) for it to be burnt. The question of precautions for the safety of persons engaged in blending and other incidental processes would also have to be considered.

To the extent, therefore, of adoption of efficient means for the removal of dust and for the safety of the persons employed in rooms where the processes of willowing, etc., are carried on, and the burning of the dust, precautions appear to be necessary in view of the repeated cases of anthrax recently recorded in connection with the use of East Indian wool; but before coming to any decision as to the extension of the Regulations, the Secretary of State will be glad to consider any observations which manufacturers or others may wish to bring to his notice, if received by him before January 10th, 1907.

CO-PARTNERSHIP IN HOUSING.

SIR JOHN BRUNNER, M.P., presided on December 6th over a meeting, convened by the Co-partnership Tenants' Housing Council, to consider the question of "Co-partnership in Housing."

The method of dealing with the housing question advocated by the Co-partnership Tenants' Housing Council consists, briefly, in the formation of tenants' societies, similar to one already established at Ealing, in which tenants pay the usual rent, and then any balance which is left over, after paying all expenses and interest on capital, is divided among the tenants in proportion to the rent they pay.

Sir J. Dickson-Poynder, M.P., moved the following resolution:—"That this meeting recognizes the merits of the co-partnership tenant system of housing, especially in regard to—(1) The encouragement of self-help and mutual help in the provision of houses for the working-classes; (2) The mobility given to the worker, who is thus enabled to own shares instead of a house; (3) The limitation of the return to capital, and the crediting of any surplus as shares to the tenant members; (4) The better planning of areas; and (5) The social intercourse and bringing together of various classes of tenants which ensues." He maintained that if universal housing were carried out by municipalities it would

impose upon those bodies such responsibilities and duties that it would be a great burden for them to discharge them. What they wanted to get was a larger number of the people in this country directly interested in the possession of land. The scheme before them largely solved that problem.

Mr. Vivian, M.P., seconded the resolution, and pointed out that, in connection with the housing problem, there had until lately been two proposals before them, one to encourage workmen to purchase the houses they lived in, and the other to throw upon public authorities the work of building and collecting rents from individual citizens. Both systems were limited, and he felt that the latter was not capable of great extension without serious danger. The method of societies of public utility, he claimed, had the advantages of both systems, and eliminated their disadvantages. The movement had gone on in a very satisfactory way during the past eighteen months, and they were receiving overwhelming evidence that it was the right thing.

The resolution was adopted.

Mr. Nettlefold then moved:—"That this meeting trusts that the promised Government Housing Bill will make more capital available for lending to those 'societies of public utility' at the lowest market rates, and at the same time will give public authorities greater scope in planning new districts and acquiring land, so that they may co-operate with such societies." He said that the scheme before them had succeeded so far as it had gone, and he considered that it was so sound that it must go far to solve the housing problem if it only had an opportunity for development.

This also was adopted.

GLYCERINATED CALF LYMPH.—A preliminary report on the results of sustained subjection of glycerinated calf lymph to temperatures below freezing point has been presented to the Local Government Board by Dr. Frank R. Blaxall and Mr. H. S. Fremlin. The experiments were, in the first instance, undertaken to determine whether the active agent of vaccine lymph could withstand without loss of potency temperatures below the freezing point. Afterwards they were directed to ascertain whether sustained subjection of glycerinated calf lymph to a temperature 5° C. below freezing point could be utilized as a means of maintaining a reserve and store of lymph without risk of loss of its specific activity. From these experiments, which were commenced in January, 1900, it would appear

1. That in glycerinated lymph the active agent of vaccine not only can withstand freezing, but can survive a temperature 180° C. below freezing point for a considerable time, and this without loss of potency.

2. That glycerinated lymph can be retained in a cold store at -5° C. for a year without diminution of its potency, whereas glycerinated lymph, stored at 10° C. for a year, parts with its activity to an uncertain but considerable extent.

3. That sustained subjection to cold appears to be in no sense hostile to the active agent of vaccine; that, on the contrary, lymph thus dealt with was capable of producing excellent vesicles on calves, and that the results obtained with it in human vaccination were wholly satisfactory.

LAW REPORTS.

BOW COUNTY COURT.

November 26th, 1906.

BEFORE HIS HONOUR JUDGE SMYLY.

KING AND OTHERS v. POPLAR BOROUGH COUNCIL.

Public Health (London) Act, 1890—Sewer—Owner Opening up on Request of Inspector—Recovery of Costs.

When an owner of property in consequence of a nuisance opens up a pipe upon the verbal order or request of a sanitary inspector, and this pipe proves to be a sewer, he cannot recover the cost of so doing from the Council for whom the inspector was acting.

This was an action to recover £46 for money expended upon opening up a sewer by the plaintiffs, who were owners of certain houses in Bow. A case of typhoid had occurred in one of these houses, and the inspector of the defendant Council had served a notice under Section 3 of the Public Health (London) Act, 1891, requiring certain alterations in the wash-house, but not referring to the drains. In the course of the work the drain from the wash-house was opened and found to be in a bad state. The owners alleged that the inspector then ordered them to open this drain. It was found to connect with a pipe running at the back of the houses. This pipe, the owners stated, the inspector also ordered them to open, and that he did so from time to time until the whole length was opened. When this was done the owners raised the question that this was a sewer, which was admitted by the Council, who then relaid the sewer. The owners thereupon claimed the repayment of the money they had expended in opening it up.

The inspector denied that he had ordered or requested the plaintiffs to open the sewer, but had merely told them that he would not allow them to connect until they had found sound work, and that they must go on opening up until they did.

C. E. Allan appeared for the plaintiffs; *Chester Jones* for the defendants.

The Judge found that the owners and their agents were under the impression that they had been ordered to open up the sewer, although the inspector had used very guarded language. He held, however, that even if the inspector had clearly ordered the sewer to be opened he would be exceeding his authority, and that he had no power to do so without the consent of the Council who, in the absence of having given their consent, could not be made liable for his acts. The power of entry and of causing drains to be opened given by Section 82 of the Metropolis Management Act, 1855, did not apply to this case, but related to a case where the Council entered themselves and did the work. He therefore gave judgment for the defendants.

SHERIFF COURT (WIGTOWNSHIRE).

Interdict granted for enticing pigeons about premises so as to be a nuisance to neighbours.

Sheriff-Substitute Watson having heard proof, on December 11th, granted an interdict in this case. From the interlocutor it appears that

for some years the defender had been in the habit of feeding pigeons in front of her house, using about half a stone of Indian corn daily, with the result that large numbers of pigeons were attracted thereby. As the pursuer's house is higher than that of the defender, which it adjoins, the birds perch upon it, and their droppings caused the gutters and rain-water pipes to be frequently obstructed, the pollution of the rain-water collected in barrels for washing, and a filthy mess on the doorsteps when the rain washed the excreta from the roof. The Sheriff found that these facts amounted to a nuisance at common law.

WARRANTY OF MILK.—Alderman Sir David Evans, sitting at the City of London Guildhall, on October 25th, dealt with several summonses under the Sale of Food and Drugs Act, relating to impoverished milk sold by small tradesmen carrying on business in some of the City courts and alleys. In two cases the defendants were foreigners and clearly ignorant of the law; and all urged that they had not tampered with the milk, but sold it just as they received it. One of the defendants produced a piece of paper which purported to be a guarantee from a dairyman (also a foreigner), who undertook to supply him with pure milk only, and pay all "finds" imposed in relation to samples taken. The chief clerk explained what the Act interpreted as a warranty, and said that under a recent decision in the High Court a retailer of milk could only be legally protected by having a warranty with each delivery. Sir David Evans: That is the view of the Judges, and we Magistrates are bound by it; but using my own common sense I cannot agree with the Judges. The defendants, in some perplexity, enquired what they had better do, and were advised to consult a solicitor. Fines of 10s., and 40s. and costs were imposed.

SANITARY AUTHORITY REQUIRING NEW WORKS IN PLACE OF OTHERS PREVIOUSLY ORDERED BY THEM.—At Gainsborough Police Court last month, the Urban District Council of Gainsborough made application for an Order authorizing them and their Inspector of Nuisances to enter premises for the purpose of applying water carriages in place of three Gaux tubs, which had to serve seven families, in all thirty-one persons. Mr. Bell, who appeared for the Council, said the owner had been ordered to make the conversion in consequence of insufficiency of accommodation, and of complaints of a nuisance. They had served the Order under the Public Health Act, 1875, Section 36, and, the owner refusing to do the work, they now applied under the same section to enter the premises under a magistrates' order and do the work themselves, charging the cost to the owner. Mr. Tweed, for the owner, argued that the Council ordered a conversion to the Gaux system in 1898. The owner complied with the request in every detail, and the Council had now no power to make him do the work over again. In support of this contention he quoted the case of the Hornsea Local Board v. Davis. In reply it was argued that the Council acted rightly eight years ago, and that it was unreasonable to suppose that nothing further would ever be needed. The accommodation was not sufficient, and, that being so, and the proper notices having been served, the Bench had no alternative but to make the Order. Mr. Tweed argued that, under Section 305 of the Act, the Bench might, if sufficient reason were shown, refuse to make an Order. The Bench decided that they had no option but to make an Order as requested.

CORRESPONDENCE.

THE VALUE OF ISOLATION HOSPITALS.

To the Editor of "Public Health."

SIR,—It is very gratifying to me to hear from Dr. Fremantle that I have "cleared the air of vain statistics, and brought him and his side back to clear reasoning." This is something to have accomplished after all.

He concludes his letter with this friendly sentiment:—"Let us link arms . . . honestly recognizing that in discussing their value the statistical method is inapplicable." Let me add but these few words, and I can agree with him: "to those who wish to demonstrate the value of these institutions as a disease-preventing agency." To those who take the opposite view statistics are, and are likely to remain, the backbone of their case.

Yours, etc.,

LEICESTER, December 4th, 1906.

C. KILLICK MILLARD.

To the Editor of "Public Health."

SIR,—Will you allow me to deprecate the personal allusions to Dr. Millard in Dr. Francis Fremantle's letter in your current issue? The problem under discussion is a difficult one, but its elucidation is likely to be rather retarded than advanced by references to Dr. Millard's style of dress, whether emblematic or otherwise. Dr. Millard may, or may not, wear a red tie and a squash hat; but really that has nothing to do with the value of Isolation Hospitals for Scarlet Fever.

I feel sure that on reflection Dr. Fremantle will himself regret the personal tone of his letter, and will recognize that it is far better to deal with the facts adduced by a controversialist than to disparage his personality. Dr. Millard may, or may not, be a Socialist, but if he be one, and if his Socialist views influence his opinions on Isolation Hospitals for Scarlet Fever, it is still conceivable that his views may be well founded. Personally, I differ from him on this and on other points, but I would still appeal to Dr. Fremantle not to obscure an interesting and difficult question by personalities.

Yours, etc.,

HUDDERSFIELD, Dec. 4th, 1906.

S. G. MOORE.

THE LENGTH OF IMMUNITY AFTER INJECTION OF DIPHTHERIA ANTITOXIN.—Sittler (*Jahrbuch f. Kinderheilk*, Sept., 1906) comes to the following conclusions as the result of his practical experience:

1. The immunity given by the prophylactic injections lasts from three to five weeks, if the children are not too often exposed to diphtheria in the interval.

2. Unimmunized children are much more susceptible to diphtheria than the children who have been immunized.

3. Catarrhal affections of all kinds, and wounds of the mucous membranes, predispose to diphtheria and tend to shorten the period of immunity.

4. The length of the period of the immunization is not increased by using doses larger than 500 units.

5. Certain children show a greater predisposition to diphtheria than others. It is advisable to isolate these children as thoroughly as may be, so as to avoid the necessity for too frequent injection of antitoxin.

PUBLIC HEALTH NEWS.

THE Public Health (Regulations as to Food) Bill passed the second reading and was then withdrawn.

A CONFERENCE for the discussion of Sanitary and Public Health questions has been arranged by the Royal Sanitary Institute to be held in Dublin from June 25th–29th, 1907, to which they are inviting delegates from the various Authorities and Public Bodies.

POTATOES IN MARGARINE.—A provision dealer in Hackney has been fined for selling margarine containing 13 per cent of mashed potatoes and an excess of water. The defence was that the margarine was manufactured in Holland for consumption in Germany, but had been sent to this country by mistake.

A GARDEN SUBURB FOR WOLVERHAMPTON.—A scheme has been prepared for establishing a large model village on the outer fringes of Wolverhampton on an estate of about 400 acres belonging to Sir Richard H. Paget. The centre of the estate is two miles from the centre of the town, and lies at from 450ft. to 500ft. above sea-level. It is well timbered and picturesque in character. The design of the whole area is being prepared in advance on Garden City principles. Ample provision will be made for wide roads and open spaces for gardening and recreation. The plan of development is being prepared by Mr. Detmar Blow, F.R.I.B.A., and Mr. Fernand Billerey, architects, and Mr. Thomas Adams, late secretary and manager of the First Garden City (Limited), is acting as agent for the owner in carrying out the scheme. It is proposed to hold a model housing exhibition on the estate in the late summer and autumn of 1907, when prizes amounting to at least £250 will be awarded for the best houses containing four and five rooms, erected at a cost not exceeding £250. Particulars can be obtained from the secretary, Gresham Chambers, Lichfield Street, Wolverhampton.

SECOND INTERNATIONAL CONGRESS ON SCHOOL HYGIENE.—The preliminary programme of this Congress, of which the King is patron, has just been issued. The session will be from August 5th to August 10th, 1907, at the University of London, South Kensington. The work of the Congress will be divided into 11 sections, each presided over by an eminent authority on the subject dealt with, and these various meetings will afford an opportunity for those engaged in administering the Education Acts, educationists, and others interested from all parts of the world to meet together and discuss the many problems coming within the scope of the Congress. Members' tickets for the British Empire cost one guinea, and remittances should be sent to Sir Richard B. Martin, 68, Lombard Street, E.C., together with a visiting card. An exhibition of school building and furnishing and appliances will be organized by the Royal Sanitary Institute. Lectures will also be given and general discussions held. A large number of national committees from all parts of the world are working in the interests of the Congress. The organizing committee are inviting educational and public health authorities, universities, colleges, schools, societies, and others to appoint delegates to the meeting, and are appealing for donations to meet the large expenditure involved in organizing the Congress, which it is estimated will be not less than £3,000. The president of the Congress is Sir Lauder Brunton, vice-president of the Royal Society. The hon. secretaries are Dr. James Kerr and Mr. E. White Wallis.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

Midland Branch.—The Annual Meeting was held on October 11th, 1906, at the Council House, Birmingham. Present: Dr. Bostock Hill (in the Chair), Drs. Snell, Green, Bailey, Clendinnen, Howarth, Orton, Reid, M'Crindle, and Lyster.

Replies were read from the other Branches with reference to the proposed Conference in Birmingham. It was resolved that the Conference be arranged for November.

Votes of thanks were moved to Dr. Robertson (retiring President), and to the Birmingham City Council for use of room.

Dr. Howarth delivered his Presidential Address on "The Public Health Aspect of Pneumonia." A vote of thanks to the President for his address closed the proceedings.

Northern Branch.—A meeting of the Branch was held in Newcastle-on-Tyne, on the 26th October, 1906, the President (Dr. W. W. Stainthorpe) in the chair.

1. It was resolved that during the session 1906-1907 the meetings of the Branch be held on the fourth Friday in February at South Shields, the fourth Friday in April at Newcastle-on-Tyne, the fourth Friday in June at Barnard Castle, and the fourth Friday in October at Newcastle-on-Tyne.

2. Dr. T. Eustace Hill was elected Vice-President, and Dr. John Taylor was re-elected Hon. Secretary and Treasurer.

3. The retiring Vice-President inducted Dr. Stainthorpe as President for the session.

Dr. Stainthorpe, after thanking the Branch for the honour he had received from them in electing him President, casually remarked that he had been thirty years a member of the Society.

The President then read his address, entitled, "Co-operative Living," and an interesting discussion ensued. A cordial vote of thanks was awarded on the motion of Dr. Eustace Hill.

Metropolitan Branch.—A Meeting of the Branch was held at the Society's Offices, on December 14th. Consideration was given to the Drainage By-Laws made by the London County Council under Section 202 of the Metropolis Management Act, 1855, and the difficulties experienced in connection with their administration.

Dr. John F. J. Sykes called attention to the circular letter issued by the Medical Officer (Education) of the London County Council with regard to School Children and Diphtheria.

Dr. G. F. McCleary opened a discussion on the requirements desirable as a condition to the issue of exemption certificates under Section 11 of the Revenue Act, 1903, in respect of houses let in tenements or flats, especially with reference to the ventilation of gas stoves.

Yorkshire Branch.—A Meeting of this Branch was held at the Town Hall, Huddersfield, on Friday, the 14th December, 1906. There were present: Drs. E. M. Smith (York, the President), J. Spottiswoode, Cameron (Leeds), J. Knight (Scarborough), J. R. Lambert (Farsley), J. Wright Mason (Hull), S. G. Moore (Huddersfield), J. T. Neech (Halifax), F. Robinson (Wakefield), H. Scurfield (Sheffield), T. Smailes (Honley), R. H. Trotter (Holmfirth), A. G. Webster (Golcar), J. Mitchell Wilson (Beverley), and J. R. Kaye (Wakefield, Hon. Sec.).

Dr. Trotter, of Holmfirth, read a very interesting and carefully prepared paper on Scarlet Fever Experiences. The paper proved so interesting that the discussion was adjourned to the following meeting.

Dr. Smith, of York, presented a paper on Death Registration, but owing to want of time the discussion was postponed.

Consideration was given to the various resolutions passed by the Joint Meeting of Provincial Branches with regard to the constitution and administration of the Society.

The Honorary Secretary (Dr. Kaye) presented a pamphlet upon Infant Feeding, and also exhibited some diagrams on Anthrax, issued by Dr. Whitelegge, of the Home Office.

At the conclusion of the meeting, Mr. Alderman Broadbent, the deputy Mayor, provided light refreshments. He was thanked (together with the Corporation for the use of the room) by Dr. Smith, of York, and Dr. Mason, of Hull, both of whom referred to the position taken up by Huddersfield with regard to infantile mortality, and to the fact that Mr. Broadbent had, during his mayoralty, made Huddersfield memorable on that account.

Alderman Broadbent replied, expressing his high appreciation of the work of Medical Officers of Health, and said he regarded what he had done at Huddersfield as the result of direct association with them. The Public Health administration now commanded the greatest admiration and respect, and he had no scruple in saying that Medical Officers of Health are doing as great amount of good as can be done by any body of men. He added that there was no doubt this branch of medicine was becoming more powerful, its dictums being now received with general approval, and its advice followed with more confidence than ever before.

NEW METHOD OF INCREASING THE NUMBER OF TYPHOID BACILLI IN BLOOD.—Conradi and Kayser have shown that the addition of bile to blood to be examined for the presence of typhoid or paratyphoid bacilli will greatly increase the number of bacilli primarily present and thus facilitate their cultural isolation. Meyerstein (*Münch. Med. Woch.*, 1906, No. 38) has extended the method to the use of the active bile constituent, the biliary acids, for the preparation of which he gives a simple method. A small amount of the substance added to the blood prevents coagulation, and after a short period of incubation shows a great increase of the number of typhoid bacilli that could be demonstrated primarily. In this way he often demonstrated them before the Widal reaction was present. The method is well adapted to general use, and much more convenient and certain than all of the other procedures used for the cultivation of the bacilli. It can easily be performed in the sanitary work of Health Departments. As to diagnosis, the results would be quicker and more reliable, than by the Widal reaction as the latter is usually employed.

CURRENT PUBLIC HEALTH LITERATURE.

Zeitschrift für Hygiene und Infektionskrankheiten.

VOL. LIII, PART I.

4. On the frequency and causation of human tuberculosis. By Albin Burkharat, M.D. (Dresden). (In this paper the author endeavours by an analysis of a large number of about 1400 post mortems carried out mainly in the Dresden Friedrichstadt Hospital, and partly in the Imperial Clinic for Women, in Dresden, to form some idea of the amount of fatal and healed tuberculosis in the general populations. He begins by citing two previous attempts of the same kind, viz., those by Schlenker and Nägeli. The former found out of 100 post mortems that 66 showed tuberculous lesions. Nägeli, on the other hand, divides his results into two groups, viz., of children and adults. In the former, 88, or 18 per cent, showed tuberculous lesions, and in the latter (adults) 420, or 93 per cent, showed similar lesions. In the present instance the number of post mortems was 1452, and they were performed between January 1, 1900, and July 1, 1901. Author, like Nägeli, divides them into those on children and on adults. 190 post mortems were performed on children (105 males and 85 females), and of these 118, or 62 per cent, showed no tuberculous lesions, and 72, or 38 per cent, were tuberculous (viz., 39 males and 33 females), of these 190, or 50 per cent, were fatal tuberculosis (i.e., 18 per cent of the total 1452). As was to be expected, cicatrized lesions were very rare in children. Among adults, out of 1262 post mortems (700 males and 562 females), no tubercular lesions were found in 113, 62 males and 51 females, viz., 9 per cent. In 91 per cent, including 640 males and 509 females, there were tuberculous lesions. These concerned principally the lungs in 865 cases (viz., 511 males and 354 females). In 300 cases there were completely healed apical cicatrices. In 91 cases (55 males and 36 females), there were what the author classifies as "latent beginning" signs of tuberculosis, and in 474 (302 males and 172 females), the lung trouble was advanced. 466 adults died of tuberculosis, which is 37 per cent (i.e., 305 males and 161 females). There were 2½ times more deaths in men than women. Taking age-periods, the greatest number of deaths was between 18 and 30 years, viz., 165 (100 males and 65 females), which is equal to 35 per cent. This, therefore, is the most dangerous period to have the disease. From 30 years of age onwards the fatality decreases in both sexes, but more in favour of women till 60 years of age, when it is in favour of men. There are many other interesting statistical points entered into and illustrated graphically. The author makes a quotation from Nägeli which represents one of his principal conclusions, viz.: "The possibility of infection is greater the longer the individual lives; but, in spite of this, the mortality decreases as the higher age-periods are reached, from which it would appear that the other factor, viz., *disposition to fatal tuberculosis*, is gradually lessened.")

5. Experimental contribution on the question of the divisions of the hog-cholera group. By Dr. Julius Citron (Berlin). (He comes to the conclusion "that in spite of the cultural and serum-diagnostic points of agreement between swine plague, mouse-typhoid, and paratyphoid, and the fact that as Wasserman, Ostertag, and the author, mouse-typhoid produces active immunity against swine-plague, we must continue to study and observe more closely the epidemiological relationship between the various diseases of this group before we can consider them in practice identical, and therefore treat them similarly.")
6. On the bacteriology of the flesh of fish. By Dr. Samuel Ulrich (Zürich). (The present investigation was undertaken on account of the occurrence of several cases of fish poisoning in Zürich in 1904. Members of two families were taken ill on account of indulgence in two different kinds of fish. On late enquiry it was found that they were probably caused by hake. The symptoms were those of gastro-enteritis and typhoid. The fish had to travel a considerable distance after being caught, and were some time (several days) on the journey; after this they were cooked, but were not eaten till 24, 36, or 48 hours after this operation. The circumstance that the patients presented more severe symptoms the longer the fish was kept before eating, and also that other fish which were put on the same plate as some of these became infected, pointed to a bacterial poison. Professor Wyss isolated *B. paratyphi*, *B. Schottmüller*, from the blood of two patients who had died from the effects of eating the infected fish. A positive agglutinative reaction with these bacilli confirmed their etiological connection with the symptoms. Proteus-like organisms had been previously found in many fish-poisoning outbreaks; and as some cases presented symptoms like cholera and typhoid, it was thought that members of the coli group might be the cause. The author thought that an enquiry into the bacteriology of the flesh of fish might throw light upon the origin of these bacilli, and this was therefore undertaken, the points to which attention was directed being (1) the bacteriology of fish at different temperatures; (2) the growth of bacteria in raw and cooked flesh; and (3) the retention of pathogenic micro-organisms in the flesh and their virulence towards the different animals. Fish of different kinds were bought in the market as fresh as possible, and numerous experiments were carried out. As a result the author comes to the following conclusions:—
1. The number of bacteria in raw fish flesh at ordinary temperatures is considerable, and these belong to two groups: (a) coli group (does not liquefy gelatin); (b) proteus group (liquefies gelatin). The coli group is strongest both in growth and numbers.
2. When fish is bought fresh and cooked in the ordinary way, the flesh is not sterile after this process. The flesh is a favourable nutrient medium for micro-organisms. The increase may be enormous at the higher temperatures. In cooked flesh both the above mentioned groups are prevalent, but the coli much more so than the proteus groups.

3. No decided difference could be ascertained between raw and cooked flesh of fish on feeding. On subcutaneous injection of bouillon prepared from cooked fish, mice, rats, and guinea-pigs succumbed quicker than when a watery decoction of raw flesh was used.
4. If *B. paratyphi* (fish) is inoculated in cooked flesh of fish it develops freely. Animal experiments give no marked difference in virulence between flesh inoculated with *B. paratyphi* and that not inoculated.
5. *Proteus* also increases rapidly in cooked flesh of fish, and early causes the unpleasant smell of decaying fish.
6. One may draw the practical conclusion that micro-organisms grow very rapidly at a high temperature in the flesh of fishes, and that in summer it should be eaten not later than 24 hours after cooking.)

VOL. LIII, PART II.

The influence of prosperity on the mortality in Vienna, especially as regards the deaths from infectious diseases. By Dr. Siegfried Rosenfeld (Vienna). (The author endeavours here to find out the effect which different degrees of prosperity have on the death-rates. As the information requisite for such an enquiry cannot be got directly from death certificates, etc., the author takes the various districts of Vienna, and classifies them according to the prevailing character of the inhabitants into various degrees of prosperity. In each important disease the author goes carefully into the statistics of the various districts.)

2. The quantitative determination of bacteria in fluids. By Ober-Med-Rat Dr. W. Hesse, and Geh. Med.-Rat Dr. Niedner (Dresden). (In this paper the authors mention the great want of a uniform method in the bacterioscopic examination of fluids. Owing to the different methods employed at present it is impossible to compare the results of different investigators. They treat the subject from four points of view, viz., (1) Composition of the nutrient medium; (2) Measuring the fluid to be experimented on; (3) Length and temperature of incubation; (4) Method of counting colonies. They sum up the results as follows:—

1. A common method of estimating the bacteria in such fluids as water, sewage, and milk, so that the results of different enquirers can be compared, is very necessary.
2. Such a method depends in the first place on counting not only a part but the whole of the colonies which have developed on the nutrient medium from the fluid tested.
3. For this purpose neither growing on gelatine nor counting with a lens is sufficient. Gelatine is unsuitable, because it offers a bad medium for many, especially water bacteria, since it does not permit of a uniform composition, and is usually liquefied before all the colonies have developed. An ordinary lens is unsuitable, because a part of the colonies are invisible with it.
4. Albumose-agar is most suitable for quantitative estimation of bacteria, viz., agar-agar, 1 part; Nährstoff-Heyden, 1 part (special medium prepared by Merck); Aq. dist. 100 parts.

5. The colonies can be counted in 1 cc.m. of fairly pure water by simply mixing it with the medium: impurer waters must be diluted in various degrees. The fluid to be tested can best be measured by means of drops of known size.
6. Incubation for 3 weeks at 18 to 25 C.
7. Trustworthy counts can be made only with the microscope. The following are the conditions:—
 - (a) Petri dishes of as near as possible equal diameter, even bottom, with right-angle corners at the junction of sides and bottom.
 - (b) Layer of nutrient medium at most $1\frac{1}{2}$ mm. thickness.
 - (c) Even spreading of medium.
8. Plates with small numbers of colonies (1-500) can best be counted in rings, but above this number by counting "fields." The first method is always trustworthy, the latter only when similar and symmetrical "fields" are counted.
9. The more the colonies the greater the microscopic power necessary. Numbers from 1000 to 10,000 require enlarging 12-20 diameters, and 10,000 to 100,000, 40-50 diameters.)
3. On cholera and cholera-like vibrios among pilgrims returning from Mecca. (A contribution to the epidemiology of cholera.) By Dr. Felix Gotschlich (Alexandria).
4. Contamination of the Lahn and Wieseck by the sewage of the town of Giessen, with special reference to the usefulness of the ordinary methods of examination of river impurities. By Dr. K. Kisskalt (University of Giessen).

VOL. LIII, PART III.

1. The Danube from Leopoldsberge to Pressburg, the sewage of Vienna and its fate after entering the river. By Dr. Ernst Brezina (Vienna). (The present volume of the *Zeitschrift* is mainly occupied with a very full account of the contamination of the Danube by the sewage of Vienna, and the amount of self-purification which takes place in its course, with some suggestions for partial purification of the sewage before it is allowed to enter the river. He shows that the purification is (1) mechanical, and; (2) bio-chemical. The former includes the washing up of coarse particles on to the banks, the breaking up of these by the water into smaller pieces, the dilution of sewage, and sedimentation. The second or biological-chemical method of purification is not so well understood. This appears to consist of oxidation from the dissolved oxygen in the water, and of the action of organisms, among which protozoa play an important part. Algæ, as far as the Danube is concerned, take no part in the purification process. According to Thez and Spitta, with whom the author agrees, self-purification is not to be looked for by a diminution of the bacterial flora. The author comes to the final conclusions that, owing to the large volume of water and other circumstances, the bio-chemical purification possesses mainly a theoretical interest, and that practically the mechanical form of this process suffices for the Danube. He suggests therefore:—
1. Holding back the coarser floating sedimentary particles of the sewage by suitable arrangements, and

2. Conducting the modified sewage by separated outfalls into the river, arranged at such intervals as the profile of the country demands.

By the first method suggested a very large number of the pathogenic organisms will be removed. They do not advise the withholding of the sewage of Vienna as a sanitary precaution, and think that sewage farms are to be considered from an economical rather than a sanitary standpoint as far as this river is concerned.)

2. Diphtheria bacilli in pus. By Oberstabsarzt Hammerschmidt (Gresen). (The author mentions cases in literature which go to show that in some rare cases diphtheria bacilli may be found in the blood and internal organs, and goes on to describe a case which came under his cognizance which appeared at first sight to be one of this kind. A dragoon, 22 years of age, presented symptoms of typical diphtheria in his pharynx and larynx. The infection was confirmed by bacteriological diagnosis, and was of a severe form. He was treated in the usual way, but on the fourteenth day of the illness a small pustule appeared at the root of the left middle finger, and a day or two after a similar but larger one appeared near the insertion of the *tendo Achillis*. Both these contained Klebs Loeffler bacillus as proved by microscope and inoculation of a guinea-pig. A blood infection was thought of first, but repeated examinations of this fluid showed it to be sterile; and as both pustules were very superficial, it was thought probable that he was infected when he put his hand to his mouth during the severe paroxysms of coughing, and that the heel became infected either from infected bed-clothes or else scratching with infected fingers. The patient made a good recovery.)
3. Enquiry into the gaseous combination of arsenic formed by moulds. By Dr. Walther Hanomann. (In 1892 Gosio showed that the above organisms, among which is *Penicillium brevicaulis*, have the power of forming very ill-smelling gases by splitting up the stable compounds of arsenic in wall papers, etc. The author repeated these experiments under strictly scientific conditions, and found that the arsenical gases were not injurious to white mice or to those who were working in the laboratory where the bad smell of these gases was perceptible. He thinks that the symptoms of arsenical poisoning are therefore not caused by these gases, but by very fine particles of arsenic (possibly arsenuretted hydrogen) given off by the papers.)
4. Supplement to my study "on the histology of experimental trypanosomiasis." By Ernst Sauerbeck (Basel). (In this short contribution the author details his repetition of Prowacek's discovery, that the polynuclear leucocytes digested and destroyed the trypanosoma. By placing the spinal cord of a rabbit newly dead (while the body was warm) from this disease in physiological salt solution, and immediately making a smear preparation after the method of Marino, he was able to discover polynuclear leucocytes full of what were evidently the remains of trypanosomata. These he pictures in the text. He comes to the conclusion from this and other investigations that these leucocytes kill bacteria, but that the mononuclear busy themselves with larger elements, such as parasites and body cells.)

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ELEMENTARY EDUCATION FROM THE POINT OF VIEW OF THE MEDICAL OFFICER OF HEALTH.*

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EDUCATION, especially elementary education, can at least claim to be a subject of exceptional interest to every Medical Officer of Health at the present time, and to be a matter to which every member present must have already given some time and thought in his capacity as Medical Officer of Health, or, may be, as adviser to the Education Authority in his district.

Public Health, as usually understood, is largely a branch of education in its widest sense, and the ordinary duties of a Medical Officer of Health and his staff are, in great part, but a series of object-lessons in the prevention of disease. The extent to which these lessons are understood and appreciated very greatly depends upon the intelligence of those to whom they are given, or for whose benefit they may be displayed. If we take, for instance, an ordinary disinfection of a house or room, is it not an addition to the knowledge of every thoughtful observer of the process; is it not an indication to such that the infectious element of the particular disease is capable of being imparted to inanimate objects, and from them may be conveyed to persons; and that the object of disinfection is to destroy such dangerous properties, and thus protect the healthy from harm?

As much may be said of the great portion of the work of every Medical Officer of Health. Properly utilized and understood, what a source of educative material the annual reports of many Medical

* Presidential Address delivered at Cardiff, October 18th, 1906.

Officers of Health may be made to be! In the narrower sense, however, the Medical Officer of Health has hitherto taken little or no part in the direct or indirect education of the young; but the trend of public opinion and consequent legislation are leading to a change, and the Medical Officers of Health are often in a position to wield great influence upon the policy of Education Authorities throughout the country.

From an analysis of the codes which have had their being from time to time at the Central Education Department, one would conclude that until quite recently very little importance was attached to the physical welfare of the scholars, as evidenced by the want of prominence given to, or total neglect of, subjects, the teaching of which would tend to create in every child a wholesome respect for his personal health and well-being, and would, consequently, foster the cultivation of habits inimical to the violation of the laws of health.

The most recent codes, however, show evidence of a change of attitude in this respect, inasmuch as more latitude is given to Local Authorities in the choice of a curriculum, and greater opportunities given to teach subjects, a knowledge of which may be expected to exercise greater influence upon the future welfare of the scholars themselves, as well as of those whose prospects may later in life be dependent upon them. Nevertheless, there appears to have been in the past, either the want, or a disregard, of the advice of men whose training and knowledge would lead them to emphasize the importance to the future of our country of due attention being paid in our educational scheme to the physical as distinguished from the intellectual side of education. It would seem desirable, therefore, that the *personnel* of the Education Department be augmented by the appointment of an adequate staff of men who have undergone a medical training, somewhat after the lines of the medical section of the Local Government Board.

The influence hitherto exercised by the Medical Officer of Health upon elementary education has been rather in the direction of immediate interference with its usual course, either by excluding certain scholars, or by the closure of one or more schools for a definite and stated period—either course being necessary in the interests of the public health.

It now appears probable, however, that in the near future Medical Officers of Health will themselves be expected to take an active, though may be indirect, part in elementary education. At present teachers are not expected to devote much time during their training to subjects directly bearing on school hygiene and the physical welfare

of their pupils. In consequence, all the present teachers in elementary schools, as well as all those who will become certificated before any change in their curriculum is effected for the purpose of meeting future requirements in this direction, will probably depend very largely upon the Medical Officers of Health in their district for direct instruction, for the selection of the proper subjects, and for the organization necessary to make it possible for those subjects to be efficiently taught.

It may be well to summarize here the existing powers and duties of the Medical Officer of Health, so far as they relate to elementary schools and the scholars.

Besides those already referred to—the closure of schools and the exclusion of certain scholars from school—the Medical Officers of Health of some districts possess additional powers conferred upon them by special Acts. In the Rhondda, for example, he may “enter any public elementary school within his district . . . and examine the scholars attending the same, and may exclude from attendance thereat, for such period as he may consider requisite, any scholar who, in his opinion, is suffering from infectious disease, or is likely to spread infection. . . .” He may also in certain cases obtain a list of the names and addresses of scholars attending school, from the school-master or principal of the school.

The Medical Officer of Health, as such, is also expected to satisfy himself that the school buildings comply with the sanitary by-laws in force in his district. I question very much, however, whether many Medical Officers of Health consider it their duty periodically to inspect every school within their districts, and, even when of that way of thinking, fewer still are able to satisfy their conscientious attitude of mind, in addition to meeting their many other obligations. Usually the Medical Officer of Health depends upon the inspection as performed by the Sanitary Inspector, whose knowledge of the hygienic requirements necessarily has its limitations. Many other questions besides those specifically dealt with in the ordinary by-laws require attention, such as air humidity, school furniture (especially desks and their relation to the lighting, both natural and artificial), periodical disinfection, ventilation, light, heating, accommodation, playgrounds, cloakrooms, etc.

Just now, however, greatest interest attaches to the prospective duties of Education Authorities as laid down in the Education Bill, which was recently “sent up” by the House of Commons to the House of Lords, and will be considered by the latter during the coming Session.

From the standpoint of the Medical Officer of Health, the all-important provision is contained in Clause 24, and reads as follows :—

"The powers and duties of a Local Education Authority under Part III. of the Education Act, 1902, shall include :—

"(b.) The duty to provide for the medical inspection of children before, or at the time of, their admission to a public elementary school, and on such other occasions as the Board of Education direct, and the power to make such arrangements as may be sanctioned by the Board of Education for attending to the health and physical condition of the children educated in public elementary schools."

Should the Bill escape total rejection by the House of Lords, it is improbable that this provision will in any way be modified in its passage through the Upper House. It is noticeable that the section naturally divides itself into three parts of different import; in the first place, the medical inspection of children before, or at the time of, entering school is obligatory on the Education Authority; in the second place, such inspection may have to be repeated at the direction of the Central Authority; in this case the Board of Education possess the power to take the initiative; in the third place, the Local Authority is given the power to make further arrangements for attending to the health of the children in their elementary schools; in this case the proposals have to emanate from the Local Authority, but before they become operative they must receive the sanction of the Board of Education. Even a superficial consideration of this clause suffices to impress one with the extent of the obligations imposed by the first of the three divisions, no less than with the immensity of the benefit to future generations that is likely to accrue.

One of the first questions which present themselves to the Medical Officer of Health is, Whose duty will it be to do the actual examinations? The terms of the provision exclude the possibility of any attempt being made to impose the duty upon teachers or anybody other than medical men.

The only question arising in the case of large districts is as to whether the special men who will be required to devote their whole time to the duties will form members of the staffs in the respective Health Departments already existing, or whether they will act solely as the executive officers of the Education Authorities with independent staffs. From the administrative and economic points of view it appears to be preferable to make any additional men required subject to the control of the Medical Officer of Health as adviser to the Education Authority in his district.

In the case of rural and sparsely populated districts the problem

presents a different aspect, and appears to need a different solution. At first sight, the most reasonable solution would appear to be the delegation of the duties to the Medical Officer of Health within whose area the school lies; but it must be admitted—and the admission involves no depreciation of the professional skill, as general practitioners, of any medical men—that the duties implied may need, in certain directions, knowledge of a very special kind, which such men may have had no opportunities to acquire. Where, under such circumstances, a special officer is appointed to carry out the medical inspection, it may be considered undesirable to place such under the supervision of the Medical Officer of Health, on the ground that the latter officer has, or may have, no special knowledge of the character of the work demanded. When, however, it is admitted that but few Medical Officers of Health have the requisite knowledge confidently and accurately to carry out the technique connected with such work as the estimation of errors of refraction, it is not to be concluded that such an officer is incapable of drawing correct conclusions from the accurate observations made by the school doctor for the purpose of advising his authority in the adoption of any course which it may be necessary to take.

In non-autonomous areas the duties now under discussion will probably devolve upon the County Medical Officer of Health, where such has been appointed. Where such an officer is non-existent, it is difficult to escape the conclusion, either that such an appointment must be made, or that a Medical Officer must be appointed to perform the special duties it is proposed by this clause of the Bill to lay upon Education Authorities. There remains another large group of districts, whose population may not justify the appointment of a whole-time officer, and which are not within the jurisdiction of the County Education Authorities. In such the performance of the duties will probably fall upon either the existing Medical Officer of Health, or upon a part-time officer, with qualifications which give him special advantages in the kind of work required to be done. The population of a district which would warrant the appointment of a whole-time officer will depend largely on the thoroughness of the medical examination it is intended to make. In this connection it may be of interest to refer to a calculation I have made with reference to my own district. Some time ago I had occasion to examine about 7,000 school children, for the specific purpose of ascertaining their condition in respect of vaccination. More recently I made a medical examination of 40 candidates for pupil teachership: the work entailed being probably more than may be expected to be

performed when a large number of school children have to be examined for the detection of departures from health. Taking these two very dissimilar items of experience as a guide, I estimate that each child will require five or six minutes, and that the examination of the 3,000 odd children admitted into the schools of the district in a year will absorb ten or twelve weeks of the time of a man whose working hours are identical with the school hours. The time here allowed for each pupil doubtless appears too short to the clinician; but it should be remembered that the object of the inspection of school children is not the treatment but the mere detection of disease, with the view of deciding whether in the case of a particular child school life would be harmful to himself or others, or, where a child presenting some abnormality is admitted, of determining what alteration of the usual curriculum should be made in his particular case.

The determination of the nature and extent of the examination is, of course, of importance. I take it that each examination should enquire into the state of the heart, lungs, air passages, eyes, ears, mouth, nose, spinal column, teeth, and skin. The record of the height and weight, if taken, might be relegated to a teacher or nurse. It appears to me that any attempt to make an exhaustive examination of the eyes and ears of all children on their admission to school would be impracticable, and the results obtained would not be commensurate with the time spent and expense incurred. Such an examination might be made with advantage later in the school life of the children in cases selected after a preliminary, and more or less cursory, examination by the school doctor, or even by the teacher under the supervision of the doctor. Moreover, the conditions under which a complete examination of the eyes or ears can be successfully undertaken are very different to those obtaining in a public elementary school, or even in an ordinary consulting-room. It will, no doubt, be readily admitted that anything savouring of treatment by the Medical Inspector should be carefully avoided, but suggestions as to the need for treatment in particular cases will probably be necessary in some form or other.

The third and last portion of the clause is suggestive of great possibilities, and may not unfairly be interpreted to mean that Local Education Authorities may, subject to the sanction of the Board of Education, formulate schemes for the relief of the underfed, the provision of such remedial measures as spectacles for the children of those who cannot afford to buy them, the appointment of nurses as auxiliaries, and other similar measures aimed at improving the health and physical condition of the children. It is, perhaps, in this

connection, and with this section in his mind, that the Medical Officer of Health, when acting as adviser to his Education Authority, will have most opportunities to advocate the adoption of reforms and measures calculated to improve the health and physique of future generations, and thereby help to equip the units with one of the most important essentials to success in life, and to the attainment of full and worthy citizenship.

To summarize :—The first desideratum appears to be the education of the Central Authority; education of the kind that will convince them of the wisdom of seeking the aid and advice of men with special knowledge and experience. Public opinion, as voiced by the House of Commons, is the only possible schoolmaster, assisted by applications in the form of revised curricula from Local Education Authorities.

The Medical Officer of Health, when acting as medical adviser to the Education Authority, can do much towards the education of the local "powers that be," especially if in collaboration with a sympathetic and progressive Director of Education. Consideration should be given to the special needs of his district, and efforts should be made to secure the insertion in the curriculum of subjects, a knowledge of which will tend to counteract the prevailing evils. The curriculum for the education of infants appears to be already well considered and rational. Apart from the conditions under which the children are taught, the Medical Officer's interest is centred upon the kind of knowledge imparted to the older scholars. At present the curriculum for scholars, other than infants, consists of English language, handwriting, arithmetic, drawing, observation lessons and nature study, geography, history, music, physical exercises, and needlework. It is also recommended that, where possible, older girls should be given practical training in "domestic subjects," meaning thereby cookery, laundry work, and housewifery. It appears to me that next to the three R's the subjects mentioned as to be taught, "where possible," are the most important, and that their teaching should take precedence over all the other subjects in the curriculum, and should be made compulsory. Knowledge of subjects such as music, history, and geography can generally be made use of only during the leisure hours of life, and their acquisition might likewise be mainly confined to time of leisure, and they should not be taught to the exclusion of subjects which enter of necessity into the daily life of everyone. The so-called "domestic subjects" may be supplemented by others equally important, such as temperance, elementary physiology especially in reference to the relative values of different foods, gardening, and, in the case of girls, the care of infants and home nursing. It

might be said that these are more suitable subjects for after-life, and that some other means than the elementary schools should be employed to teach them. But all the other channels available at present are voluntary, with the result that only an insignificant fraction of the population can be reached by the means at hand.

It is generally admitted that much of the time of every child is now wasted in learning our system of weights and measures, and still more time is thrown away in its application in every branch of life. Were the employment of the metric system made compulsory, a great deal of time would very soon be at the disposal of Education Authorities, which could be more profitably devoted to some of the subjects mentioned. After a period of transition the advantages gained would undoubtedly be very considerable.

One welcomes the introduction in the most recent code of the regulation allowing organized games "to be played during the hours set aside for an afternoon attendance, thereby counting as a part of the school routine." Previously, participation in such games was possible only by the voluntary efforts of teachers, outside of school hours. Organized games are much better calculated to aid the development of certain desirable qualities than a set drill or gymnastics; thus the necessity to work or play in unison with, or in opposition to, their fellows, teaches them to "give and take," to curb their temper, to efface themselves for the common good of their side, to bear defeat with stoicism and victory without undue pride, and to cultivate the spirit of discipline and of fairplay.

If, however, it were considered desirable to effect some modification of the curriculum on the lines indicated, the first necessity would be the education of the teachers; and in this work the Medical Officer may well take a not unimportant share, and thus assist in the development of healthy men and women, endowed with the physique and stamina necessary to fit them for the work of life, and to render it possible for them to become worthy sons and daughters of the country which has given them birth.

DISCUSSION.

DR. W. WILLIAMS, Glamorgan County Council, said there were some 65,000 children in the area under the jurisdiction of the Glamorgan Education Committee. He had also calculated that about 10,000 of these children entered annually, and some probably entered every school on each day of the school year. He failed to see how such a large number could be examined within a reasonable time, and proper attention given to each scholar. Dr. Williams stated that the examination of schools

and scholars naturally divided itself into (a) the sanitary control of school buildings; (b) medical inspection of scholars, and that these were inseparable and ought to be carried out by one and the same authority; and he also pointed out that this work ought to belong to the County Health Department, but there were some difficulties in the way which might be easily overcome. With regard to boroughs, district councils, etc., employing whole-time Medical Officers of Health, there were but few difficulties, but in those who employed only part-timers there were many difficulties.

DR. D. S. DAVIES, Bristol, said the Bristol Authority had made enquiries as to how this inspection of children was being carried out by other authorities, and in some cases they found that the work was done by an independent medical officer. This had caused friction, and there appeared to be a general feeling that these inspections should be in the department of the respective Medical Officers of Health, and that they should receive the reward of added responsibility. They should direct the parents how to treat their children.

DR. E. WALFORD, Cardiff, urged that they should educate the public as to the importance of this work. He agreed that the parents should not be relieved of any of their responsibility. Last winter they had given 51,000 free meals to school children at Cardiff, at a cost of £100, but he found that the meals were partaken of largely by the children of parents who were improvident and addicted to drink, and that the children of the more modest and thrifty class did not get much assistance.

MR. HERBERT JONES (Hereford Combined District) was of opinion that the defective eyesight of school children was very often due to the existing construction and arrangement of the schools. The authorities first of all caused the defective eyesight, then proposed to examine the children who suffered from it, and later to provide the remedy. They should start at the proper end.

DR. EBENEZER DAVIES urged that great caution should be observed lest sanitary authorities should be hurried into ill-considered schemes. The Medical Officer of Health should act as the medical adviser to the Education Committee and in large communities he should be given medical assistance.

SEWAGE EFFLUENTS AND WATER SUPPLIES.—An important statement of policy by the Royal Commission on Sewage Disposal has been communicated by the Local Government Board to the Metropolitan Water Board. The Commission say that they find that in times of storm a considerable portion of the sewage of towns passes into the rivers untreated, and the evidence rather seems to show that it is not practicable to prevent this. If the sewers had to be made of sufficient capacity to carry off storm-water, it is doubtful whether they would work efficiently in dry weather. But if this difficulty could be overcome, the cost of providing and maintaining purification plant which could be relied on both chemically and bacteriologically, together with the cost of enlarging the sewers, would in most cases be prohibitive. Moreover, rivers with towns on their banks are necessarily exposed to other pollutions besides sewage. Therefore it should be regarded as part of the duty of any authority taking such water to purify it before distribution to their customers.

THE PUBLIC HEALTH ASPECT OF PNEUMONIA.*

By WILLIAM J. HOWARTH, M.D., D.P.H.,
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FOR a considerable number of years past there has been an increasing tendency to regard the disease known as pneumonia as one capable of spreading from person to person, with occasional extensions of such degree as to merit the terms epidemic, contagious, or infectious being applied to it. As a consequence, it is assuming an increased importance to those engaged in preventive medicine, since the question is raised, to what extent, if any, is it preventible? In the following outline some of the details relating to this disease which are of interest to Medical Officers of Health have been classified, in the hope that the subject will prove sufficiently attractive to interest you.

The term pneumonia is a general one, which indicates an inflammation of lung tissue, and conveys no suggestion of any ætiological factor. The inflammation may differ widely both in its anatomical and clinical aspects. Until 1901 all the varieties of pneumonia were classified in the Returns of the Registrar-General under the one heading "Pneumonia," which, in its turn, was given a place among "Local Diseases" and more specifically among "Diseases of the Respiratory System." In the Report for 1901 pneumonia was removed from this group, and "in recognition of its infective character," it was classed with those conditions to which it is more generally allied, viz., the diseases known as "General Diseases," among which are placed the zymotic diseases. In addition, the disease was subdivided into lobar, broncho-, and epidemic pneumonia, and "pneumonia not defined" as belonging to one of the above three classes. This subdivision, from a statistical point of view, is of considerable value; but the possibility of anything like accurate classification is still remote, since each year the number of cases registered as "not defined" is equal to the combined total of the other three subdivisions. There is, however, a tendency to improve each year, which it is to be hoped will be maintained, though at a more rapid rate.

Epidemic pneumonia, so-called, has displayed a rather peculiar distribution, inasmuch as during the year 1904 no deaths were registered from this type of the disease. During 1901 there were 94 deaths, and it is interesting to note that they were distributed among no fewer

* Presidential Address read at the meeting of the Birmingham and Midland Branch of the Society, October 11th, 1906.

than twenty counties, the largest number, 21, being registered in Lancashire; in London there were 14 deaths, and in Warwickshire 10 deaths. Even these small totals diminished to one each in Surrey, Devonshire, Worcestershire, Lincolnshire, and Northumberland. In 1902 the total of 10 deaths was distributed amongst five counties, the North Riding claiming 6. In 1903, 7 deaths occurred in six counties, Worcestershire claiming 2 of them. It is difficult to appreciate the association of the word "epidemic" with these few deaths from a disease with a mortality which may reach 18 per cent of attacks; possibly in several instances they were so called on account of a sequence of deaths occurring in a limited community, or from one or more deaths occurring among members of the same family who had been subjected to coincidental attacks.

It has been stated, and rightly so, that during recent years the mortality from pneumonia has shown a tendency to increase, and the following have been suggested as causes contributing to that end: (a) The continued tendency of the urban communities to increase at the expense of the rural, with the result that more persons are exposed and succumb to attacks of pneumonia than would be the case with a more equal distribution of the population; (b) The continued prevalence of influenza since 1890; (c) The transference between cases of pneumonia, bronchitis, and phthisis; (d) The tendency of the disease to show an increase in virulence, the variable nature of which is characteristic of infectious diseases; and (e) The diminution of resistance which individual members of the community show to the disease chiefly as a result of diminished vitality.

The suggestion of increased virulence is difficult of proof or disproof, but some consideration will be given to the question of increased individual susceptibility, as there would appear to be reasons in favour of such a cause being in operation if only as a result of urbanization. With reference to the other suggested causes the annexed Table contains some necessary details.

It will be seen that during the three decades preceding the advent of influenza in 1890, the highest death-rate from pneumonia was in the first of these periods, but that since 1890 there has not been a single year in which the rate recorded has been as low as that of any three decennial averages, with the exception of the year 1894, when it fell to 1,082, a figure slightly below the decennial rate of 1861-70. This increase, it will be observed, has corresponded with the continued prevalence of influenza. On the other hand, bronchitis, which showed a tendency to increase up to 1891, has since displayed an irregular though undoubted tendency to decrease. (The distribution of the

mortality into age-periods for the last decade is not yet available.)

The importance to be attached to the transference between pneumonia, phthisis, and bronchitis is not easy to decide; the Registrar-General suggests that deaths which in former years have been ascribed to capillary bronchitis are now returned as pneumonia. Dr. Newsholme has also made reference to this subject, and in contrasting the rates from these two diseases in the decades 1861-70 and 1881-90, he found that pneumonia had decreased to the extent of about 1 per cent, which decrease was confined to the first quinquennium of life, the decline at this age-period actually amounting to 31 per cent, but that, in the subsequent years there was an increase varying from 10 per cent at the age-period five to ten, to 86 per cent at ages thirty-five to forty-five. In the case of bronchitis there was an actual increase in

DEATH-RATES PER MILLION FROM PNEUMONIA, BRONCHITIS, AND INFLUENZA.

Disease.	Decades.			1890	1891	1892	1893	1894
	1861-70	1871-80	1881-90					
Pneumonia ...	1089	1004	1066	1404	1471	1250	1285	1082
Bronchitis ...	1760	2288	2138 For 1889	2333	2593	2266	1905	1640
Influenza ...	—	—	2	157	574	533	325	220

Disease.	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
Pneumonia ...	1169	1146	1118	1125	1250	1374	1147	1407	1220	1281
Bronchitis ...	1967	1535	1503	1479	1606	1692	1365	1323	1112	1246
Influenza ...	423	122	195	330	389	504	174	223	189	168

the later decade of 22 per cent, which was chiefly accounted for by an increase of 58 per cent in the first quinquennium, this being associated with a decrease in bronchitis mortality at ages ten to fifty-five, so that a decrease in the deaths from pneumonia at the early period is associated with an increase in the deaths from bronchitis, and the increase in pneumonia mortality in the later years with a decrease in bronchitis mortality. There has also been a decline in the phthisis mortality, the decline of 44 per cent under five years being perhaps due in part to transference to bronchitis; at the later ages the decline is probably in great part real and not due to transference to pneumonia.

With reference to the excess of deaths in urban communities over rural the Registrar-General has shown that the excess is distributed

over every age-period, and that in both urban and rural districts males show a preponderating death-rate compared with females. Taking all ages together, the excess of mortality among males amounts to nearly 50 per cent, the period fifteen to sixty-five showing the greatest incidence of the excess. The classification previously referred to as adopted by the Registrar-General in 1901 enables this incidence of pneumonia on the urban districts to be strongly emphasized by permitting a comparison of the death-rates recorded in each county to be made. For this purpose, I have averaged the county rates for the years 1901-4, and it will be seen that the county with the highest death-rate has a rate more than three times that of the lowest, among both males and females. For comparative purposes, similar information relating to bronchitis, a chest ailment of non-specific origin, has also been worked out and placed in parallel columns. The results are shown on the opposite page.

It will be observed that the mortality among females practically follows that recorded among males, and that as a rule a high pneumonia mortality is associated with a high bronchitis mortality, the two chief exceptions being in the North Riding and Northumberland, in which counties a relatively low mortality from bronchitis is associated with a pneumonia mortality considerably above the average.

The converse, viz., that a low mortality from pneumonia is associated with a comparatively low mortality from bronchitis does not so regularly obtain; in the case of Huntingdonshire, for instance, the bronchitis mortality is nearly twice that from pneumonia among males and more than twice among females. In Rutlandshire the bronchitis mortality among females is disproportionately high compared with pneumonia. The same holds good, though to a less degree, in the case of Norfolk, Buckinghamshire, Bedfordshire, and Dorsetshire. It is interesting to note that although in only a few instances is the death-rate from pneumonia among males less than the death-rate from bronchitis, this is the rule among females with only a few exceptions, the reason for which is not to be found in a marked increase in the number of deaths from bronchitis, but to the decrease in the number of deaths from pneumonia among females. There are two other points of comparison which should be noted, viz., there is not the same disparity between the highest and lowest mortalities from bronchitis among either males or females as is observed in the case of pneumonia, nor between male and female mortality from bronchitis in the same county. On the contrary, the rates in the latter instance closely approximate each other; thus Lancashire has a male mortality

DEATH-RATES PER MILLION 1901-1904 IN THE VARIOUS
REGISTRATION COUNTIES AMONG MALES AND FEMALES FROM
PNEUMONIA AND BRONCHITIS.

MALES.			FEMALES.		
County.	Pneumonia.	Bronchitis.	County.	Pneumonia.	Bronchitis.
Lancashire ...	2100	1670	Monmouthshire	1575	1358
Monmouthshire	2097	1436	Lancashire ...	1428	1633
North Riding ...	1973	1007	South Wales ...	1811	1167
Durham ...	1728	1440	Durham ...	1292	1351
South Wales ...	1721	1247	North Riding ...	1260	1015
London ...	1689	1397	London ...	1204	1419
West Riding ...	1639	1445	Northumberland	1200	1009
Warwickshire ...	1618	1423	Warwickshire ...	1172	1389
Northumberland	1583	965	West Riding ...	1168	1354
Cheshire ...	1580	1187	Nottinghamshire	1147	1196
Nottinghamshire	1549	1330	Staffordshire ...	1103	1471
Staffordshire ...	1496	1667	Cheshire ...	1073	1177
England & Wales	1485	1282	England & Wales	1057	1244
Cumberland ...	1464	1137	Cumberland ...	1030	1046
Shropshire ...	1398	999	Shropshire ...	948	899
North Wales ...	1355	1044	Essex ...	918	1113
Gloucestershire	1277	1273	East Riding ...	912	1279
Essex ...	1257	1141	Middlesex ...	907	907
Devonshire ...	1255	1223	Gloucestershire	903	1279
Middlesex ...	1252	887	Devonshire ...	893	1166
Worcestershire...	1222	1204	Worcestershire...	879	1010
Derbyshire ...	1207	1247	North Wales ...	878	1092
East Riding ...	1172	1303	Derbyshire ...	878	1127
Herefordshire ...	1136	1077	Cornwall ...	794	1004
Somersetshire ...	1094	1011	Hertfordshire ...	786	1033
Cornwall ...	1063	1014	Herefordshire ...	753	947
Surrey ...	1054	840	Wiltshire ...	741	1110
Hampshire ...	1000	1037	Surrey ...	738	785
Kent ...	993	863	Lincolnshire ...	733	1028
Lincolnshire ...	984	1114	Kent ...	727	899
Sussex ...	934	817	Oxfordshire ...	722	1002
Cambridgeshire	934	906	Somersetshire ...	719	996
Berkshire ...	931	870	Leicestershire ...	699	1092
Leicestershire ...	917	1154	Cambridgeshire	680	939
North'mpt'nshire	914	1035	Hampshire ...	675	977
Oxfordshire ...	896	1135	Sussex ...	664	798
Hertfordshire ...	895	996	North'mpt'nshire	657	996
Dorsetshire ...	882	985	Dorsetshire ...	637	1015
Norfolk ...	882	1057	Berkshire ...	627	938
Suffolk ...	869	937	Bedfordshire ...	626	1111
Westmoreland ...	863	727	Buckinghamshire	620	1076
Wiltshire ...	861	1091	Suffolk ...	613	950
Buckinghamshire	807	1122	Norfolk ...	609	1162
Bedfordshire ...	805	1005	Rutlandshire ...	605	1259
Huntingdonshire	720	1308	Westmoreland ...	509	693
Rutlandshire ...	685	708	Huntingdonshire	477	1163

from pneumonia of over 2,000, as compared with a female mortality from the same ailment of 1,428, whilst the corresponding rates for bronchitis are 1,670 and 1,633. Unless the male case mortality is for some reason markedly higher than the female, this wide variation between the rates tends to prove that males are more exposed to the infection, or to conditions predisposing to attacks than females. This point will receive subsequent attention.

With respect to the actual exciting cause of the disease, there is practically no doubt that the pneumococcus of Fraenkel stands to the majority of cases of fibrinous lobar pneumonia in the relation of cause and effect, but whether it is the only organism which is capable of producing this particular type of disease is, I think, doubtful. Netter is quoted in the *Practitioner* as stating that "there is no pneumonia (lobar) without pneumococci," and further, "that the constant presence of the pneumococcus of Talamon-Fraenkel in lobar pneumonia and the plurality of microbes causing broncho-pneumonia are the distinctive elements which bacteriology permits us to recognize in the history of pulmonary inflammations." This observation seems to suggest a precise ætiological differentiation between the two types of pneumonia according to the anatomical seat of the inflammatory lesion, the lobar invariably due to the pneumococcus, and the lobular to a variety of organisms of which the pneumococcus may be one.

From the preventive point of view it is important that numerous cases are on record where the *Bacillus coli communis*, or some variety of colon organism which is not capable at the present time of further differentiation, has given rise to undoubted epidemics, and that in these instances the pneumococcus, although searched for, has not been found. The pneumobacillus of Friedländer has been found alone in cases of pneumonia, and although it is true that this organism is most frequently found in cases of lobular pneumonia, it has been found in practically pure culture in the lungs in lobar pneumonia and has, at the same time, given rise to a generalized infection. The bacillus of influenza has been frequently mentioned as giving rise to pneumonia. The various pus organisms have also been discovered in cases of pneumonia, but they are as a rule secondary to some general blood ailment which has origin in a remote part of the body, or to some septic process in the respiratory tract. Another method of their introduction is the ingrafting of these organisms, which are practically ubiquitous, on a lesion commenced by the pneumococcus. The overwhelming presence of the pneumococcus in cases of lobar pneumonia is not observed in lobular pneumonia, and Netter found

that the organisms most frequently present in cases of lobular pneumonia were the pneumococcus, streptococcus, pneumobacillus, and the staphylococcus pyogenes. He concluded that they were each capable of giving rise to this type of the disease.

Diseases which are communicable are characterised at frequent or occasional intervals by epidemic prevalence, and this has been the case with pneumonia. The epidemics of this disease are apparently capable of a rough classification as follows: (1) Epidemics of a more or less anomalous type of illness in which pneumonia is a frequent complication; (2) Epidemics apparently dependent upon the *Bacillus coli communis*; (3) Epidemics occurring during excessive influenza prevalence; and (4) Outbreaks dependent upon the pneumococcus.

1. Numerous epidemics of so-called pneumonia have been recorded, particularly on the continent and less frequently in this country. In many instances the symptoms have suggested other illness than pneumonia. Thus, some have rather indicated enteric fever, from the association of diarrhoea and changes in the intestinal follicles; others cerebro-spinal meningitis, and one outbreak described as intermittent broncho-pneumonia, occurring in a marshy district and yielding to quinine, rather indicates a malarial condition. In more recent years two outbreaks of an anomalous illness, in which pneumonia was a frequent though not constant complication, were investigated by Dr. Bruce Low, in Northamptonshire in 1890, and in Laxfield, Sussex, in 1894. These were symptoms common to both, and possibly cerebro-spinal meningitis was the real cause. An outbreak of pneumonia in Flint was investigated by Dr. Reece in 1895, in which there was a suspicion that the disease might have been typhus fever. The interest which these cases have for persons engaged in public medicine is that fairly extensive outbreaks of disease of an infectious nature may occur in a district to which the diagnosis of pneumonia may be given, and that such an outbreak may have obtained rather a formidable hold before the unusual incidence of pneumonia becomes a striking feature, thus directing attention to the real nature of the malady present.

2. There have been some most interesting outbreaks investigated which have been said to be due to the *Bacillus coli communis*. The first of these was the pleuro-pneumonic fever in Middlesbrough and neighbourhood investigated by Dr. Ballard. There is practically no doubt that the actual cause of the disease was what Klein, who investigated the bacteriological conditions, termed the *Bacillus pneumoniae*, but which has more recently been recognized as a variety of the *Bacillus coli communis*. Klein definitely states that neither

Friedländer's bacillus, nor the *Bacillus pneumoniae* of Fraenkel and Weichselbaum was obtainable. Infected food and infection from individual to individual were considered to account for the epidemic.

This increase of 1888 was followed by one of greater degree in 1900. This was reported on by Dr. Dingle, the Medical Officer of Health, who observed that the outbreak of 1888 was sudden, and that the high rate of 1900 had been preceded for several years by high pneumonia rates. The infectious nature of the disease is illustrated by examples, and the origin was attributed to the *Bacillus coli communis*, in respect to which Dr. Dingle states: "There are many ways in which this bacillus may gain access to the air of Middlesbrough in considerable quantities." The bacteriological examination was conducted on this occasion by Dr. Foulerton, Medical Officer of Health for East Sussex, who states that none of the cases were of the nature of ordinary pneumococcal pneumonia. There was strong evidence that several of the cases had suffered from an infection by one and the same bacillus, and that this bacillus was identical with the *Bacillus coli communis*.

Associated with the Middlesbrough outbreak one naturally recalls the pneumonias reported in association with the various deaths from "food poisoning"; thus, in investigating the Welbeck cases more or less severe pneumonia was one of the conditions produced in animals by feeding or inoculating with the Welbeck poison material; also a man who died at Nottingham in 1881 from symptoms similar to those in the Welbeck outbreak, and which followed the ingestion of pork purchased at a shop in that town, suffered from pneumonia, whilst severe pneumonia was also an incident in the fatal case of food poisoning at Chester.

Secondary pneumonia referable to the *Bacillus coli communis* has been reported as following operative peritonitis, strangulated hernia, and other lesions of the intestines, and Dr. Foulerton informs me that at the Middlesex Hospital he has examined at least two cases of pneumonia after death in which he was unable to discover any other organism than the *Bacillus coli communis* to account for the condition.

Dr. Parsons investigated an outbreak of pneumonia, or pleuro-pneumonic fever at Scotter and certain associated villages during the year 1890. In Scotter 16 cases of pneumonia, with other illnesses suspected to be of the same nature, had in the course of three months occurred in a population of 700 to 800 persons; 12 proved fatal. A prevalence of pneumonia had also occurred in the same place in the spring of 1896. Outbreaks also occurred subsequently. Investigations were made by Dr. Klein, who found in the blood of mice that died after being fed on pneumonic sputum, a bacillus identical with

that found by him in the Middlesbrough cases reported on by Dr. Ballard. One point of interest in this outbreak was that the community of occupation would probably lead to occasional migrations to these villages from Middlesbrough, and in this way a specific disease might be introduced from the latter place.

3. The association of pneumonia with outbreaks of influenza has already been shown in the mortality returns which have been submitted, and it is within the recollection of most medical men that at the height of the influenza epidemic attacks of pneumonia were numerous and fatal, and instances of multiple attacks in houses were fairly common. In some instances the prevalence of pneumonia was so marked as to justify the medical men of the district terming it an epidemic, and two typical instances were those reported at Yeadon by Dr. Russell McLean, and Sheffield by Dr. Gwynne. In the former instance the *Bacillus influenzae* (Pfeiffer) was found in several cases. Instances of apparent direct infection are given in each case. I think if one had time to go through the records of the great towns that many others would be shown to have suffered from an excessive mortality about that time. I am not quite sure whether it has been established that the pneumonia is actually due to the influenza bacillus, or whether a patient suffering from influenza displays a lessened resistance to infection by the pneumococcus; this latter suggestion seems feasible and probable.

4. Notwithstanding the fact that the pneumococcus is so frequently discovered in the sputum of patients suffering from croupous pneumonia there seem to be very few records which would indicate that the type of pneumonia due to this particular infection is capable of any considerable extension. Where even minor epidemics have occurred they have been on a limited scale and localized to houses in a particular district, or have occurred among a group of individuals who pass a considerable part of their time in common, as in institutions, barracks, etc. An excellent example of this type with other interesting features is reported as having occurred in the Leavesden Asylum in 1901. These were briefly the circumstances: A male patient sickened with pneumonia in November, 1901; pneumococci were found in the sputum. In January, 1902, indefinite illness was reported among the members of the staff, the symptoms being those of ordinary catarrh; influenza was suspected. No influenza bacilli were discovered, but pneumococci were found in large numbers. This influenzal type of illness next appeared among the female attendants, who suffered more from cough than had the males, and in one instance a nurse developed typical apical pneumonia. Again the

expectoration of these cases swarmed with pneumococci. At the end of January six of the female patients developed illness in which cough, frothy sputum, and coarse crepitation at the bases of the lungs were the chief symptoms. Three cases of illness the next week showed patchy consolidation of the lung, and another suffered from true lobar pneumonia. In the following week there were 15 new cases of true lobar pneumonia, 12 of which proved fatal, and 5 other persons suffered from a short pyrexial illness, with pain in the back and bronchial catarrh. There were 13 women attacked the following week, 9 with true lobar pneumonia, of whom 4 died. During these weeks there were several attacks among the male patients, 6 of whom died from pneumonia. The epidemic subsided suddenly at the end of February. The apparent increase in the virulence of the infection and the sudden cessation which might have been due to exhaustion of the virulence are most interesting points in the outbreak, as also is the fact that there may be infection of the lungs or air passages sufficient to cause marked constitutional symptoms without the characteristic clinical signs of pneumonia being developed.

A consideration of the recorded outbreaks of pneumonia indicate that epidemics are far from common, and that it is against the endemic prevalence of the disease that preventive measures should be adopted. That type of pneumonia which is due to the *Bacillus coli communis* appears to have quite a local incidence, whilst the type due to the pneumococcus is generally distributed over the country. Instances of direct infection by the latter organism among persons who have been in contact with a patient are on record, but compared with the frequency of attacks the number does not seem to be considerable. Dr. H. Pye Smith records only three instances of direct infection out of 434 cases which were observed by him in his private and hospital practice, two being of children and one of a lady who sickened after nursing her husband who had recently convalesced. Direct infection from person to person is strongly suggested when members of a household are attacked, not simultaneously or nearly so, but more or less consecutively. Such a series of cases was reported by Dr. Callender in the *British Medical Journal* of 1904. A child suffered from what was considered to be a pneumococcal infection of the left antrum. Three days after the child came under medical treatment the father complained of feeling ill, and was found to be suffering from pneumonia, from which he died. He went to his office on the day he commenced to be ill, and there had an interview with a gentleman who three days later had a sharp rigor and passed through an indefinite illness, which terminated by crisis on the eighth day. A domestic servant who had

been in the sick room of the fatal case twice during the illness was invalided three days after with sore throat, dysphagia, prostration, and feverishness. She rapidly improved on the seventh day. A relative of the fatal case entered the sick room two days before death; she assisted the nurses and fell asleep on a couch at the foot of the bed. On the third day following she went home, was taken ill in the train, and died of acute pneumonia three days afterwards. If the cases were due to infection by the pneumococcus, the risks from an infection not necessarily derived from pneumonia are emphasized, and it makes a knowledge of the various pneumococcal lesions a matter of some importance; for although the pneumococcus most frequently causes a fibrinous pneumonia, and although such may be the only recognizable lesion of a systemic infection, it may cause such diverse conditions as peritonitis, pericarditis, endocarditis, salpingitis, otitis media, keratitis and other inflammatory conditions, and such may exist either in association with pneumonia, or as the only lesion, and without pneumonia.

The suggestion of suitable preventive measures in any case is rendered easier and more certain when the life-history of the organism against which they are directed has been well ascertained. The life-history of the pneumococcus has been carefully investigated during recent years, and the following points are the most important from the public health point of view. It has been found in the dust of different places, such as hospital wards, by several observers; but what is of greater import is the fact that the organism is found in the mouth and naso-pharynx of healthy individuals. The number of observations to this end is now so large as to place the fact beyond doubt, the percentage of successful searches ranging from 20 to 80. Among the latest of these observations is that of Professor His, who examined the saliva of 15 healthy persons and found typical pneumococci in 7, or 46.6 per cent. In the case of 7 of the remainder, repeated tests were made extending over weeks or months, and the pneumococcus was found once or more in six of these, which is equal to 85.7 per cent; the conclusion he arrives at being that practically every individual, at least once during the winter, when exposed to environmental conditions such as those existing in New York City, acts as the host at some time or other, and probably at repeated intervals, of organisms of the true pneumococcus type. Experiments conducted with the idea of ascertaining whether there is any difference between the virulence of organism discovered in the mouths of healthy persons and those isolated from cases of lobar pneumonia have been undertaken by Buerger for the New York State Board of Health. He

examined the organism found in the mouths of 38 healthy persons, and of these found that 30 were virulent and 8 avirulent, percentages of 79 and 21. Of the organisms taken from 13 cases of pneumonia, 10 were virulent and 3 avirulent, or percentages of 77 and 23. Apparently, therefore, there is the same proportion of virulent pneumococci among those discovered in the mouths of healthy persons as among those taken from pneumococcic sputum. The experiment is wanting to the extent that the test of the relative pathogenicity of these organisms is made on animals, and it is an open question whether such pathogenicity indicates in any way the degree of pathogenicity of the organism for man. Experimental variation of virulence has been attained by different observers, the late Dr. Washburn among others having shown that the passage of the organism through rabbits results in an extraordinary increase in its virulence for those animals; and in this respect it is interesting to compare the course of events at the Leavesden Asylum already referred to.

The persistence of the pneumococcus in the mouth of normal persons has also been worked out by Buerger, and he details among others the following interesting results. One case was examined eleven times during 19 days, with 6 positive results; another six times in the course of 12 days, 6 positive results being obtained; and in another instance seven examinations were made in the course of 22 days, with the result that on 5 occasions the pneumococcus was discovered. There are numerous other results of a similar nature, but these given are sufficient to emphasize the persistent association which the pneumococcus shows to some mouths. After an attack of pneumonia the pneumococcus was found in one instance 9 days after the crisis, and in other cases 11, 16, and 23 days after.

Observations on the viability of the organism show that it is easily killed by chemical and physical agencies, but it is rather in relation to natural conditions that we are interested. In this respect several observers have shown that it remains active for a considerable time in sputum, and Dr. Wood, who conducted observations on this point for the New York report, states that in moist sputum kept in the dark at room temperatures the average life of the pneumococcus is 11 days, and at 0° C., 35 days. In sputum at room temperature in a strong light it lives less than five days. In dried sputum in the dark the pneumococcus lives, on an average, 35 days; in diffused light, 30 days; in sunlight, less than four hours. In powdered sputum, even when kept in the dark, the organism dies in from one to four hours, and within an hour if exposed to sunlight. In sprayed sputum the cocci rarely survive more than one hour; they die in even less

time if the infected spray is exposed to sunlight: in such a case the destruction of the pneumococcus takes place in half an hour.

Having in view the fact that the pneumococcus has such an extended range, there must be some conditions which are powerfully operative in preventing attack, or some particular condition of the human body or peculiarity of the infecting organism which determines an attack. The presence of the bacilli in the mouths of normal individuals can obviously be regarded, as pointed out by His, from two different points of view: (a) The facility which it would offer for general dissemination, in which event preventive measures would assume very great importance; and (b) The possibility that the mouths of normal persons may be a common and permanent habitat of this organism, in much the same way that the *Bacillus coli communis* is a regular inhabitant of the intestinal tract, and under ordinary conditions gives rise to no symptoms; in this latter case the existence of the pneumococcus in healthy mouths assumes a diminishing importance. Which of these two conditions is to be regarded as the normal one is not yet decided. There is the possibility that varying degrees of virulence of the organism may have some influence in determining an attack, and Netter suggests that during March, April, and May the virulence of the pneumococcus increases. He arrived at this conclusion as a result of a weekly examination of the saliva of a patient who always showed pneumococci, and he observed a correspondence between the virulence and the death-rate. Other observers have suggested that during the winter months the pneumococcus has a wide distribution, and at that time a large number of healthy individuals harbour virulent pneumococci in their buccal cavity. These months precede those in which pneumonia is most prevalent. These do not appear to be very strong reasons to account for the absence of a more general infection resulting from an organism which has such a universal distribution, and the enquiry naturally follows: Is there any condition of the human body which helps to determine an attack? Two points are clear from the statistical returns, viz., that increased density of population is associated with an increase of pneumonia mortality, and that this increase is observed among both males and females. Although the mortality among females is higher in urban than in rural districts, it is invariably considerably lower than the male mortality in either district. This would seem to indicate that in urban districts the females are exposed to more frequent risks of infection than are females in rural districts, but that they are not exposed to the risk in the same degree as are the males in the respective districts. This difference in the death-rates of males and females is

not due to the greater fatality of the disease among males than among females. It is due entirely to the greater incidence of attacks on males. This is clearly shown by the following table prepared by Dr. Hector Mackenzie, who has divided the mortality among the cases treated at St. Thomas' Hospital and the series collected by Dr. Fox from different sources, into the rates observed at different age-periods among both males and females. It will be seen that at some age-periods the rate among females is higher than among males, notably from 10-30, 50-60, and 70 upwards. Between 30 and 40 the mortality is exactly the same.

RATE OF MORTALITY PER 100 CASES AT VARIOUS AGES FROM PNEUMONIA.

	0-	5-	10-	20-	30-	40-	50-	60-	70 upwards.
Persons ...	12·8	2·9	7·5	12·2	20·4	29·7	37·1	47·9	71
Males ...	—	—	6·5	11	20·4	31·6	36·6	48·6	69·8
Females ...	—	—	8·7	14·5	20·4	26·6	38·1	47	73

The chief differences between males and females in these urban districts are perhaps those relating to work and habits, and two considerations seem to be suggested which would result in an increased predisposition of the males to attack; they are, that dust—which has been shown to diminish the activity of the respiratory mucous membrane, and which is inhaled during many occupations—may facilitate the passage of the infection to the lower air vesicles; and secondly, that prolonged breathing of air vitiated by human emanations, in consequence of insufficient ventilation, may result in a diminished power of vitality, and therefore, resistance to this particular disease. These two factors will frequently be found acting in combination, and are probably contributory to the increased mortality. As to habits, although it may not be the only factor, the alcoholic tendency—which I believe is more prevalent among males than females, and in urban than rural communities—must result in an increased number of enfeebled constitutions, with the natural result, an increase in pneumonia mortality. Chills have been suggested as an exciting cause, and no doubt in many cases they have been so; the arguments which have been advanced being the evidence that the primary localization of the pneumococcus is in the lungs in the large percentage of cases, the frequency with which pneumonia has been observed to follow rapidly on a chill, and the limitation of the disease to a single lobe. Against this theory it is stated that the disease is not most

prevalent during the coldest months of the year, but during March, April, and May; but I question whether this is a sound objection, as during the latter months there would be probably more variability in the weather and hence more careless exposure to the risk of chill. Perhaps a more valid reason for the seasonal incidence of the disease, i.e., greater prevalence during the months of March, April, and May, is again to be found in lowered vitality. It seems probable that during the winter season, with its short days, long nights, and diminished outdoor exercise, a combination operating in conjunction with more pronounced vitiation of the air of homes and workshops, an organic depression and weakness is engendered, which will be at its worst at the end of winter and early spring. This suggests that the human body becomes vulnerable to attacks by the pneumococcus in much the same way that it does to attacks by the tubercle bacillus, viz., as a result of a created predisposition, to which indifference to house and workshop sanitation are most important factors.

In conclusion, I can only briefly indicate the general direction which preventive measures should take. They are as follows:—

The public should be educated to recognize the infectious nature of the disease, and to appreciate the fact that persons with impaired constitutions, whether the result of defective home hygiene, or pernicious habits, are those upon whom the pneumococcus can most readily exhibit its pathological effects.

The diffusion of knowledge as to how best to improve the physique of individuals, and the essentials of a healthy home—as is being attempted in the case of phthisis—can only result beneficially.

The ventilation of work-rooms and similar places subject to inspection is an essential of prime importance.

Dust not only harbours bacilli, but interferes with the efficient working of the respiratory tract if present in the air in excessive amount. Therefore, dustless streets and less dust-raising methods of scavenging should be aimed at, whilst every endeavour should be made to prevent dust reaching the respired air in occupations where such is produced.

Care should be exercised in the disposal of infected sputum and other discharges likely to contain pneumococci.

The hygiene of the sick-room, particularly with reference to the admission of sunlight and fresh air, is of great importance in this disease, having in mind the influence of both on the pneumococcus, and persons attending to patients suffering from pneumonia should be carefully instructed as to the precautions necessary to be taken to avoid becoming themselves infected.

The bacteriological examination of the sputum in all cases of pneumonia should be encouraged. It would also be an advantage if investigations were made as to the frequency of the pneumococcus in the mucopurulent secretions following common colds. At the present time the diagnosis of the various types of pneumonia is a matter of great difficulty, but the accumulation of knowledge resulting from these bacteriological examinations would help in the more ready recognition of the different infections, and at the same time would, I am sure, act as a direct stimulus to the formulation of schemes directed against the heavy mortality caused by one of the most fatal diseases to which the people of this country are subjected.

SODIUM CITRATE IN INFANT FEEDING.—Cotton (*Jour. A. M. A.*, Oct. 6, 1906) believes that sodium citrate is of much value in the feeding of infants through its inhibition of dense coagulation of cow's milk in the presence of an acid and rennin. He has found that infants will tolerate a larger proportion of the milk in the feeding mixture when citrated than of any other modification. His experience extends over 112 cases embracing nearly all conditions from simple dyspepsia to marasmus, and ranging in age from the new born to adults who have suffered from milk dyspepsia. He uses an aqueous solution containing from one to five grains to the drachm, and enough of this solution is added to the bottle immediately before feeding to represent one, two, or even three grains of the citrate to each ounce of the milk in the feeding mixture, according to the requirements. The feeding mixture may consist of varying dilutions of milk with water or gruels, with the addition of cane or milk sugar, with or without cream. No alkalies are added to the sodium citrate used, it being a neutral salt.

A most noticeable feature in this method of feeding is the large proportion of milk in the feeding that the infant will tolerate without evidences of gastric disturbance, or the appearance of any considerable amount of undigested casein in the stools.

In no case has the author seen any harm resulting from the use of the citrate, although at times the period of use was quite prolonged. The following shows the result of his experiments:—

1. Sodium citrate in .25 per cent or more retards, and in high percentages will inhibit coagulation.
2. The presence of HCl hastens coagulation.
3. Diluting milk generally retards coagulation.
4. Gruels appear to have little or no effect in retarding coagulation when the citrate is used.
5. The coagula of citrated milk are softer, smoother, and more jelly-like, or more flocculent, than those of milk not thus treated.

The author believes that the simplicity of this method furnishes an additional reason for its employment.

THE RESISTANCE OF SOME PATHOGENIC MICRO-ORGANISMS TO DRYING.*

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THE subject which I am about to introduce to your notice is one of great importance from the point of view of the public health. The powers of resistance to drying, under various conditions, possessed by different bacteria have an important bearing on the manner in which infectious diseases are disseminated. It is clear that if the specific organism of a disease is very quickly killed by drying, the share taken in the dissemination of the corresponding disease by dry dust and other fomites cannot be so great as it would be in the case of a disease caused by microbes offering great resistance to drying.

It has generally been accepted that certain organisms were very sensitive to the effects of desiccation, and on that ground it has been supposed that infection was not to be expected under circumstances which would deprive the organisms of the necessary moisture. On looking through the available experimental evidence, however, one is struck with the scarcity of well-established data, and many of the observations are incompletely recorded, so that it is difficult to establish a comparison between the observations of the different investigators. This may account, to some extent, for the want of agreement between these observers. In order to obtain comparable data Professor Delépine advised me to study systematically, and under well-determined conditions, the effects of drying upon a series of well-known pathogenic organisms.

The results will give some indication of the length of time during which infected materials may continue to be dangerous. They may also explain, to some extent, the relation between dry or damp buildings, sites, or climates, and the prevalence, or otherwise, of certain diseases.

Organisms Selected.

The organisms selected for these experiments were :—

Staphylococcus pyogenes aureus.	Bacillus diphtheriæ.
Bacillus coli communis.	Bacillus pestis.
Bacillus typhosus.	Spirillum cholerae.

* Read before the North-Western Branch of the Society of Medical Officers of Health. The investigation was carried out in the Public Health Laboratories of Manchester, and will be published *in extenso* in the forthcoming volume of the Archives of the Laboratories.

Source of the Organisms.

The *Bacillus pestis* was from a culture isolated by Professor Delépine from a case of plague which occurred in Manchester in 1905.

The *Spirillum cholerae* was from a culture obtained from Prussia in 1903. All the other organisms were from cultures recently isolated in the Public Health Laboratories of Manchester from typical Manchester cases, and were typical in every respect.

Materials Selected.

In the following experiments various materials were taken and infected with one of the organisms in the manner to be described presently. The materials selected were :—

Cotton wool.	Pine wood.	Glass.
Lime wood.	Plaster of Paris.	Paper.

And they were chosen as examples of materials which enter into the composition of most buildings or furniture. The cotton wool was formed into small swabs similar to those used in suspected cases of diphtheria. The two varieties of wood and the plaster were cut into small flat pieces about 5 mm. square. The paper (filter paper) was cut into pieces of the same size as the wood and plaster. In the case of glass, ordinary microscopical cover-glasses were used.

The materials were washed, sterilized, and thoroughly dried.

Infection of Materials.

To infect the materials they were soaked for one hour in a thick emulsion of the organism experimented upon. In the case of glass a small drop of the emulsion was placed in the centre of each cover-glass.

The emulsion was made by rubbing up the growth of four agar cultures in two cc. of peptone bouillon. (In the case of the *Bacillus diphtheriæ* serum cultures were used.)

All the cultures had been grown for three days at a temperature of 37° C.

The infected materials were placed in a single layer in Petri dishes, the lids of which were very slightly raised by means of thin bent pieces of wire, so as to enable the materials to dry quickly.

Conditions of Moisture or Dryness.

The infected materials were kept under three conditions :—

1. In a desiccator containing air dried by means of pure sulphuric acid.

Most of the moisture was abstracted from the materials by exhausting the desiccator of its air, and allowing a fresh supply of dry air to enter. This process was repeated two or three times, and the drying completed by the sulphuric acid inside the desiccator.

In the case of the cholera spirillum, an extra set of materials was dried in small tubes, as the air could be more rapidly removed from the latter and fresh dry air allowed to enter. The materials were thus dried very quickly.

2. In ordinary atmospheric air.

3. In air saturated with water vapour.

Temperature and Light.

All the infected materials were kept in a large cupboard in total darkness, and at a temperature varying between 16° C. and 18° C.

Testing Vitality of Organisms.

At certain intervals (longer or shorter according to the duration of life of the organism) a piece of each infected material was taken out, and tested as to its vitality. If a growth resulted, it was tested in various ways to make certain that it consisted of the particular organism experimented with.

RESULTS OF PRESENT EXPERIMENTS.

A brief summary of these is contained in the following Tables. In each case the figure given is the average of several experiments, and may be taken to indicate the resistance of the bacteria when they are surrounded by a small quantity only of organic matter, and are not exposed to the effects of decomposition occurring in the materials in which they are usually found.

TABLE I.—*STAPHYLOCOCCUS PYOGENES AUREUS*.

Material.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	130 days	122 days	38 days
Lime wood	126 "	126 "	140 "
Plaster	140 "	140 "	113 "
Glass	90 "	53 "	74 "
Pine wood	64 "	39 "	35 "
Paper	66 "	70 "	51 "

TABLE II.—*BACILLUS COLI COMMUNIS*.

Material.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	49 days	64 days	53 days
Lime wood	86 "	80 "	*168 "
Plaster	84.5 "	84 "	*168 "
Glass	60 "	32.5 "	98 "
Pine wood	22 "	14 "	78 "
Paper	21 "	7.5 "	47.5 "

* These two experiments were not concluded. There was no appreciable diminution of vitality after 168 days.

TABLE III.—*BACILLUS TYPHOSUS*.

Material.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	50 days	64 days	59 days
Lime wood	89 "	91 "	119 "
Plaster	83 "	91 "	101 "
Glass	44.5 "	12 "	38.5 "
Pine wood	38.5 "	9 "	12 "
Paper	13 "	5.3 "	10.5 "

TABLE IV.—*BACILLUS DIPHTHERIÆ*.

Material.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	88.5 days	24 days	17.5 days
Lime wood	77 "	41 "	75 "
Plaster	73 "	37.5 "	75 "
Glass	68 "	24 "	51.5 "
Pine wood	20 "	8.5 "	7 "
Paper	21 "	6 "	15 "

TABLE V.—*BACILLUS PESTIS*.

Material.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	22 days	11 days	36.3 days
Lime wood	6.5 "	2 "	2.6 "
Plaster	9.5 "	5 "	11 "
Glass	3.5 hours	2.3 "	13.5 "
Pine wood	3.5 days	—	1 hour
Paper	5 "	3.6 "	8.3 days

TABLE VI.—*SPIRILLUM CHOLERÆ*.

Material.	In Tubes.	In Desiccator.	In Air of Room.	In Moist Chamber.
Cotton wool	25 hour	2.5 hours	9 hours	14.5 days
Lime wood	1.5 "	2.5 "	8 "	19 "
Plaster	.5 "	3 "	8.5 "	17 "
Glass	.5 "	.5 "	1.75 "	8 "
Pine wood	1.5 "	1.5 "	7.5 "	1 "
Paper	1.5 "	1.75 "	5 "	5 "

These figures differ considerably in some cases from those of previous observers. For instance, in the case of the *Bacillus coli communis* Weisser states that bouillon cultures, when dried on cover-glasses, were dead after twenty-four hours. Heim says that when dried on threads they were living after six months.

In the case of the *Bacillus diphtheriæ*, one observer states that when dried over sulphuric acid they live only a few hours.

The greatest variety of results is to be found, however, in the case of the cholera spirillum. Kanthack and Stephens state that the organism lives 86 days on silk threads, and 120 days when dried on cover-glass; whilst Berckholtz says that the organism lives 186 days when dried. The results of most previous observers, however, agree fairly closely with the present ones.

GENERAL CONCLUSIONS.

1. It will be seen from the results of these experiments that there is a great difference between the various bacteria as regards their powers of resistance to desiccation. The great resistance of spores is well known. Of the non-sporing organisms used in these experiments the *Staphylococcus pyogenes aureus* is the most highly resistant to drying, whilst the *Spirillum cholerae* is least so.

Of the remaining four organisms, if the average duration of life, on all materials and under complete and partial drying, be taken, the *Bacillus coli communis* and the *Bacillus typhosus* are most highly resistant. Next in order come the *Bacillus diphtheriae* and the *Bacillus pestis*. The cholera spirillum cannot live in a condition of complete dryness.

2. Some organisms live longer in a moist, and others in a dry atmosphere. In the first class are the *Spirillum cholerae* and the *Bacillus coli communis*, which live very much longer, and the *Bacillus typhosus* and the *Bacillus pestis*, which live only slightly longer in a moist atmosphere than in a dry one. In the second class are the *Staphylococcus pyogenes aureus* and the *Bacillus diphtheriae*.

3. Speaking generally, the absolutely dry atmosphere of the desiccator is less harmful to the bacteria used in these experiments than the partially dry atmosphere of the room. This is possibly due, as suggested by some observers, to the quick drying of the outer portions of the individual bacilli, which would result in the formation of a complete protective coat for each organism. The cholera spirillum is an exception to this rule.

4. The material infected exerts a considerable influence on the powers of resistance to drying possessed by the different organisms; but this influence is not of the same kind on all bacteria nor under all conditions of dryness or moisture. On examining the Tables it will be found that the longest life was reached usually on plaster and lime wood. The single exception is in the case of the *Bacillus pestis*, which was very short-lived on lime wood, and this was the case in each of ten series of experiments. All the organisms were short-lived on paper. As would be expected from the fact that the emulsion is

unable to sink into glass, and would consequently dry rapidly, the organisms did not live very long on that material.

The effect of pine wood was variable, and especially so in the moist chamber, pointing to the fact that some constituent or constituents of the wood were capable of acting injuriously upon the organisms in the presence of moisture. In all cases this variety of wood exercised an adverse influence on the organisms, and this suggests the advisability, from a sanitary standpoint, of the use of pine wood, as far as possible, in such buildings as hospitals—and especially hospitals for infectious diseases.

5. Infection can persist in dry buildings, clothes, etc., for at least the following periods:—

<i>Staphylococcus pyogenes aureus</i>	..	for 140 days.
<i>Bacillus diphtheriae</i>	.. ..	114 ..
<i>Bacillus coli communis</i>	.. ..	92 ..
<i>Bacillus typhosus</i>	.. ..	91 ..
<i>Bacillus pestis</i>	.. ..	34 ..
<i>Spirillum cholerae</i>	.. ..	12 hours.

(These figures represent in each case the longest period during which the organism was found living on any material, in the desiccator or in the air of the room.)

In the case of certain organisms infection may persist for even longer periods if the buildings, etc., are damp:—

<i>Bacillus coli communis</i>	.. ..	for 168 days.
<i>Bacillus typhosus</i>	.. ..	119 ..
<i>Bacillus pestis</i>	.. ..	45 ..
<i>Spirillum cholerae</i>	.. ..	21 ..

APPENDIX.

Practical instances of infection by desiccated products:—

It is difficult to estimate accurately the part taken by dry products in the dissemination of disease. There can, however, be little doubt as to this mode of infection. The following are a few instances which have been put on record of lengthened persistence of the infectious property of dried products. They are not, however, given as having the value of absolutely demonstrated facts. Of the organisms used in these experiments I have only been able to find instances of probable infection by dried products in the case of two, viz. the *Bacillus diphtheriae* and the *Bacillus typhosus*. As regards *Staphylococcus pyogenes aureus*, infection of wounds by dry dressings and instruments used to be common.

Diphtheria.—Delépine gives the following particulars of an outbreak in Cheshire investigated by him. Two children, members of one family, contracted diphtheria, probably on the same date, from a third person. One child died on January 6th, and the other on January 10th, 1900. A third member of the family died from the disease on August 15th, 1902. There had been no case of diphtheria anywhere in the district for some considerable time previous to August, 1902. All the children of the family slept in two small rooms communicating through a small landing, and the three children who died all slept in the same room.

Delépine suggests that, in the absence of any other source of infection, the only probable explanation is that the rooms and their contents had become infected. Here, then, is a case which suggests that the bacillus had remained alive and virulent in infected materials for a period of 2 years and 7 months.

Carstairs, in the Newtown (Victoria) Health Report relates a case where father and son, both cornet players, developed diphtheria. Their instrument was put away, and was discovered, four years later, by a child, who commenced to play with it. Within a week the child contracted diphtheria. Previous to this there had been no case in the locality for eight months.

Typhoid Fever.—Instances in the case of typhoid fever are fairly numerous. Only one or two, however, will be given here.

Henrot (quoted in the *Lancet*, 1896, 1, 307) gives particulars of an epidemic of typhoid fever which occurred in two regiments of cavalry quartered at Rheims. During some manoeuvres the men rode over ground which had been manured with night soil. The weather was dry, and much dust was produced, which was inspired and swallowed by the troops. A bad smell was noticed at the time. Shortly afterwards the epidemic broke out among these men. The water supply was not to blame, as other people drinking from the same source were not affected.

In the *British Medical Journal* of November 10th, 1900, is an article on the outbreak of typhoid fever at Quetta, India. At this place the water supply is derived from the hills, and was above suspicion. There was, as usual, freedom from typhoid fever up to May, but from May 2nd to 13th there were dust storms. Sore throats and tonsillitis resulted, followed by an outbreak of typhoid fever, some of the cases commencing with sore throat. The night soil was placed in pits to the north-west, from which quarter the prevailing winds blew, and in the dry air the deposited matters were dried and blown

about as dust. Those companies suffered most who were nearest to the filth pits. The air coming from the direction of the pits contained "large numbers of germs that are invariably present in faecal matter, and not in pure air, although the enteric bacillus itself was not isolated." It appears from a subsequent article in the issue of September 14th, 1901, that the outbreak ceased on the removal of this source of infection.

The foregoing examples, which could easily be multiplied, will suffice to indicate the probable influence of desiccated products on the dissemination of disease.

DISCUSSION.

DR. COURTTS proposed a vote of thanks to the reader of the paper, and in introducing the discussion alluded to the results obtained in the desiccator which, in his opinion, were due to the rapid drying of the outer portion of the test material causing the formation of a protective coating. In the matter of enteric fever the results obtained by Major Firth when experimenting upon the vitality of the bacillus in soil agreed to a very large extent with the results obtained by Dr. Buckley in the case of plaster and lime wood. He did not know whether it was a coincidence or not, but he had frequently noticed outbreaks of diphtheria following east winds, and these outbreaks had usually taken place in back streets where the surface was unformed and in consequence pretty dirty. He put these outbreaks down to a scattering of diphtheria bacilli from infected soil in these back streets. He would like to have seen some experiments carried out more nearly in accordance with the conditions prevailing in ordinary practice, e.g., on wood polished with Ronuk or similar material, or painted.

DR. SERGEANT asked whether the wood used in the experiments was old or new, because particularly in the case of pine wood the virtue of the wood was lost after a certain time. In the matter of diphtheria, the experiments of Dr. Buckley were of value as emphasizing the necessity of thorough disinfection of walls, floors, furniture, etc., in schools, when they were closed for diphtheria. He was particularly interested in the account of the typhoid fever outbreak following the military manoeuvres.

The PRESIDENT alluded to the different kinds of paper used for school books, and expressed the opinion that some papers were much more likely to retain infective matter than others, and he would like to know from some bacteriologist which paper was most suitable on these grounds for school use. He had reached the same opinion as Dr. Courtts by a rather different method, that is, he had noticed that in Blackburn they had a small amount of diphtheria and a large amount of westerly winds, and he had often wondered whether there was any connection with these two.

DR. MARTIN alluded to the dangers of modelling material as used in schools, and also asked the reader of the paper if he had made any experiments as to the effect of direct sunlight on the vitality of the various bacilli.

DR. PILKINGTON did not agree with Dr. Courtts as to the east winds being the direct cause of diphtheria. If they were associated at all with

the distribution of the disease, he thought it was only indirectly; the diphtheria bacilli, in his opinion, were fostered on wet clayey soils for example, and it was only when an easterly wind came and dried the soil and distributed the bacilli that the outbreak occurred.

DR. A. E. THOMAS asked whether Dr. Buckley had done any inoculation experiments in order to test the vitality of the various bacilli used prior to making his experiments on their resistance to drying. The great number and great variety of these bacilli known even by the same name should certainly, in his opinion, lead first to what he might call a standardization of bacilli prior to experiments of this kind being carried out. Dr. Buckley's evidence was largely negative in its character, and did not altogether apply to conditions obtaining in practice. He had, for example, known cases where diphtheria bacilli had been retained for six months in the fauces. He would like to know whether Dr. Buckley had any experience as to the effect of metallic copper on the vitality of the various bacilli. It was supposed by many that it had a distinct germicidal value.

DR. BUCKLEY, in reply, stated that the long persistence of infection in many cases might possibly be due to the fact that a considerable amount of organic matter was mixed up with the bacilli being tested. He had used commercial spills for the pine wood experiments. In reply to Dr. Martin, he had not tested the effect of sunlight, because that would have been extending the enquiry in quite a different direction, and he believed other observers had already worked at that subject. No inoculation experiments had been made, but the greatest care had been taken to obtain organisms for the experiments, and for the control taken from absolutely the same source, and of the same age.

BACTERIA IN SCARLATINAL AND NORMAL THROATS.

IN view of the interest attaching to the rôle of the streptococcus in the causation of scarlet fever, the investigations of Ruediger (*Journal A.M.A.*, Oct. 13, 1906) are interesting.

Ruediger examined 154 cases, 51 normal throats, 75 cases of scarlatina, 14 of measles, 5 of tonsillitis, 5 of pneumonia, and 4 pharyngitis. He found streptococcus pyogenes constantly in great abundance on the tonsils of patients suffering from tonsillitis and scarlet fever before the inflammation of the throat has subsided. These organisms rapidly decrease in numbers with the subsidence of the throat symptoms.

Streptococcus pyogenes cannot be considered a normal inhabitant of all healthy throats, although it was found in small numbers in 58 per cent of the normal throats in this series. Pneumococci of low virulence were found in 135 of this series of 154 throats.

A large group of organisms which lies between the typical streptococcus pyogenes and pneumococcus was found in all normal throats, and in nearly all diseased throats. These organisms have very little virulence for rabbits, and as they are found in great abundance in practically all throats, they appear to be normal inhabitants of the throat.

Streptococcus pyogenes from normal throats appears to have a slightly greater virulence for rabbits than these organisms from scarlatinal throats.

A FURTHER EXPERIENCE OF THE TREATMENT OF SMALL-POX BY RED LIGHT.*

By HERBERT PECK, M.D., D.P.H.,

Medical Officer of Health, Borough and Rural District of Chesterfield;
Medical Adviser to the Chesterfield Joint and North Derbyshire Hospital Committees.

NO apology is necessary for bringing forward anything which is likely to diminish the mortality from small-pox, or to lessen the amount of permanent disfigurement.

I read a short paper on the subject before the Branch in December, 1903, when I gave the result of 85 cases treated under red light in the hospitals of the Chesterfield Joint and North Derbyshire Hospital Committees. The number treated since then in this manner is 159, bringing the total number of cases to 244. It was necessary in tabulating the figures relating to these to disregard the stages at which patients were admitted to hospital in order to allow of a fair comparison being made with other figures I submit.

Reference to the first of the accompanying tables will show the mortality in relation to the number of vaccination cicatrices, and also the character of the rashes and some other particulars. I think it well to mention that eleven of the patients without vaccination marks were vaccinated after exposure to the infection of small-pox, with the result that the attacks were mild and the rashes modified. The patient with five marks was revaccinated fifteen years before, and had only six modified pocks. The two who had eight marks were men who had been revaccinated twelve and seven years before, one of whom had an abortive rash, and the other four modified pocks. These three revaccinated patients had all slept with patients, and might have been overlooked but for that fact.

The epidemic throughout the country having been generally of a milder character than previous epidemics, figures for the same period in other localities are of more value for comparison than older figures. Therefore the second table compares the mortality in the hospital districts with the mortality during the same period in Derbyshire, Cheshire, Lancashire, Liverpool, and Manchester, showing it to be the lowest of them all, though only slightly below that of Liverpool. These localities were selected on account of their proximity and the probability that the cases occurring in them were of a similar type to

* Read at Meeting of the North-Western Branch of the Society of Medical Officers of Health, on 21st September, 1906.

those in the hospital districts. It is possible that some of the patients in them were treated in a similar manner, but I have not heard that such was the case.

TABLE I.
CHESTERFIELD JOINT AND NORTH DERBYSHIRE HOSPITAL COMMITTEES.

SMALL-POX PATIENTS TREATED UNDER RED LIGHT, 1902 to 1905.

Number of Vaccination Marks.	Age-Period.	Character of Rash.				Cases.	Deaths.	Mortality per cent.
		Scanty or very discrete.	Copious but discrete.	Copious to semi-confluent.	Confluent.			
None ...	Under 1	0	1	4	1	6	0	
	1 to 5	4	5	2	2	13	0	
	5 „ 15	16	10	4	8	38	1	
	15 „ 25	2	2	2	2	8	0	
	25 „ 45	2	1	5	3	11	1	
	45 and upwards.	0	0	0	0	0	0	
One ...	1 to 5	2	0	0	0	2	0	
	5 „ 15	1	0	1	0	2	0	
	15 „ 25	1	2	2	0	5	0	
	25 „ 45	8	4	3	4	19	1	
	45 and upwards.	1	3	2	1	7	0	
	1 to 5	1	1	0	0	2	0	
Two ...	5 „ 15	1	0	0	0	1	0	
	15 „ 25	5	2	1	1	9	0	
	25 „ 45	5	4	2	2	13	0	
	45 and upwards.	4	4	2	3	13	2	
	1 to 5	1	0	0	0	1	0	
	5 „ 15	0	0	0	0	0	0	
Three ...	15 „ 25	10	2	0	3	15	0	
	25 „ 45	13	17	2	4	36	0	
	45 and upwards.	3	3	0	0	6	0	
	1 to 5	1	0	0	0	1	0	
	5 „ 15	2	0	1	0	3	0	
	15 „ 25	4	1	0	0	5	0	
Four ...	25 „ 45	9	9	1	1	20	1	
	45 and upwards.	2	0	1	0	3	0	
	15 to 25	1	0	0	0	1	0	
	25 „ 45	1	0	0	0	1	0	
	45 and upwards.	1	0	0	0	1	0	
	25 to 45	2	0	0	0	2	0	
TOTALS	All ages	103	71	35	35	244	6	2'4

When the cases and deaths which occurred in the hospital districts are deducted from those of Derbyshire, the remainder shows a mortality of 6 per cent, or more than double that which obtained in the hospital districts.

The whole of the treatment in the majority of the cases consisted of placing the patients on admission in wards with windows glazed with ruby red glass, or with ordinary glass covered with the ruby paper used by photographers. They were kept in these until the rash had subsided, or the scabs had dried. It was rare for the pocks to become purulent when the patient was admitted at an early stage, even when the rash was confluent or promised to become so on the enlargement of the pocks from the formation of pus. This is attributable, I believe, to the fact that the micro-organisms responsible for the formation of pus do not thrive under red light, and that consequently there is little or none formed. It was interesting to see the check which took place on admission in the development of the rash in cases which promised hideous disfigurement, and the trifling marks which eventually

TABLE II.
SMALL-POX, 1902 to 1905.

	Cases.	Deaths.	Mortality per cent.
Derbyshire	...	23	4'4
Cheshire ...	528	34	6'4
Lancashire	2268	118	5'2
Liverpool ...	2322	63	2'7
Manchester	589	33	5'6
TOTALS	6234	271	4'3
Derbyshire without the Chesterfield Joint and North Derbyshire Hospital Districts	283	17	6'0
Chesterfield Joint and North Derbyshire Hospital Districts	244	6	2'4

resulted. Any other treatment was confined to that of complications, of which there were comparatively few. One patient, whose death is included among those mentioned above, really died of a progressive paralysis, for which he was under treatment when he contracted small-pox. His attack of small-pox was not severe. Another was that of an unvaccinated tramp, admitted in a condition bordering on delirium tremens, who was said to have taken no solid food for three weeks.

In conclusion, my experience of the treatment by red light has made me believe that under it the mortality is lessened, the suffering mitigated, and the permanent disfigurement diminished or avoided, while the average length of the period of detention in hospital is much reduced. Incidentally the cost of maintenance is smaller, for fewer trained nurses, medicines, and special diets are required.

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PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

GENERAL MEETING.

A GENERAL MEETING of the Incorporated Society of Medical Officers of Health was held at the Offices of the Society, No. 1, Upper Montague Street, Russell Square, London, W.C., on Friday, January 11th, 1907. Present: Dr. D. S. Davies (in the chair), Sir Shirley F. Murphy, Drs. R. Dudfield, A. Newsholme, A. Bostock Hill, H. Kenwood, H. Meredith Richards, J. Taylor, J. C. McVail, T. H. C. Stevenson, T. Evans, C. Sanders, H. Cooper Pattin, R. M. Craven, G. B. Millson, P. C. Smith, J. S. Tew, G. Newman, F. J. Allan, S. C. Lawrence, J. T. C. Nash, A. D. Cowburn, W. H. Symons, R. A. Dunn, W. A. Bond, F. Fremantle, R. W. C. Pierce, J. Groves, J. Wheatley, H. Jones, J. Priestley. Visitors: Messrs. F. H. Jones, T. Lloyd, T. Fisher.

The PRESIDENT having taken the chair, it was resolved unanimously that the minutes of the last meeting having been printed and published in the December number of PUBLIC HEALTH, be taken as read and be duly confirmed.

The Hon. Secretary read the following Report of Council:—

Report of Council.

Your Council report:—

1. That they have appointed Drs. R. Dudfield and H. Stott as delegates to act on the British Committee for the International Congress of Dairying to be held in September, 1907, at the Hague.
2. That they have appointed Dr. R. Dudfield to act as a member to sit on the Registration Committee of the Worshipful Company of Plumbers.
3. That they have received and adopted the following reports of Committees:—

Report of Finance Committee.

Your Finance Committee report:—

- (1) That they have elected as Chairman, Dr. Joseph Groves.
- (2) That they have appointed as a sub-committee to deal with the accounts submitted for payment the following members: Drs. Bryett, Reginald Dudfield, and W. A. Bond, together with the officers.
- (3) That they have considered a letter written by the Hon. Treasurer regarding the payment of first-class fares to representatives on the Council of the Society, together with a suggested scheme by the Hon. Treasurer for pro rata payments based on mileage, and have decided to recommend the Council to adopt the resolution that was passed at a Conference of Branch Representatives held in Birmingham on November 21st, 1906, to the following effect:—

“That the resolution of the Council dated April 6th, 1906, which was referred back by the Society, with regard to alteration of the financial arrangements of the Branches, be confirmed.”

- (4) That they have received and adopted the report of the Finance Sub-committee as follows:—

Your Finance Sub-committee report:—

- (a) That they have paid accounts amounting to £289 19s. 1d.
- (b) That they have passed for payment accounts amounting to £120 7s. 7d.
- (c) That the Bank Balance up to date is £95.
- (d) That subscriptions have been received since 30th June amounting to the sum of £507 1s. 9d.
- (5) That they recommend that formal notice be given to Messrs. Wright & Co., of Bristol, to terminate their contract with the Society for printing PUBLIC HEALTH.

General Purposes, Legal, and Parliamentary Committee.

Your General Purposes, Legal, and Parliamentary Committee report:—

- (1) That they have elected as Chairman, Dr. J. Mitchell Wilson.
- (2) That they recommend that a Sub-committee be appointed to consider the clauses of the Public Health Bill which is to be introduced, dealing with proposed new sanitary areas, and that such Sub-committee consist of Drs. Wheatley, Willoughby, Taylor, F. T. Bond, and Ashby, together with the Chairman of the Committees, Dr. J. M. Wilson and Dr. Herbert Jones.
- (3) That they have co-opted a new member of the Committee, Dr. H. W. Beach.
- (4) That they have referred the question of the hygienic supervision of schools (referred to them by the Council) to the Education Legislation Committee, with power to act.
- (5) That they recommend that the Local Government Board be asked to introduce into Parliament a Bill dealing with: (a) Security of tenure of office of medical officers of health; (b) Extension to the rest of the country of the requirement at present in force in London, that sanitary inspectors must be approved by examination before appointment; (c) The institution of special classes of inspectors to act as health inspectors, and for the inspection of food; (d) Extended powers to the Local Government Board to combine districts.

That the question of dealing with the recent offer of a Jubilee medal be left with the President, Sir Shirley Murphy, the Editor, and Hon. Secretaries.

4. That they have agreed to the following resolutions from Branches:

(a) *Home Counties*: “That the Medical Officer of Health is the person best qualified to organise and supervise the medical inspection of school children as required by the contemplated Education Act, and to be responsible for the sanitary condition of school buildings.”

5. That they have further considered the question of the payment of travelling expenses of Representatives when attending Council and Committee Meetings in London, and have decided to adhere to their former resolution, and do not, therefore, think it necessary to refer the matter to the Branches.

6. That the Chairman has ruled that by Article 45 of the Association the Management of the Association is vested in the Council, and that therefore, the report of the Council will only require to be received.

Resolved unanimously that the Report of the Council be received.

Elections.—The following candidates having been duly nominated and balloted for, the President declared them to be unanimously elected.

AS FELLOWS:

Alexander, F. W., L.R.C.P., M.R.C.S., D.P.H., The Nook, Hardy Road, Westcombe Park, Blackheath, London, S.E., M.O.H. Poplar Met. B.
Allison, John, M.D., F.R.C.S.E., D.P.H., Kettering, M.O.H.
Buchanan, Walter Isaac, M.B., C.M., Thirsk, Yorks, M.O.H. Thirsk R.D.
Case, Henry, L.R.C.P. and S.E., Withnell, M.O.H. Withnell U.D.
Cook, William Stuart, M.B., B.Sc., D.P.H., 2, Ardgowan Square, Greenock, M.O.H., Greenock Burgh.
Currie, James, M.A., M.B., C.M., High Hill, Lees, near Oldham, M.O.H.
Holt, Thomas, M.D., D.P.H., Burnley, M.O.H., Burnley C.B.
Kerr, Harold, M.B., D.P.H., Town Hall, Bury, Lancs., Assistant M.O.H.
Mackenzie, Duncan John, M.D., C.M., Glossop, M.O.H. Glossop Borough and R.D.

AS A MEMBER:

Thorpe, Winifred, M.B., B.S., D.P.H., Town Hall, Croydon.

Nominations.—The Hon. Secretary read a list of nominations for membership of the Society.

Presentation.—DR. ARTHUR NEWSHOLME, in presenting to the Society the portrait of Dr. Alfred Hill on behalf of the Midland Branch, said that he considered it a privilege to have been deputed to make the presentation, in the unavoidable and regretted absence of Dr. Reid. Dr. Hill rightly enjoyed the respect and gratitude of the members, both for the excellent work he had rendered to the Society and also for his services to public health during his long and successful career.

The PRESIDENT, on behalf of the Society, accepted the portrait with very great pleasure. Speaking personally, as well as on behalf of the members, he was glad that they had in their possession the portrait of one so well known in the public health service. He had always felt the greatest admiration for the able manner in which Public Health work was supervised and conducted in Birmingham, and felt sure that he was voicing the feelings of the members in congratulating Dr. Alfred Hill on attaining his great age and wishing him a long continuance of life, health, and happiness. (Applause.)

The President then delivered his Presidential Address.*

SIR SHIRLEY MURPHY in moving a cordial vote of thanks to the President said that he congratulated himself upon the fact that he was the senior Vice-President present, as it enabled him to express not only the thanks of the Society, but his own, for the admirable paper which had been read to them. They had listened to many interesting communications, but none would surpass and few equal the address delivered to them on the present occasion. He regretted that they could not now discuss the problems which had been so ably put before them, but hoped that an opportunity to do so would be afforded on some other occasion.

The motion having been seconded by Dr. J. C. McVAIL and supported by Dr. ARTHUR NEWSHOLME it was carried by acclamation.

The PRESIDENT in reply expressed his thanks for the kind manner in which they had received his address and said that if any of the suggestions it contained proved helpful to his brother medical officers of health he should be more than satisfied.

* The Presidential Address will be published in the March number of PUBLIC HEALTH.

THE ANNUAL DINNER.

THE Annual Dinner of the Society was held at the Holborn Restaurant, London, on Friday evening, January 11th. Dr. D. S. Davies, Medical Officer of Health of Bristol (President), occupied the chair.

The loyal toasts having been honoured,

DR. COLSTON WINTLE (Chairman of the Sanitary Committee of the Bristol Corporation) proposed "The Society of Medical Officers of Health." He said that all honour was due to the medical men who in 1856 laid the foundation of such an important organization; and it would be most interesting if they could have recorded the experiences of those gentlemen as to the advancement made in public health during the half-century that the Society had been in existence. They would then be able to form a fairly accurate opinion as to the value of the work of such a Society. He was pleased to hear that the progress of the Society had been steady and satisfactory, and that it had ten Branches and a membership of upwards of 1,000. It was also a matter for congratulation that the Society had taken a house of its own, and established a valuable Public Health library. It was a remarkable as well as a gratifying fact that practically every Medical Officer of Health was a Fellow of the Society. The Society was also proud of the fact that its journal was the oldest Public Health journal in existence. He could not help feeling that the members had a great and growing work before them, and he desired to congratulate the Society on its past work and progress. To be an efficient Public Health Officer it was necessary to be endowed with many virtues. The Medical Officer of Health, like the general of an army, must be a master in attack; he must also be an expert in defence; more than that, he must have one of the most priceless gifts of diplomatists, that of tact. The Committees with whom Medical Officers had to work were largely composed of laymen; this fact had, perhaps, from time to time brought them disappointments, as they could not be expected to have that knowledge of the laws of hygiene which they themselves possessed. It was the duty of Medical Officers of Health to educate not only their Committees but the public at large. The interchange of ideas through the medium of such a Society as this was bound to be of great benefit to the members, and add greatly to their practical knowledge. The Society had a most important public work to perform, and for that reason it gave him great pleasure to propose the toast entrusted to him. But there was to him an added pleasure, in that this year's President, Dr. Davies, was Medical Officer of Health of Bristol, from which city he (the speaker) came. Dr. Davies had been their Medical Officer now for twenty-one years. He (Dr. Wintle) had been intimately associated with their President for the past nine years, and could testify to his worth and work and to the masterly way in which his reports were presented. He had not had the pleasure of hearing Dr. Davies' Presidential Address that afternoon, but if it came up to the high standard of his reports to the Bristol Corporation, he ventured to think it would rank as one of the most historical addresses in the life of their Society. The work of Medical Officers of Health was a noble one, having for its highest ideal the lessening of mortality among their fellow men. It was, therefore, with great pleasure that he proposed the important toast which had been placed in his hands, and with which he associated, in addition to the name of the President, the names of Dr. Caldwell Smith, of the Metropolitan Branch; Dr. Meredith Richards, of the Home Counties; and Dr. Edmund Smith, as representing Yorkshire.

The PRESIDENT said he was extremely indebted to Dr. Wintle for the kind words he had spoken regarding himself. As Dr. Wintle had stated, Medical Officers of Health had to lead lay Committees, often anything but an easy task; but when the Medical Officer had the advantage, as he had had for some years, of having a medical gentleman on the Committee, the difficulties were in a great measure smoothed, because the medical member brought to bear special knowledge of, and sympathy with, the Public Health needs of the district. The work of a Medical Officer of Health grew more varied day by day, and very few people appreciated the extent of its ramifications. The Medical Officer of Health dealt not only with the prevention of diseases and nuisances, but with many matters in relation to the people, their homes, and their employment. His work, in its relation with port sanitary authorities, dealt with the distribution of disease over the whole world, and its importance, therefore, could not be over-rated. When plague—which for many years proved so terribly destructive in India—spread over many parts of the world, the possibility of its introduction into this country became only too imminent. In fact, upon several occasions it was introduced into many of our port districts, but by the careful and united action of the authorities it was never allowed to make any headway in England. In 1832, in 1849, and again in 1854 cholera played sad havoc in many towns in England; but when it was again introduced, somewhere in the year 1866, the progress of Public Health work had been so great that the disease was able to be effectively combated. The intimate knowledge which they were gaining year by year of the various diseases and of the general conditions which affected the public health was being more and more assiduously applied, and he thought they had every reason to congratulate themselves on the substantial progress that had attended their endeavours. But, although they had made real progress, they were not yet at the end of their work. A great deal remained to be done with regard to the medical aspects of education. Although the clause which dealt with this matter in the Education Bill now dead had not been placed on the Statute Book, they hoped it would not be long before some opportunity would be given to them of dealing effectively with the medical control of schools. Again, there was evidence that the urgent question of housing would in a very short time receive that attention which would place it, especially in regard to rural districts, upon a more satisfactory basis. It was to him a source of very great pride that he should have been the first Medical Officer from the West of England to occupy the presidential chair of the Society. He felt that the value of a Society of that kind could not be over estimated. It might be thought that there was no need to attend the meetings, and that it was quite sufficient to read the papers delivered before the Society when they were published in the journal. But a great deal of benefit was undoubtedly obtained by each member who attended the meetings. There they met medical men from far-distant districts, and by mutual discussion gained knowledge which in the end proved invaluable. At some of the meetings they also met representatives from Germany, France, America, and other countries, and by a comparison of the methods adopted abroad with those at home, knowledge was gained which could not fail to be of public service. There were a number of Branches in various districts of England, and just as a tree was known by its fruit so was a society known by its Branches. There were separate Branches at work in the north, south, east and west; they discussed the local conditions, and the work they did was most

interesting and useful and materially assisted the progress of knowledge in Public Health. It was, therefore, with great pleasure that he welcomed the association with the toast of the names of Dr. Caldwell Smith, Dr. Meredith Richards, and Dr. Edmund Smith. He again thanked them for the honour they had done him, and for the felicitous way in which they had received the toast.

DR. CALDWELL SMITH, responding for the Metropolitan Branch, recalled the fact that his immediate predecessor in Wandsworth read the first paper before the Society exactly fifty years ago, and said that he would have the pleasure of giving next month, half a century afterwards, an address on the same subject.

DR. MEREDITH RICHARDS briefly replied for the Home Counties. All he would like to have said on behalf of the Home Counties had been much better and more eloquently expressed by the President, and he therefore begged formally to thank them for the way in which they had received the toast.

DR. EDMUND SMITH responded for the Yorkshire Branch. They welcomed the presence that evening of Dr. Wintle, whose enthusiasm and energy in connection with the Bristol Sanitary Congress they all remembered, and they greatly appreciated the terms in which that gentleman had proposed the toast of their Society. He agreed with the President that they did not get equal benefit from merely reading the papers as they appeared in PUBLIC HEALTH. He attached great importance to the personal element and to the chats which they had with one another before and after the meetings. He thought the members made a great mistake in not taking more advantage of the meetings of the various Branches. The Yorkshire Branch was second to none in ardour and zeal, and their meetings, which were held in various parts of the county, were remarkably well attended. He never missed a meeting if he could help it, and he never went away from a meeting without feeling that it had been fully worth attending. He would like to add how highly they appreciated the services of medical practitioners like Dr. Wintle, who, in addition to their professional labours, took an active part in the public work of the districts in which they lived. The service which they rendered was probably greater than they knew.

The PRESIDENT then proposed the toast of "Kindred Societies." He said there was always a tendency when one belonged to a society to consider that that was the chief, if not the only, society in the world. The members of the Society of Medical Officers of Health, however, did not hold such an opinion; their minds were more attuned to the actual facts. There were in existence several other learned societies which were working, if not on exactly the same lines, at any rate on parallel lines with their own. The Epidemiological Society dealt with most important questions regarding the causation, distribution, and prevention of disease, very much as they did. The Royal Sanitary Institute dealt with questions affecting the public health in almost every aspect, and it had done during its long existence a very large amount of substantial good. The Royal Institute of Public Health was another society whose aims and objects were entirely in the interests of public health. He asked those present to join with him in drinking heartily to the success of these societies, and he had much pleasure in coupling with the toast the name of Professor Lane Notter, a distinguished scientist who was well known to them all for the deep interest he took in every question of public health.

PROFESSOR J. LANE NOTTER thanked them sincerely, on behalf of kindred societies, and in particular on behalf of the Royal Sanitary Institute, with which he was more closely associated. The work of Medical Officers of Health was, he said, so interwoven into the life and character of the whole community that the toast "Kindred Societies" really embraced a much larger number of bodies than those the President had enumerated. It was wide in its interest and wide in its scope, and those societies looked, and would in the future look more extensively, to the help of the Medical Officers of Health to guide them in their work of bringing the blessings of health to the community. There was no more satisfying sign of the times than the interest which was being taken in Public Health work by laymen generally. The Institute which he was more particularly interested in was doing admirable work in creating a class of trained inspectors for food inspection; this was really one of the most important subjects in Health work, and he hoped that, with the help of legislation, they would be able to improve the supplies and prevent the importation into this country of food unfit for human consumption.

SIR SHIRLEY MURPHY, in submitting the toast of "The Visitors," said they had with them that evening a number of distinguished gentlemen who came within this category. First, there was Dr. Colston Wintle, Chairman of the Sanitary Committee of the Bristol Corporation. It was of the utmost importance that a medical man who became a member of a Sanitary Committee and rose, as he very naturally did, to be chairman of that Committee, should be in sympathy with the Medical Officer of Health. His influence was enormous; he could do more harm, and equally more good, than a member of any other profession who was elected to serve the ratepayers. The presence of Dr. Wintle that evening was a manifestation of the excellent feeling that existed between him and the Medical Officer of Health. Next, they had the honour of the company of Dr. Dawson Williams, an old friend who commanded enormous influence in his profession and outside, and who had always been a warm supporter of Medical Officers of Health. They had also with them the Rev. Frank Jones, who was known to them in London as the librarian of the Dr. Williams Library. His presence was of peculiar interest, because they were collecting a library which, although it might not rival the Dr. Williams Library, they believed would serve a very useful purpose, and would, they hoped, be arranged on the same basis as the Dr. Williams Library. They were also favoured with the presence of Dr. Whitelegge and Dr. Tatham, Medical Officers of Health, who had been called from among their number to occupy important positions under the State. There were no two guests whose welcome was more sincere. For, as Medical Officers of Health, they knew how very much they were dependent on the efficiency of the work of Dr. Whitelegge and Dr. Tatham for progress in their own. Then they had with them Mr. J. Yabbicom, City Engineer of Bristol and a colleague of their President. The relations between the Chief Engineer and the Medical Officer of Health in a great city were of the utmost importance in determining the success of many of the operations of the Medical Officer, and it was, therefore, gratifying to see this cordial relationship existing in the case of Bristol. He was convinced that he was voicing the feelings of the members in extending to the visitors a most cordial welcome.

MR. J. YABBICOM, C.E., in replying, said he was extremely proud of the opportunity of supporting the President on this occasion, for he

strongly believed in the importance of the various departments of a Corporation working in harmony one with the other; and the departments of the Medical Officer of Health and the City Engineer were so intimately connected that they should always work together.

Dr. WHITELEGGE, C.B., proposed the toast of "The Press." He said that those of them who had to address public bodies and committees found it necessary occasionally to secure a wider audience through the medium of the Press, and they were happy in the knowledge that when any real necessity arose the Press never failed them in extending the courtesy of its columns. When the time came for any important question of public health to be brought adequately before the public it was to the Press they had to look, and they were glad to know that the Press of this country was with them in their work. That was true of the great daily Press which had been represented that evening. It was true to an even greater extent of the Public Health Press, which was more immediately associated with them; and it was true of the great Medical Press, of which his friend Dr. Dawson Williams was the representative. Dr. Williams conducted the great medical journal under his control to the enormous advantage of medical interests generally, and in coupling his name with the toast, he could assure him that they recognized how great was the service which an enlightened and competent Press could render to the country.

Dr. DAWSON WILLIAMS, in replying, said he thought the Press as a whole, and particularly the Medical Press, had a grievance against the Medical Officer of Health. He could remember the time when it was the Medical Press that shocked the public, and made its flesh creep; but nowadays the Medical Officer of Health performed that function. But, in spite of this, the Press had to thank the Medical Officer of Health for being its guide in many difficult questions, and in supplying a great deal of interesting reading. In recent times the general Press had given a great deal more enlightened attention to Public Health questions. This was primarily due, in his opinion, not so much to the Medical Press as to the able reports drawn up by the sanitary staffs of the great municipalities, which the provincial Press published with remarkable public spirit. He regretted that this was not so in London. They might take up London newspapers, and hardly find any space given to Public Health matters.

During the evening an attractive selection of music was gone through under the direction of Mr. Herbert Schartau, assisted by Miss Esmé Atherden, Miss Esther Franklin, Mr. Frederic Lake, Mr. Charles Pond, and Mr. Fred Rome.

North-Western Branch.—An ordinary meeting of the above Branch was held at the Chemical Club, Victoria Hotel, Manchester, on December 14th, 1906. Present: Dr. A. Greenwood, President (in the Chair); Drs. Garstang, Wheatley, Barlow, Holt, Hamilton, Buckley, Kerr, Hulbert, Buchan, Wilkinson, Moir, Sergeant, Martin, Berry, M. Young, and Dr. Millson Rhodes as a visitor. Letters of apology for absence were read from Dr. Kenneth Fraser, A. E. Thomas, and W. Deans.

Mr. Arthur Fielding, member of the Chemical Club, submitted specimens of a new style of bookcloth provided by the makers: The Winterbottom Bookcloth Co. Mr. Fielding gave as his reason for bringing this product to the attention of the Association that its use afforded greater safety against the cultivation and distribution of disease germs, notably in relation to the books of free libraries. The ordinary bookcloth owes its

beauty of finish to the starch, mineral matter, tallow, bone, fat, etc., with which the dyed fabric is treated; its close surface thus produced being largely composed of such starch and other material enmeshed in the open texture of the original cloth base—such filling being more or less unstable, and therefore unreliable. The new material, on the contrary, consists of a cloth filled with a preparation of cellulose material, the subsequent treatment of which involves “boiling” in various liquids from ten to twenty times, during which numerous boiling operations the texture remains intact. The finished cloth is practically unaffected by handling, dust, or damp, and any traces of dirt on the bound volume can at any time be removed by means of a cloth damped in some disinfecting liquid. Mr. Fielding demonstrated the salient differences of the two types of cloth by immersing specimens of each in hot water—the starch-filled cloth came out of the test as a rag; the new material came out untouched except for the adhering water which, when removed, would leave the new cloth as bright and perfect in appearance as before its submission to the bath.

The Honorary Secretary read a letter from Professor Delépine relating to the subject of bookbinding and disinfection, and enclosing two books which had been specially bound for Professor Delépine, india-rubber solution being used in the place of glue or paste. Although the books had been twice sterilized by steam they were practically none the worse for it.

It was resolved that a hearty vote of thanks be accorded to Mr. Fielding, Mr. Bishop, and Professor Delépine, for the trouble they had been to in connection with the demonstration.

The Secretary reported a suggested alteration in the programme for February, under which Dr. Dearden will postpone his paper until the May meeting, and at the February meeting papers would be read by Sir W. J. Sinclair, and Dr. Hanna, of Liverpool. It was resolved that the arrangements made by the Honorary Secretary be confirmed and adopted.

Dr. Garstang reported the result of the Conference of Branch Representatives held at Birmingham on November 21st. Resolutions Nos. 1, 2, 3, and 4 were individually proposed and seconded, and unanimously approved by the Branch. It was resolved that a copy of resolution No. 4 be forwarded to the Central Council. In reference to paragraph 41 of the by-laws relative to the appointment of Treasurer and Honorary Secretaries of the Society, it was resolved that, in the opinion of this Branch, there should be no restriction upon the election of Treasurer and Secretaries. It was resolved that this Branch urge upon the Council of the Society the desirability of making some arrangement by which the present delay which took place in the commencement of work by the Council should be avoided. It was resolved that the Honorary Secretary of this Branch write to the Honorary Secretaries of the Society and ask what action had been taken with a resolution passed by this Branch some time ago, recording their opinion that the management of the Association should be vested in the Council, which resolution had been duly forwarded for consideration by the Central Society.

The discussion on “The Relation of Poor Law Medical Relief to the Public Health Service” was then resumed by the following speakers: Dr. W. Berry, Dr. Millson Rhodes, Dr. Sergeant, Dr. Niven, Dr. Buchan, Dr. Martin, Dr. Barlow, Dr. Wheatley, and the President. No resolution was arrived at.

It was resolved that Dr. A. W. Martin be asked to be kind enough to postpone the reading of his paper to an early meeting of the Society.

Southern Branch.—A Meeting of this Branch was held at Portsmouth, January 4th, 1907. There were present Drs. Stott (President), Fraser, Groves, Willoughby, and Griffith, with Major F. Smith, D.S.O., R.A.M.C., as visitor.

The President and Dr. Willoughby reported that they had attended as delegates of the Branch at a Conference of Branch representatives held at Birmingham, where certain resolutions were passed relating to the Articles of Association of the Society.

After discussion the following resolutions were passed:—

1. That the resolution of the Council, which was approved of by the Society, with regard to representation of the Branches upon the Council be confirmed.

2. That the resolution of the Council, which was referred back by the Society, with regard to alteration of the financial arrangements of the Branches, be confirmed. This resolution is as follows:—

“The Treasurer of the Association shall pay in every year, on or before the last day of June, to the Treasurer of each of the Branches for branch expenses, the sum of not less than two shillings and sixpence in respect of every member of a Branch whose annual subscription for the current year shall have been paid to the Treasurer of the Association, and may, by special resolution of the Council, pay travelling expenses of Branch Representatives on the Council of the Society, when attending Council Meetings or Meetings of Committees of the Council.”

3. That in case of arrears of members' subscriptions being paid, the proper proportion be paid to each Branch, i.e., there should be payment of 2s. 6d. for each annual subscription received.

4. That this Branch respectfully asks that the Council do take such steps as to put these resolutions into force as soon as possible.

After lunching together, members drove to Haslar Hospital, where they were received by Fleet-Surgeon P. W. Bassett-Smith, R.N., in the laboratory, where he gave a demonstration of specimens of malaria, filaria, trypanosomes, spirachetes, etc. A visit was then made to the museum, X-ray rooms, and library; and the members were entertained to tea.

DR. LESLIE KINGSFORD has been appointed Assistant to the Liverpool Medical Officer of Health, at a salary of £250 per annum, subject to a contribution of £3 per cent to the superannuation fund and £2 per cent for life assurance.

THE Sheffield City Council has increased the salary of their Medical Officer of Health, Dr. Harold Scurfield, from £700 to £800 per annum.

DR. GAFFIKIN, of Huddersfield, has been appointed Assistant Medical Officer of Health of Warrington, at a salary of £125 a year.

A CREWE butcher was recently fined, with costs, £25, for preparing for sale the carcasses of two cows alleged to be tuberculous. The purchase-price of the beasts was admitted to be only 45s. and 50s., and the defendant said that “he killed stuff of this class regularly for a neighbouring city.”

VITAL STATISTICS FOR 1906.

(COMPILED BY REGINALD DUDFIELD, M.A., M.B.,

With the kind assistance of the Medical Officers of Health of the Districts included in the returns.)

IN this issue is given the first series of tables compiled from the returns received from Medical Officers of Health in response to our circular letter of November last. We desire to take this opportunity of expressing our indebtedness to those gentlemen who have responded to that appeal, often, we fear, at considerable personal inconvenience.

Every care has been taken to make the returns comparable, i.e., extracted on the same system; and nearly every rate has been calculated by the arithmometer. Much valuable material remains to be extracted from the returns which time has not permitted us to extract for the present issue. The tables here given will, it is believed, be both interesting and useful to our readers.

The most striking feature of the statistics contained in the three tables is the diversity in the birth-rate, which ranged from 16·7 in Torquay to 38·4 in Wallsend. In fifteen towns the rate was below 20 per 1,000. Making every allowance for the unsuitability of a rate based on the total population as a test of fertility, the frequency of low rates among the towns included in our tables is, we think, a matter demanding serious consideration.

The corrected death-rate ranged from 8·7 in Hornsey to 23·8 in Longton. A few words on our use of the term "corrected death-rate" is perhaps necessary. In the circular the numbers of deaths, uncorrected and corrected, were asked for. By the former was meant the deaths as registered in the district, by the latter the number obtained by deducting the deaths of non-residents and including those of residents recorded outside the district. The more common use of the factor for sex-age correction has evidently led many of our correspondents to conclude that the "corrected death-rate" included in our letter meant the rate obtained by the use of the above-mentioned factor. For the sake of uniformity, and to ensure a complete understanding of the values of the different rates, it appears desirable that the different rates should in future be described as:—

1. *Gross rate*, based on the number of deaths registered in the district (gross total);

2. *Nett rate*, based on the figure (nett total) obtained by deducting the deaths of non-residents and including those of residents recorded in out-lying districts; and

3. *Corrected rate*, obtained by multiplying the latter rate by the sex-age factor.

The use of these terms would probably prevent the confusion at present arising from the use of the word "corrected" in two different senses.

The lowest infantile mortality rate (74) was recorded in Winchester and the highest (234) in Longton. In the absence of earlier data for the towns included in these tables, it is profitless to say more than that the rates as a whole appear to be lower than usual.

TABLE I.

Population—Births—Notifications.

Township	Estimated Population 1906	Births			Cases Notified					
		Total Registered	Rate	Illegitimate Births	Small-pox	Scarlet Fever	Diphtheria and Membranous Croup	Enteric & Con- tinued Fevers	Puerperal Fever	Erysipelas
ENGLAND & WALES:										
Great Towns.										
London* ...	4,721,217	125,651	26·6	?	31	20,514	8,048	1,610	298	5,019
Birmingham ...	548,022	16,016	29·2	401	—	1,814	817	191	28	589
Blackburn ...	133,583	3,418	25·6	134	—	849	166	82	12	112
Bolton ...	180,502	4,599	25·5	186	—	630	84	197	9	123
Bootle ...	68,000	2,171	31·9	35	—	338	74	40	6	38
Bradford† ...	288,544	5,937	20·6	258	2	1,047	482	237	12	224
Brighton ...	128,095	2,853	22·3	171	—	225	230	22	9	100
Bristol ...	363,223	9,372	25·8	326	32	1,019	839	120	37	239
Burnley ...	102,914	2,838	27·6	167	—	262	80	64	10	149
Burton-on-Trent ...	52,922	1,282	24·2	46	—	209	24	15	6	71
Bury ...	58,744	1,336	22·7	50	1	90	35	36	11	42
Cardiff ...	183,823	5,001	27·2	172	2	776	333	78	17	117
Coventry ...	83,900	2,348	28·0	46	—	312	59	12	8	59
Croydon‡ ...	151,011	3,886	25·7	196	4	425	304	34	9	68
Derby ...	123,981	3,103	25·0	149	—	290	565	70	11	113
East Ham ...	129,886	3,656	28·1	75	—	790	249	39	6	146
Great Yarmouth ...	52,613	1,422	27·0	83	3	148	67	48	6	39
Halifax ...	108,000	2,070	19·2	99	—	214	158	38	7	56
Hornsey ...	86,877	1,604	18·5	27	—	411	157	25	1	37
Huddersfield ...	94,862	2,301	24·2	?	—	321	64	75	8	41
Hull ...	262,426	7,778	29·6	?	27	528	1,257	269	23	234
Ipswich ...	71,809	1,889	26·3	?	—	119	78	36	3	53
King's Norton ...	72,608	2,158	29·7	84	—	226	40	11	2	69
Leeds§ ...	463,495	12,093	26·1	?	2	1,029	673	305	30	381
Leicester ...	232,111	5,865	25·3	221	1	2,301	315	67	10	158
Liverpool|| ...	739,180	24,122	32·6	?	18	2,959	910	502	88	1,014
Manchester... ..	637,520	18,466	29·0	654	5	3,267	650	433	105	397
Newport (Mon.) ...	74,227	2,407	32·4	69	3	264	170	38	5	33
Northampton ...	91,640	1,985	21·7	63	—	276	28	34	2	71
Norwich ...	117,958	3,070	26·0	125	—	735	190	87	7	69
Nottingham ...	254,567	6,759	26·5	404	—	608	569	287	14	220
Portsmouth ...	205,118	5,870	28·6	?	1	387	432	156	13	121
Preston ...	116,399	3,317	28·5	168	3	474	71	156	4	69
Reading ...	79,559	1,881	23·6	63	—	207	342	21	5	65
Rhondda ...	127,684	4,751	37·2	101	—	362	194	126	18	79
Rotherham** ...	61,500	1,941	31·6	86	—	657	66	67	1	71
St. Helens†† ...	91,153	3,091	33·9	70	—	190	170	91	5	85

* The figures for London have been obtained from the weekly returns issued by the Registrar General and the Metropolitan Asylums Board.

† Notifications of Anthrax 9 † Notifications of Phthisis 96
 § " Phthisis 720 || " " 1,919
 ** " " 54 †† " " 86

TABLE I.

Population—Births—Notifications.

Township	Estimated Population 1906	Births			Cases Notified						
		Total Registered	Rate	Illegitimate Births	Small-pox	Scarlet Fever	Diphtheria and Membranous Croup	Enteric & Con- tinued Fevers	Puerperal Fever	Erysipelas	
ENGLAND & WALES:											
Great Towns.											
Sheffield ...	447,951	13,420	29.9	569	1	4,905	677	392	52	395	
Smethwick ...	65,000	2,027	31.2	34	—	275	129	36	6	54	
Southampton ...	117,312	2,913	24.8	81	—	68	263	15	8	56	
South Shields ...	111,402	3,531	31.7	118	1	217	168	54	1	104	
Stockport ...	99,646	2,686	26.9	78	—	152	40	47	5	41	
Stockton-on-Tees ...	52,664	1,785	33.9	65	1*	140	50	52	1	36	
Sunderland...	154,251	5,375	34.8	?	—	283	231	141	7	106	
Swansea ...	100,690	3,212	31.9	94	—	348	115	63	6	44	
Tottenham ...	130,444	3,674	28.2	61	—	459	122	63	6	92	
Wallasey ...	62,000	1,716	27.7	53	—	266	58	65	2	28	
Warrington...	69,816	2,248	32.2	80	1	64	28	43	8	68	
West Bromwich	68,470	2,171	31.7	?	—	162	18	42	3	115	
West Ham ...	301,617	9,193	30.5	148	—	1,703	668	375	18	230	
Wigan ...	89,342	2,920	32.7	144	—	257	49	137	9	86	
Willesden ...	141,714	4,267	30.1	125	—	637	286	47	9	103	
Wolverhampton	100,867	2,761	27.4	?	—	535	101	49	13	83	
York ...	83,467	2,216	26.5	114	—	217	104	79	5	34	
Smaller Towns.											
Acton ...	53,000	1,543	29.1	39	—	173	46	13	3	35	
Aldershot ...	33,600	1,117	33.2	19	—	58	63	7	3	16	
Bath ...	50,000	929	18.6	40	2	83	36	13	2	30	
Blackpool ...	57,115	1,023	17.9	65	9	183	54	39	2	18	
Brighouse ...	22,196	460	20.7	?	—	68	12	9	1	15	
Cambridge ...	39,731	791	19.9	40	—	101	31	4	1	27	
Chatham ...	41,594	1,107	26.6	60	—	202	29	51	—	22	
Cheltenham ...	51,000	975	19.1	48	1	103	61	24	6	37	
Chesterfield...	29,190	830	28.4	51	—	63	19	19	3	39	
Chiswick ...	33,873	852	25.1	?	—	121	28	8	—	48	
Chorley ...	29,500	791	26.8	30	—	24	14	8	1	13	
Colchester †	40,540	969	23.9	33	—	37	29	12	—	51	
Coseley ...	22,250	773	34.7	?	—	159	17	25	2	17	
Darwen ...	41,164	811	19.7	28	—	50	18	17	4	17	
Dewsbury ...	27,255	639	23.4	35	—	48	24	22	2	10	
Eastbourne...	49,000	892	18.2	39	—	148	19	8	1	32	
Eccles ...	38,500	1,010	26.2	32	—	208	29	22	1	9	
Edmonton ...	56,818	1,881	33.1	95	—	383	93	25	5	78	

* "Suspected."

† Notifications of Phthisis 45

TABLE I.

Population—Births—Notifications.

Township	Estimated Population 1906	Births			Cases Notified						
		Total Registered	Rate	Illegitimate Births	Small-pox	Scarlet Fever	Diphtheria and Membranous Croup	Enteric & Con- tinued Fevers	Puerperal Fever	Erysipelas	
ENGLAND & WALES:											
Smaller Towns.											
Felling	25,600	884	34.5	25	—	95	40	13	4	27	
Finchley	30,750	773	25.1	20	—	128	30	11	3	18	
Folkestone	35,500	675	19.0	18	—	49	37	11	2	14	
Gloucester	51,867	1,455	28.0	65	—	61	55	16	3	31	
Gorton	33,000	1,102	33.4	21	—	198	30	41	1	21	
Gosport & Alverstoke	30,500	917	30.1	25	—	42	5	20	4	15	
Hebburn	23,336	814	34.9	34	—	163	12	14	—	31	
Hindley	25,625	820	32.0	37	—	76	25	31	2	25	
Hove	41,040	674	16.4	21	—	39	27	15	1	9	
Hyde	34,023	781	22.9	20	—	344	24	18	1	57	
Ilford	65,165	1,696	26.0	?	—	326	132	35	3	52	
Keighley	44,502	943	21.2	43	—	174	73	5	4	25	
Lincoln	52,611	1,410	26.8	?	—	137	278	22	1	33	
Longton	35,437	1,339	37.8	99	—	150	57	32	2	26	
Luton	39,000	1,098	28.1	40	—	180	104	9	—	52	
Mansfield	29,000	948	32.7	?	1	171	27	102	1	45	
Middleton	27,000	565	29.9	16	13	81	14	4	5	15	
Oldbury	27,000	984	36.4	38	—	60	6	26	3	27	
Oxford	51,226	1,092	21.3	58	—	314	37	3	4	59	
Poole	32,000	961	32.0	25	—	27	33	27	—	19	
Reigate	27,880	549	19.7	?	—	81	62	2	1	8	
Richmond (Surrey)	34,358	636	18.5	25	—	59	16	8	1	10	
Salisbury	21,495	466	21.7	10	—	35	11	6	1	4	
Scarborough	40,670	774	19.0	61	—	28	18	14	1	33	
Shrewsbury	29,288	678	23.1	?	—	33	47	10	1	10	
Southend-on-Sea ...	50,300	1,095	21.8	24	—	193	71	19	4	24	
Stalybridge... ..	28,778	698	24.2	32	3	31	12	11	3	19	
Taunton	21,778	489	22.4	?	—	50	12	1	—	13	
Torquay	33,950	566	16.7	25	—	34	2	11	—	2	
Tunbridge Wells ...	34,973	676	19.3	33	—	78	10	21	2	14	
Wakefield	42,978	1,000	23.3	60	2	195	33	14	6	30	
Wallsend	25,000	959	38.4	15	—	97	54	11	—	24	
Wimbledon... ..	49,760	1,185	23.8	53	—	229	55	11	1	32	
Winchester... ..	22,978	471	20.5	24	—	17	34	5	1	9	
SCOTLAND:											
Dundee	165,007	4,524	27.4	373	13	739	183	78	4	209	
Edinburgh	341,240	7,649	22.4	607	—	987	667	145	11	337	
Glasgow	835,625	24,559	29.4	1,725	3	1,382	1,270	393	119	1,265	

TABLE II.
Deaths, all and Selected Causes.

Township	All Causes All Ages		Corrected Numbers of Deaths (persons all ages) from														
	Uncor- rected	Cor- rected	Under 1 year	Small-pox	Measles	Scarlet Fever	Whooping Cough	Diphtheria	Enteric Fever	Diarrhoea	Erysipelas	Puerperal Fever	Phthisis	Other Tubercular Diseases	Cancer	Premature Birth	Respiratory Diseases
ENGLAND & WALES :																	
Great Towns.																	
London *	73,952	?	16,660	—	1,918,533	1,239	704	277	4,507	245	187	6,969	2,631	4,945	2,316	12,901	
Birmingham	9,068	9,158	2,686	—	227,533	251	93	40	857	23	18	671	212	458	323	1,706	
Blackburn	2,263	2,193	533	—	63,333	17	26	14	171	9	5	124	78	108	72	366	
Bolton	2,551	2,794	636	—	2,172	20	24	40	208	3	1	202	101	114	98	492	
Bootle...	1,039	1,177	310	—	44,143	30	11	7	83	—	2	86	23	54	38	248	
Bradford	4,617	4,650	903	—	127,422	38	62	52	267	9	10	377	117	281	142	726	
Brighton	1,887	1,850	316	—	28,222	22	13	3	68	5	2	182	75	163	56	274	
Bristol	5,299	5,196	1,196	—	140,271	102	82	21	213	7	14	404	137	307	233	855	
Burnley	2,144	2,030	604	—	117,121	27	12	11	256	11	3	140	55	73	51	592	
Burton-on-Trent	702	686	151	—	2,312	12	5	4	30	2	1	79	17	42	27	86	
Bury ...	1,081	1,000	236	—	51,226	6	6	5	46	3	4	74	28	59	45	160	
Cardiff	2,554	2,618	675	—	2,366	13	13	13	151	1	2	229	97	141	87	443	
Coventry	1,242	1,247	337	—	1,538	12	3	3	141	2	3	85	40	68	79	150	
Croydon	2,085	2,019	485	—	37,828	40	5	5	204	2	2	173	61	145	81	228	
Derby	1,829	1,733	354	—	2,429	64	11	78	78	2	3	113	56	92	66	244	
East Ham	1,226	1,497	463	—	32,182	24	27	8	150	3	1	122	47	74	70	242	
Great Yarmouth	923	900	228	—	33,426	2	7	7	71	1	—	63	31	46	26	95	
Halifax	1,736	1,674	245	—	53,643	6	42	4	31	4	3	122	43	102	39	289	
Hornsey	672	760	136	—	18,641	4	13	5	41	2	2	45	14	65	26	90	
Huddersfield	1,688	1,638	311	—	60,632	13	13	9	69	1	3	119	38	108	36	274	
Hull ...	4,426	4,459	1,254	10	67,975	135	50	409	83	4	1	82	30	76	45	134	
Ipswich	1,129	1,074	276	—	—	6	10	4	24	2	—	46	19	41	31	105	
King's Norton	964	724	196	—	6,717	5	5	1	24	2	—	—	—	—	—	—	
Leeds ...	7,405	7,347	1,837	—	275,331	146	76	49	450	15	14	570	309	432	239	1,192	

Vital Statistics for 1906

[Public Health

February, 1907]

Vital Statistics for 1906

Leicester	3,122	3,341	975	—	80	52	112	27	14	258	2	4	339	92	168	156	438
Liverpool	15,745	15,001	4,137	1	576	188	356	148	79	1,389	23	31	1,171	374	608	489	3,078
Manchester	12,106	?	3,109	—	474	108	193	119	85	972	23	27	1,094	399	569	402	2,241
Newport (Mon.)	1,234	1,234	355	—	15	6	25	11	4	77	4	1	81	28	57	65	215
Northampton	1,108	1,061	240	—	—	5	8	7	10	94	2	2	81	31	80	31	145
Norwich	2,113	1,973	539	—	99	11	20	27	11	166	15	3	194	94	131	74	275
Nottingham	4,220	4,069	1,158	—	5	16	39	40	41	378	9	18	314	99	229	160	722
Portsmouth	3,082	3,029	761	—	8	3	63	60	17	226	4	1	206	69	160	133	362
Preston	2,065	2,235	665	—	122	15	11	16	21	188	3	2	122	101	93	106	350
Reading	1,052	1,017	217	—	—	—	34	40	2	73	1	4	74	31	74	27	134
Rhondda	2,014	2,023	822	—	24	9	26	25	20	206	2	8	76	34	68	68	406
Rotherham	1,060	1,005	307	—	64	24	27	7	8	94	1	1	36	27	40	74	216
St. Helens	1,523	1,569	487	—	10	4	5	24	20	121	3	1	111	77	27	73	265
Sheffield	7,496	7,473	2,128	—	75	229	109	85	51	785	19	24	452	208	348	260	1,321
Smethwick	853	951	265	—	17	4	30	14	8	62	3	6	67	33	44	48	184
Southampton	1,611	1,545	330	—	—	—	36	24	8	97	—	3	154	51	102	54	225
South Shields	1,767	1,986	529	—	109	6	39	30	9	127	8	1	165	76	71	61	300
Stockport	1,968	1,939	501	—	70	3	35	8	9	177	2	1	125	60	96	49	354
Stockton-on-Tees	875	865	228	—	1	1	13	10	7	68	4	1	68	34	50	30	128
Sunderland	2,858	2,858	752	—	16	4	56	36	20	174	2	3	235	97	130	114	572
Swansea	1,828	1,807	501	—	28	9	51	7	10	83	1	4	149	65	90	37	288
Tottenham	1,605	1,673	484	—	44	18	23	12	5	182	1	5	75	112	78	61	236
Wallasey	824	857	201	—	13	6	15	12	5	70	3	2	57	20	54	17	130
Warrington	1,303	1,262	353	—	33	2	33	9	5	147	7	2	109	48	59	44	222
West Bromwich	1,205	1,075	347	—	7	4	46	4	13	65	3	1	54	51	40	52	213
West Ham	3,709	4,610	1,368	—	123	39	70	89	53	578	10	9	344	201	227	165	769
Wigan	1,713	1,575	468	—	45	5	3	6	27	139	3	4	108	40	46	87	345
Willesden	1,518	1,673	493	—	25	11	25	17	7	134	2	5	139	49	111	67	234
Wolverhampton	1,459	1,486	386	—	28	17	20	23	8	130	6	5	80	47	82	58	253
York	1,163	1,141	275	—	15	7	17	13	14	79	3	4	89	38	73	52	143

* The figures for London have been obtained from the weekly returns issued by the Registrar General and the Metropolitan Asylums Board.

TABLE III.

Death Rates (per 1,000 persons all ages) from all and the Selected Causes; Infantile Mortality per 1,000 Births.

Township	All Causes		Small-pox	Measles	Scarlet Fever	Whooping Cough	Diphtheria	Enteric Fever	Diarrhoea	Erysipelas	Puerperal Fever	Phthisis	Other Tubercular Diseases	Cancer	Premature Birth	Respiratory Diseases	Infantile Mortality
	Uncor- rected	Cor- rected *															
ENGLAND & WALES:																	
Great Towns.																	
London †	15.7	?	—	0.40	0.11	0.26	0.14	0.05	0.95	0.05	0.03	1.47	0.55	1.04	0.49	2.73	132
Birmingham	16.5	16.7	—	0.41	0.10	0.46	0.16	0.07	1.56	0.04	0.03	1.22	0.38	0.83	0.58	3.11	168
Blackburn	16.9	16.4	—	0.47	0.24	0.12	0.19	0.11	1.28	0.06	0.03	0.92	0.58	0.80	0.53	2.73	156
Bolton	14.1	15.5	—	0.01	0.09	0.11	0.13	0.22	1.15	0.01	0.00	1.11	0.55	0.63	0.54	2.72	138
Bootle	15.3	17.3	—	0.64	0.20	0.44	0.16	0.10	1.22	—	0.03	1.26	0.33	0.79	0.55	3.54	143
Bradford	16.0	16.1	—	0.44	0.15	0.13	0.21	0.18	0.92	0.03	0.03	1.30	0.41	0.97	0.49	2.52	152
Brighton	14.7	14.4	—	0.22	0.02	0.17	0.10	0.02	0.55	0.03	0.02	1.42	0.58	1.27	0.44	2.14	111
Bristol	14.6	14.3	—	0.38	0.07	0.28	0.22	0.05	0.58	0.01	0.03	1.11	0.37	0.84	0.64	2.35	128
Burnley	20.8	19.7	—	1.13	0.11	0.26	0.11	0.10	2.48	0.10	0.03	1.36	0.53	0.70	0.49	5.75	213
Burton-on-Trent	13.3	13.0	—	0.03	0.05	0.20	0.09	0.07	0.50	0.03	0.01	1.49	0.32	0.79	0.51	1.62	118
Bury	18.4	17.0	—	0.87	0.03	0.10	0.10	0.08	0.78	0.05	0.06	1.26	0.48	1.00	0.79	2.72	177
Cardiff	13.9	14.2	—	0.01	0.01	0.35	0.07	0.07	0.82	0.00	0.01	1.24	0.52	0.76	0.47	2.40	135
Coventry	14.8	14.9	—	0.01	0.06	0.45	0.14	0.03	1.68	0.02	0.03	1.01	0.47	0.81	0.94	1.78	143
Croydon	13.8	13.4	—	0.25	0.05	0.18	0.26	0.03	1.35	0.01	0.01	1.14	0.40	0.96	0.54	1.50	125
Derby	14.7	14.0	—	0.01	0.03	0.23	0.51	0.08	0.63	0.01	0.02	0.91	0.45	0.74	0.53	1.96	114
East Ham	9.4	11.5	—	0.24	0.14	0.18	0.20	0.06	1.15	0.02	0.00	0.93	0.36	0.56	0.54	1.86	127
Great Yarmouth	17.5	17.1	—	0.62	0.07	0.03	0.13	0.13	1.34	0.01	—	1.19	0.58	0.87	0.49	1.80	160
Halifax	16.1	15.5	—	0.49	0.05	0.05	0.38	0.03	0.28	0.03	0.02	1.12	0.39	0.94	0.36	2.67	118
Hornsey	7.7	8.7	—	0.20	0.06	0.04	0.14	0.05	0.47	0.02	0.02	0.51	0.16	0.74	0.29	1.03	85
Huddersfield	17.8	17.3	—	0.63	0.06	0.33	0.13	0.09	0.72	0.01	0.03	1.25	0.40	1.13	0.37	2.88	135
Hull	16.9	17.0	0.03	0.25	0.03	0.28	0.51	0.19	1.55	0.03	0.03	1.09	0.46	0.86	0.52	2.53	161
Ipswich	15.7	14.9	—	—	0.02	0.08	0.13	0.05	1.15	0.05	0.01	1.14	0.41	1.05	0.62	1.86	146
King's Norton	13.3	10.0	—	0.08	0.09	0.23	0.07	0.01	0.33	0.02	—	0.63	0.26	0.56	0.45	1.44	91

Leeds	16.0	15.8	—	0.60	0.07	0.32	0.16	0.11	0.97	0.03	0.03	1.23	0.66	0.94	0.52	2.57	152
Leicester	13.4	14.4	—	0.34	0.22	0.48	0.11	0.06	1.11	0.00	0.01	1.46	0.39	0.72	0.66	1.88	166
Liverpool	21.3	20.3	0.00	0.77	0.25	0.48	0.20	0.10	1.87	0.03	0.04	1.58	0.50	0.82	0.66	4.16	171
Manchester	19.0	?	—	0.74	0.17	0.30	0.20	0.13	1.52	0.04	0.04	1.71	0.63	0.89	0.63	3.51	166
Newport (Mon.)	16.6	16.6	—	0.20	0.08	0.33	0.14	0.05	1.03	0.05	0.01	1.09	0.37	0.76	0.87	2.89	147
Northampton	12.1	11.6	—	—	0.05	0.08	0.07	0.10	1.02	0.02	0.02	0.88	0.33	0.87	0.33	1.58	121
Norwich	17.9	16.7	—	0.83	0.09	0.16	0.22	0.09	1.40	0.12	0.02	1.64	0.79	1.11	0.62	2.33	176
Nottingham	16.6	16.0	—	0.01	0.06	0.15	0.15	0.16	1.48	0.03	0.07	1.23	0.38	0.89	0.62	2.83	171
Portsmouth	15.0	14.8	—	0.04	0.01	0.31	0.29	0.08	1.10	0.02	0.00	1.00	0.33	0.78	0.65	1.77	130
Preston	17.7	19.2	—	1.04	0.13	0.09	0.14	0.18	1.61	0.03	0.02	1.04	0.86	0.79	0.91	3.00	200
Reading	13.2	12.8	—	—	—	0.43	0.50	0.02	0.91	0.01	0.05	0.93	0.39	0.93	0.33	1.68	115
Rhonda	15.8	15.8	—	0.18	0.07	0.20	0.19	0.15	1.61	0.01	0.06	0.59	0.26	0.53	0.53	3.17	173
Rotherham	17.2	16.3	—	1.04	0.39	0.43	0.11	0.13	1.52	0.01	0.01	0.58	0.43	0.65	1.20	3.51	158
St. Helens	16.7	17.2	—	0.10	0.04	0.05	0.26	0.21	1.32	0.03	0.01	1.21	0.84	0.29	0.80	2.90	157
Sheffield	16.7	16.7	—	0.17	0.51	0.24	0.18	0.11	1.75	0.04	0.05	1.01	0.46	0.78	0.58	2.94	158
Smethwick	13.1	14.6	—	0.26	0.06	0.46	0.21	0.12	0.95	0.04	0.09	1.03	0.50	0.67	0.73	2.80	131
Southampton	13.7	13.2	—	—	—	0.30	0.20	0.06	0.82	—	0.02	1.31	0.43	0.86	0.46	1.91	113
South Shields	15.7	17.8	—	0.97	0.05	0.35	0.27	0.08	1.14	0.07	0.01	1.48	0.68	0.64	0.55	2.69	150
Stockport	19.7	19.4	—	0.70	0.03	0.35	0.08	0.09	1.77	0.02	0.01	1.25	0.60	0.96	0.49	3.54	186
Stockton-on-Tees	16.6	16.4	—	0.01	0.01	0.24	0.18	0.13	1.29	0.07	0.01	1.20	0.64	0.94	0.56	2.43	128
Sunderland	18.5	18.5	—	0.10	0.02	0.36	0.23	0.13	1.12	0.01	0.01	1.52	0.62	0.84	0.74	3.70	140
Swansea	18.1	17.9	—	0.27	0.00	0.50	0.07	0.09	0.82	0.00	0.03	1.47	0.64	0.89	0.36	2.86	156
Tottenham	12.3	12.8	—	0.33	0.13	0.17	0.09	0.03	1.39	0.00	0.03	0.57	0.85	0.59	0.46	1.80	132
Wallasey	13.3	13.8	—	0.20	0.09	0.24	0.19	0.08	1.12	0.04	0.03	0.91	0.32	0.87	0.27	2.09	117
Warrington	18.7	18.1	—	0.47	0.02	0.47	0.12	0.07	2.10	0.10	0.02	1.55	0.68	0.84	0.63	3.17	157
West Bromwich	17.6	15.7	—	0.10	0.05	0.67	0.05	0.18	0.94	0.04	0.01	0.78	0.74	0.58	0.75	3.11	160
West Ham	12.3	15.3	—	0.40	0.12	0.23	0.29	0.17	1.91	0.03	0.02	1.14	0.66	0.75	0.54	2.54	149
Wigan	19.2	17.6	—	0.50	0.05	0.03	0.06	0.30	1.55	0.03	0.04	1.20	0.44	0.51	0.74	3.86	160
Willesden	10.7	11.8	—	0.17	0.07	0.17	0.11	0.04	0.94	0.01	0.03	0.98	0.34	0.78	0.61	1.65	115
Wolverhampton	14.5	14.7	—	0.27	0.16	0.19	0.22	0.07	1.28	0.06	0.05	0.79	0.46	0.81	0.57	2.50	140
York	13.9	13.7	—	0.18	0.08	0.20	0.15	0.16	0.94	0.03	0.04	1.06	0.45	0.87	0.62	1.71	124

* Corrected for non-residents and outlying institutions, etc., only.

† The figures for London have been obtained from the weekly returns issued by the Registrar General and the Metropolitan Asylums Board.

TABLE III.

Death Rates (per 1,000 persons all ages) from all and the Selected Causes; Infantile Mortality per 1,000 Births.

Township	All Causes		Small-pox	Measles	Scarlet Fever	Whooping Cough	Diphtheria	Enteric Fever	Diarrhoea	Erysipelas	Puerperal Fever	Phthisis	Other Tubercular Diseases	Cancer	Premature Birth	Respiratory Diseases	Infantile Mortality
	Uncor-rected	Cor-rected *															
ENGLAND & WALES:																	
Smaller Towns.																	
Acton ...	11.1	12.9	—	0.51	0.13	0.09	0.04	0.05	1.81	0.02	0.05	0.81	0.51	0.81	0.47	1.96	130
Aldershot ...	10.0	11.2	—	0.03	0.03	0.09	0.21	0.12	1.45	0.03	0.03	0.95	0.45	0.48	1.13	1.27	118
Bath ...	16.6	15.0	—	0.34	0.06	0.28	0.10	0.02	0.26	—	0.02	1.14	0.14	1.42	0.28	2.36	114
Blackpool ...	14.2	13.0	—	0.12	0.03	0.10	0.19	0.10	0.56	—	0.03	0.68	0.47	0.94	0.49	1.62	131
Brighouse ...	13.1	14.2	—	0.31	0.31	0.18	0.04	0.09	0.31	0.13	0.04	1.21	0.58	0.94	0.31	2.88	141
Cambridge ...	15.1	13.4	—	0.02	0.02	0.40	0.30	0.02	1.11	0.05	—	1.06	0.12	0.85	0.27	2.46	131
Chatham ...	14.8	13.5	—	0.09	0.02	0.19	0.07	0.14	0.74	0.02	—	1.37	0.38	1.22	0.93	1.75	138
Cheltenham ...	14.6	13.9	—	0.13	0.02	0.02	0.18	0.02	0.31	0.02	0.06	0.78	0.53	1.08	0.25	2.29	100
Chesterfield ...	19.4	15.5	—	0.13	0.07	0.27	0.07	0.17	1.37	0.03	0.03	1.06	0.79	0.47	0.72	2.26	182
Chiswick ...	10.6	13.0	—	0.08	—	0.20	0.14	0.02	0.94	0.05	—	1.29	0.17	1.23	0.44	2.33	106
Chorley ...	16.3	15.6	—	0.41	0.03	0.17	0.17	0.10	0.61	0.06	0.03	0.82	0.37	0.64	0.41	3.22	140
Colchester ...	13.2	12.5	—	0.22	0.02	0.46	0.07	0.04	0.86	0.07	—	0.78	0.49	0.54	0.41	1.69	129
Coseley ...	15.1	16.1	—	—	0.31	0.35	0.13	0.26	0.76	—	0.04	0.94	0.53	0.44	0.81	1.47	120
Darwen ...	12.5	13.1	—	0.41	0.07	0.02	0.02	0.09	0.31	0.02	0.04	0.46	0.31	0.82	0.43	3.06	137
Dewsbury ...	21.3	18.2	—	0.51	—	0.58	0.18	0.14	1.06	—	0.03	1.72	0.80	0.83	0.51	3.11	170
Eastbourne ...	10.7	10.1	—	0.20	—	—	0.04	—	0.18	—	—	1.08	0.26	1.10	0.34	1.30	88
Eccles ...	15.5	13.9	—	0.07	0.12	—	0.12	0.10	1.48	0.05	—	1.11	0.36	0.67	0.59	2.44	140
Edmonton ...	16.1	13.8	—	0.33	0.22	0.14	0.19	0.12	2.04	0.07	0.03	1.14	0.66	0.65	0.68	1.79	132
Felling ...	15.0	16.1	—	0.07	0.11	0.07	0.38	—	0.85	0.07	0.07	1.64	1.71	0.50	1.75	2.07	135
Finchley ...	10.9	11.7	—	0.22	0.16	0.03	0.09	—	1.00	—	0.06	0.97	0.48	0.78	0.61	1.43	118
Folkestone ...	10.6	10.6	—	0.02	—	0.05	0.02	—	1.12	0.02	0.02	0.90	0.28	1.09	0.39	1.32	129
Gloucester ...	14.7	13.7	—	0.01	—	0.11	0.07	0.01	0.61	0.07	0.03	0.98	0.42	0.98	0.57	2.06	120.
Gorton ...	14.4	16.8	—	0.42	0.09	0.48	0.21	0.12	2.33	—	0.03	1.36	0.36	0.45	0.66	2.96	160
Gosport & Alverstoke ...	14.8	14.8	—	—	—	0.29	—	0.16	1.63	—	0.09	1.54	0.45	1.14	0.39	1.54	126
Hebburn ...	16.1	17.2	—	0.08	0.08	0.38	0.08	0.08	1.62	0.12	—	1.20	0.51	0.38	0.34	2.95	136
Hindley ...	16.4	15.8	—	1.36	0.07	0.07	0.15	0.11	1.67	0.04	—	0.66	0.82	0.35	0.66	3.04	160

Hove ...	10.7	12.3	—	0.04	—	0.09	0.02	0.04	0.56	0.02	—	1.19	0.29	1.21	0.29	1.21	116
Hyde ...	15.1	15.9	—	—	0.29	0.15	0.16	0.12	0.79	0.03	—	1.26	0.35	0.99	0.41	2.76	154
Ilford ...	15.7	9.9	—	0.07	0.03	0.17	0.31	0.02	0.38	—	0.03	0.50	0.27	0.78	0.39	1.30	110
Keighley ...	15.2	14.9	—	0.18	0.06	0.23	0.89	0.05	0.58	0.01	—	1.43	0.49	0.83	0.51	2.74	149
Lincoln ...	16.7	16.7	—	0.03	0.13	0.36	0.05	0.14	4.06	0.05	—	0.96	0.45	1.15	0.55	2.03	147
Longton ...	21.9	23.8	—	0.16	0.11	0.05	0.10	0.43	0.02	0.03	0.05	1.74	0.42	0.90	0.78	4.48	234
Luton ...	15.9	15.4	—	1.02	0.05	0.24	0.13	0.48	1.13	0.03	0.03	1.07	0.20	1.17	0.48	1.97	144
Mansfield ...	15.8	14.8	—	—	0.06	0.24	0.13	0.48	1.13	0.03	0.03	0.82	0.27	0.68	0.37	1.55	120
Middleton ...	13.7	16.0	—	0.51	0.07	0.07	0.22	—	0.92	0.04	0.14	1.55	0.33	0.96	0.25	2.85	136
Oldbury ...	17.3	17.2	—	0.11	0.03	0.77	0.07	0.22	1.44	0.03	0.07	0.55	0.37	0.85	0.81	3.22	167
Oxford ...	14.2	13.5	—	0.01	0.13	0.13	0.11	0.01	0.27	0.01	—	0.99	0.21	1.13	0.29	1.91	97
Poole ...	15.1	14.8	—	0.43	—	0.24	0.28	0.03	0.31	—	—	1.28	0.40	1.12	0.78	2.28	119
Reigate ...	12.0	10.9	—	0.39	0.03	0.07	0.14	0.03	0.32	—	0.03	1.18	0.17	0.96	0.28	1.25	91
Richmond (Surrey) ...	12.0	11.0	—	0.08	0.05	0.14	0.08	0.02	0.49	0.05	0.02	0.98	0.32	0.81	0.29	1.33	82
Salisbury ...	18.2	14.6	—	—	—	0.09	—	0.04	0.69	0.09	—	0.93	0.51	1.39	0.27	2.00	105
Scarborough ...	15.4	15.1	—	—	—	0.07	0.09	0.04	1.13	0.07	0.04	0.81	0.71	1.08	0.51	1.69	136
Shrewsbury ...	14.6	14.8	—	—	—	0.71	0.17	0.07	0.47	—	—	1.08	0.37	1.05	0.17	2.03	115
Southend-on-Sea ...	11.4	11.8	—	0.06	0.06	0.04	0.10	0.04	1.43	0.04	0.04	0.99	0.60	0.93	0.47	1.15	142
Stalybridge ...	19.4	19.3	—	0.06	0.03	—	0.21	0.03	1.52	—	0.03	1.25	0.90	0.97	0.24	4.20	206
Taunton ...	17.5	15.6	—	0.59	—	—	—	—	0.59	—	—	1.10	0.45	0.96	0.32	1.88	123
Torquay ...	14.0	14.7	—	—	—	0.03	—	—	0.50	—	—	1.38	0.23	1.44	0.47	2.06	108
Tunbridge Wells ...	11.6	11.8	—	—	—	—	—	0.02	0.25	—	—	0.80	0.22	1.34	0.48	1.28	83
Wakefield ...	20.5	14.4	—	0.39	0.13	0.09	0.11	0.06	0.65	—	0.06	1.11	0.55	0.86	0.41	2.55	127
Wallsend ...	15.9	15.4	—	0.24	0.16	0.24	0.36	0.12	0.88	—	—	1.00	1.12	0.80	0.56	2.48	148
Wimbledon ...	11.7	12.7	—	0.38	0.10	0.08	0.18	0.10	1.81	0.10	—	0.86	0.32	0.96	0.34	1.52	148
Winchester ...	13.3	11.7	—	—	—	—	0.04	—	0.04	—	0.04	1.08	0.21	1.43	0.26	1.87	74
SCOTLAND:																	
Dundee†	19.6	19.6	0.00	0.38	0.11	0.39	0.18	0.07	0.75	0.02	0.01	1.75	0.87	1.04	0.69	3.72	170
Edinburgh ...	16.0	14.3	—	0.37	0.09	0.10	0.14	0.03	0.19	0.07	0.02	1.09	0.63	0.96	0.46	2.28	112
Glasgow†	17.8	17.5	—	0.47	0.05	0.48	0.17	0.10	0.92	0.06	0.03	1.54	0.85	0.89	0.53	3.36	131

* See footnote page 321. † Rates (selected causes) based on uncorrected figures.

PUBLIC HEALTH NEWS.

WHEN it first became incumbent upon Sanitary Authorities in England and Wales to appoint Medical Officers of Health, it was a common practice in rural districts to elect the Poor-Law Medical Officers as Medical Officers of Health. This custom has survived in the County of Durham longer than any other part of the country, and among the fourteen rural districts in the county there are five which are served by more than one Medical Officer of Health. One of these—Durham, having a population of over 30,000—has lately decided to appoint only one officer.

THE MILK SUPPLY OF NORTHAMPTONSHIRE.—In a recently issued report of the Medical Officer of Health for the County of Northampton, it is stated that among the 28 Sanitary Districts within the administrative area there are now only four, including the Borough of Higham Ferrers and the Urban District of Finedon, in which Regulations under the Dairies, Cowsheds, and Milkshops Orders are not in force. It is to be regretted that the Sanitary Authorities in the two urban districts mentioned do not make regulations. In Finedon the infantile mortality is nearly the highest in the county.

MEDICAL INSPECTION OF SCHOOL CHILDREN.—A report upon the medical inspection of 806 school children has been issued by Dr. Wm. Robertson, Medical Officer of Health for Leith. The inspections have been principally carried out by Dr. R. A. Glegg, Assistant Medical Officer, with the voluntary assistance of medical—including some lady—practitioners. Only 218 out of the 806 children examined were found to be without defect of development or other morbid condition. Enlarged tonsils were present in 40 per cent, rickets in 14 per cent, spinal curvature in 8 per cent, very bad vision in 18 per cent, and deafness in 8 per cent.

THE Urban District Council of Aberdare, in Glamorganshire, having a population of nearly 50,000, has decided to appoint a whole-time Medical Officer of Health, at a salary of £500 per annum, the duties to include those of Superintendent of the Isolation Hospital and Medical Officer to the Education Committee. The present Medical Officer of Health, Dr. D. Davies, who is in private practice, has held the post since 1872.

THE Ripley (Derbyshire) Urban District Council has refused to comply with the suggestion of the Local Government Board to enter into combination with the Belper and Alfreton Councils for the purpose of jointly appointing a Medical Officer of Health. The population of the three districts is over 50,000.

THE Reading Town Council has decided in future to pay a fixed salary of £200 per annum to Dr. E. W. Rowland, the Medical Superintendent of the Corporation Fever Hospital. Hitherto Dr. Rowland has been paid at the rate of two guineas for each patient treated in the hospital.

THE Burslem (Staffordshire) Town Council has decided that in cases where the Medical Officer of Health finds it necessary to call in another medical practitioner to consult as to the treatment of a patient at the hospital, a fee of one guinea shall be paid to the consultant by the Council.

REVIEWS.

SCHOOL HYGIENE AND THE LAWS OF HEALTH. A Text-book for Teachers and Students in training. By Charles Porter, M.D., B.Sc., M.R.C.P. Ed., Barrister-at-Law of the Middle Temple, Assistant Medical Officer of Health and Chief Sanitary Inspector, Leeds. 1906. London: Longmans, Green and Co. Pp. 313 and x., with 119 illustrations. Price 3s. 6d.

The author writes from practical experience, having lectured to the teachers and students at the Sheffield Training College on School Hygiene, and having held the appointment of visiting Medical Officer to the Education Committee. The book is divided into two parts: the School Child and the School Building. The description in Part I of the anatomy and physiology of the different systems of the body is clear; in parts it tends to be too full. The description of the manner in which the various physiological systems may be affected by school conditions and diseases forms the most valuable portion of the book. The articles on teeth, adenoids, and enlarged tonsils are very good; but we do not agree with the author that the function of the tonsils is practically unknown. The author's recommendation that the children be allowed a few minutes' outdoor recreation, should an epidemic of yawning arise, will doubtless be much appreciated by the scholars themselves. There are concise, well-written paragraphs on Infant Feeding and Infant Milk Depôts. But what have these to do with school hygiene? We are glad to see that the importance of clean towels for the children is insisted on. There are plain, useful instructions for home-cleansing of the head. Signs of overstrain and signs of insufficient sleep are well described. While reading this book one cannot fail to be struck with the importance of the medical man in the school economy, and the damage that must have been done in the past owing to the delay in his introduction. There is a good account of defective children. In dealing with school furniture the advantages of single seats and desks are well brought out. The signs of diseases are given in some detail, but with proper medical inspection the onus of diagnosis will not be thrown on the teacher. The importance of nasal diphtheria as a means of spreading the disease is noted. School closure is dealt with briefly, not being within the province of the teacher. In Part II we notice that the propulsion method is considered the most satisfactory for warming and ventilating the school. The difficulty of maintaining the proper degree of humidity in this method, and the want of freshness of the incoming air, are not mentioned as disadvantages. We can recommend the book as an excellent guide to Teachers and Students. There are numerous good illustrations.

CANCER OF THE BREAST AND ITS OPERATIVE TREATMENT. By W. Sampson Handley, Hunterian Professor of Surgery and Pathology in the Royal College of Surgeons of England; Assistant Surgeon Middlesex Hospital. 225 pages. Price 12s. 6d. net. London: John Murray, 50a, Albemarle Street.

The author here desires to place the operative treatment of breast cancer on a rational basis. He embodies the results of his work in the cancer research laboratories, and we would recommend a study of this work to those who desire to keep themselves abreast of the subject.

THE MORPHOLOGY OF NORMAL AND PATHOLOGICAL BLOOD. By Geo. A. Buckmaster, M.D. Murray, 1906. Pp. 224; size 9 ins. by 6 ins. Price 7s. 6d. net.

This volume contains the substance of a course of lectures recently delivered in the Physiological Institute of the University of London. It is illustrated by fourteen figures in the text and five full-page plates, some of them coloured. It deals, as the title indicates, solely with the blood corpuscles, containing nothing about coagulation, or the oxygen and carbonic acid capacity of the blood. Perhaps the most interesting part of the book is that giving the author's personal researches on polycythæmia at high altitudes. In less than twenty-four hours an increase both of hæmoglobin and of corpuscles is found at a height of 6,000 feet, and this augmentation goes on for some weeks. Within thirty-six hours of return to a lower level, a distinct fall of both hæmoglobin and corpuscles occurs. Four days' residence at a height of 14,000 feet did not produce more marked polycythæmia than at 6,000 feet. The coloured illustrations by Mrs. Buckmaster have been beautifully executed. There is a good bibliography. The volume is both interesting and useful for practical work.

THE TRAGEDY AND COMEDY OF WAR HOSPITALS. By Sister X. Murray, 1906. Pp. 185; 8 full-page plates; size 9 ins. by 6 ins. Price 6s. net.

A slight, but graphic, description of the weaknesses of hospital and medical arrangements in the Boer War from the standpoint of a nurse, who, without any bias against doctors, is able to state in somewhat caustic style the evils of the system of which doctors, as well as their patients, were the victims. The orderlies receive much severe criticism; and it appears certain that their military discipline sometimes led to dire results. Thus, when an order from a superior officer came that a patient must be moved to another hospital, the orderly saw that it was done, although that patient was in an advanced stage of typhoid fever, and notwithstanding the vigorous protest of Sister X.

The conditions at the hospital at Ladysmith after the siege were particularly bad, and there appears to have been great and unnecessary delay in sending up medical requirements and invalids' food. All the patients are stated to have been "on two sorts of stimulants, and some three, and lots were undoubtedly on the verge of D.T., trembling like aspen leaves in consequence." The defence was that there was nothing else to give them. It may be hoped that the mistakes of the past will not be without fruit, and that orderlies will be as little used for sick nursing as possible, unless they can be given ample training for their work.

CHEMISTRY OF THE ALBUMINS. Ten Lectures delivered 1904 in the Physiological Department of University College, London. By S. B. Schryver, D.Sc. Lond., etc. Murray, 1906. Pp. 192; size 8½ ins. by 6 ins. Price 7s. 6d. net.

Presents the chemistry of the albumins in a clear and readable form. Does not deal to any considerable extent with the physiological aspects of albumin, and might, therefore, be thought to possess little interest for doctors and hygienists. This is, however, far from being the case. Thus, toxicity in a tissue is conceived of as due to a stereo-chemical inhibition of normal function, and an important chemical factor which has so far been neglected in bio-chemical considerations is brought into notice.

PROBLEMS IN ANIMAL METABOLISM. A Course of Lectures given in the Physiological Laboratory of the London University, 1904. By J. B. Leathes, Lecturer in Physiology to St. Thomas's Hospital. Murray, 1906. Pp. 205; size 9 ins. by 6 ins. Price 7s. 6d. net.

This book will come as a pleasant relief to all physiologists who are weary of one-sided views on metabolism. Dr. Leathes summarizes in it very ably the most recent advances, as well as older work, on metabolism. The value of the book lies not only in the rich supply of facts it contains, but quite as much in an atmosphere of suggestiveness pervading it, and stimulating thought in a way very grateful to the reader. The only weak point in the book is an insufficiency of headings.

The subject is one of special interest to hygienists, as shown by recent addresses in our columns on the food problem. This book goes to the foundation of things. It suggests solutions of problems, with the solution of which are wrapped up most important questions of health: for, as Dr. Leathes says, "Disease is a disturbance in the normal balance of concurrent chemical changes, and the balance is in the first instance disturbed because some one or other of the indispensable chemical reactions is either precipitated or checked." We must further agree with Dr. Leathes: "It is difficult to believe that the chances of our being able to restore the balance will not be improved the more we learn of the nature of each of these concurrent changes."

On Chittenden's well-known views the author keeps an open mind, though he uses one argument which should cause caution in too wide a generalization from Chittenden's results. He shows that on a low estimate the milk food of an infant in the second half of the first year of life contains more proteid than the conventional adult diet, and from five to ten times as much as the minimum. "If, then," he says, "the minimum rate is the normal diet provided by Nature, then, even after making full allowance for the necessities of growth, the minimum can hardly be normal for the adult, nor the amount ordinarily taken a very great deviation from the prescriptions of Nature."

MIDWIFERY DIAGRAMS. By Victor Bonney, M.S., M.D., B.Sc. (Lond.), F.R.C.S., M.R.C.P., Lecturer on Practical Midwifery, Middlesex Hospital. Price £2 2s. net. Bristol: John Wright & Co. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd.

The purpose of these diagrams is to facilitate the teaching of midwifery to student midwives. The drawings are original, and have been made by Mr. F. G. Lewin from rough indications by the author. The subjects for diagrammatic representation have been well selected. The anatomy of pregnancy, the stages and management of normal labour, the mechanism of abnormal labour, the treatment of breach delivery, the methods of treatment of asphyxia, the condition of the uterus during the puerperium, difficulties with the bladder, conditions of puerperal sepsis of the breast, and abnormalities of the child are depicted. The figures number 160. The diagrams are of large size, clear, easily comprehended, and are not overloaded with detail. We consider they will be of the greatest use to lecturers to midwives, and elementary students. The 24 sheets are all attached to one metal roller, and so are easily portable. They are suitable for hanging on the wall so as to be seen by a class.

LECTURES ON MASSAGE AND ELECTRICITY IN THE TREATMENT OF DISEASE.
By T. Stretch Dowse, M.D., F.R.C.P. Ed. 6th edition. 447 pages.
Price 7s. 6d. net. Bristol: J. Wright & Co., 1906.

To say that the lectures are by Dr. Stretch Dowse is a sufficient guarantee of excellency; that the work has met a felt want is shown by the demand for six editions within a very few years. Dr. Dowse would like to see every person engaged in the application of massage and electricity to the human body not only certified as proficient, but registered by the State. In all cases, these remedies should only be applied under the strict supervision of a medical man, and in this work the profession will find the information which will enable them to exercise that control.

MUNICIPAL POSTERS OR CIRCULARS ON ALCOHOLISM.—Dr. Butler, the Medical Officer of Health of Willesden, has tabulated 36 replies received by him last November to enquiries on this subject sent by him to different municipalities. Of the returns, 30 were from Metropolitan boroughs, four from parts of greater London, with the addition of Croydon and Brighton. The following issued posters—Battersea, Bermondsey, Camberwell, Croydon, Deptford, East Ham, Finsbury, Fulham, Hackney, Hampstead, Lambeth, Lewisham, Poplar, St. Pancras, and West Ham. The following issued circulars—Leyton, Southwark, and Woolwich. Brighton issued an illustrated calendar, of which 10,000 copies were distributed. No action had been taken in Bethnal Green, Chelsea, Greenwich, Hammersmith, Holborn, Hornsey, Kensington, City of London, Paddington, St. Marylebone, Shoreditch, Stepney, Stoke Newington, Tottenham, Walthamstow, Wandsworth, and Westminster. The document issued was signed by the Medical Officer of Health in Battersea, Brighton, Camberwell, Croydon, Deptford, East Ham, Fulham, Hackney, Hampstead, Lambeth, Leyton, Southwark, West Ham, and Woolwich. In other instances the Medical Officer of Health does not appear to have signed it.

NOTIFICATION IN GERMANY.—Prof. Robert Saundby, in a series of lectures on Medical Ethics, states (*Birmingham Med. Rev.*, Oct., 1906) that notification in Germany is a much more stringent obligation than it is in this country, as default, even when not wilful, may be punished under Article 327 of the Penal Code, by imprisonment not exceeding three years. That this is not an idle threat is shown by a case which occurred two years ago. A medical practitioner at Albendorf, a small place in Silesia, to which a number of pilgrims annually resort, failed to recognize two cases of small-pox, and consequently did not notify them. On their return home the pilgrims carried the disease with them, and 65 cases followed, of which six died. The Albendorf practitioner was prosecuted under Article 327 of the Penal Code, the prosecution demanding that he should be condemned to six months' imprisonment. The defendant pleaded that small-pox being practically unknown in Germany, he had no opportunity of studying the disease, and that he considered one case to be chicken-pox and the other bullous erysipelas. The Court, while rejecting this defence, refused to convict under Article 327, but convicted him of a breach of another law, which requires the notification of all suspicious cases, and fined him 150 marks (£7 10s.).

CORRESPONDENCE.

To the Editor of "Public Health."

SOCIALISTIC MEDICAL RELIEF.

SIR,—I have re-read Mrs. Sydney Webb's paper in PUBLIC HEALTH for December very carefully, and, while admiring the skill with which she puts her case forward, I wish, with your permission, to shortly draw attention to the outcome of her proposals.

Logically, Mrs. Webb's arguments are very strong. They amount to this: the nation has gone so far in the way of trying to prevent and even to treat infectious diseases—the category of which is not only large but extending—why not undertake the care and medical supervision of all and every kind of illness at the nation's expense?

If it were at all possible to carry out such a scheme effectively, there is little doubt that, as compared with individual efforts, it would be a great improvement on the present chaotic system of medical relief. In short, such a national plan of dealing with disease and death would, so to speak, pay.

It is easy, however, to talk of starting a staff of State doctors. But supposing such chosen and set to work, who is to superintend them? And, constituted as human nature at present is, how long would these officials continue to please the public at large, which, after all, must be their final masters?

Contract practice, as we know it, is bad enough; but where would the profession be if we were all reduced to the level of the club doctor? No! No! Skill and attention cannot be weighed and measured.

Individual likings and dislikings count for too much. "The reason why I cannot tell—I do not like thee, Dr. Fell," remains as true now as when first uttered, a hundred years ago. Reverting to the first objection to Mrs. Webb's scheme. Plainly, a national system of public practitioners for one and all would require an army of inspectors. Who is to set these men over the doctor, and what guarantee would there be of their fitness to judge as to whether he were doing his duty or not?

The fact is, Sir, the whole thing is Utopian: much better keep what we have, and take pains to prevent any unfortunate overlapping of the two services—medical attendance to paupers on the one hand, as legally defined, and the totally different kind of work that is connected with public health on the other.

With active Sanitary Committees of County Councils and large towns; Medical Officers under them well paid, possessing proper security of tenure, and diligent in their work; and with a general Public Health Act on the lines of that of London for all England—distinguishing sharply between Poor-Law Guardians and their jurisdiction, and Sanitary Officials and their proper field of work, as is the case in Scotland—the situation would be sufficiently well met without such socialistic expedients as that foreshadowed in the too clever mind of the lady referred to.

If the sphere of the Medical Officer of Health is to be enlarged, far better revert to the original idea of a State official acting as police surgeon, expert in medical jurisprudence, medical referee in lunacy cases, and medical registrar of sickness and mortality. Then his hands would be full enough!

Yours, etc.,

WILLIAM BRUCE.

DUTIES OF THE RURAL M.O.H.

SIR,—A certain County Education Committee has recently issued a circular letter to the managers of schools in the county, stating that the Committee "has had under consideration the question of the payment of fees to a local practitioner who was called in to advise the school managers in the case of several children suffering from skin disease. The proper course to adopt in such cases is to call in the Medical Officer of Health for the district, to whom no special fee is payable."

The Education Committee has not appointed a Medical Officer; and there is no County Medical Officer of Health. I am anxious to ascertain what has been done in other counties similarly situated. I cannot read into the duties of a Medical Officer of Health, as set out in Article 18 of the Order of the Local Government Board of 23rd March, 1891, any obligation upon the Medical Officer of Health to take any special action when, say, a few children are affected with eczema.

I am, etc.,

RURAL MEDICAL OFFICER OF HEALTH.

EFFECT OF SEA WATER ON SEWAGE.—Messrs. Purvis and Coleman (*Journal of the Royal Sanitary Institute*) found in the course of experiments that a solution of sodium chloride seemed at first to favour the production of free and albuminoid ammonia from sewage, but the process did not go far and neither nitrates nor nitrites appeared, nor was the action of the magnesium sulphate and magnesium chloride more effective, but the mixture of these salts in their respective relative percentages was more marked. One of the most striking effects of the salts in solution, both singly and when mixed in the proportions in which they occur in sea water, and also of the natural sea water, both sterilized and unsterilized, was in the interference in the production of nitrates and nitrites. The general result of these experiments tends to prove that to pour sewage directly into the sea or an estuary is essentially unsound. The intolerable smell produced appears to be due to an incomplete and slow oxidation of the various organic compounds in the sewage. There may also be interference with the growth of the useful nitrifying organisms which would normally and rapidly convert the material into non-odorous and neutral substances, such as nitrates. Before sewage is discharged into the sea it should first be treated by some filtration or bacterial or other process.

THE INSTITUTIONAL RELIEF OF PHTHISIS.—At a recent meeting at the Hulme Town Hall, Manchester, Dr. Jas. Niven, the Medical Officer of Health, drew public attention to the prejudice entertained by people which prevented them from availing themselves of the accommodation for consumptives in the Union Hospitals. He believed that if these institutions were less intimately bound up with Poor-Law relief it would be a good thing. He did not think that adequate public provision had yet been made for artisans and industrial people afflicted with consumption, and he hoped the time would come when it would be a necessary part of the prevention of consumption to give assistance to the consumptive's household.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

* * *

Annual Reports:—

ABERDEEN, CITY OF. Report for the year 1905. By Matthew Hay, M.D., M.O.H.

ABERDEEN, CITY OF. Reports for the month of November, 1906. By the M.O.H., and the Sanitary Inspector.

ADELAIDE, CITY OF. For the twelve months ending 30th September, 1906. By T. Borthwick, M.D., M.O.H.

BIRMINGHAM, CITY OF. For the fourth quarter of the year 1906. By John Robertson, M.D., B.Sc., M.O.H.

GERMISTON MUNICIPALITY (TRANSVAAL). For the year ending June 30th, 1906. By Ben. Geo. Brock, M.O.H.

LONDON. Report for the year, 1905. Sir Shirley F. Murphy, M.O.H.

PATRINGTON, District Council of. Report for the year ending December 31st, 1906. By W. H. Coates, M.A., M.B., etc., etc., M.O.H., and Analyst.

American Journal of Medical Sciences.

No. 1, Vol. CXXXIII. January, 1907.

American Statistical Association.

No. 75, Vol. X. September, 1906.

Antitoxin Treatment of Diphtheria in Theory and Practice.

W. R. Hadwen, M.D., etc. British Union for the Abolition of Vivisection.

Australasian Medical Gazette.

No. 11, Vol. XXV. Sydney, November 20th, 1906.

Birmingham Medical Review.

No. 48, Vol. VIII. New Series. December, 1906.

British Journal of Tuberculosis.

No. 1, Vol. I. Quarterly. 1s. 6d. net. Baillière, Tindall & Cox.

Glasgow Medical Journal.

No. 1, Vol. LXVII. January, 1907.

Health Visiting Among Infants.

Special Report, 1904-6. Marguerite Le F. Boileau, Certificated Sanitary Inspector. Wakefield and District Sanitary Aid Society.

Hospital.

Saturday, January 12th, 1907.

Local Government Journal.

January 12th, 1907.

Local Government Officer.

January 12th and 19th, 1907.

Practical Sanitation.

Dr. George Reid. Thirteenth Edition. Chas. Griffin & Co., Ltd.

Reale Società Italiana d'Igiene.

Journal of. Milan, December 31st, 1906.

Royal Army Medical Corps.

Journal of. No. 1, Vol. VIII. January, 1907.

Royal Institute of Public Health.

Journal of. No. 1, Vol. XV. January, 1907.

Royal Sanitary Institute,

Journal of. No. 12, Vol. XXVII. January, 1907.

Royal Statistical Society,

Journal of. Part IV, Vol. LXIX. Quarterly. December 31st, 1906.

Sanitary Evolution of London, The.

By Henry Jephson, L.C.C. Fisher Unwin. 1907.

Sanitary Journal.

No. 7, Vol. XII. New Series. December, 1906.

Service de Santé et de l'hygiène,

Bulletin du. Brussels, November, 1906.

State Board of Health.

Monthly Bulletin of Massachusetts. No. 10, Vol. VII. October, 1906.

Technique Sanitaire.

Vol. II. January, 1907. Brussels.

Toxins and Antitoxins.

Carl Oppenheimer and C. A. Mitchell. Chas. Griffin & Co., Ltd.

Transvaal Census, 1904.

Supplementary Tables in respect of the Districts and Wards defined by Proclamation, No. 43, 1904.

Transvaal Medical Journal.

No. 4, Vol. II. Johannesburg, November, 1906.

Tropical Medicine and Hygiene,

Journal of. No. 24, Vol. IX. December 15th, 1906. No. 2, Vol. X. January 15th, 1907.

Water.

January 15th, 1907.

THE MEDICAL INSPECTION OF SCHOOLS.—The medical inspection of schools is a subject much written about, often by those having little knowledge or experience of the necessary conditions underlying the problem. It is, therefore, refreshing to turn to an article on the subject in the January issue of the *Journal of the Royal Sanitary Institute*, by Dr. Kerr, the Medical Officer (Education) for the County of London. The following extract expresses what is known by all experienced Medical Officers of Health to be the exact fact:—

"It has been proposed to have, and in America, where zeal sometimes outruns wisdom, there are places where doctors and nurses attend daily in the schools to see the children and arrest disease. This certainly is a case of wasting the ratepayers' money to little purpose."

The prevention of the spread of infection in schools cannot be secured by such simple and extravagant means as are here cited. No doctor can diagnose an infectious disease in its period of incubation, and seldom with certainty when only the earliest symptoms are present. A patient with whooping-cough without the characteristic whoop, or with measles having only catarrh, is intensely infectious in the absence of completely characteristic symptoms; and similar remarks apply for diphtheria, scarlet fever, and other infectious diseases. It is not thus that school infection is stopped. It must be in each instance a process of investigation in which the Medical Officer of Health proceeds from the known to the unknown. Having had certain cases notified to him, he works from them to the children who have been associated with them; and it is not surprising, therefore—though the statement has a Hibernian flavour—that the greater part of school inspection for the prevention of infection must be carried out at the children's homes.

CURRENT PUBLIC HEALTH LITERATURE.**Münchener Medicinische Wochenschrift.**

VOL. LIII.

- (No. 2.) Determination of typhoid and other bacteria in samples of blood. R. Müller and H. Graf (Kiel Institute).
- (No. 4.) Intermediate host of cancer. O. Schmidt (Cologne). (He believes that he has discovered in a certain fungus (*mucor racemosus*) the intermediate host of the protozoan parasite, which he considers responsible for malignant tumour growth.)
- (No. 5.) Precipitin for cow's milk in the blood of infants. E. Moro. (Albumin from cow's milk circulating in the blood cannot be regarded as a harmless condition. He discusses the possibility of atrophy being due to the presence of an alien albumin in the blood.)
- Infant mortality and survival of fittest. H. Koepe. (He presents new statistics which confirm his previously published views that a high infant mortality does not indicate that the survivors are particularly well adapted for the struggle for existence. On the contrary, the same causes which induce a high infant mortality in the first year presumably still operate to induce high morbidity in the following years.)
- (No. 6.) Serum activity and phagocytosis. M. Gruber and K. Futaki.
- (No. 7.) Pure milk supply. W. Hempel. (He describes the conditions in a model dairy near Dresden, in which milk is obtained under such aseptic conditions that it can be sent to Bremen without ice during the summer, and has been found sweet and pure after crossing the ocean in an ice-box. He gives illustrations of a contrivance which ensures the even mixing of the milk in a pail while avoiding drawing the milk at the surface and that at the very bottom of the pail, where germs congregate most. If the milk is to be sent a great distance during hot weather, it is frozen in a freezer. Quite fresh milk does not suffer from freezing, but milk that is a little old curdles as it melts.)
- Sterilized milk and infant mortality. Manteufel (Halle).
- Measures to arrest diphtheria. B. Fischer. (Also in preceding issues.)

Bulletin de l'Académie de Médecine (Paris).

VOL. LXX, 1906.

- (No. 4.) Small-pox and Vaccination under Napoleon I. Kelsch. (It is contended that he probably required compulsory vaccination.)
- (No. 5.) Tuberculosis Mortality in France and Germany. A. Robin.
- Emigration and Public Health. Chantemesse and F. Borel. (They are of opinion that more supervision should be exercised over persons passing through France to America, especially such as may be refused or detained.)
- (No. 8.) Serum Treatment of Dysentery. L. Vaillard and C. Dopter. (The authors for years have been making a special study of dysentery and its treatment with a prepared serum. Shiga and Kruse used cultures alone to immunize the animals in making their serum, ignorant of the existence of a soluble dysenteric toxin. Vaillard and Dopter immunize their horses by inoculation on alternate weeks with progressive doses of

living bacilli and of soluble toxin. The toxin is obtained by filtering through porcelain a culture in Martin bouillon kept for 20 days at a temperature of 37 C. The injections are made under the skin at first and later in the veins. The serum of the horses acquires immunizing properties against the bacillus of dysentery and against its toxin. 96 patients with dysentery have been treated with this serum. The number includes 50 with from 15 to 20 stools in 24 hours; 18 with from 30 to 80; 24 with from 80 to 150; and 4 with from 150 to 288 stools. All recovered except 1 patient in the last group. The serum has an almost immediate influence on the local and general symptoms of the dysentery, and recovery is complete in two or three days in the mild and in four or six days in the severest cases. Relapses were observed only twice, and in these instances they occurred the tenth day or third week after the last injection of serum, when its effect was exhausted. Some of the patients had been treated for weeks with calomel, lavage of the intestines, etc., without appreciable effect. The condition changed as soon as the serum was injected, and the patients were cured in two or three days. The minimal dose is 20 c.c., injected under the skin, repeated once or twice in the severer cases. Its harmlessness has been amply established.)

(No. 9.) Serum Treatment of Typhoid Fever. Brunon. (He reports the results of the use of antityphoid serum in 100 children from 3 to 16 years old. The typhoid mortality in his service with other methods of treatment was 17 per cent, but under serotherapy it dropped to 3 per cent. In the fatal cases the serotherapy had not been applied until the fifteenth, sixteenth, and thirty-eighth days respectively. It has an unmistakable action on the disease, modifying and attenuating it as a whole, shortening its duration, reducing the chances of complications, and the mortality.)

(No. 10.) Ibid. Josias speaks from an experience with 182 cases of typhoid fever in children, and the mortality was about the same as Brunon's, 3.8 per cent. He is convinced that the outlook for a typhoid patient is very much better when the serum is injected as an adjuvant to the usual measures. He confirms its absolute harmlessness.

Method for Absorbing the Carbon Dioxide in Confined Air. (Gréhant shut up a dog in a cylinder, and in four hours found that the air in the cylinder contained 127 times as much carbon dioxide as pure air, and in eight hours 185 times as much as pure air, or 5.5 per cent. The next day he repeated the experiment, but connected the cylinder with his apparatus for absorbing the carbon dioxide. At the end of two hours the air in the cylinder contained 6 times as much carbon dioxide as pure air; at the end of six hours, 5.6 times, and at the end of eight hours only 5.3 times as much. The proportion of oxygen in the air in the cylinder at the end of eight hours was 13.4 and 14 per cent in these experiments. He thinks that the results obtained warrant the assertion that with his absorbing apparatus and a little extra supply of oxygen, it will be possible for human beings to breathe and to live even in absolutely confined air.)

(No. 12.) Dusts and Tuberculosis. Inquiry in regard to Morbidity and Mortality among 257 Carpenters and Men employed in Packing-rooms, and in making Inlaid Floors. L. Landouzy.

Prophylaxis of Contagious Complaints at Bathing Health Resorts. De Nanse.

Presse Médicale (Paris).

VOL. XIV.

(No. 12.) A Florescent Liquefying Bacillus found in various Bronchopulmonary Affections. Ferry and A. Mandoul.

(No. 13.) Albumin in the Feeding of Consumptives. H. Labbé and G. Vitry.

(No. 15.) Danger from Ingestion of Tubercle Bacilli killed by Heat. A. Calmette and M. Breton announce that guinea-pigs after experimental tuberculosis infection, either by the mouth or by intraperitoneal injection, succumbed much sooner than the controls under repeated ingestion of small amounts of tubercle bacilli killed by boiling. The repeated ingestion of tubercle bacilli killed by boiling caused disturbances even in sound guinea-pigs, the symptoms observed resembling those induced by several small doses of tuberculin at intervals of a few days in non-tuberculous animals. Experiments are now under way to determine whether these same conclusions apply to larger animals, cattle, and goats. Enough has already been learned, however, to warrant the statement that tuberculous products, even when sterilized by heat, are liable to be dangerous for persons already infected with tuberculosis, and may not be entirely harmless even for healthy persons. Milk from tuberculous cows, therefore, should not be used, even after thorough boiling, as this does not render it entirely harmless. Its use should be absolutely forbidden for children and for tuberculous adults. In conclusion Calmette and Breton add that these new facts should impel the powers that be to exercise still stricter supervision over dairy farms and to insist on the systematic use of the tuberculin test.)

(No. 16.) Five Years of Antityphoid Serotherapy. Chantemesse. (He gives a table showing the mortality from typhoid fever in the various hospitals of Paris during the last five years, the average being 17.3 per cent in 3,595 cases. At the hospital known as Bastion 29, there have been 712 typhoid patients, and all have been treated with antityphoid serum, with a mortality of only 3.7 per cent. This treatment has not yet been introduced in the other hospitals. In the 27 fatal cases death was due to perforation in 9, to pneumonia in 3, to gangrene of the mouth in 1, to rupture of an aneurysm in 1, to cancer of the kidney in 1, and to gangrenous pleurisy in 1. None of the patients succumbed to hæmorrhage. Chantemesse makes a practice of giving calcium chloride in the severe cases not treated until late. A little calcium chloride is given as a preventive of hæmorrhage about the middle or end of the second week. This is about the only drug used aside from the serum. Perforation occurred in only 9 cases, and in these treatment had not been instituted until late. It was never observed in any patient whose treatment had been commenced during the first week; all the patients treated during the first week recovered without exception. In 2 other patients perforation occurred, but was successfully sutured. This is a

total of 11 perforations in 712 cases, or 1.5 per cent. In various statistics cited the proportion was 2.6 per cent in 8160 cases. Chantemesse ascribes the action of the serum to its stimulating influence on the lymphoid system. If the disease is advanced and the lymphoid system gravely affected, it is wise to inject only a small amount of the serum.

Annales de l'Institut Pasteur.

VOL. XX.

- (No. 1.) Studies of Paratyphoid bacilli. E. Sacquépée and F. Chevreil.
Studies on Yellow Fever. E. Marchoux and P. L. Simond.
No. 2.) Typhoid Antitoxin. Besredka.
The Culture of Anaërobic Microbes Applied to the Analysis of Water. A. Guillemand.

Boston Medical and Surgical Journal.

Open-air Treatment of Bone Tuberculosis at the Wellesley Convalescent Home. E. H. Bradford (Boston). (Bradford cites thirty cases of patients treated successfully at the Wellesley Convalescent Home, showing the condition of these patients ten and twenty years after the cessation of the treatment. He says that the success obtained in these cases should stimulate all efforts in the treatment and control of joint and bone tuberculosis, in which the open-air treatment is by no means the least.)

Relation between Human and Bovine Tuberculosis: Effect on Inmates of Public Institutions. T. Smith (Boston). (In institutions in which children are cared for, the source of the milk used should receive careful attention, and herds belonging to the institution should be free from any traces of tuberculosis. In institutions for adults there need be less anxiety on this point, and if all animals of reduced vitality or whose udders are not above suspicion are eliminated, the danger of infection of dairy herds cannot be dispensed with, and such inspection should be made a necessary function of state and local boards of health, or of specially organized bureaus, in order that any advanced cases of tuberculosis may be detected, removed, and destroyed. More than this cannot be demanded at present in the interest of public health.)

Should the Tuberculous Insane in Hospitals be Segregated? O. F. Rogers (Danvers, Mass.). (Rogers is of the opinion that segregation offers a rational, practicable, and not too expensive remedy for conditions that urgently demand relief. The trustees and superintendent of the Danvers Hospital, impressed by this fact, decided that segregation of the tuberculous is the only available remedy. For three years eight or ten female patients were kept in tents on the lawn during the summer months. They enjoyed the tent life, and several made rapid improvement. Encouraged by the result of this experiment, the superintendent recommended that two buildings should be erected of capacity sufficient to accommodate all the tuberculous patients in the hospital. These buildings are now nearly completed. Each building will shelter fifteen patients. They are practically alike, one for women and the other for men. They are about 76 feet long and 21 feet wide. They front the

south. Each has a piazza 10 feet wide running the whole length of the front of the building. The front is nearly all glass, and there is considerable glass in other portions of the walls. The windows are double, and above each window is a glass transom, and all can be raised or swung. The buildings are heated by steam pipes running beneath the windows on three sides of the wards. Fresh air is taken directly through the walls. A sheet iron arrangement causes the air to flow over the steam pipes before it enters the wards. Each building has two wards, 30 feet by 20 feet, 13 feet high, with a room between them 16 feet by 20 feet, containing a fireplace. There is a bathroom and a dressing-room which can be kept warm at all times. The walls are lathed and plastered, and painted with lead and finished with a coat of enamel. The floor is covered with inlaid linoleum of the best quality. There are openings for ventilation in the ceilings and gable ends. The wards are lighted by electric light. There are no window guards.)

What should be the Policy regarding Tuberculosis in Insane Asylums?

O. Copp (Boston).

What Special Instructions regarding Tuberculosis should be given Institution Nurses and other Employés? J. H. Nichols (Tewksbury, Mass.).

Importance of Early Diagnosis in Pulmonary Tuberculosis. H. C. Clapp (Boston).

Treatment of Tuberculosis in Public Institutions. W. Tileston (Long Island Hospital).

Suppression of Tuberculosis in Dairy Herds. A. Peters.

Day Sanatorium for Consumptives. Parker Hill and D. Townsend (Boston).

Sanitary Importance of Clean Milk. C. Harrington (Boston).

Journal of Medical Research (Boston).

Biology of the Micro-organism of Actinomycosis. J. H. Wright (Boston).

Reaction Curve of Tubercle Bacilli from Different Sources in Bouillon containing Different Amounts of Glycerin. T. Smith (Boston).

Variations in Virulence in Organisms acted on by Serum, and the Occurrence of Spontaneous Agglutination. E. Steinhardt (New York City).

Changes in the Bacterial Content of Water in Passing through a Distributing Reservoir. B. G. Philbrick (Boston).

Intracellular Febrils in a Malignant Tumour of Epithelial Origin. S. B. Wolbach (Boston).

Cyclasterion Scarlatinale. F. B. Mallory (Boston).

Bacteriolytic Power of Immune Serum and the Theory of Complement Diversion. B. H. Buxton.

Relation of the Index of Alkalinity to the Production of Diphtheria Toxin. A. P. Hitchens.

Micro-chemical Reactions and Their Value in the Study of Cancer Cells. M. Tracy (New York).

Etiology and Pathology of Vaccinia in the Rabbit and in Man. W. T. Howard, Junr., and R. G. Perkins (Cleveland, Ohio).

Production of Active Immunity with the Split Products of the Colon Bacillus. V. C. Vaughan, Junr. (Ann Arbor, Mich.).

Study of Epidemic Cerebrospinal Meningitis. W. J. Elser (New York).

- Synthetic Culture Media and the Biochemistry of Bacterial Pigments. M. X. Sullivan (Providence, R.I.).
- Observations on Bactericidal Complement. E. Steinhardt (New York).
- Relative Influence of the Blood Fluids and the Bacterial Toxins of Phagocytosis. E. L. Walker (Boston).
- Fermentation Tube in the Study of Anaërobic Bacteria, with Special Reference to Gas Production and the Use of Milk as a Culture Medium. T. Smith, H. R. Brown, and E. L. Walker (Boston).
- Critical Review of the Literature on Experimental Variola and Vaccinia in the Monkey. W. R. Brinckerhoff and E. E. Tyzzer.
- Histology of the Skin Lesions in Varicella. E. E. Tyzzer.
- Experimental Work in Relation to Micrococcus Rheumaticus and Streptococcus Pyogenes. J. M. Beattie.
- New Colony Counter and Dissecting Microscope. A. H. Stewart (Philadelphia).
- Experimental Myiasis in Goats, with a Study of the Life Cycle of the Fly Used in the Experiment. F. C. Wellman (Benguela, Angola, West Africa).

American Medicine, Philadelphia.

- Puerperal Infection. E. McDonald (New York). (McDonald reports six cases of which a careful study was made. She found that while streptococcus infection is usually the most common and severe type of infection, other organisms, which usually produce clinically mild symptoms, may produce a severe type of this disease with a fatal termination. She urges that the term puerperal infection should be broadened to include infection elsewhere than in the uterus, and that the location and nature of such lesions should be recognized before any operative measures are undertaken. The presence of pathogenic microorganisms in the genital canal is by no means sufficient evidence on which to base a diagnosis of puerperal infection.)
- Cleansing of Milk Vessels: Relative Value of Washing Powders. A. H. Stewart (Philadelphia). (Stewart commends a method which consists of washing the bottles and cans by a powerful stream of some hot washing powder solution with rapid solvent power pumped into the bottles, which are then rinsed with boiling water. This method cleanses 95 per cent of the bottles perfectly. Stewart urges the establishment, under supervision of the bureau of health, of can-washing and cleansing buildings, where all cans may be sterilized before they are sent to the farms. The advantages of such a scheme would be: (1) Saving of milk which is now destroyed by rapid fermentation due to infection from dirty cans; (2) saving of ice used to preserve milk which is eventually lost; (3) saving of time; (4) abolition of the use of preservatives; (5) saving of space for the storage of empty cans; (6) increased sale of milk due to restored confidence in its purity; (7) saving of the lives of thousands of children who are now fed on fermenting milk, the food value of which has been lost; (8) prevention of epidemics of dysentery and other milk-borne diseases.)
- (Mar. 3.) Disinfection of Ships. J. D. Long (Manila).
- (Mar. 10.) Experimental Method in Sanitary Science and Sanitary Administration. W. T. Sedgwick (Boston). (Comparatively few physicians

- or sanitarians are in a position to conduct artificial experiments, but that almost any wide-awake observer, whether he be a physician, physiologist, sanitarian, or engineer, may, if he will, find going on all about him natural experiments, the conditions of which may often be learned with great accuracy, even after the experiment is completed, and which may yield conclusions quite as capable of verification as are those of experiments made in the laboratory. He pleads for better material on boards of health. Too often a hack politician or two, a second-rate physician or two, and one or more vain or place-seeking nobodies—useless but not harmless—make up local boards of health; and as no stream can rise higher than its source the services of such boards are disgracefully small in quantity and poor in quality.)
- Pathology of Rabies. A. Gordon (Philadelphia). (He holds that the presence of mast cells corroborates his view that the spinal ganglia are the place of predilection for the virus of rabies.)
- Prophylaxis of Lobar Pneumonia. J. M. Anders. (He claims that thorough and prompt sterilization of pneumonic sputum, and of the secretions from the upper respiratory tract, and then their prompt destruction by burning, is a matter of first necessity. Disinfection of the bed linen and body linen, the mattress, and the room occupied by the pneumonia patient is also a primary requisite. These matters do not receive the rigid care and attention which they richly merit by the average general practitioner. The public measures of greatest value are summarized as follows: The issue of drastic edicts against spitting on the sidewalks; the work of street cleaning and street sprinkling should be looked after by bureaus or boards of public health, to whom should be given full executive authority; there should be greater diffusion of popular information concerning efficient ventilation of our office buildings, theatres, courts of justice, manufacturing establishments, churches, public schools, and passenger and street railway cars, and also regarding details connected with the subject of the prevention of lobar pneumonia, stating simple, plain facts about the way in which the disease is spreading.)
- #### Journal of Infectious Diseases (Chicago).
- Observations on the Agglutination of Bacteria. W. H. Park (New York).
- Comparative Studies of Diplococci Decolorized by Gram's Method, Obtained from the Spinal Fluid and from the Nares in Cases of Epidemic Cerebrospinal Meningitis. E. K. Dunham (New York).
- Frequent Occurrence of Meningococci in the Nasal Cavities of Meningitis Patients and of Those in Direct Contact with Them. M. E. Goodwin and A. I. von Sholly (New York).
- Temporary Alteration of Character of an Organism Belonging to the Colon Group. O. Klotz (Montreal).
- Longevity of Bacillus Typhosus in Natural Waters and in Sewage. H. L. Russell and C. A. Fuller (Madison).
- Relation Between Oxygen in Water and the Longevity of the Typhoid Bacillus. G. C. Whipple and A. Mayer, Junr. (Brooklyn, New York).
- Relative Applicability of Current Methods for the Determination of Putrescibility in Sewage Effluents. G. A. Johnson, W. R. Copeland and A. E. Kimberly (Columbus, Ohio).

- Comparative Review of Current Methods for the Determination of Organic Matters in Sewage. G. A. Johnson and A. E. Kimberly.
- Method for the Direct Determination of Organic Nitrogen by the Kjeldahl Process. A. E. Kimberly and M. G. Roberts.
- Practical Advantages of the Gooch Crucible in the Determination of the Total and Volatile Suspended Matter in the Sewage. A. E. Kimberly and H. B. Hommon.
- Resistance to Decomposition of Certain Organic Matters in Sewage. H. W. Clark (Boston).
- Collection and Preservation of Samples of Sewage for Analysis. S. De M. Gage and G. O. Adams (Ithaca, New York).
- Ready Method of Preparing a Silica Turbidity Standard. E. C. Levy.
- Solubility of Calcium Carbonate and of Magnesium Hydroxide and the Precipitation of these Salts with Lime Water. G. C. Whipple and A. Mayer, Junr. (Brooklyn, New York).
- Use of Copper Sulphate in Water Filtration. Bactericidal Action of Copper. H. W. Clark and S. De M. Gage (Ithaca, New York).
- Determination of Copper in Water. F. B. Forbes and G. H. Pratt.
- A Notable Source of Error in Testing Gaseous Disinfectants. H. W. Hill (Minneapolis).
- Methods of Bacteriological Examination of Milk. F. H. Slack (Boston).
- Suggestions for Changes in the Schedules for Making Broth, Gelatin, and Agar, Recommended in the last Report of the Committee on Standard Methods of Water Analysis. H. W. Hill (Minneapolis).
- Device for Filtering Toxins, etc., by the Use of Water Pressure. H. W. Hill.
- Bacteriology of Whooping Cough. D. J. Davis (Chicago).
- Studies on Human Parasites in North America. 1. *Filaria Loa*. H. B. Ward (Lincoln, Neb.).
- Disseminated Blastomycosis. P. Bassoe (Chicago).
- Rôle of Phagocytosis in Anthracidal Action of Dog Blood. L. Hektoen (Chicago).
- Anthracidal Substance in the Serum of White Rats. J. M. Horton (Chicago).
- Adjuvant Action of Serum, Egg Albumin, and Broth on Tetanus Intoxication. H. T. Ricketts and E. J. Kirk (Chicago).
- Further Studies on Virulent Pseudodiphtheria Bacilli. A. Hamilton and J. M. Horton (Chicago).
- Identity of Fusiform Bacilli and Spirilla. R. Tunncliffe (Chicago).
- Etiology of Pemphigus Contagiosus in the Tropics. M. T. Clegg and W. B. Wherry (Manila, P. I.).
- Significance of Streptococci in Milk. P. G. Heinemann (Chicago).
- Further Studies on Streptococcus Infections. Method of Isolating the Pneumococcus in Mixed Cultures, Such as Throat Cultures. G. F. Ruediger.
- Common Mosquitoes of Bihé and Bailundo Districts, Portuguese West Africa. (Concluded.) F. C. Wellman.
- Toxins and Antitoxins of Poisonous Mushrooms (*Amanita Phalloides*). W. W. Ford (Baltimore).
- Auxilysins. W. H. Manwaring.
- New Species of Trypanosome Occurring in the Mouse, *Mus Muculus*. A. I. Kendall.

PUBLIC HEALTH

The Journal of the Incorporated Society of
Medical Officers of Health.

VOL. XIX. No. 6.

MARCH, 1907.

MEDICAL INSPECTION OF SCHOOL CHILDREN.

WE are pleased to see that the member for Scarborough (Mr. W. R. Rea) has just introduced a short Bill embodying the medical inspection clauses which were inserted in the Education Bill of last session at the instigation of Mr. Tennant. The passage of this measure seems assured, as the promotion of the physical welfare of the children is the one phase of the education question on which both Houses of Parliament and all political parties are agreed.

We trust opportunity will be afforded at some stage for certain amendments. More latitude should be allowed as to the time when the first inspection of the children is to be undertaken, and power should also be granted to Local Authorities to frame by-laws to facilitate the work of inspection. The latter addition is necessary in order to secure the attendance of children at centres for the detailed examination of the eyes and for other special purposes, including the re-examination of children excluded from school on account of ringworm, scabies, and so forth. We understand, however, that the Bill is being introduced under the ten minutes rule, and there will therefore be little opportunity for discussion. Under these circumstances the prospect of amending the Bill in the House of Commons must be small; and on the principle that half a loaf is better than no bread, it may be wiser to take the Bill as it stands rather than risk an indefinite postponement of a valuable reform. We must, therefore, be content to put forward these suggestions and leave the whole matter to the members of Parliament who are interesting themselves therein. In any case, should the Bill become law we trust the Board of Education will see their way to make a grant in aid of say £25 per 1,000 children towards the cost of medical inspection. This would materially diminish the opposition of parsimonious authorities, while the cash nexus would enable the central department to secure greater efficiency than would otherwise be practicable.

THE ORGANIZATION AND PRACTICE OF MEDICAL INSPECTION OF SCHOOL CHILDREN.

NOTHING is said in the Bill now before Parliament as to the way in which medical inspection of school children is to be carried out. This is undoubtedly wise, as the necessary organization must naturally vary according to the size and character (urban or otherwise) of the various educational districts. We cannot doubt, however, that in the vast majority of cases the organization of medical inspection will be entrusted to the medical officer of the Authority which elects the Education Committee. In this view we are supported by the fact that many medical officers of health have already undertaken a large amount of school work, and this aspect of preventive medicine has already assumed such proportions that in Mr. Power's recently issued "Memorandum as to the Annual Reports of Medical Officers of Health" information is specifically required as to "*Schools, especially elementary schools; sanitary condition of, including water supply; action taken in relation to the health of the scholars and for preventing the spread of infectious disease.*"

We trust that every medical officer will bear this new instruction in mind when writing his report for 1906, so that Local Authorities may have a clear idea of the amount of work already done in this direction and of the innumerable points of contact between schools, scholars, and the more general aspect of preventive medicine.

In the immediate future the actual practice of medical inspection will also need adjusting to local circumstances. In urban districts this work will naturally devolve on the medical officer of health or his assistant, while in rural districts the services of a local practitioner, preferably, perhaps, the district medical officer, will probably be secured. The reasons for adopting this course have been debated on many occasions during the last few years and do not need re-stating. A Committee of the British Medical Association has made itself responsible for an attempt to encourage Local Authorities to appoint an army of general practitioners organized by the divisions of the Association. This scheme must, we think, have passed the Committee in the absence of competent advice. It would undoubtedly be condemned by any medical man engaged in school work. In saying this we are speaking, so far at least as urban districts are concerned, as much in the interests of general practitioners as in that of public health. It is, we understand, for the detection of

communicable disease that this impracticable scheme is specially advocated. Now, anyone who has had any experience of public elementary schools knows that the number of instances in which clear cases of diphtheria or scarlet fever are found in actual attendance is extremely small. What one has to do, in say an outbreak of diphtheria, is to visit the infected class, examine each of the children, and exclude those presenting symptoms of latent diphtheria. This entails the taking of many swabs and explanatory visits to the homes of the suspected cases, whose parents have to be consulted and other clues followed up. Next, attention has to be paid to the attendance register and recent absentees examined at their own homes, while, in a certain proportion of cases, information gained at the school has to be read in the light of what is already known as to the existence of diphtheria in children attending other schools or below the school age. It will be seen that this is a fairly large order, frequently necessitating several hours' continuous work on the part of the medical inspector *as well as the simultaneous activity of one or more of the health visitors* employed in the districts from which the children are drawn. The exigencies of private practice do not allow time for such detailed work, which, when required, must be done promptly and rapidly, and difficulties with neighbouring practitioners would inevitably ensue. Consider, again, the case of ringworm and verminous conditions. Here a provisional diagnosis can be made by the teacher or school nurse, but confirmation by the school doctor is frequently required, especially if the parents have to be prosecuted for neglecting treatment. This is not a particularly pleasant task in any case, and is certainly incompatible with the personal interests of a practitioner who desires to establish a lucrative practice in the vicinity of the school. Though we have only referred to communicable diseases, similar difficulties would, in our experience, arise in other instances, and we have no hesitation in affirming that the opportunities for coming into conflict with parents and with competing practitioners are so numerous as effectually to bar general practitioners from undertaking school work in towns.

THE NEW NOMENCLATURE OF DISEASES.

PROBABLY every medical practitioner has now received a copy of the 4th Edition, being the 3rd revision of "The Nomenclature of Diseases drawn up by a Joint Committee, appointed by the Royal College of Physicians of London," which has been recently issued. Probably also most practitioners have put it aside as a volume having little interest for them. We hope it has not met with the same fate from many medical officers of health, for to them it is a volume of great importance, and practical familiarity with its

contents, as well as with the Schedules of Causes of Death issued by the Incorporated Society of Medical Officers of Health, is indispensable for the efficient compilation of the statistical portion of their annual reports.

It would be a great gain to the cause of medical statistics if every medical student had to attend, in his last year of student's life, two lectures on medical nomenclature and classification, and if he had to write out sample medical certificates of cause of death for every fatal case occurring in the wards in which he is learning his profession; these certificates to be subject to the criticism and correction of a competent person, who understands the principles and methods of death certification for the purposes of our national system of vital statistics.

THE HISTORY OF THE NOMENCLATURE.

THE preparation of the first edition of this work was begun in 1859, and it was completed in 1869. The second edition was begun in 1880, Dr. Ord being secretary and editor. The third edition was begun in 1892, Dr. Bristowe being Chairman of the Sub-Committee on Classification, and Dr. Payne its secretary and editor. The present edition was begun in 1902. Dr. Pye-Smith was appointed the Chairman of the Sub-Committee on Classification, and Dr. Ormerod its secretary, among other members of this sub-committee being Drs. Payne, Tatham, and Whitelegge. A large number of sub-committees were appointed to revise the classification of local diseases, whose work is duly acknowledged in the preface.

NOMENCLATURE AND CLASSIFICATION.

To correctly name a disease is more important than to be able correctly to classify it under a more general heading. If every practitioner would return correctly the primary chief cause of death, their statutory duties would be completely fulfilled. Even a medical officer of health need not trouble himself with classification if he chooses in his reports to adopt the long schedule A, published by our Society. It is only when he wishes to condense his data that classification is required, and most men who have had experience of such classified returns wish that the constituent parts of the information thus fused into one common mass were now available for them. Few who add together causes of death in their returns, and refrain from giving each cause separately, fail to have subsequent cause for regretting the practice. The most flagrant instance of this is what is known as the "zymotic death-rate"; but there are also valid objections against massing bronchitis, and still more pneumonia, with "all respiratory diseases," and against putting all diseases of the circulatory organs in one group.

The principal changes in classification introduced in the present edition of the Nomenclature relate to the large and heterogeneous section headed "General Diseases" in the third edition. This has been broken up into the following groups:—

1. Infective Diseases, of which 49 are enumerated.
2. Intoxications, including pellagra, lathyrism, and poisoning by alcohol, arsenic, cocaine, ergot, lead, mercury, morphia, phosphorus, and tobacco.
3. General Diseases, not included in the two preceding groups, as anæmia, cretinism, gout, rickets, scurvy.
4. Certain morbid conditions incident to various parts, as malformations, new growths, cysts, effects of parasites, of injuries, of foreign bodies, and of poisons.

This classification is as satisfactory as is possible in the light of rapidly growing knowledge. For practical statistical purposes, however, the golden rule to bear in mind is not to indulge in groupings, but to enumerate each cause of death singly. If any other plan is adopted, and the full details of individual diseases are not also published, the growth of knowledge will almost certainly render comparisons of grouped materials for a series of years impracticable or useless.

NOTES ON INDIVIDUAL DISEASES.

UNDER diphtheria the important note is made that the use of the term "membranous croup," as a synonym for "laryngeal diphtheria" should be discontinued. These brief words form the last chapter in the history of a medical discussion lasting over fifty years. Even yet some practitioners do not believe in the essential and uniform identity of membranous croup with diphtheria; but the discussion is now dead, and it may be hoped that it will be followed by the disappearance of the term "membranous croup."

Infective Enteritis, with its synonym, epidemic diarrhoea, is now the official name of a disease with which medical officers of health are greatly concerned. The name zymotic enteritis has disappeared, as also summer diarrhoea. We note that cases of diarrhoea due to food are directed to be returned under this head. Thus deaths from poisoning by pork-pie or rabbit-pie, caused by the Gaertner or some allied bacillus, will be classified with infantile diarrhoea. It does not need much foresight to express the belief that when the time of the decennial issue of the Nomenclature again comes round, Infective Enteritis will probably be capable of being split up into two or more separate diseases.

It is pleasant to see Rheumatic Fever in its proper place, next to Scarlet Fever among the infective diseases.

Under the heading Small-pox, the following note is given:—

In every case the presence or absence of marks of vaccination, and when marks are present, their number, size, and character, should be noted. There should be added any reliable information as to whether the patient was

- (1) Unvaccinated.
- (2) Vaccinated in infancy only.
- (3) Vaccinated after infancy (state age if known).
- (4) Vaccinated only after infection with small-pox.
- (5) Revaccinated (give dates if known).

Under the heading Septicæmia the following important note is given:—

The term "Puerperal Fever" has been removed from the Nomenclature. Pyæmia, Septicæmia, or Septic Intoxication, occurring in puerperal women should be described as "Puerperal pyæmia," Puerperal septicæmia, or "Puerperal septic intoxication," respectively. Other conditions formerly included under the term "Puerperal fever" should be returned under Affections consequent on Parturition, the word "Puerperal" being in all cases prefixed to the word denoting the local process.

TUBERCULOSIS.

UNDER the heading tuberculosis the Nomenclature advises that the terms "Strumous," and "Scrofulous," should be no longer used. Under diseases of the lung, Phthisis is enumerated with the note that, "when ascertained to be due to other causes than tuberculosis, this should be stated." It will be remembered that in the Registrar-General's reports in recent years *Phthisis* has been given in italics when not otherwise defined, so as to discourage the use of the word, the term preferred being Pulmonary Tuberculosis (Tuberculous Phthisis). Obviously this is a good plan so long as the Phthisis is retained. It is always possible to add the two together; it would be impracticable to separate them if they were both entered under one heading. The Nomenclature does not appear to discourage the use of the word Phthisis. The above quotation appears to indicate that every death from phthisis, unless otherwise defined, is to be regarded as Pulmonary Tuberculosis, though doubt as to this inference is created by the fact that "phthisis" is placed among diseases of the lungs, and not, like pneumonia, among infective diseases. On the next page of the Nomenclature, however, *tuberculosis* (under the general heading Diseases of the Lung) is printed in italics, along with cancer, syphilis, etc., with the note that "italics indicate that the disease in question should not be registered in this section. The

proper place is shown by the number which follows." Referring back to this number we find it is simply "tuberculosis," without any advice at this point that the name of the organ chiefly affected should be inserted, although in a foot-note, not on the same page as pulmonary tuberculosis, it is stated that the local condition as well as the general cause should be specified. One of the great difficulties experienced in measuring the amount of past decline in the death-rate from pulmonary tuberculosis is the increasing tendency on the part of certifying practitioners in recent years to return the death as due to "tuberculosis," without specifying as formerly the chiefly pulmonary localization of the disease; and unless the directions in the Nomenclature are very closely scanned this tendency will be encouraged. It may be urged that this is in the direction of accuracy, as all tubercloses are due to the same specific agent. In practice, however, confusion is being increased by this means, owing to the incomparability and inaccuracy of the death returns as to *tuberculosis mesenterica*, *tuberculous meningitis*, and all forms of tuberculosis, other than phthisis. On the same page of the Nomenclature as phthisis is mentioned chronic interstitial inflammation of the lung, with the synonym "fibroid phthisis," to be tabulated separately from phthisis. *Tabes mesenterica* appears to have disappeared from the Nomenclature.

PNEUMONIA.

PNEUMONIA, with the variety epidemic pneumonia, is placed among infective diseases, between plague and pyæmia. Broncho-pneumonia or catarrhal pneumonia remains among diseases of the lungs. The various forms of pneumonia probably represent several varieties of infection, and we fail to understand how it can be said that "pneumonia" is an infective disease, while "broncho-pneumonia" is a local disease of the lungs. In practice these two diseases should be tabulated separately, and then it signifies little under what heading they are classified.

ENTERITIS AND GASTRO-ENTERITIS.

THE comparability of the returns for different years and different places relating to epidemic diarrhoea is a matter of serious importance. Changes in nomenclature and classification in recent years have seriously endangered this comparability. It arose somewhat in this way. The term summer or epidemic diarrhoea failed to satisfy certifying practitioners, who began to use the alternative terms gastro-enteritis or enteritis. This led to a fictitious reduction in the diarrhoeal death-rate, to remedy which practitioners were instructed to prefix the words "zymotic" or "epidemic" to the designation enteritis when they meant epidemic diarrhoea. It should be added that in the official classification "intestinal or gastro-intestinal catarrh" is also classified with diarrhoea. In the new Nomenclature, enteritis is classified as catarrhal, infective, ulcerative, and membranous. Infective enteritis will, of course, be classified as epidemic diarrhoea. Whether catarrhal enteritis will be so classified by the Registrar-General is doubtful. The only safe plan for medical officers of health in preparing their annual reports is to insert for a series of years a table giving separately the deaths from diarrhoea and its customary synonyms, from enteritis, and from intestinal catarrh. In this way it will be practicable to see what transfers are gradually occurring between these different names.

MALIGNANT DISEASES.

New growths are divided into malignant and non-malignant. The former are grouped into sarcoma and carcinoma and malignant endothelioma. It is specially noted that malignant forms of tumours containing cartilage should not be returned under the headings of osteo-chondroma or myxochondroma. It cannot be too strongly emphasized that certificates of death should state the locality affected with malignant disease. It is very often impossible to state whether a given malignant growth is sarcomatous or carcinomatous; but the statement of part affected often enables this to be decided. This is clearly shown in the admirable classification of

such growths adopted in Dr. Tatham's letters to the Registrar-General.

The almost insuperable difficulties of diagnosis of malignant growths, in the absence of both autopsy and microscopic examination, was clearly brought out by a paper recently read by Dr. Bashford to the Epidemiological Society. For several years returns have been received by the Imperial Cancer Research Fund from the large Metropolitan hospitals, and from these returns the following table has been prepared:—

	Total Number Examined	Percentage of total cases which were		
		Correctly Diagnosed	Not Diagnosed	Wrongly Diagnosed as Cancer
Accessible New Growths ...	2,799	85	8	7
Inaccessible " ...	1,102	55	39	6
Intermediate " ...	720	79	12	9

The malignant new growths were classified according to whether the parts of the body affected were easily accessible to complete physical examination. It appears that 45 per cent of those in inaccessible positions as compared with 15 per cent of those in accessible positions were clinically unrecognizable as cancer. In all these cases subsequent confirmation or contradiction of the diagnosis was made by pathological means. Evidently malignant growths have no specific characteristic symptomatology, and much more work will be needed before we can speak with any measure of satisfaction concerning the alleged increase of cancer.

INFANT MORTALITY.

SIR SHIRLEY MURPHY's annual report is always full of matter of both statistical and administrative interest. The section on Infant Mortality in the recently issued report for 1905 comprises an interesting statement to the effect that in the first month of life the mortality in the most overcrowded is not higher than that of the least overcrowded groups of districts of London. This absence of difference is ascribed in part to the more complete registration of births and deaths in the better circumstanced districts. If confirmed in future reports by continued experience, it certainly does "not lend support to the view that ante-natal conditions constitute a pre-dominant factor, if any, in determining infant mortality." This conclusion is confirmed by the fact that the excess of infant mortality in the most crowded districts increases with the interval from birth. Thus at the ages 0-3 months, the infant death-rate in the least crowded districts of London is to that in the most crowded as 100-115, at ages 3-6 months it is as 100-138, at ages 6-9 months it is as 100-155, and at ages 9-12 months as 100-195.

Sir Shirley Murphy also makes the important suggestion that much of the apparent increase of mortality in the beginning of life from premature birth and allied conditions may be due to better certification of deaths, especially of children who only survive their birth a very brief period. It is not unlikely that this explanation may go far to explain the increased death-rate from premature birth, etc., as shown by the death returns, and consequently may go far to explain the failure of the infantile death-rate to decline.

PHTHISIS DEATH-RATES AND OVERCROWDING.

SIR SHIRLEY MURPHY's annual report for 1905 contains on p. 50 a table which, we believe for the first time in the history of such statistics, gives corrected death-rates from phthisis, compared with overcrowding in the same districts, the death-rates being corrected for differences in the age and sex constitution of the various sanitary districts. The standard of overcrowding taken is that of the Census Report, it being assumed that every dwelling occupied by more than two persons to every room in it is over-

crowded. Taking this standard the sanitary areas having less than 7·5 per cent of their dwellings overcrowded had in 1901-5 a corrected phthisis death-rate of 1·12 per 1,000; those having 7·5 to 12·5 per cent overcrowded had a corrected death-rate of 1·40; those having 12·6 to 20 per cent overcrowded had a corrected death-rate of 1·47; those having 20 to 27·5 per cent overcrowded had a corrected death-rate of 2·00; while in the districts with over 27·5 per cent of their dwellings overcrowded, the corrected phthisis death-rate was 2·17 per 1,000. Thus the death-rate from phthisis in the most crowded was nearly double that in the least crowded districts. On the evil effects of bad housing in predisposing to and disseminating phthisis and increasing the death-rate from it, there can be no dispute. At the same time it has, of course, to be borne in mind that a very large proportion of consumptives do not fall ill where they die, and that another large proportion do not acquire their infection where they fall ill. The average duration of a case of phthisis may be said to be three years, probably more. The frequency with which the poor change their homes is well known. These facts make the relationship between housing and phthisis a more complicated problem than at first sight appears.

NOTIFICATION OF BIRTHS BY MIDWIVES.

It appears that 2,105 certified midwives reside in London. What proportion of these are in actual practice as midwives is doubtful. With a view to bringing new-born infants under the supervision of medical officers of health, certified midwives were in 1905 asked by the London County Council to furnish weekly lists of the cases attended by them. In the 11 weeks of 1905 during which this system of voluntary notification of births was in operation, 6,506 births were attended by midwives furnishing lists, which means, if the same rate of notification were continued throughout the year, nearly a fourth of the total number of births in London. About 150 midwives, including most of those in large practices, have supplied the information, the Council paying the postage; and the names and addresses of the mothers are forwarded from the Council offices to the various medical officers of health concerned. It is found that by this means the mothers can be visited on an average within 11 days from the birth of the child, i.e., about the time when the midwife leaves the mother to her own resources. There can be no doubt that this system of notification of births opens out great possibilities of good work. It will also be useful in affording information as to the number of cases attended by midwives, and in enabling more accurate comparison to be made of the incidence of stillbirths or puerperal fever occurring in the practice of particular midwives.

THE GROWTH OF INSANITY.

DR. ROBERT JONES, of Claybury, has contributed an interesting letter to a recent issue of the *Times*, dealing with the proportionate increase of insanity from 1 in 761 of the population in 1844 to 1 in 271 in 1905. He first draws attention to two factors, which go far to explain the increase, at least in institutionally treated insanity. Firstly, a capitation grant has been paid since 1874 to the Guardians for each case sent by them from workhouses into asylums. It is not surprising therefore that in 1905 over 78 per cent of all pauper lunatics were in asylums in 1905, as compared with 56 per cent in 1859. Secondly, the death-rate among occupants of asylums has greatly declined. In 1844, it was about 24 per cent, and in the last quinquennium was only 8·8 per cent per annum. These factors need consideration in considering the "growth of insanity."

Some suggestive remarks are added by Dr. Jones on the cure of insanity. He advocates as more fertile in results, its prevention rather than its cure, instancing particularly steps tending to prohibit the sale of alcoholic drinks, measures considered for the control of immorality, of vice, poverty, and crime; efforts made to establish the science of eugenics or stirpiculture; and general improvements rendered possible by public health administration.

DIPHTHERIA AND SMALL-POX: AN EPIDEMIOLOGICAL CONTRAST.*

By D. S. DAVIES, M.D. (Lond.), D.P.H. (Camb.),

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I FEAR I cannot offer you a Presidential Address in any way worthy of the brilliant traditions of the Society over which, by your courtesy and complaisance, I am called upon to preside, but, recognizing, as I fear, in modern Public Health effort, a tendency to leave to others the buffeting with the conflicting waves of epidemiological study, and to paddle in the smoother waters of sociological experiment, I venture to lay before you a humble endeavour towards the comprehension of some points in the life-history of two of the commoner communicable diseases.

The conception of disease-prevention as a general formula, whether in terms of municipal cleanliness, or of isolation and disinfection, has undergone much modification under the teachings of incomplete success, but the disappointment which awaited each generalization in turn has made for progress by directing attention to the variations in the life-history of the diseases classed together as communicable, and it is now fully realized that only by a close study of these variations—including the habits of the parasitic organism, and the reaction of the host—can measures suitable for the effective checking of each disease be devised.

Dr. J. F. Payne contributed to the *St. Thomas's Hospital Reports* for 1892, vol. xx., No. 59, a lucid paper on "Specific Diseases Considered with Reference to the Laws of Parasitism," in which he demonstrated how, when the parasitic habit is once established, the conditions favouring the continuance of the species are regulated by the laws of parasitism, of *entrance*, *migration*, and *exit*, each of these being such as to secure, for each variety, the successive passage of the parasitic organism into the next proper medium, or into the next successive host; and he pointed out that in the case of the vegetable parasites, such as the fission-fungi of disease, there are many analogies with the phenomena of animal parasitism. Thus, while some micro-organisms produce only local trouble, others, as in the case of the acute exanthemata, at once migrate to situations on the body surface favourable for their continuance, at the same time increasing enormously in numbers, and thus favouring the continuance of the species by cutaneous excretion of infection. In these diseases, too,

* Presidential Address delivered January 11, 1907.

If, however, we confine our attention to the organisms alone, we are apt to under-estimate the importance of the varying resistance of the individual to invasion, and to neglect the phenomena produced by the action and inter-action between organisms of varying virulence and individuals of varying resistance. Two outstanding facts that cannot be neglected in dealing with communicable disease are, first, that certain pathogenic bacteria survive the disease they produce, thus tending to prolonged infectivity and the occurrence of "return" cases, and, secondly, that under certain conditions a virulent organism can establish itself upon the tissues of an immune subject, so that we are confronted with the disconcerting fact that persons, to all appearances well, may carry and distribute disease germs. The conception which early followed the discovery of the specific pathogenic bacteria, that they entered, permeated, and then passed out of the body, like an orderly army without stragglers, is found in many instances to be far from the truth. Had it been generally true, the efficacy of isolation hospitals would have been complete, and the control of infectious fevers would have proved an almost crudely simple matter. As we shall see later, it possibly is true with regard to one disease, small-pox, so that in certain respects this is one of the

COMPARATIVE TABLE SHOWING DIPHTHERIA MORTALITY.
DEATH RATES PER 100,000 LIVING.

		FROM THE REGISTERS GENERALLY, ANNUAL JOURNALS																							
		1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905
76 TOWNS		16	16	17	17	16	18	21	26	24	21														
33 TOWNS		22	24	24	22	20	23	30	37	32	32	44	76	61	53	60	51	39	43	34	30	25	16	16	12
12 TOWNS		7	4	13	16	18	25	20	10	11	10	20	35	42	80	77	70	37	63	61	50	46	26	17	26
WOLFHAMPTON		82	17	31	46	34	12	23	32	4	17	17	19	11	15	16	10	17	50	52	28	16	12	4	4
BRIGHTON		12	16	12	13	13	7	14	56	19	7	9	16	6	11	14	13	11	20	11	11	13	13	12	15
PLYMOUTH		4	9	11	14	11	9	7	6	6	14	22	21	15	16	15	14	10	31	38	54	35	30	16	
BRISTOL		25	25	37	40	13	19	8	7	13	13	26	68	46	36	37	53	73	33	42	47	52	20	18	23
CARDIFF											11	5	11	12	10	11	122	136	58	19	25	22	25	10	
SWANSEA																									
WOLVERHAMPTON		1	5	6	11	18	9	12	9	6	3	5	6	4	98	60	62	43	19	10	13	20	9	18	18
BIRMINGHAM		14	12	10	11	17	13	9	13	12	8	15	13	15	37	53	29	26	29	14	16	24	26	24	17
NORWICH		3	6	14	9	13	23	32	17	28	27	16	22	17	16	22	9	13	33	10	27	9	11	7	20
LEICESTER		4	5	10	11	3	8	9	7	8	10	7	11	7	18	32	36	30	106	151	73	15	3	5	
NOTTINGHAM		11	17	19	14	5	3	14	5	6	7	10	7	8	4	6	9	9	9	8	6	14	10	2	19
DERBY		4	1	1	2	7	7	19	19	19	21	7	5	6	10	9	9	8	6	14	10	3	25	19	
BIRKENHEAD		3	3	8	14	16	10	7	8	11	11	8	15	39	42	20	23	43	21	9	25	24	10	24	28
LIVERPOOL		9	9	14	23	21	16	11	9	17	12	11	12	19	24	24	20	33	34	26	37	30	23	27	21
BOLTON		8	6	4	6	6	5	8	29	15	10	10	10	13	11	10	13	11	7	9	12	16	15	11	16
MANCHESTER		7	9	6	6	9	20	34	41	39	24	20	32	28	21	15	9	15	18	24	14	21	20	17	20
SALFORD		10	12	9	8	6	10	20	72	81	38	26	29	31	30	23	15	15	34	41	63	33	38	49	36
OLDHAM		9	7	4	12	21	41	23	11	4	14	12	13	28	18	24	8	7	16	13	9	43	39	25	9
BURNLEY		2	-	2	1	-	1	1	4	4	-	1	2	14	7	30	43	46	57	27	23	19	41	20	12
BLACKBURN		4	14	11	16	8	26	22	30	14	14	14	13	7	10	13	10	13	5	2	6	13	15	11	16
PRESTON																									
Huddersfield		8	2	5	3	10	42	16	13	5	7	7	3	22	15	21	10	13	5	2	6	13	15	11	16
NALIFAX		7	5	3	10	21	8	5	15	16	2	20	25	13	15	22	9	8	15	13	17	8	9	16	26
BRADFORD		3	3	4	8	4	5	2	5	3	8	7	10	8	9	7	7	11	11	12	30	19	37	28	
LEEDS		10	13	20	7	8	3	5	5	6	4	8	16	19	16	12	16	34	78	59	41	21	15	10	10
SHEFFIELD		7	7	4	4	3	6	9	16	15	13	24	18	20	15	16	13	26	128	126	63	27	9	11	13
HULL		8	12	15	4	2	6	5	8	9	7	6	11	14	17	13	14	7	12	8	16	35	31	25	30
SUNDERLAND		13	16	12	10	4	5	11	16	9	8	7	8	7	6	6	15	21	10	11	10	12	16	10	12
GATESHEAD																									
NEWCASTLE		3	7	10	16	12	19	21	20	30	22	22	16	16	25	18	12	13	13	14	16	10	17	22	19

DIAGRAM I.

diseases most amenable to control, in spite of its intense infectivity.

Arising out of the life-history of the diphtheria organism in conjunction with its human soil, and in marked contradistinction to the simple phenomena presented by small-pox, we find that epidemic invasions of diphtheria present very distinctive and notable features worthy of careful study.

Diphtheria is more or less endemically prevalent in all large towns, but the periods of fatal prevalence which we may call epidemic recur, not after the manner of measles, in tidal waves, at fairly constant and somewhat short intervals, but at long and uncertain intervals, after a prolonged period of comparative, and often remarkable, quiescence. In the case of measles, the accumulation of susceptible individuals during inter-epidemic intervals, infection, and spread amongst these individuals in a wave limited by exhaustion of the susceptible material, consequent subsidence of the disease, and an interval of little prevalence, form a fairly correct picture of the simple recurring history of the disease, but are an insufficient explanation for the vast differences in the behaviour of diphtheria before and during the epidemic period. Newsholme has postulated, in his customary cogent manner, certain influences in regard to rain-fall and soil, which, no doubt, contribute materially to the efficiency of a diphtheria invasion; but behind these and kindred determining causes, and beyond the undoubted influence of schools and personal infection, a factor must be sought, and will be found, as I believe, in a necessity for the importation into a district about to be infected of a new and relatively more virulent type of diphtheria bacillus.

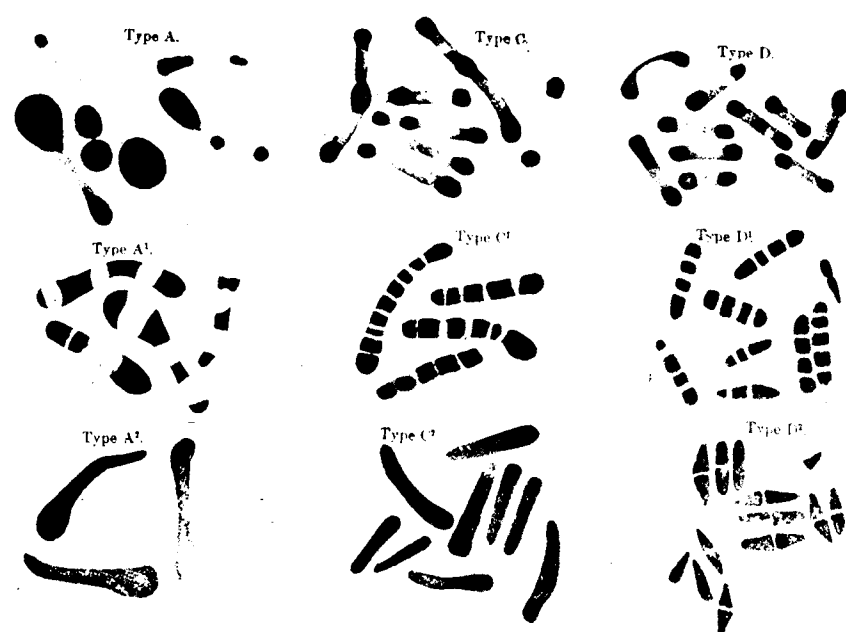
So marked are the differences observed between the low- and the high-wave period in diphtheria, that even Medical Officers of considerable experience, if they have only had opportunities of observing the former periods, are incapable of forming a just conception of the behaviour of virulent and fatal diphtheria outbreaks.

Since the year 1886, twenty-one years ago, I have had the opportunity of observing the habits of diphtheria in the City of Bristol, numbering then 214,134; and numbering now, owing to considerable extension, as well as natural increase, 367,000 (1907).

THE PRE-INVASION STAGE.

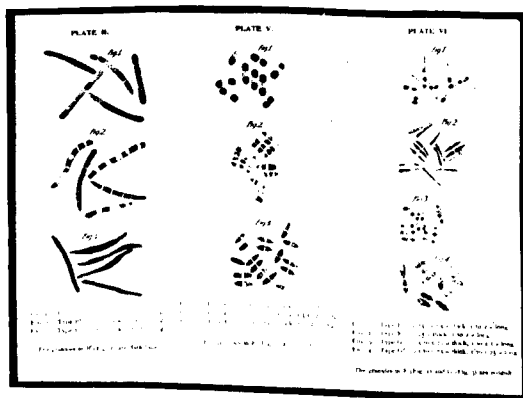
During the first fourteen years of this period, up to the year 1900, although some diphtheria was always present in the city, not only was the fatality singularly and consistently low, as it had been for many previous years; but certain other peculiarities marked the habits of the disease, and formed a strong contrast to its subsequent

DIAGRAM 2.



Westbrooke's Types of Bacilli of Diphtheria.
Common Types, A, C, D. — Rarest Types, A¹, C¹, D¹. —
Still Rarer Types, A², C², D².

DIAGRAM 3.



behaviour. For example, during these fourteen years there was no sign of any special school influence, and school outbreaks were practically, or, I may say, entirely unknown, no hospital beds for diphtheria were provided, nor was there any apparent need for them: diphtheria was, in fact, during that whole period a factor of no great urgency in the city's nosology; such cases as did occur were apparently clinically marked (text-book cases), and, therefore, readily diagnosed and dealt with, there seems to have been no tendency to the occurrence of "minimal" and "carrier" cases, to confuse diagnosis and complicate control.

At the British Medical Association Meeting in Bristol in 1894, I had the advantage of hearing from Dr. Hermann M. Biggs, some account of the diphtheria work already commenced in the United States; and early in the following year I commenced and followed up as completely as possible a systematic examination of cultures from every case of diphtheria notified in the city, amounting by the year 1900 to 2,218 cases, occurring before the invasion of what I may call the epidemic type of virulent diphtheria. In the three succeeding years, after the invasion, I had the opportunity of examining a further 8,510 cases, so that the chances afforded me of morphological comparison between the bacilli of the two periods were considerable.

Although the disease gave comparatively little trouble, and was amenable to control during the pre-invasion period, we were able to confirm from our own experience the observations of American observers as to the occurrence and significance of "nasal" diphtheria, and to realize its importance and its possible efficiency, especially when accompanied by few or negligible clinical symptoms, as a distributor of the disease.

In work of such magnitude, with limited help, reliance must chiefly be placed upon morphological peculiarities, and we found in the work of Dr. Westbrooke (Bacteriologist and Professor of Pathology and Bacteriology to the University of Minnesota) a valuable and practical classification.

In the diagram 2, the granular forms A, C, and D, are the forms most commonly present in clinical diphtheria, and would be classed as diphtheria by most bacteriologists.

In the pre-invasion period in Bristol, however, that is to say, before the year 1900, these well-marked forms, which subsequently became so painfully familiar to me, were almost always conspicuous by their absence. I was hardly able, indeed, to realize, from my own observation, that the diphtheria bacillus was a long round-ended bacillus, staining distinctively in the beaded or granular fashion. The type of bacillus

present in clinical cases conformed more closely to those grouped by Wesbrook as type F, F2 (*Plate VI, Fig. 1, Fig. 2, Report on Diphtheria in Well Persons by a Committee of the Massachusetts Board of Health. Boston, Geo. H. Ellis Co., 1902*), being shorter, thinner, and generally definitely pointed at one end, staining either solid or in granules. The characteristic text-book, long, round-ended, granular-staining bacillus was, during this period, quite rare.

THE PERIOD OF EARLY INVASION.

The phenomena of early invasion were these: In February, 1900, quite suddenly, a considerable number of cases of diphtheria were notified in a southern district of Bristol, almost completely cut off by a river from the main city, to which two bridges at a long interval gave access. This community, in regard to shopping, schools, places of worship, etc., was thus, to some extent, distinct. Diphtheria had been prevalent in some adjacent districts of the county. The invasion at first showed no noticeable tendency to spread by school influence, but after the first year this tendency became increasingly marked.

The fatality of the disease at once attracted attention; the deaths per 100,000 rose from 10 in 1899 to 31 in 1900.

The bacteriological features of this invasion of virulent diphtheria showed corresponding variations: in cultures from the affected district, characteristic and typical long diphtheria bacilli of the type C replaced the forms which had hitherto prevailed, and occurred so regularly that for some time the geographical position of a case could be determined from observation of the specimen. A sudden change of type had occurred in one district only of the city, subsequently to spread, by traceable extension, to others, until the whole was leavened; so sudden and so complete was this change, that to me it appears certain that it was a fresh introduction of a new and virulent type not previously present in the city.

The accumulation during inter-epidemic periods of sufficient susceptible individuals to feed an epidemic wave, while it appears to be a sufficient explanation for the regular recurrences of measles, does not seem sufficient to account for the remarkable change in the whole character of the disease which accompanies the epidemic invasion of diphtheria after a prolonged period of quiescence.

Diphtheria is peculiarly liable to variation of type, which may flourish side by side in a given town; not only this, but special types may apparently attach themselves to special towns, to the temporary exclusion of other types.

Examples of this are afforded in three observations by American

bacteriologists, to which my attention has been kindly drawn by Dr. Chas V. Chapin, of Providence, R.I.

1. Gorham found that the types present in Providence in clinical diphtheria ran very considerably smaller than those in Boston (Hill) when actual comparison was made under similar conditions.

2. Wilson, of Minnesota, found branching forms of *Bacillus diphtheriae* in abundance in Boston, although they have been seen only three times in Minnesota.

3. Amyot, of Ontario, states that the types vary with the locality to some extent, since, in studying clinical cases bacteriologically, he was able to distinguish between two specific localities by the types present.

Again, through the courtesy of Dr. Chapin, I am enabled to quote a letter from Amyot, of date Nov. 22nd, 1906:—

“At Boston, some two or three years ago, I mentioned the fact that I had observed, particularly in the case of Berlin, Ont., and Newcastle, Ont.—two towns some ninety miles apart—that the bacilli were quite different in character. At Berlin they were short and thick, and showed very marked deeply coloured metachromatic granules, and very indifferent barring; whilst at Newcastle they were long, slender, showed light-coloured metachromatic granules and rather distinct barring, and this held for the whole outbreak, extending over some months. Hill and Gorham, either then, or some months afterwards, recited the difference in organisms in your City of Providence and Boston. It was after this that Kendall undertook his work with Welch at Hopkins, and I believe found this to be so in other places, as well with diphtheria as with other infective bacteria.

“I have not recorded the observation anywhere else.

“Though not so marked as with Berlin and Newcastle, I have since observed this difference in other localities in Ontario; and we have a good chance here, since our Province is nearly 1,800 miles long, and in many places 200 to 400 miles wide.”

Hence, in any two outbreaks in different districts, one may not be dealing with the same bacillus, nor meet with the same phenomena; but when the outbreak is notably fatal, and the phenomena include carriers, minimal cases, and nasal implication, the prevalence of the C type is, I think, fairly assured.

THE PHENOMENA OF FULL INVASION.

After the first months of invasion, the special features of epidemic diphtheria become fully established. We may accept without hesitation the grouping of diphtheria cases into marked clinical cases, slight

ambulant cases, and carrier contact cases; and we must recognize the fact that the potency of a case for spreading the disease is inversely as its severity.

The progress of an epidemic appears to follow a course, determined partly by the virulence of the type introduced, and partly by the resistance of the individuals attacked. In any population there are certain immunes to the most searching infection, and a comparatively large number are apparently less or more immune to the poison of diphtheria. During the first months the introduced infection is somewhat limited in distribution, and no wide condition of active immunity or part immunity exists amongst susceptible bodies, such as school groups, so that the individuals affected present largely clinical types of disease, and at this stage hospitals might prove of far greater service in prevention than later—in conjunction, of course, with bacteriological means to combat the insidious diffusion of indeterminate infections which are all the time being set up far and wide.

During inter-epidemic periods it would appear that the normal resistance to diphtheria in a population is sufficient to protect the majority against any clinical manifestation of the disease, and also against any mere parasitic attachment to the tissues, on the part of the type of bacillus then present; hence, marked clinical cases are met with, minimal and carrier cases are rarely, if at all, established, and the disease is amenable to control.

But with the advent of a virulent type, the resistance which was formerly sufficient to resist infection partly breaks down, and, as a result, infections of varying degree occur, the slighter cases are readily overlooked, and even with bacteriological aid are apt to outstrip control; thus the way is paved for school outbreaks and for wide-spread personal infection.

The outbreak in Bristol, which, starting in 1900, did not decline until 1905, showed features agreeing closely with this hypothesis.

Although one or more schools had become implicated during 1900 and 1901, they had proved generally amenable to control; but in 1902 the population had become so leavened by minimal and carrier cases, that infection was fed from many undiscovered sources, and school outbreaks became urgent, widespread, and with difficulty controllable. The expression "school-outbreak" is often somewhat of a misnomer, for, though many of the cases attend the same school, home infection is frequently responsible for much spread; and "district outbreaks, with accompanying school implication," would often be a more accurate description.

When virulent diphtheria has been for some years prevalent in a

large population, a condition of things becomes established which is probably constant for most towns, and which has been ably summed up by Dr. Kerr (in his 1905 *Report* to the Education Committee of the London County Council), with whose conclusions my experience in general agrees. These conditions do not, it must be noted, hold in districts during the earlier stages of invasion.

Dr. Kerr points out that, whereas, judging from notification returns, the ages of chief diphtheria incidence are from 3 to 5, reaching the maximum at 4, and from 5 to 8 there is a very rapid fall in the incidence of diphtheria, which, thereafter, becomes relatively level; yet these very ages 5-8, are precisely those during which classes at school become foci of infection. The most serious cause of spread of diphtheria in schools consists in the mild cases actually in attendance (forming 80 per cent of a total completed by apparently well contacts, recrudescence cases, and independent carriers); and the habitual occurrence of mild cases at these ages may be explained in Dr. Kerr's own words: "Diphtheria bacilli are so widely spread in the community that a proportion of older people have acquired an active immunity, either through slight attacks, or through subminimal dosage. At birth many infants have a transient passive immunity obtained from the maternal blood: this gradually wears off, and so an increasingly heavy incidence of diphtheria occurs up to the age of 4; from this stage onward an active acquired immunity makes itself apparent, and between 5 and 8 there is a rapid diminution in the incidence rate; but if diphtheria is introduced amongst these children, there is a large number of them yet capable of suffering from slight attacks, which do not prevent their attendance at school (and would probably escape notification), and a large proportion become 'carriers.'

"If the disease attacks a babies' class, few are capable of suffering from slight attacks, so the cases are obvious and readily dealt with; and over the age of 8 or 10 slight attacks are comparatively uncommon, so classes over these ages rarely present spreading outbreaks."

Many important questions arise as to the most efficient methods of dealing with a disease of so great complexity.

The marked clinical cases, which are readily notified, should obviously receive early antitoxin treatment and sufficient isolation; if not possible at home, in hospital. To this extent hospital provision for diphtheria is essential, but obviously, from the nature and the number of contact cases showing little or no clinical symptoms, hospital isolation of obvious cases can act in only a very limited sense as a preventive measure.

The essential towards prevention is an efficient organization for the

bacterial examination of throats and noses of all contacts, whether members of an infected household, or class-mates in an infected school. In this way the remaining subjects fall into three classes :—

A. Actual mild cases showing some, probably slight, clinical symptoms.

B. Cases without obvious clinical symptoms, but yielding organisms classed as true diphtheria bacilli (carriers).

C. Cases without clinical symptoms, but yielding organisms classed as pseudo-diphtheria or Hofmann bacilli (pseudo-carriers).

With regard to Classes A and B, we have always secured isolation at home or in hospital, exactly as in ordinary notified cases ; indeed, such cases have been treated as within the provisions of the Notification and Public Health Acts, and dealt with accordingly, although the point might be raised whether cases without obvious clinical symptoms, even though yielding true diphtheria bacilli, can be held to be "suffering" from a dangerous infectious disorder.

Considerably greater difficulty is felt in dealing with cases amongst contacts who present no clinical symptoms, and yield on examination doubtful forms of diphtheria. If such a case is a close contact of an actual clinical case, and especially if a child of school age, school attendance must certainly, in my opinion, be prohibited. I attach little importance to Hofmann in nose or throat of children examined at hazard in unaffected schools or institutions, especially after long months of epidemic prevalence, when probably the majority of the population has become leavened with some sort of diphtheria bacillus ; but during the early months of diphtheria prevalence, close contacts of actual cases presenting any suspicious forms may, in my opinion, form actual sources of infection. From this it follows that the importance of the Hofmann bacillus varies in the different stages of invasion.

In a populous district such cases may accumulate so rapidly that hospital isolation is impossible, and we have met the difficulty by establishing in three infected districts temporary out-patient hospitals, at which such contacts might receive attention from a trained nurse acting under medical supervision.

Mixed Infections.—When diphtheria assumes the epidemic condition it introduces the troublesome condition of mixed infections. There is no antagonism between scarlet fever, measles, and diphtheria ; if anything, one predisposes to the other. The largest number of mixed infections are of diphtheria upon scarlet fever. Now this was an unknown or practically unknown occurrence in my fourteen years' experience during the pre-epidemic stage ; the type of diphtheria

then present did not spread widely in subacute form through large masses of the population, and this numerical deficiency would lessen the chances of superimposed infection. But after the invasion of 1900 these complications became notably common.

PERSISTENCE OF DIPHTHERIA AFTER APPARENT RECOVERY.

Chronic Cases.—During epidemic prevalence of diphtheria in large populations the occasional occurrence of chronic cases is indisputable. Fortunately they are somewhat uncommon, and the majority of cases clear up within a reasonable time, and may safely be discharged as cured after the usual double examination at an interval for bacteriological clearance. But some very troublesome cases occur in which the diphtheria organism persists in active form over long periods of time, either in the throat, or more markedly, after it has gained access to the nasal cavity or the accessory sinuses. Considerable light has been thrown upon these conditions in the excellent monograph by Drs. Councilman, Mallory, and Pearce, of the Harvard and Pennsylvania Universities, entitled *A Study of the Bacteriology and Pathology of 220 Fatal Cases of Diphtheria*. Some interesting details are given of the results of their examinations of the accessory sinuses of the nose in 63 cases, of which 52 were cases of diphtheria only, 7 of diphtheria complicated by scarlet fever, and 4 of diphtheria complicated by measles. In no case were there any clinical symptoms pointing to disease of the antra or other sinuses ; all except 3 cases were in children ; care was taken to avoid accidental infection in opening up the sinuses.

In the 52 cases of diphtheria, both antra showed inflammatory changes in 19 cases, and both antra as well as the sphenoidal and ethmoidal sinuses in 2, one antrum only in 9, the sphenoidal sinuses only in 2, the sphenoidal and ethmoidal sinuses in 1 case. Of the 21 double antral cases the exudate present in most cases was a thick yellow pus, but a sero-purulent fluid, a thin cloudy serous fluid, a purulent fluid with membrane were also found, and in 8 a thin mucoid fluid.

Excluding these 8 cases, the bacillus of diphtheria was present on both sides in all but 3 cases ; in 2 of these 3 the bacillus was present on one side. In 2 cases the bacillus of diphtheria was the only pathogenic organism found, in others various organisms such as streptococcus, pyogenic cocci or pneumococcus. Of the 8 cases showing thin mucoid fluid, the diphtheria bacillus was present in 3 ; in one it was found alone. In other cases infection with diphtheria was found to exist in the sphenoidal sinus. The authors sum up the position thus :

"The cases indicate that infection of the antrum of Highmore is quite common in fatal cases of diphtheria. The micro-organisms commonly found are the diphtheria bacillus, the pus cocci, and the pneumococcus. In the cases here reported the inflammatory changes in the antra did not produce symptoms sufficiently marked to attract attention during life. The practical point in regard to this subject is to determine whether this infection takes place as commonly in those cases which recover as in those which are fatal; and if it does, whether it may not lead to subacute or chronic disease of the accessory sinuses. In fatal cases with diminished resistance to bacterial invasion an infection of the antrum is not surprising. It is very probable, however, in view of its frequency in fatal cases, that it may occur in some cases which recover. In most of these cases it probably clears up without any ill effects, but it is very possible that in others it may so alter the condition of the lining membrane that later an acute inflammatory condition in the nose may readily set up chronic antral disease. That the infection of the antrum with diphtheria bacilli explains the persistence of these bacteria in cultures from the nose long after all evidence of membrane has disappeared seems very probable. Anyone who has made routine bacteriological examinations of the throat and nose in diphtheria can recall cases in which positive cultures were obtained from the nose for weeks and even months after all evidence of the disease had subsided. In the laboratory of the Boston City Hospital, where no case of diphtheria is discharged until three negative cultures have been obtained from both throat and nose, cases have been detained for six, seven, eight, and nine weeks, and even three months, on account of the persistence of diphtheria bacilli in the nose."

Le Gendre and Pochon (1895) reported a case in which they obtained positive cultures from the nose for fifteen months after nasal diphtheria. Upon douching the nose with antiseptic solutions the bacilli would disappear, but as soon as the cleansing was stopped, the bacilli would appear again in cultures, a condition probably to be explained by antral infection. Similar experiences have occurred in Bristol. I have dwelt upon this point at some length, because the problem of satisfactorily and speedily freeing the complicated nasal cavities of diphtherial infection is a recurring difficulty during an epidemic, and such cases may prove sources of considerable mischief if not carefully watched. It is indeed fortunate that they are comparatively rare.

SCHOOL CLOSURE IN DIPHTHERIA.

On this point I entirely concur with Dr. Kerr, who states (1905), "The necessity for school closure for diphtheria has become very

rare in London. It would only be resorted to now as a confession of failure, either from want of time or want of staff, as the measures detailed (examination of suspected contacts bacteriologically, and exclusion) are efficacious in immediately arresting the spread of the disease in 95 per cent of the outbreaks."

This amount of success can be looked for, however, only in a district which has been fully leavened by some continuance of diphtheria prevalence, so that a large amount of acquired immunity has been secured. It is, I think, possible in Bristol now, but it was not so in 1902-3 and 4.

But at all times school examination of contacts in infected classes appears to me to be a more rational procedure in urban communities than mere school exclusion without such examination, and if there is sufficient staff available to carry this out promptly and thoroughly, there is little continuance of risk to the scholars: it is far simpler and quicker to single them out at school than to follow them to scattered homes; but it must never be forgotten that there may be home contacts who have to be sought for and dealt with also.

The difficulty met with in London owing to the inaction of some authorities to whom cases are referred upon detection and exclusion has not been felt with us, as the whole of the work with school visitation and examination has had, in default of any Education Medical Officer, to be initiated and carried out by the Health Department.

CARRIER CASES.

In the course of an epidemic invasion of diphtheria, the question of the proper method of dealing with apparently well contacts is constantly presenting itself.

This question has been very carefully considered by a Committee of the Massachusetts Association of Boards of Health, who have published (1902) a report on "Diphtheria in Well Persons." Their conclusions are, from my own experience, well founded.

They conclude that only a small percentage of the morphologically typical diphtheria bacilli found in well persons not recently exposed to the disease are virulent, but the number of infected individuals well enough to mingle freely with others is so great that even if only a small proportion of them be likely to transmit the disease, there is in them a very important factor in the spread of diphtheria. In this connection they point out that infected adults are ordinarily less likely than children to communicate the infection, and that the opportunities of infection vary greatly with occupation and habits; also that infection from rooms or from any other cause than personal

communication, through the secretions of the mouth or nose, is comparatively unimportant.

They formulate two practical conclusions in regard to the dealing with carrier cases.

"*Conclusion I.*—It is impracticable to isolate well persons infected with diphtheria bacilli, if such persons have not, so far as known, been recently exposed to the disease.

"This conclusion is based upon the result of careful examinations, which showed that in Boston alone at least 8,000 such cases would need isolation. The issuing of precautionary instructions to such cases, if known, is, however, very properly advocated.

"*Conclusion II.*—It is not advisable, as a matter of routine, to isolate from the public all the well persons in infected families, schools, and institutions.

"The exceptions have to be made, as a matter of expediency, in regard to wage earners, business and professional men.

"It is, however, advisable to keep the children in infected families away from day-school, Sunday-school, and all public places.

"Wage earners may usually be allowed to continue their work, but teachers, nurses, and others who are brought into close contact with children, and also milkmen, should not be allowed to do so.

"In schools and institutions all infected persons, sick or well, should, if the infection is not too wide-spread, be separated from the others.

"When diphtheria appears in a community which has for some time been free from it, it is advisable to isolate all persons who have been brought into contact with the patient until it shall have been shown that they are free from diphtheria bacilli."

These conclusions, made from a consideration of a lengthened bacteriological enquiry and investigation, must be accepted as a practical expression of possibility in the difficult circumstances produced by the social habits of the diphtheria bacillus.

The phenomena observed in diphtheria outbreaks in late years suggest that owing to the extremely wide-spread occurrence of atypical forms, especially Hofmann, upon persons not clinically recognized as suffering from diphtheria, an acquired immunity is in time developed amongst large numbers of young persons, and to this the modified phenomena of the late stages of epidemic invasion may be ascribed. Such a condition of things is not without parallel, and has been suggested in regard to another and very different disease by Koch (*Deut. med. woch.* 1900, p. 781), who considers that an immunity can be developed towards malaria, and bases his opinion on observations made in New Guinea, where he found that often nearly all the children

in a village might possess malaria parasites in their blood; the adults did not, and could go to a malaria region without contracting the disease. This cannot be explained by supposing that the insusceptible adults were the survivals of naturally immune individuals. The number of infected children was so great that natural immunity could be said to be practically absent, and Koch is of opinion that artificial immunity is developed. Quite independently of Koch, Drs. Stephenson and Christophers (*Report to the Malaria Committee of the Royal Society, 3rd Series*. London: Harrison & Sons, 1900, July 6th), in West Africa had noticed that frequently nearly all the children in a native settlement had malarial parasites in their blood, and, further, that the parasites were very rare in children over twelve. They speak with caution, however, as to this being evidence of the acquisition of immunity, especially because, as Sir P. Manson points out, different races present different degrees of susceptibility, and in certain cases of Europeans repeated attacks do not appear to confer increased resistance.

The facts observed with regard to native children might thus be accounted for by supposing that they possess a high degree of natural resistance, and they apparently suffered no inconvenience from the presence of the parasites in their bodies. Whichever is the true explanation, the conditions resulting appear to me to compare very closely with the conditions as to diphtheria and children in susceptible communities observed in England during recent years.

Passing on from the consideration of diphtheria, which presents conditions of extreme complexity in its social habits, I would next consider a disease which, in spite of high infectivity, exhibits social habits of extreme simplicity, and is in consequence comparatively easy to control. This disease is small-pox. In common with diphtheria, scarlet fever, and the majority of the common communicable fevers, the spread of this disease is for the most part *immediately* personal; in marked contrast, however, to diphtheria, the causal organism is highly *selective* in regard to the soil on which it grows, and will grow neither on an unsuitable nor on an exhausted soil. Also we can render the soil of contacts unsuitable by inducing vaccinia. If the soil is unsuitable the person exposed to infection neither *contracts* small-pox, nor *carries* it; the infection simply dies out. Again, if the soil is suitable when the opportunity for infection occurs, the disease runs its acute course; after which the soil becomes *exhausted*, and the disease cannot, and never does, persist in the patient. So we get no *chronic* cases, and no *return* cases. Hence we may say that a patient either definitely has or has not small-pox at any particular time; he

never merely *carries* it on his living tissues in an inert, but to others a potentially infective form. Owing to these points in its life-history, small-pox is the most straightforward of diseases, and in general when taken in hand upon its first introduction, all four of the essential conditions of isolation may be readily fulfilled, viz. :—

1. Seclusion secured before the disease has been handed on.
2. No infected material left behind unsterilized.
3. Perfect seclusion during illness and convalescence.
4. Perfect recovery before cleansing and discharge.

And hence hospital isolation, with protection of contacts (in case condition 1 is not possible to secure) is generally successful in this disease.

Furthermore, as small-pox disappears absolutely from communities in the intervals between outbreaks, it is possible in most cases, with the exercise of trained care, to pick up the early threads of the disease upon introduction, and to control its spread.

Considerable light has recently been thrown upon the intimate nature of small-pox by the unique work carried on in America by Councilman, Magrath, Brinckerhoff, Tyzzer, Southard, Thompson, Bancroft, and Calkins (*Studies on the Pathology and on the Etiology of Variola and of Vaccinia*. Office of Medical Research, 688, Boylston Street, Boston, Mass., U.S.A., 1904-5). So long ago as 1891-2, Guarnieri and Wasielewski discussed the vaccine bodies (cytocytes *vacciniae*), and now Calkin, working with Councilman, offers a complete life-history of the cytocytes *variola*, the causal sporozoal organism of small-pox. The sporozoa commonly infest molluscs, earthworms, crustacea, insecta, and the lower vertebrates, and one member of this class, the *Nosema bombycis*, is responsible for the destructive pébrine disease of silk worms.

In every sporozoon definite reproductive phases occur, characteristic of some phase of disease, or of some peculiar environment of the parasite, as e.g., in the malarial parasite.

Stage A.—Asexual reproduction or schizogony (takes place in the blood corpuscle of man or bird).

Stage B.—Sexual cycle or sporogony (takes place in the digestive tract of the mosquito).

Apparently, from Calkin's observations, an analogous series of processes takes place in the parasite causing vaccinia and variola; cytocytes *variola*, with this important variation :—

Stage A.—Asexual phase or schizogony (vaccine body), (takes place within the cells of the rete mucosum outside the nucleus).

Stage B.—Sexual cycle (takes place within the nuclei of these cells).

Thus the complete cycle of multiplication and of sexual reproduction is perfected in one host.

a. The first development of the germ in the host is unknown; probably a multiplicative reproduction occurs, as a result of which gemmules are carried by the blood to the skin, where the further development takes place; so much is conjectural. From this point observations are fairly complete.

b. The gemmules become intracellular (cytoplasmic) amœboid organisms, which give rise to similar gemmules (Councilman's vaccine cycle). This process must continue for some time, as the gemmules are, in variola, distributed to all regions of the skin.

c. Ultimately the germs derived in this way give rise to forms which penetrate the nuclear membrane and develop into gametocytes of two types, male and female. Conjugation probably follows, zygotes develop into a large amœboid organism in which pansporoblasts originate, which give rise to primary sporoblasts, and these to multitudinous spores; all this propagative reproduction takes place within the nucleus.

d. The infection of fresh nuclei; and

e. The transmission to new hosts, may be readily grasped.

An important point is that evidence of every stage in the first (cytoplasmic cycle) indicates that in vaccinia and variola we have to do with the same organism which in vaccinia has undergone some modification by reason of which the nuclear phase is inhibited. The cause of the functional difference, like the resulting immunity in the host, remains unexplained.

The intimate nature of the disease thus disclosed, the prolific auto-inoculation by multiplicative reproduction of gemmules, and the subsequent high potential of spore reproduction following the intranuclear sexual phase, all taking place within the extensive enveloping tissue of the body of a single host, emphasize at once the difference between this sporozoal and an ordinary bacterial infection, and afford some explanation of the *absolute* character of this infection. Once introduced into a susceptible subject, every susceptible bit of tissue forming its habitat is perforce involved; there is no escaping its searching investigation, and the infection is too intense to permit of chronic cases, and still less of *carrier* cases.

Sporozoal infection of this sort is as gunpowder to the touchwood of bacterial infection. The battle is fought and finished with, lost or won, in one decisive engagement.

Even in its extremely mild varieties, giving rise to the "minimal" cases, which give so much trouble in diagnosis, small-pox still retains

DIAGRAM IV.

CITY AND COUNTY OF BRISTOL.
SMALL-POX.

YEAR	CASES	ATTACKS PER 100,000 LIVING	DEATHS	DEATHS PER 100,000 LIVING	CASE MORTALITY PER CENT
1886	?		8	3	
1887	163	72	13	5	7.9
1888	224	98	26	11	11.6
1889	0	—	0	—	—
1890	0	—	0	—	—
1891	16	7	1	0.4	6.2
1892	0	—	0	—	—
1893	165	73	20	8	12.1
1894	201	88	16	7	7.9
1895	4	1	0	—	—
1896	42	18	5	2	11.8
1897	10	4	1	0.4	10
1898 *	2	0.6	0	—	—
1899	0	—	0	—	—
1900	0	—	0	—	—
1901	1	0.3	0	—	—
1902	4	1	2	0.6	50
1903	46	14	3	0.8	6.5
1904	34	9	1	0.2	2.9
1905	13	3	0	—	—
1906	32	8	0	—	—

* CITY EXTENDED

† CITY AGAIN EXTENDED IN 1904

its distinctive character. Some definite reaction, recognizable to the trained eye, with, it may be, one pustule only, will almost certainly occur, and however mild or abortive the case may prove, the attack is still definite. The patient will pass through the disease, not carry it; the attack will clear up as an acute case, will not become chronic, nor are *return* cases ever known.

The effect of this character upon its social history is obvious. It is quite easy of control, provided the initial introduction and its geometrically increasing personal offshoots are unerringly traced out and dealt with.

We have learnt of late years the preponderating importance of direct personal infection in the spread of most of the common communicable disorders. In small-pox this becomes the simple factor which has to be controlled in order to suppress an epidemic outbreak.

I think I am entitled, from my experience in Bristol, a manufacturing city and port of 367,000 inhabitants, to assert that this is generally possible by the exercise of extreme personal care (accepting the vaccinal condition of the population on the 1903 returns, which show a percentage of successful vaccinations to births amounting to 68.36), in such a population.

My experience in this city dates from 1886. Two outbreaks of importance have occurred since then; the first in 1887-8, consisting of 327 cases; the second in 1893-4, when 366 cases occurred. Both of these outbreaks occurred upon confines of the city adjacent to populous Local Board districts, and duality of control confused issues. But I was beginning to learn the importance, the sole importance, of absolute personal tracing out of infected contacts. In 1896 the city of Gloucester, only forty miles away, had 2,000 cases, and gave us the opportunity of seeing what we could do with 20 introductions; these spread only to 42, 16 of which were in a common lodging-house. This is the last time these lodging-houses have proved troublesome. In 1903, 15 separate introductions, by sea and land, gave us some anxiety, but were checked at 46 cases.

There are, of course, in small-pox often intervals between outbreaks, during which the disease is quite absent, as in 1899, 1900. During such intervals we keep 12 beds only in a detached block always ready. The rest of the small-pox hospital is generally in use for scarlet fever, but altogether I have only 50 beds, and since 1894 I have not needed more.

No quarantine beds are kept for contacts. I cannot see the need for them, as contacts are not infectious till they sicken, and a careful system of visiting on the calculated day for sickening has always

Although these 19 cases were generally of the minimal type, they yielded one fatal result, and showed considerable power of infection amongst close contacts. Eight of the original family were infected, and they succeeded in infecting eleven others.

In the spring of 1906 small-pox hung about the city from January until May, leading to 26 cases, apparently from two separate introductions.

The interesting feature was the involvement of a girls' public elementary school, amongst girls from 7 to 13, which yielded 6 cases. This was the first example in my experience of involvement of a school in a small-pox outbreak, so, mindful of the experience of Gloucester, I instituted, as soon as the girls began to sicken at fortnight intervals, an examination of every child in the school, and, as a result, found in the implicated class that 75 per cent were unvaccinated. This was soon remedied and the outbreak stopped, but this involved at one time supervision over no fewer than 600 contacts.

In conclusion, gentlemen, there is one outstanding fact which must impress each one who has studied the progress of knowledge in the past sixty years, the replacement of broad generalization in regard to the causation and control of communicable disease, by intimate study of each disease in detail and specific adaptation of means to secure individual success. The result spells advance; but scientific advance is slow, and does not always satisfy the impatient critic. The public has, indeed, it would seem, wearied of the recurring changes in the attitude of medicine towards disease, mistaking, as it must, for mere failure, pauses in the orderly sequence of instructed strivings towards an understanding of the obscure, and failing to recognize that every check of reconsidered knowledge is but the backwash of an individual wave upon a rising tide.

SCHOOL TRAINING IN THE HOME DUTIES OF WOMEN.*

THE volume before us gives most valuable information of what is being done in other countries in the teaching at schools of home duties. The problem is well stated in a prefatory note. There has been in the past too much of "the sterile imitation of Boys' schools on the weakest side," in many of the most distinguished Girls' schools. There can be no doubt also that the pressure of economic and social conditions in our great industrial communities is destroying the interest in house management among girls and women who have to work in factories and places of business.

Full details are given of the courses of instruction in different countries, and valuable hints can be gathered for courses in our own schools.

* Board of Education. Special Reports on Educational Subjects. Vol. 16, Part II. Belgium, Sweden, Norway, Denmark, Switzerland, and France. (Cd. 2963.) Price 1s. 6d.

CO-OPERATIVE LIVING.*

BY W. W. STAINTHORPE, M.D., D.P.H.,

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BETWEEN co-operative living and the various matters which as health officers we are wont to discuss, there would appear to be no connection, but I hope to show that such a connection exists.

It will be conceded that a very large number of those conditions inimical to health met with by medical officers of health have resulted from the aggregation of population in the circumscribed areas forming cities and towns. This massing of dwellings together impeded or entirely prevented the natural disposal of the excrementitious matter from each house, with the result that disease followed. This led to the passing of the various Health Acts which compel communities to carry out certain works and empower them to carry out others for the removal or minimizing of the evils brought about by communal living. By co-operation a community supplies itself with water, removes its solid and liquid refuse, cleans and lights its streets, feeds its poor, isolates its infectious cases, provides open spaces and baths, supervises its lunatics and criminals, educates, and, it may be, in the future will maintain its children.

But there still remain many conditions affecting injuriously the public health which are not effectively reached by the present communal powers. That this is so is very well indicated by the fact that during the past few years the daily and medical press have teemed with reports of conferences, congresses, and meetings of local authorities held for the purpose of discussing such subjects as "Infantile Mortality," "Milk Supply," "Tuberculosis," "Housing of the Working Classes," "Feeding of School-children."

What would co-operative living do in the way of promoting the desirable conditions which were discussed under the headings just mentioned? These may be divided into essential and non-essential requirements. The former would include the supply, storage, and cooking of food, a well-equipped nursery, baths and closets, a laundry with necessary fitments, a scullery with the requisite appliances, efficient means for the storage and quick removal and proper disposal of refuse, a good water supply, and well-ventilated bed-rooms. The non-essentials include land for the production of fruit, vegetables, etc., on which the solid and liquid refuse could be utilized, recreation rooms and grounds, a dairy farm, and wards for the sick.

* Presidential Address.

In regard to infantile mortality a very large proportion of the deaths of infants are due to one or more of the following causes: diarrhoea, gastritis, convulsions, premature birth, wasting, inanition. The first three are mainly due either to improper food or tainted food, the last three are chiefly due to ante-natal conditions. Now as to tainted food; too often the only storage for food in an ordinary cottage is a dark unventilated closet under the stairs. Very often it is a damp-floored, damp-walled erection, with its window a few feet from the privy or refuse receptacle; sometimes its walls are covered with a fungus-growth. In some the water tap is placed therein, the drippings from which increase the evils. Is it to be wondered at that food becomes tainted? Even if the child is breast-fed it suffers through its mother. The use of a co-operative nursery would tend to remove improper feeding. After being breast-fed the infant would be placed in the nursery instead of being taken on to the mother's knee at meal-time and regaled with tit-bits from her plate. In the co-operative nursery artificial feeding, where the infant cannot be breast-fed, could be better carried out, both as regards the preparation of food and the cleanliness of food-vessels. Most of the ante-natal causes of death result from the diseased or impoverished condition of the mother. Improvement of the mother's health must have a beneficial effect upon the infant, born and unborn. The wife, wearied with her continual round of domestic duties, is too often tempted to prepare a makeshift meal.

When recently in the shop of a grocer, I noticed that the stock-in-trade appeared to consist chiefly of tinned goods, which seems to indicate the extent of the ready-made dinner. The general health of mothers and those about to become so would be materially improved by the use of wholesome, well-cooked food such as could be supplied through a co-operative kitchen. Household work would also be reduced, and this would have a beneficial effect upon the health of women.

As to the milk, instead of it being hawked from door to door, contaminated by the dust and dirt of the streets every time the can is opened, or retailed over the counter after being stored amidst anything but ideal surroundings, it would be taken in bulk direct to the milk larder. If necessary, it could be sterilized or otherwise treated there, special attention being paid to that portion required for the nursery. Influence could also be brought to bear on the dairyman, so that in his own interest he would be compelled to exercise such care as would bring about a better condition of affairs in regard to cleanliness of cowsheds and dairies. We all know very well that the regulations

in force are not sufficient. They are fairly stringent, but to be effective a perfect army of inspectors is requisite, and even then it does not follow that the regulations would be enforced. Milk consumers, by combination, can exert a more powerful influence upon dairymen than can be obtained by any number of regulations.

With regard to the effect of co-operative living on tuberculous diseases. So much has been said as to hospital treatment of consumptives that there is a tendency to overlook preventive treatment. Prevention aims at the destruction of the specific bacilli and at an improvement of the health of individuals, so as to render them insusceptible, and, in my opinion, co-operative living would effect this. I have, however, included sick wards in the co-operative scheme, and it would be a simple matter to provide huts for the segregation and treatment of consumptives. Costly hospitals and wards are not required.

The subject of feeding school-children has been brought prominently before the public. Under-feeding appears to arise owing to the use of unsuitable, ill-cooked food, partaken of at irregular hours. Under the co-operative system the supply of suitable, properly cooked food could be ensured to the children.

It would not prevent the misuse by a father of his earnings; but the system prevailing in France might with benefit be followed in this country. There a certain portion of a workman's wages can be ear-marked for payment of the necessities of life supplied to his family. The tradesman presents his account to the employer and receives payment, the amount being deducted from the man's wages.

One step in the evolution of co-operative living is within the range of practical politics. Let there be attached to each school, or group of smaller schools, a building fitted up for the teaching of cookery and household duties to the elder girls, and boys too. Let the food so cooked be supplied to the children at prime cost. Numbers of parents would, I think, avail themselves of the system. Apart from the better feeding thus brought about, the work of the mothers at home would be lessened, with benefit to them. The building could be further utilized by supplying meals to the public, and young women might be taught cooking there for a small fee.

The maintenance of children by the State is being urged by some, which is compulsory co-operation. Its advocates apparently do not realize that State regulation of race reproduction would inevitably follow. Would not the object aimed at—the improved health of the children—be more easily brought about by voluntary co-operation? I do not advocate co-operative living as a remedy for “all the ills

that flesh is heir to," nor do I believe this system will end disease. The evils of the individual—drunkenness, laziness, thriftlessness, etc., which conduce directly or indirectly to disease—would still remain. But co-operative living would go far to remove many of the conditions at present existing which are prejudicial to health and promote those that are conducive. Further, whatever promotes physical health tends to improvement of *morale*; we cannot dissociate mind and body. Do we not now recognize, somewhat tardily, that the physical environment of an individual affects his *morale*?

It is the old story, "Union is Strength." May I be permitted to vary this and say, "Union is Health"?

DISCUSSION.

THE discussion was generally against the proposals of the paper, which were considered impracticable. Several members considered that already the State was doing too much for the individual—that individualism rather than collectivism should be fostered.

DR. JACKSON pointed out that the communal system, as suggested by the President, was in operation in some parts of Austria, where meals were provided at a moderate cost, but doubted whether the English would follow this example.

DR. DINGLE dreaded any lessening of woman's work, and considered that the President's proposal would tend to more neglect of her house, and more opportunity for drinking. He further considered that if the house was not conducive to home life, it should be made better, rather than set up feeding and cooking machinery.

In reply, the PRESIDENT said he did not intend his proposals to be made compulsory by the State, but to be entirely voluntary on the part of groups of individuals; and he agreed with the speakers that Socialism should not be fostered. He still believed in the co-operative system of supply of some commodities, such as milk.

PURIFIED SEWAGE AS COMPENSATION WATER.—AN interesting suggestion has recently been made on this point. The Sheffield Corporation have several systems of reservoirs, and are under heavy obligations to the mill owners on the streams. At their sewage works they carry on the bacteriological treatment which removes all solid matter from the sewage and which, it is stated, can be improved so as to leave a pure effluent. At a cost which is small compared to that of making a reservoir—about a quarter of a million instead of a million sterling—the six million gallons of water which they are under the obligation of sending daily down the river Loxley could be pumped up the valley for seven miles rising about 400 feet, and discharged into the river to meet the demands of the mill owners. This would set free, for the ordinary purposes of the water undertaking, the very important supply which now has to go for compensation. Whether in the somewhat distant future, when this additional amount of water will be required by Sheffield, some such scheme as this will be adopted, remains to be seen.

REVIEWS.

LOCAL AND CENTRAL GOVERNMENT: A COMPARATIVE STUDY OF ENGLAND, FRANCE, PRUSSIA, AND THE UNITED STATES. By Percy Ashley, M.A. (Murray, 1906, pp. 396, 9" x 6". Price, 10s. net.)

The relative functions of the central and local departments of public administration form a study in which medical officers of health take the keenest interest. A thorough understanding of the intricacies of these relations, and of the conditions out of which the departments have evolved, is indispensable to enable one to understand the signs of the times, to detect and possibly help in guiding the direction of future developments. Mr. Ashley's work gives a survey of the whole field of government in England, France, Prussia, and in American cities from a comparative standpoint. In the introduction, the administrative necessity of decentralization and self-government is first discussed, then the methods of central control, the position of officials, and the separation of powers. Chapter I has six sections dealing with the central departments, local departments of different kinds, London, poor relief, and education. The next three chapters give a similar review for countries other than England. In the fifth chapter the history of local administration in England since 1832 is given, two subsequent chapters dealing with the administrative history of France since 1789 and of Prussia since 1806. In Chapter VIII England and Continental States are contrasted as to administrative law. In the next chapter the relation of local authorities and the legislature, and in Chapter X the administrative control of local authorities is considered. The control of local finances is the subject of Chapter XI, and of Chapter XII the courts of justice and local administration. This hasty table of contents gives some idea of the contents of Mr. Ashley's masterly work. He traces in an interesting manner the gradual development of central and local government in four countries; and there can be no hesitation, on reviewing the evidence, in concluding that the English method, whatever its defects and logical incompatibilities, has been the most fruitful in good.

Government begins with a completely centralized bureaucracy. This remains to a greater extent in France than in Germany, and in Germany than in England. Bureaucracy inevitably tends to break down, and local self-government becomes a necessity. In England there has been no such scientific classification of the functions of government into "central" and "local" as in Germany and France; administrative conveniences have determined the result, which is that in England, unlike in the other countries, the principle of self-government is supreme. The hand of the central bureaucracy is much more seen in local government in Germany and France than in England. The duty of local authorities in the two first countries is to carry out locally the will of the central government; in England their duty is to carry out the law according to the will of, and as desired by, the inhabitants of their localities. In England "the non-professional elected members conduct the local administration, with the aid and expert advice of a permanent professional staff. In Prussia and the French departments the officials administer, subject to the supervision and financial control of the elected representatives."

There are, as pointed out by Mr. Ashley, two possible policies which a

legislature may adopt towards local authorities, apart from the imposition of compulsory duties upon them. It may give them general powers, so long as any particular use of these powers does not interfere with the power of other authorities, or it may give specific powers. In Germany and France the tendency has been in the direction of the first of these two methods; in England local authorities may do only specific things. They may, however, obtain special local enactments, though in recent years there has been a distinct tendency to curtail such enactments, and thus useful local experimentation in administration has been hampered.

The central inspectorate for the supervision of local administration is a peculiarly English institution. We have Poor Law inspectors, auditors, inspectors of the Board of Education, and constabulary inspectors, all making regular visits. Then there are medical, engineering and other inspectors of the Local Government Board, inspectors of the Board of Agriculture, making inspections at irregular intervals and merely reporting to their respective departments. To these must be added the inspectors of the Factory Department, who have important administrative functions, although they appear to be omitted from Mr. Ashley's survey. Except in the case of the Poor Law, the English central departments have little if any machinery for preventing the transference by a local authority of its legal limits, this depending solely upon private initiative.

There can be little doubt that the Local Government Board is "greatly overburdened with detailed work relating to all authorities, even the very smallest"; and the same natural result in stereotyping of both aims and methods is seen also in the Board of Education. It is also generally agreed that some further deconcentration of control is required in both departments, in order that they may perform more fully their normal and important functions of direction and guidance of important public work. How this is to be done is the problem of the future. It is doubtful if county councils will inherit the work of control. Possibly larger provincial bodies may be formed; but this is one of the problems of evolution which will be solved by the force of circumstances in due course. We heartily commend Mr. Ashley's work, which gives a lucid survey of this important subject, and enables us to take stock in the light which comparison with our continental neighbours and our American cousins supplies.

PRACTICAL SANITATION: A HANDBOOK FOR SANITARY INSPECTORS, ETC.
By George Reid, M.D., with an Appendix on Sanitary Law, by Herbert Manley, M.A., M.B. 13th Edition, 1906. Ch. Griffin & Co., pp. 352, size 10in. by 6in. Price 6s.

For the thirteenth edition of a very familiar and valuable book a detailed review is not required. The present edition has been brought up to date, the chapter on sewage disposal having been particularly improved. We have dipped into the book at various points, always finding that the information given is both accurate and exact.

The sixty pages dealing with sanitary law have been entirely rewritten. It is astonishing that so much information can be condensed in so few pages, clearly stated, and well arranged. Not only enactments, but important legal decisions are given.

THE BACTERIOLOGICAL EXAMINATION OF WATER SUPPLIES. By Dr. W. G. Savage, M.O.H. and Public Analyst, Colchester; late Lecturer on Bacteriology, University College, Cardiff, &c. Pp. xvi + 297; p. 8vo. London: H. K. Lewis. 6s. 6d. nett.

This work fully justifies the author's description of it as "a book dealing, not merely with the details of practical procedure, but also with the data upon which these methods are based, and the deductions held to be justifiable from them." After a chapter relating to the self-purification of water and the significance of various broad classes of water bacteria, the quantitative bacterial content of natural waters is dealt with. The author condemns the old unsatisfactory numerical standards and assigns a secondary place to enumeration methods. He strongly emphasizes the necessity for uniformity of procedure in water counts and indicates the influence of bacteriological technique on the results obtained.

The *B. typhosus* inevitably comes under discussion, and much evidence of a somewhat contradictory nature is adduced bearing on its viability in soil, sewage, and water. In this connection the author regards the evidence as to its loss of characteristics by saprophytic conditions as weak and unconvincing. Doubt as to the identity of organisms isolated from suspected waters at an earlier bacteriological period lessens the already small list of positive findings in waters suspected of disseminating enteric fever. The practical hopelessness of attempting to isolate from such a source the specific cause of this, the outstanding water-borne disease of this country affords justification to the large proportion of this volume which is occupied by a consideration of bacterial indicators of excretal pollution, and especially the *Bacillus coli*.

Dr. Savage leads up to a detailed consideration of such indicators through successive chapters devoted to the bacteriology of excreta (animal and human), sewage and sewage effluents, and of soil, from which the bacteria found in water are mainly derived. The variability of the characteristics of the coli group and the distribution of the bacillus in Nature are gone into with much detail, and the author is strongly of opinion that "there is no evidence or observations which have ever shown that *B. coli*, reasonably defined, is present in any numbers in sources which have not been exposed to some form of faecal contamination." Looking at this organism from the standpoint of "the perfect bacterial indicator," the author regards it as a reliable indicator of excretal pollution not necessarily human, its value depending on the completeness of its attributes and its numerical presence. Owing to the wide distribution of animals, "small numbers of the organism do not warrant the condemnation of a water, while large numbers can hardly be due to other than recent and objectionable pollution." It does not, however, indicate the source of the pollution, which may also be no longer dangerous, and difficulty arises from bacilli which deviate from the characters ascribed to a true *Bacillus coli communis*.

Among other organisms the streptococcus group and the *B. enteritidis sporogenes* receive attention, and, though important, are regarded as of less value than the *B. coli*.

In a valuable chapter on the interpretation of results Dr. Savage indicates rough standards for widely differing types of water. Chapters follow on the collection and transmission of samples and on laboratory methods of dealing with them, much very useful detail being conveyed. An extensive bibliography is appended.

Throughout this work there is evidence of its author's complete familiarity with his subject, both from his extensive personal experience and his acquaintance with the work of others. It contains much original work, and the evidence from all sources is regarded in a fair-minded and truly scientific spirit. We can most strongly recommend it to all who are interested in the subject.

RECENT PROGRESS IN THE STUDY OF VARIATION, HEREDITY, AND EVOLUTION. By R. H. Lock, M.A. Murray, 1906, pp. 299; size 8" x 5". Price 7s. 6d. net.

Those who have read Mr. Whetham's fascinating volume on *The Recent Development of Physical Science* will find a worthy companion volume in Mr. Lock's book. It is a long time since we read a book which so admirably combines popular treatment and exposition with scientific accuracy and lucidity.

The first chapter gives an interesting sketch of biology, the second of evolution, and in the third the theory of natural selection is treated. Next follow chapters on biometry, the theory of mutation, the older hybridists, Mendelism, recent cytology, and a final chapter reviewing the whole subject. Each chapter contains matter which must be novel to all those who have not had the opportunity of keeping their biological reading up to date. In every chapter shrewd criticisms and warnings as to commonly accepted views occur. Thus, it is commonly accepted that Weismann's views have upset the possibility of the inheritance of acquired powers; but instances are given showing that judgment must still be suspended in certain instances. The chapter on biometry, or the statistical study of variations, is a most judicious as well as lucid exposition of a difficult subject; and we are warned of the elementary fact which there is always a natural tendency to overlook, that "after even the most elaborate mathematical analysis, the final result cannot be clothed with any greater amount of certainty than the facts from which the calculator sets out." Similarly it is shown that much of the work of the Karl Pearson school on heredity depends on the law of ancestral heredity, which in its original form supposed that every ancestor of a particular individual contributes its quota to the heritable qualities displayed by that individual. This hypothesis Rendel has disproved in specific instances. The account of Professor Johannsen's investigations on "pure lines" is most interesting. They show that the personal character of a particular ancestor has no influence upon his descendants; only the type to which he belongs influencing the offspring.

The chapters on Mendelism are the most valuable in the whole book. It appears not improbable that Mendel's discovery, made about the year 1865, will be of "an importance little inferior to those of a Newton or a Dalton." His facts introduce the idea of unit characters, capable of being inherited independently of one another. They completely change our ideas of heredity. We no longer look upon the individual as a unit, but as a living mosaic. This law introduces us practically to the possibility of breeding new and useful types of animals and plants. In wheat, for instance, resistance to attacks of disease, good milling quality, lateness of ripening, may all be produced by Mendelian selection; and it is now possible "to take a different example of these qualities from each of three

different strains, and to combine them together in a single new variety with perfect certainty." The problems of heredity have an evident application to human genetics. Mr. Lock believes that "a steady breeding out of intelligence is taking place." On this point he needs, we suspect, to apply the caution taught by him as to the data from which he starts. But of the importance of the teaching that "education and training, however beneficial they may be to individuals, have no material effect upon the stock itself," there can be no question; and we agree that "the demand for a higher birth-rate ought to apply strictly to desirables." But are the "desirables" predominant or deficient in accordance with social position? This book should be in the hands of all hygienists, to whom "eugenics" are a matter of vital interest.

TOXINES AND ANTITOXINES. By Carl Oppenheimer, M.D. Translated from the German by C. A. Mitchell, B.A., etc. Ch. Griffin & Co. 1906. pp. 158, size 10in. by 6in. Price 7s. 6d. net.

This is a thoroughly scientific exposition of the subject of toxins and antitoxins. The book is divided into two parts; the first, consisting of sixty-eight pages, deals with the general characteristics of toxins and antitoxins, and with the behaviour of the former towards the latter; and the second part deals with special toxins. Diphtheria toxin and antitoxin naturally occupy a large space in the discussions of true toxins; then follows an account of tetanus toxin and antitoxin, of botulism toxin and of bacterial haemolysins. Endotoxins and other bacterial poisons, like those of cholera, typhoid, and tuberculosis are next considered; then the vegetable toxins, abrine, ricine, etc., and lastly, the animal toxins, such as snake toxins. An extensive bibliography is given, filling eighteen pages.

This short statement of the contents of the book shows its general scope. It can scarcely be said that British work receives sufficient recognition. Thus, Professor Wright's work is not mentioned, nor are his researches described. The book will be found useful by those requiring a succinct and accurate account of the subject with which it deals.

THE PRECIPITATE REACTION. A CONTRIBUTION TO EARLY DIAGNOSIS OF TYPHOID AND OTHER INFECTIONS.—While the precipitate reaction has been of great importance in the differentiation of many biologic questions, this reaction has not been utilized as far as the bacterial precipitins are concerned. Fornet (*Munch. Med. Woch.*, 1906, No. 38) has found that the serum of an animal injected intravenously with certain cultures gives a precipitate with an immune serum prepared with the same cultures. It does this at a time when no agglutinative or bactericidal qualities have yet appeared. In these early stages of infection, therefore, this precipitinogen is already present and can be demonstrated by its action on immune serum before the other serum reactions have become established. The application of the method to several cases that later proved to be typhoid proved positive in the first days of the disease.

NOTES ON THE MIDWIVES ACT.

AT a meeting of the Central Midwives Board on November 1st, a resolution of the Queen Victoria's Jubilee Institute was reported: "That in the opinion of their Council" it would place great difficulties in the way of the working of "the Institute for the training and supervision of midwives to be in any measure withdrawn from the control of the Central Midwives Board, as would apparently be done by the exemption suggested in the amendments of the Privy Council to the Board's revised rules." At present Queen's nurses are often appointed on the strength of a training in a Poor-Law infirmary. In the event of the Privy Council's amendments being adopted, the Queen Victoria's Jubilee Institute would have to impose a further test, and so impose "an unnecessary hardship on a very desirable class of women."

The Penal Cases Committee of the Board met on November 9th. One midwife, who had neglected to send for medical help, despite many cases of hæmorrhage occurring in her practice, barely escaped the removal of her name, owing to strong medical recommendations to the contrary. Two reported for negligence and disobedience of rules notified to the Board their intention to cease practice, and their names were removed from the roll. It is noticeable that to persuade a midwife of the difficulty of obeying certain rules and of the advisability of her voluntarily retiring from practice is an easy way of getting rid of certain undesirable midwives, when it may be difficult to convict them of gross actual disobedience of any particular rule. At the same time, the Act gives no power for a midwife to retire from the roll at her own request. Section 3, V. stipulates disobedience of rules or other misconduct as the only grounds on which a name may be removed. Some such neglect to obey rules must therefore at the same time be stated.

A special meeting of the Central Midwives Board was held on November 22nd to discuss *in camera* their requirements as to training in Poor-Law institutions.

The Board met on November 29th and considered the issue of rules for inspectors of midwives. They decided to consult the local supervising authorities on the subject. They decided not to issue a translation of their rules into Welsh, but to leave any such issue to the Welsh authorities concerned.

The Board announce examinations in London (Examination Hall), on February 12th, April 24th, and June 18th, 1907; in Bristol (University College), Manchester (Victoria University), and Newcastle-on-Tyne (Lying-in Hospital, New Bridge Street), simultaneously on February 12th and June 18th, 1907.

In our issues for August, October, and December, we have analysed all but Section E, Clauses 6 to 21, of the revised rules of the Board, now under consideration for issue this month. In accordance with the second paragraph of our notes in this issue, we would further suggest that Section C be amended to admit of voluntary retirement of a midwife.

DUTIES TO PATIENT.*

6. The midwife must, as before, stay with her patient after the beginning of the second stage "until the expulsion of the (afterbirth) *placenta*, and as long after as may be necessary." The second stage is stated in the new

glossary to date from the "beginning of 'bearing-down' pains." But now she must not leave her at any time "*without giving an address by which she can be found without delay.*"

7. The occasions when the genitalia are to be washed are detailed: "*(a) Before making the first internal examination; (b) After the termination of labour; (c) During the lying-in period, when washing is required; (d) Before passing a catheter.*"

Sponges and flannels are not to be used, "but material which can be boiled before use, such as linen, or thrown away afterwards, such as cotton wool" [cotton waste, tow, etc.]. In the old rules linen and cotton wool alike were both described as such as "can be boiled before use and thrown away afterwards." The change is perhaps intended to be more practically suggestive. Scientifically it is certainly less ideal.

8. As to seldom making internal examinations: retained intact. An invitation to the revising committee to prohibit traction on the cord or intrauterine separation of the placenta, except in severe post-partum hæmorrhage, was rejected.

9. [On the birth of a child which is in danger of death, the midwife shall inform one of the parents of the child's condition.] This is transferred to "Duties to Child," 15, and replaced by the following: "The midwife in charge must in all cases of labour examine the placenta and membranes before they are destroyed, and must satisfy herself that they are completely removed." This is an obviously good and eventually attainable aim.

11. As to after-care, the definition of the lying-in period "for the purpose of these regulations and in a normal case" as comprising 10 days after the end of labour, is still stowed away in this corner. To our mind it should come in a broad general statement of responsibilities at the head of the directions to midwives, and in the glossary as well.

A suggestion that a daily personal visit should be required has been negatived.

A suggestion that midwives should be required to supply to every mother a copy of a card of simple directions as to care and feeding of her infant has been negatived. The matter of preparing such a card for distribution through Registrars, by sanction from Somerset House, was recently referred through the Local Government Board to our Society; and it is hardly to our credit that we have been unable to agree on any such card. The drawbacks are now well known and can be obviated; the advantages, as a basis of infant-saving work, should be considerable.

A suggestion that pulse and temperature should be taken and recorded at each visit has also been rejected, presumably as coming within the limits of local option.

DUTIES TO CHILD.

Clauses 13 and 14, with the added 15, referred to under 9 above, remain intact. Suggested specifications of detail as to washing of the eyes have not been adopted.

ANNUAL REPORTS.

City of Liverpool.—Dr. Hope; number of midwives registered in 1905, in practice as midwives, 166; proportion certified by practice, 56 out of 361 registered since April 1st, 1903; births attended by midwives,

*The quotations in inverted commas are from the revised draft. Words new to the present draft are in italics; words omitted from the old rules are given in brackets.

15,080, two-thirds by the good or satisfactory midwives, 4,000 by the fair, and only 1,000 by the unsatisfactory and bad; the number of midwives in these respective five classes being 15, 55, 64, 28, 8. Cases of puerperal fever out of above, 15 (out of 67 notified to the Sanitary Authority); deaths from puerperal fever out of above, 1 (out of 35 registered); records of sending for medical aid, 363; notices of still-birth, 168.

As is well known, the Council, on the recommendation of the Health Committee, resolved: "That it be recommended that in cases of urgency in which medical practitioners have been called in by certified midwives, as contemplated by Rule 17 of the rules issued by the Central Midwives Board, pursuant to Section 3, Subsection 1, of 'The Midwives Act, 1902,' a fee of not exceeding one guinea be paid on the certificate of the Medical Officer of Health to each such medical practitioner in the event of his failing to obtain payment of his fee from the patient or from the Poor Law Authorities."

Out of 363 cases fees were paid in 104. Of these 363, there were for uterine inertia 101; hæmorrhage 38; retained placenta or membranes 36; deformed pelvis 24; presentation breech or foot, 27; abnormal vertex, 25; transverse, 15; cord, 4; fever, rigor, etc., 12; ruptured perineum, 11; abortion or premature birth, 9; placenta previa, 5; twins, 2; eclampsia, 1; other causes, 52.

The period during which the existing rules of the Central Midwives Board will remain in force has been extended by the Lord President of the Council till March 31st next. This extension is probably final: the questions at issue between the Central Midwives Board and the Local Government Board are in process of settlement, and the revised rules are expected to be issued within a few weeks, to be put in force by April 1st.

THE INTERNAL SANITATION OF DWELLINGS AND PHTHISIS.—In analysing the phthisis death-rate of the various districts in the West Riding (R. J. KAYE, Ann. Rept.), it is again noteworthy that the highest relative figures are not always found in the dense town centres, but sometimes in the more scattered districts. Of course a death-rate of 1.0 per thousand in a town is far more important, numerically, than a much higher rate in a sparsely populated district, but the figures suggest that phthisis is not specially associated with the number of houses per acre, but rather with the conditions inside the house. My sanitary survey notes show that as regards ventilation, air space, and lighting of dwellings, the less populous places are frequently in a worse position than the towns and progressive urban centres. I believe that no branch of the crusade against consumption is more important than that which deals with the internal sanitation of dwellings, and in this direction it lies within the power of every sanitary authority to help forward the good work without waiting for national schemes for the curative and preventive treatment of the disease.

THE VALUE OF A MEDICAL OFFICER OF HEALTH.—THE Sunbury-on-Thames Urban District Council have been advertising for a medical officer of health, at the princely salary of £30 per annum. The district has an area of 2,660 acres, and a population of 4,770. Each person in the district will therefore have the serious annual burden of 1½d. to bear in this respect.

PUBLIC HEALTH NEWS.

A LARGE proportion of the secretaries of Divisions are drawn from the ranks of medical officers of health, and the dispute which has arisen between the committee of the Coventry Provident Dispensary and Dr. E. H. Snell, medical officer of health for Coventry and until recently Hon. Secretary of the Coventry Division of the Association, cannot fail, therefore, to interest those in the Public Health service. The Dispensary having been placed on the "black list" of the Association, medical practitioners were warned not to apply for the Dispensary appointments without first communicating with either the medical secretary of the Association or with the secretary of the Coventry Division. The Dispensary Committee asked the Town Council if it approved of the medical officer of health being associated with this warning. The Sanitary Committee, to which the question was referred, decided that it was a matter which did not concern them. The question was referred back to the committee from the Council on two occasions, when it was decided to ask the Local Government Board whether the view was a correct one that an official had the right to undertake such honorary work in his leisure time provided that work did not interfere with the discharge of his duties to the Corporation. The reply of the Board was to the effect that they would not raise any objection to a whole-time medical officer of health holding such an honorary appointment as that in question, provided that the duties attached thereto were not incompatible with those of his office of medical officer of health, and that the Town Council were satisfied that the discharge of them did not prejudicially affect the due discharge of his official duties or bring him into inconvenient conflict with the Council or their constituents. Dr. Snell had already expressed his intention of retiring from the secretaryship of the Division at the end of the Association year, and he decided to retire at once to show his "appreciation of the Sanitary Committee's action in supporting him."

INFANTILE MORTALITY AT MERTHYR.—The Coroner for Merthyr has stated that it is his intention to hold an inquest upon every child who dies under 12 months old if there is reason to suppose that its death can be attributed to improper feeding. The infantile mortality rate in Merthyr last year was 214 per 1,000 births.

ARMY SANITATION.—The apportionment to certain army surgeons of specific sanitary duties has been followed by another step in the right direction. A recently issued Army Order requires that general officers commanding-in-chief shall arrange for at least one annual course of lectures in sanitation for officers, the lectures to be given by the command sanitary officer or by a selected officer of the Royal Army Medical Corps. After March 1st, 1908, lieutenants will be required to pass an examination in sanitation before promotion to the rank of captain, and officers of companies, squadrons, etc., are to give instruction to their non-commissioned officers and men in sanitation.

THE Marylebone Borough Council has decided to appoint an assistant medical officer of health at a salary of £300 per annum. He is to devote his whole time to the duties of the office.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

GENERAL MEETING.

A GENERAL MEETING of the Incorporated Society of Medical Officers of Health was held at the Offices of the Society, No. 1, Upper Montague Street, Russell Square, London, W.C., on Friday, February 8th, 1907. Present: Dr. D. S. Davies (in the chair), Sir Shirley Murphy, Drs. A. Newsholme, H. E. Corbin, G. Sowden, S. C. Lawrence, R. M. Craven, Winifred Thorp, H. O. Pilkington, F. Fremantle, R. A. Dunn, W. H. Symons, G. B. Millson, J. T. C. Nash, S. Davies, R. Dudfield, J. F. J. Sykes, Wm. Butler, J. A. H. Brincker, F. J. Allan, H. M. Richards, H. D. Richmond, F. H. Alderson, H. B. Collins, H. Jones, members; and M. E. Bibby, B. Gardiner, Nurse Ollett, and Capt. W. W. Clemesha, I.M.S., visitors.

The President having taken the chair, it was resolved unanimously that the minutes of the last meeting, having been printed and published in the January number of *PUBLIC HEALTH*, be taken as read and be duly confirmed.

The Hon. Secretary read a letter from Dr. Francis T. Bond having reference to the Resolutions of the society relating to vaccination.

It was unanimously resolved "that copies of the Resolutions adopted at a meeting of the Society, held on February 13th, 1903,* be sent to the Prime Minister, the President of the Local Government Board, and to those Members of Parliament whose names shall be given to the Hon. Secretaries by Dr. Francis Bond."

Elections.—The following candidates having been duly nominated and balloted for, the President declared them to be unanimously elected:—

AS HON. FELLOWS.

Nominated by the Council.

Baron Kanehiro Takaki, D.C.L. Durh., F.R.C.S. Eng., Tokio, Japan.

Peter Henderson Bryce, M.A., M.D., Department of Interior, Ottawa, Ontario, Canada.

AS FELLOWS.

Dallewy, John, L.R.C.P., M.R.C.S., Wem, Salop, M.O.H. Wem U. and R.Ds.

Dryland, Leslie, L.R.C.P., M.R.C.S., D.P.H., Kettering, M.O.H. Kettering R.D.C.

Smailes, Thomas, L.S.Sc., Honley, Yorks, M.O.H. South Crosland U.D.

Thomson, Walter Lewis, M.D., D.P.H., County Offices, Hamilton, Assistant M.O.H. County of Lanark.

Wille, F. A., M.D., D.P.H., Borough Hospital, Croydon, Assistant M.O.H. Borough of Croydon.

AS A MEMBER.

Wilcox, R. L., L.R.C.P., M.R.C.S., South Eastern Hospital, New Cross, S.E.

* *PUBLIC HEALTH*, Vol. XV, pp. 414 *et seq.*

Nominations.—The Hon. Secretary read a list of nominations for membership of the Society.

DR. FRANCIS FREMANTLE desired to move a resolution as a matter of urgency, and therefore proposed that the by-laws be suspended. Dr. Dudfield seconded the resolution, and it was carried unanimously.

DR. FRANCIS FREMANTLE then drew attention to the fact that at the Colonial Conference to be held in London in April one of the most important things to be discussed would be the question of public health. He understood that the question of co-operation between the different parts of the British Empire in regard to public health would be brought before the Conference by Sir Joseph Ward, the Prime Minister of New Zealand. He therefore moved "That His Majesty's Government be asked to receive a deputation of this Society to urge the importance of considering the question of co-operation in questions of public health at the forthcoming Colonial Conference." Dr. R. Dudfield seconded, and the resolution was unanimously adopted.

DR. FREMANTLE then moved "That the Society do invite Sir Joseph Ward to a complimentary dinner on the occasion of the forthcoming Colonial Conference, and that the following Committee be appointed to carry out the arrangements both for the deputation and the dinner: The President, Hon. Secretaries, Presidents of Branches, Prof. Simpson, Prof. Kenwood, Drs. H. Williams, Fremantle, Millson, S. Davies, and J. F. J. Sykes." This was seconded by Dr. Pilkington and unanimously passed.

DR. H. O. PILKINGTON then read a paper on "The Reduction of Infantile Mortality without the Aid of Municipal Milk Depôts."*

The following took part in the subsequent discussion: The President, Drs. S. Davies, J. F. J. Sykes, H. M. Richards, R. M. Craven, Wm. Butler, H. B. Collins. Dr. Pilkington having replied, a hearty vote of thanks was accorded him by acclamation.

North-Western Branch.—An Ordinary Meeting of the above Branch was held by the special invitation of Professor Delépine at the Public Health Laboratory, York Place, Manchester, on Friday, the 18th of January, 1907. Present: Dr. Wilkinson, in the chair; Drs. Barlow, Coutts, Wheatley, Laird, Martin, Brindley, Buckley, Kerr, Hitchon, J. A. Harris, W. Hanna, Dallewy, Hamilton, Gordon, Margaret M. Smith, Dearden, Sergeant, Edlin, Niven, and Garstang; with Messrs. W. Thomson, C. W. Laskey, and H. Bowes, F.I.C., as visitors.

Letters of apology for absence were read from Drs. Vacher, Deans, and M. Young.

The minutes of the last meeting were read, confirmed, and adopted. Drs. Harper and Dowling were elected Members of the Branch. Dr. Brindley nominated Dr. Wheeldon, M.O.H., Middleton, for Membership of the Branch.

A letter was read from the Honorary Secretary relative to resolution passed by the Branch in April, 1906, as to the vesting of the powers of the Association in the Council of the Society, and it was expressly stated that the government of the Society, according to the Articles of Association, was vested in the Council.

* The paper will be published in the April number of *PUBLIC HEALTH*.

Dr. Garstang reported that at the last Council meeting of the Society held in London, the Metropolitan Members agreed with the resolutions passed at the Birmingham Conference, and reported by this Branch at the December meeting.

Professor Delépine then read a paper on "The Comparative Value of Disinfectants." A vote of thanks to Professor Delépine, proposed by Dr. Niven, seconded by Dr. Wheatley, and supported by Dr. Wilkinson and others, duly acknowledged by Professor Delépine, brought the meeting to a close.

CORRESPONDENCE.

CITRATE OF SODIUM IN INFANT FEEDING.

To the Editor of "Public Health."

SIR,—In the February issue of PUBLIC HEALTH, page 289, you give a summary of Cotton's paper on "Citrate of Sodium in Infant Feeding." From it one would be led to infer that to the author of this paper is due the whole suggestion and working out of the method.

It may not be known to some of your readers that about ten years ago Sir A. E. Wright suggested that sodium citrate should be tried in the artificial feeding of infants; also that it was Dr. F. J. Poynton who was the first to put this suggestion of Wright's to a practical test. This he did in 1903.

Wright, whilst carrying out some experiments on the clotting of milk, observed, and was the first to describe, the specific effect possessed by sodium citrate on the clotting of cow's milk.

The honour of putting this suggestion to a practical use undoubtedly belongs to Dr. Poynton; for after a series of preliminary experiments directed mainly to deciding upon the most satisfactory dose, and also to working out for himself a method of putting it into practical use, he instituted a prolonged series of observations in the Out-Patients' Department for Sick Children, Great Ormond Street, W.C., with most satisfactory results. Your readers will find these observations, together with results, in a paper by Dr. Poynton, in the *Lancet* of Aug. 13th, 1904, and in a later paper read by him at the B.M.A. meeting in Manchester in 1905.

The beneficial results obtained by the use of sodium citrate are as stated in your summary, and Dr. Poynton also suggests that the action of this salt is as follows: The sodium citrate replaces the calcium in the milk and forms sodium caseinogen; present in this form casein is thrown down in a looser, more flocculent curd; this curd being more finely divided is more easily and rapidly acted upon and digested by the peptic juices.

57, Great Ormond Street, W.C.,
Feb. 25th, 1907.

I am, etc.,

J. A. H. BRINCKER.

VITAL STATISTICS FOR 1906.

Correction.—By a clerical error the births in King's Norton which were stated to be 2,158 should have been given as 1,859.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

* * *

Annual and other Reports.

JOHANNESBURG, from 1st July, 1904 to 30th June, 1906. By Charles Porter, M.D., and P. G. Stock, M.R.C.S. BULLETIN OF THE STATE BOARD OF HEALTH OF MAINE (MASS.), Dec., 1906, Jan., 1907. CITY OF ABERDEEN, Report of M.O.H., and San. Inst., for Dec., 1906. SANITARY CONDITION OF LONGTON FOR 1906. By J. W. Dawes, M.B., etc. ANNUAL REPORT OF COSELEY U.D.C., 1906. By W. M. Glendinnen, M.O.H. MALDON R.D.C., 1906. By J. C. Thresh, D.Sc., M.D., etc. AN ANALYSIS OF THE INFANTILE MORTALITY OF SCARBOROUGH FOR THE 30 YEARS 1876 to 1905. By John Knight, M.D., etc., M.O.H. CONTRIBUTIONS FROM SANITARY RESEARCH LABORATORY, Vols. II and III. Boston, 1906. EXPERIMENT STATION RECORD, U.S. DEPARTMENT OF AGRICULTURE, No. 4, Vol. XVIII. Washington, Dec., 1906.

Douglas's Encyclopædia.

Douglas Wharf, Putney, S.W.

Employment Pictures from the Census.

M. G. Spencer and H. J. Falk, M.A., with a preface by Prof. C. S. Loch. 1906. P. S. King & Son.

Food and Hygiene.

Wm. Tibbles, M.D. Rebman, Ltd.

Home Office.

DRAFT OF PROPOSED REGULATIONS UNDER SECTION 79 OF FACTORY AND WORKSHOP ACT, 1901. REGULATIONS FOR THE MANUFACTURE OF PAINTS AND COLOURS. SUPPLEMENT TO THE ANNUAL REPORT OF CHIEF INSPECTOR OF FACTORIES AND WORKSHOPS, 1905. PRELIMINARY TABLES OF CASES OF INDUSTRIAL POISONING AND FATAL ACCIDENTS IN FACTORIES, WORKSHOPS, ETC., DURING 1906. HOME WORK ORDER OF 1907.

Journals.

AUSTRALIAN MEDICAL GAZETTE, No. 12. Vol. XXV. Sydney, Dec., 1906. CANADIAN PRACTITIONER AND REVIEW, Nos. 1 and 2, Vol. XXXII. Toronto, Jan. and Feb., 1907. BIRMINGHAM MEDICAL REVIEW, Jan., 1907. GLASGOW MEDICAL JOURNAL, Feb., 1907. JOURNAL OF ROYAL ARMY MEDICAL CORPS, Feb., 1907. THE HOSPITAL, Feb. 2, 1907. JOURNAL D'HYGIENE. Paris, Jan., 1907. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, Feb., 1907 (No. 2). JOURNAL OF ROYAL INSTITUTE OF PUBLIC HEALTH, No. 2, Feb., 1907. JOURNAL OF ROYAL SANITARY INSTITUTE, No. 1, Feb., 1907.

Local Government Board.

DR. FLETCHER'S REPORT UPON SANITARY CIRCUMSTANCES AND ADMINISTRATION OF THE CHESTER-LE-STREET R.D. DR. S. MONCKTON'S REPORT ON THE COUNTY BOROUGH OF WIGAN, WITH SPECIAL REFERENCE TO INFANTILE MORTALITY AND TO ENDEMIC PREVALENCE OF ENTERIC FEVER AND DIARRHŒA. REPORT BY DR. M. H. GORDON ON THE MICROCOCCUS OF EPIDEMIC CEREBRO-SPINAL MENINGITIS AND ITS IDENTIFICATION. SPECIAL REPORT ON THE PREVALENCE OF DIARRHŒA IN GORTON U.D., DURING THE SUMMER AND AUTUMN MONTHS OF 1906. By Dr. A. W. Martin, M.O.H.

LAW REPORTS.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.

January 16th, 17th, 1907.

BEFORE SIR GORELL BARNES, PRESIDENT OF PROBATE, DIVORCE, AND ADMIRALTY DIVISION, FARWELL AND BUCKLEY, L.JJ.

WEST RIDING OF YORKSHIRE RIVERS BOARD *v.* ROBINSON BROTHERS.

Rivers Pollution Prevention Act, 1876, Sections 4, 6, 13.—Notice of Proceedings.—Consent of Local Government Board.—Polluting Liquid from Factory.

When proceedings are taken by a Sanitary Authority against manufacturers for permitting polluting fluids to flow into any stream, it is necessary that the consent of the Local Government Board be first obtained, and that two months' notice of the proceedings be afterwards given. If the notice is first given and the consent of the Local Government Board afterwards obtained, the proceedings will be invalid.

This was an appeal by the defendants from a Divisional Court who had affirmed an order of the Judge of the Huddersfield County Court made under the Rivers Pollution Act, 1876.

The plaintiffs have the powers of the Sanitary Authority under the above Act for the West Riding of Yorkshire, and on August 6th, 1904, they served on the defendants a notice of their intention to take proceedings against them under Section 4 of the Act for permitting polluting matter to flow into the River Colne. Section 6 provides that proceedings shall not be taken save by a Sanitary Authority, and with the consent of the Local Government Board, and directs on what grounds that Board may give its consent. Notwithstanding the consent, the Section also allows any person to object before the Sanitary Authority to these proceedings, and provides for his being heard by the authority. Section 13 enacts—"Nor shall proceedings in any case be taken under this Act for any offence under this Act until the expiration of two months after written notice of the intention to take such proceedings has been given to the offender."

In this case the Local Government Board did not give their consent until December 5th, 1904, four months after the notice. Proceedings were not begun until March 20th, 1905. The defendants set up as a defence that proper notice had not been given under Section 13, as it was given before the consent of the Local Government Board. The County Court Judge decided in favour of the plaintiffs, and a Divisional Court of the King's Bench Division affirmed his decision, following a previous case of *West Riding of Yorkshire Rivers Board v. Scarr End Mill Company*, 65 J.P. 776. The Scottish Courts had given a contrary decision in *Midlothian County Council v. Oakbank Oil Company, Ltd.*, 5 Court of Sess. Cases 700.

MacMorran, K.C., and *Lowenthal* were for the defendants, the appellants; and *Danckwerts*, K.C., and *T. E. Ellison* for the plaintiffs. The Court allowed the appeal.

The President said that the point was whether the two months' notice

required by Section 13 of the Act to be given to an offender might be given before the consent of the Local Government Board to taking proceedings had been obtained, or whether it must be given after that consent had been obtained. In the present case the notice had been given before the consent of the Local Government Board had been obtained, and no notice was given after that consent had been obtained, though the proceedings were not taken for more than two months after the consent was obtained. Was the notice in these circumstances good or bad? In his Lordship's opinion it was not a good notice. It was clear from Section 6 of the Act that no proceedings could be taken without the consent of the Local Government Board being obtained. Even if that consent were obtained the person against whom proceedings were to be taken might, notwithstanding such consent, object before the Sanitary Authority to any proceedings being taken, and the Sanitary Authority might give him an opportunity of being heard against such proceedings being taken. Another condition was imposed by Section 13 that two months' notice of intention to take proceedings must be given. Having regard to Section 13 it seemed to him that the person who gave notice must be in a position to act on the notice by having previously obtained the necessary consent. That seemed to be the conclusion to be drawn from Section 13, and when Section 6 was carefully considered it seemed to be the proper way of carrying out the requisitions of that Section. The whole working of the scheme of the Act seemed to his Lordship to lead to the conclusion that the intention of the Legislature was that no proceedings should be taken until two months' notice had been given after the plaintiffs were in a position to take proceedings. He was glad that he was able to arrive at the same conclusion as had been come to by the Inner House of the Court of Session in Scotland, as the Act applied equally to both countries.

KING'S BENCH DIVISION.

October 29th, 1906.

BEFORE ALVERSTONE, L.C.J., RIDLEY AND DARLING, JJ.

BATTERSEA BOROUGH COUNCIL *v.* GOERG.

Public Health (London) Act, 1891, Section 4, Black Smoke.—Notice to Abate Nuisance.—Recurrence of Nuisance after long interval.

If a person receives notice to abate a smoke nuisance, and if after a long interval there is an emission of black smoke, it is open to the magistrate to hold that the original nuisance was abated and that the second occurrence was not connected therewith.

This was a special case stated by a Metropolitan Police Magistrate on the hearing of a summons on behalf of the Battersea Borough Council against the respondent Goerg for failing to abate a nuisance in respect of a notice served on him to do so in March, 1904. The notice was served under Section 4 of the Public Health (London) Act, 1891. The nuisance complained of was the issuing of black smoke from the same chimney on January 5th, 1906. The magistrate dismissed the summons, on the ground that too long an interval had intervened.

Macmorran, K.C., and *Moresby* appeared for the appellants, *Gover* for the respondent. The Court dismissed the appeal.

ALVERSTONE, L.C.J., said that the magistrate might have come to a

different conclusion if there had been any evidence to show that the nuisance in respect of which the notice had been given was not abated. He evidently held that the two occurrences were not connected, and he was entitled so to do.

RIDLEY and DARLING, JJ., concurred.

January 14th, 15th, 16th, 17th, 18th, 1907.

BEFORE BUCKNILL, J., AND A COMMON JURY.

COLE v. VINCE.

Sale of Meat.—Breach of Warranty.—Alleged Unfitness for Human Food.—Damages.

This was an action brought by Mrs. Cole against a butcher named Vince to recover damages for breach of a contract to supply her with sound meat. She alleged that he had supplied her with a diseased loin of pork, and that in consequence of eating it, both she and her husband had been taken ill, and her husband had died. Negligence was also alleged. The questions in dispute were solely questions of fact, namely, whether the pork when supplied was unfit for human food, and whether it had caused the illness and death alleged. It appeared that the meat was ordered and delivered on October 1st, 1904, a Saturday, cooked on the Sunday, and eaten by the plaintiff and by her husband on that day, and by her on the Monday. Her husband died on the Friday, October 7th.

Powell, K.C., and *P. B. Morle* appeared for the plaintiff; *Lush, K.C.*, and *R. J. N. Neville* for the defendant.

Mrs. Cole, in her evidence, said that she ordered a small loin of pork on October 1st, 1904. It was sent about 7 p.m., and she saw it soon after in the meat safe in the scullery, where the meat and fruit were always kept. It remained there till the Sunday. She did the cooking on the Sunday. They had bacon and tomatoes for breakfast, which they all, including her little nephew, ate. She cooked the pork with sage and onions, and served it with apple sauce, brussels-sprouts, and potatoes, followed by custard and apples. Her husband ate heartily of it, including the kidney, and she had one slice, but the child did not have any. They had a cup of tea about 5 p.m. About 9 p.m. her husband said he felt sick and took no supper, except a whisky and soda. He went to bed about 10. He slept well, but witness felt sick all night and felt badly next morning and only had some tea. Her husband also felt sick, and had only an egg and some milk. On the following day she and the charwoman had the cold pork for dinner. It had been in the meat safe. They had brussels-sprouts with it. The child had bovril only. After eating the pork the witness had a burning sensation in the throat, and told the charwoman to eat no more. They were both sick. The witness was sick after going to bed, and suffered from diarrhoea. Her husband came home about 9 p.m. and seemed very ill and white and in pain. Witness did not get up on Tuesday morning, and her husband, who also felt very ill, went out and called the doctor and returned at 2. He went to bed then, and died on Friday evening. She was ill for weeks after.

In cross-examination she denied that her husband was addicted to drink.

Dr. Podmore called about 12 on Tuesday morning, and had asked for the pork. In consequence of its removal it could not be analysed. The

medical officer of health saw her throat on the 8th and said "Ptomaine poisoning."

Mrs. Olive, the charwoman, corroborated, and said she had also a bad throat, but she took some of the pork home and her daughter ate it and was ill.

Dr. Forbes Ross, M.D., D.P.H., attributed the symptoms to meat poisoning, and to this loin of pork. Pork was more liable to become poisoned than any other meat. It might poison persons by ptomaine, or by the action of bacteria. The pig might be attacked by the bacteria and then killed. Its meat would retain the bacteria if frozen. Bacteria were probably more plentiful in the kidney than in the loin. Cooking would not remove ptomaines in the meat if they already existed, and would only kill bacteria if the meat were reduced to shreds. The bacteria not reached by a temperature of 100° would thrive and increase. A person who took pork of this kind would be seriously affected if the pork were not ejected. He thought it was affected before it was brought into the house, and that the bacon was not poisonous. The cheese could not have affected the pork. English meat was dry on the surface. Frozen foreign meat sweated when unfrozen, and the fat was "shiny." The beads of perspiration on this joint indicated either frozen or sick meat. Meat frozen and then thawed was more dangerous than unfrozen meat. Cheese had never been known to produce ptomaine poisoning. The riper the cheese the safer. He did not think that habits of heavy drinking would predispose to ptomaine poisoning.

In cross-examination he said that certain vegetables, such as lentils, peas, and beans, and also eggs and yeast, might be acted upon by bacteria so as to produce ptomaines. Their susceptibility depended on the proportion of nitrogen each contained. He did not know about sage. Onions contained very little nitrogen. Ptomaine created ill effects quicker than the bacteria which would produce ptomaine. Ptomaine poisoning might follow almost directly on the eating of the poisoned tissue. It depended on the individual. He had known such a direct result. He would infer that this meat contained ptomaines besides bacteria, because the plaintiff became ill very soon—on the Sunday evening. If a person ate a piece of a joint one day and felt no ill effects, and ate another slice the next day and became ill, the joint might have been perfectly free from ptomaine on the first day. So far as the symptoms only in this case were concerned, ptomaine may not have produced them. They were symptoms of irritant poisoning, referable to food. Swelling and burning in the throat were specially referable to muscarin, a form of fish poisoning, and were not a common symptom of meat poisoning. Tyrotoxin, in his opinion, did not come from milk and cheese; at any rate, not from real cheese. The gastric juices destroyed bacteria. Alcohol in excess tended to impair the gastric juices. Uræmia might be caused in a person who drank to excess, quite apart from ptomaine poisoning, and it might kill that person. Diarrhoea, in his opinion, was not a symptom of uræmic poisoning. Ptomainous meat should indicate its condition by its smell, but did not invariably. Perspiration on meat might be caused by its having been kept in cold storage without its having been frozen. No one had ever been poisoned by mutton or lamb, frozen or other. It would be material to know how other parts of the carcass belonging to this loin had affected others.

Robert Podmore, M.R.C.S., said he had attended the plaintiff and her

husband for a year previous to this illness. The husband was not a drunkard and he had never treated him for alcoholism. He was called in on October 4th. The symptoms of both were consistent with pork poisoning. He certified Mr. Cole's death as due to ptomaine poisoning, and he understood that Mr. Simpson, the medical officer of health, agreed with him. In cross-examination he said the temperatures of both Mr. and Mrs. Cole were above normal. Mr. Cole's was 105° at 1 p.m. on Friday. On Wednesday it was 106° in the morning, and normal in the afternoon, on Thursday it was over 100° . Several questions were put to the witness as to whether or not he and Mr. Simpson had not seen the pork on the 8th, but this he denied, and thought that Mr. Simpson was confounding this case with another. There was a mistake as to the date of the removal of the pork from the dustbin. He was satisfied in his own mind that ptomaine poisoning was the cause of death, but he would have liked to have tested the pork to make sure.

Evidence was called as to the habits of the deceased in regard to drinking, and evidence of damage was given.

For the defence G. A. Garry Simpson, M.R.C.S., medical officer of the district until September, 1905, said he only remembered two cases of ptomaine poisoning during his years of office. When he went to Mrs. Cole's house on the 8th, the pork was fetched, and he discussed its appearance with Dr. Podmore, and said he could smell no putrefaction. He looked at Mrs. Cole's throat and thought she was suffering from pharyngitis. He said nothing about ptomaine poisoning as to her throat. He then went to the butcher and spoke to him about the pork. A piece of pork was shown to him which was wholesome and sweet. No other complaints of ptomaine poisoning reached him, and on the 13th he wrote to Dr. Podmore that it was useless to go further on the materials before them. In his experience it was impossible for throat symptoms such as those described by Mrs. Cole to have ensued so soon after eating the meat. It must have taken several hours, whether the meat was affected by bacteria or ptomaines. Ptomaines would produce vomiting, diarrhoea, and cramps, the latter being produced by the action of the poison on the muscles or nerves. He did not think ptomaine poisoning could be absolutely proved by a post-mortem examination. A person who had led an alcoholic life would have a weakened stomach, which would allow indigestible food to pass into the intestines, which might cause enteritis. Alcoholism predisposed to attacks of all kinds of illness.

Cross-examined: He ceased to be medical officer of health for Acton in September, 1905. Mr. Cole might have died of meat poisoning although not of ptomaine poisoning. He was certain he had seen the meat and did not think it poisonous, or he would not have let it out of his sight. He had heard nothing about this action until just before Christmas, 1906, and he had quite forgotten that he had written to the plaintiff's solicitors about it in 1905.

Robert Burnett, M.D., F.R.C.P., said the symptoms of ptomaine poisoning varied. The symptoms generally did not occur for four or six hours. The most characteristic were abdominal pains, sickness, and diarrhoea. There was no peculiar symptom. The diagnosis was most difficult, because other causes might give rise to these symptoms, such as enteritis. Enquiry should be made as to the patient's habits, and what he had eaten. He should not like to swear as to ptomaine poisoning without an autopsy. Uræmia generally was evidenced by

sickness, diarrhoea, violent headache, and convulsions. Its symptoms much resembled those of ptomaine poisoning, excepting the pain. It was caused by Bright's disease, which was often latent. In ptomaine poisoning the effects usually passed off quickly in a few days. Ten weeks would be a long period. A free liver's eliminative organs would be less active than another person's. What was not eliminated tended to become poisonous, and the poison so formed might produce vomiting, and diarrhoea, and possibly death, as a result. In his opinion, Mr. Cole did not die from ptomaine poisoning, judging from the evidence he had heard. Burning in the throat had never, in his experience, immediately followed on the eating of diseased meat. In cases of such poisoning the temperature was usually low to begin with, and later rose to 103° . There was a ptomaine in cheese which produced the same effects as those in meat. Bad cheese might cause a burning in the throat. If meat were ptomainous it could usually be detected by the nose or the eye. He had a general consulting practice, and had had about half a dozen poisoning cases. He had not had one of cheese poisoning.

Dr. James McMunn said he had had special experience in urinary and some in ptomaine cases. A chill or alcohol might bring on acute symptoms in a person suffering from latent Bright's disease. In ptomaine cases the temperature was almost always below normal. He never knew or heard of the swallowing of ptomainous meat producing burning of the throat as alleged in this case, in the absence of something corrosive. Alcoholism predisposed to pharyngitis. Anyone suffering from pharyngitis would be inconvenienced by the swallowing of any meat, good or bad. In alcoholism the poison not eliminated by the organs of the body might produce symptoms similar to those of ptomainous poisoning. He thought this man died of uræmia. Bacteria might attack the meat through contact with anything. Sweat on the meat was evidence of a change of temperature. Almost always a ptomainous condition of meat could be detected by taste or smell. The odour might then be bitter or sweet. The ordinary consumer could not tell whether a joint of meat contained bacteria which would produce ptomaine. Convalescence in ptomaine poisoning would, he thought, be very rapid; and a duration of ten weeks very improbable. Without an autopsy and an examination of the urine and of the meat itself he thought it was impossible to prove if the cause of illness were ptomaine.

Arthur Vince, the defendant, said he had been in the business all his life, but retired last May. He did his own buying. He bought this pork on September 29th, 1904, from Lewington, a man in Chiswick High Road. It was in perfect condition. He bought five short sides, about 140lb. in all, out of twelve sides there. He marked them with a skewer. They came on Friday, the 30th. He saw the meat on the 30th. It was perfectly good then. He did not ask where the pork came from. He knew it was best Dutch pork, and had bought thousands of Dutch pigs. Generally, there was a Dutch Government label on it. When there was such a label, he would say it was the best pork. English pork bore no such label. He sold some of that pork on the 30th. At night it was put in the cold chamber as usual. On the 1st it was perfectly good. Beads of perspiration on meat were quite common, and occurred when meat was brought from 40° to the warmer outside air. It had no effect whatever, and occurred in butter, poultry, and game. It was not peculiar at all to frozen meat. He cut up this pork himself, but not this joint,

which the foreman cut. It was the best piece. He bought 140lb. because it was good keeping weather. Most was sold on Saturday. He had known Lewington three or four years, and had often bought meat from him. Lewington sold the best meat, and had a very large cash trade, and sold at the lowest prices. This pork was from a ten-weeks old pig. He first heard of ptomaine poisoning on the Wednesday and Thursday from his foreman. He himself and his family ate some of it, without any ill effects, and no one else complained. Dr. Simpson saw him on the 8th, and asked if he had any of the pork left. He replied "No." He showed him a part of the cooked leg which the witness had had for himself, and Dr. Simpson said it was perfectly good. He sold part of this pork to twenty customers and heard no complaints.

In cross-examination he said he thought this pork had the Dutch label on it. The leg he and his family ate had been put in pickle on the Saturday. He preferred salt pork.

Mr. G. P. Territt, the chief inspector of meat for the City of London since 1893, said he had helped to induce the Dutch Government to make an inspection of carcasses slaughtered in Holland and to attach a label to them. That system had been in vogue since 1902, since which date the carcasses imported had largely increased in number, but of 90,552 only eighteen carcasses had been condemned, fifteen of those had been "tired" pigs, and the other three had been diseased. The labelled Dutch pigs were more expensive than English ones. English pork was not inspected. He had six inspectors at Smithfield, who were cordially co-operated with by the salesmen. The Dutch Government paid some compensation if a labelled pig was unfit for food. Clayton had been a salesman at Smithfield for many years, and was a careful man with a large trade. A carcass of pork required careful handling and storing to avoid contamination. A customer should not keep pork in a scullery if he wished his dinner sweet. Pork kept in dry cold storage would not sweat. It depended on the dryness or humidity of the storage chamber. If he saw pork in the market with beads of perspiration on it, he should consider it required very careful examination. Where surfaces of the flesh were in contact, e.g., where the diaphragm joined the ribs, fermentation might be found to have been set up and putrefaction induced. He had no special knowledge of ptomaines.

Cross-examined: Before 1902 Dutch pork was not always good, and that led to representations on the subject. There were Dutch inspectors only at the principal places from which pigs came. The ships carrying the carcasses were general trading boats, including the mail boats. The carcasses were in open crates, through which air circulated. They had to take the air as they found it, with its possible impurities. The market was a busy one; great pains were taken to keep it as clean as possible. There were always possibilities of contamination. A good deal of Dutch pork still came in without labels, and some was certainly not desirable. Each inspector had to deal with about 200 tons of meat each day. He would be surprised if now and then a side which was unsatisfactory did not escape detection, but a bad kidney would probably be noticed.

Mr. G. Clayton, a meat salesman at Smithfield Market, said he sold Dutch pork on commission—about 2,500 pigs a week. He sold six Dutch pigs to Lewington on September 29th. They were practically certain to have been labelled. They would have been killed on Tuesday and sold by him on Thursday morning. He sold some unlabelled Dutch

pork, perhaps 300 or 400 pigs a week out of 2,500. The price would be the same. He specially inspected unlabelled Dutch pigs.

Mr. Lewington said he bought six pigs from Clayton, on Thursday, 29th September. They were labelled and wholesome. He sold five short sides of these pigs to Mr. Vince.

Evidence was giving as to the drinking habits of Mr. and Mrs. Cole, and Mrs. Cole was recalled to contradict some of this. Counsel then addressed the jury for both parties.

BUCKNILL, J., in the course of his summing up, said the defendant had to supply meat fit to be eaten for the Sunday dinner. If he had supplied meat which was good when delivered he must win, and if the man did not die of diseased pork the jury must find for the defendant.

The jury found that it was not proved that the pork was delivered for Sunday's dinner, or that it was inspected when delivered, or that it was the cause of Mr. Cole's death, or of Mrs. Cole's illness.

Judgment was thereupon entered for the defendant.

[For a full report of this case see the *Times* of January 15th-19th, 1907.]

STARCH IN CREAM.—The Cream Dairy Co., Ltd., were charged at the Mansion House in January, for selling cream adulterated with 3 per cent of starch, present in the form of starch paste. They relied on the written guarantee of the Etchingham Dairy Co., who supplied the cream, that it was pure. The case was adjourned until January 30th, when Mr. Thomas Charles, representing the Etchingham Dairy Company, said his clients were quite innocent of any offence. There was no legally fixed quantity of butter-fat in cream. In order to preserve uniformity in its density the company had added 3 per cent of cornflower material to the cream supplied to the defendants. Nothing had been abstracted from the cream. The warranty as to "pure cream" had been given accidentally. Sir Horatio Davies said that explanation entirely absolved the Cream Dairy Company from all blame, and the summons must be dismissed. At the same time it was very unsatisfactory that the public should have to put up with such a state of things without redress. He thought the attention of the Board of Agriculture should be drawn to the matter as showing the futility of the law as it at present existed.

PREMATURE SEIZURE OF MEAT.—At the South-Western Police Court, on January 31st, a butcher was summoned by the Battersea Borough Council for having a carcass of an ox on his premises for sale, or for the purposes of preparation for sale, and unfit for human food. It had been seized in a private slaughter-house very soon after it had been killed. Traces of tuberculosis were found, which it was admitted could not have been discovered until after it had been killed. The defence was that the butcher had not had time to examine the carcass, and that he would have rejected it, and that such was his usual custom. The magistrate held that there was no evidence that the beast was intended for sale. The Council's officers, he said, were premature; they came down on the man before he had the opportunity of making an inspection. It was preposterous, and it would be an abuse of the Act to convict the defendant under the circumstances. He dismissed the summons, and ordered the Council to pay the defendant £10 10s. cost.

CURRENT PUBLIC HEALTH LITERATURE.

The Journal of the American Medical Association.

VOL. XLVI.

- (No. 2.) Spirochaete Obermeieri. F. G. Nory and R. E. Knapp (Hygienic Laboratory, Univ., Michigan). (Preliminary Note: The blood of rats which have been given repeated injections of spirochaetal blood exerts a marked preventive and curative action. The spirochaetes, as in the case of Trypanosoma Lewisi, are filterable through a Berkefeld filter. They regard the tick fever of Africa, and relapsing fever as due to different species of spirochaetes.)
- (No. 3.) Rest in Pulmonary Tuberculosis. J. G. Hilleary. Tent Cottages for Consumptives. E. Fletcher Ingals and John M. Dodson (Chicago). (Conditions such structures should fulfill. Disadvantages of tents. Description of cottages devised by Dr. W. T. Brown, Superintendent of the Valmora Ranch, Watson's, New Mexico.) (Illustrated.)
- (No. 4.) Sodium Aurate: a Non-irritating Local Antiseptic of Remarkable Power. F. H. Verhoeff (Boston). (The desirability of a non-toxic germicide. Sodium aurate as such. Mode of its preparation. Bacteriological tests. Toxicity and penetrating power of the antiseptic. Comparison with other antiseptics. Its bactericidal power does not appear to be interfered with by the presence of albumin. It is recommended in purulent conjunctivitis.)
- (No. 5.) Leprosy in the Philippines, with an Account of Its Treatment with the X Ray. H. Brookman Wilkinson (Manila). (Leprosy in the Philippines; its frequency and modes of spread. Types of the disease. X-Ray treatment; its results. Reports of cases recovered. Theory of the action of the rays.)
- Mosquito Work in Relation to Yellow Fever on the Isthmus of Panama. W. C. Gorgas. (Mortality among the employes during the French occupation of the Canal Zone. Sanitary work since the United States took control. Care of yellow-fever patients. Fumigation and disinfection. Habits of the stegomyia. Results of the work done.)
- (No. 7.) The Essentials of Successful Public Health Administration. A. C. Abbott (Philadelphia). (Modern views concerning public health administration. Plea for professional co-operation. Need of discretionary power. Conditions in Philadelphia. Preventive medicine in the past. Modern public health organization. Necessity of notification. Vaccination, antitoxin and other preventive measures. Creation of public sentiment.)
- National Quarantine a Reasonable Function of the Government. L. V. Sexton (New Orleans). (Importance of prevention of imported disease. Evils of present system and how they could be remedied by National control.)
- Ulceromembranous Angina (Vincent's Angina) and Stomatitis. George H. Weaver and Ruth Tunnicliff (Chicago).

- (No. 12.) An Examination of the Stools of 100 Healthy Individuals, with Especial Reference to the Presence of Entamoeba Coli. Edward B. Vedder (Washington).
- A Clinical Study of Mixed Infection in Tuberculosis. Preliminary Report. F. M. Pottenger, and Charles C. Browning.
- (No. 15.) Infantile Scorbutus. An Analysis of Fifty Cases. John Lovett Morse (Boston).
- Fever in the New Born. A Consideration of the Febrile Temperatures Observed During the First Days of Life, with Report of an Epidemic Infection of the Respiratory Tract in the New Born. William J. Butler (Chicago).
- (No. 17.) A Review of Cancer in the United States, According to the Twelfth Census. Guthrie McConnell (St. Louis). (Comparison of death-rates from cancer and other diseases. Cancer in cities. Death-rate at various ages. Cancer of various organs. Relation of cancer to occupation. Geographical distribution of cancer in the United States.)
- A Plea for the International Study of Carcinoma. Nicholas Senn (Chicago).
- (Nos. 17 & 18.) The Parasitism of the Tubercle Bacillus and Its Bearing on Infection and Immunity. Theobald Smith (Boston). (Present-day problems in tuberculosis. Invasion of the body by the tubercle bacillus. Reciprocal action of bacilli and the invaded animal tissues. Production of specific artificial immunity toward tubercle bacilli. Practical application of methods to produce immunity.)

Zeitschrift für Hygiene und Infektionskrankheiten.

VOL. LIV, PART I, 1906.

- Contributions to the developmental history of the piroplasmata—with plates I-III. By Robert Koch (Berlin). (This short article consists of two parts, the first dealing with "Texas fever," and the second with "Coast fever." They are really explanations of three very excellent coloured plates at the end of the volume, and give a short account of the life-history of these parasites in ticks, their intermediate hosts.)
- Cultivation experiment on the piroplasma of dogs. By Stabarzt Prof. Dr. F. K. Kleine (Berlin). (This article is accompanied by a plate.)
- On the characters of the Eberth-Gaffky bacillus. By Dr. Hugo Příbram (Prague). (This is an attempt to find out whether those cases classified under the clinical aspect of typhoid are caused by one bacillus or are due to different species of a similar bacillus.)
- On protective inoculation for cholera from the standpoint of specific humoral changes. By Dr. med. Leon Karwacki (Warsaw). (This is an enquiry to show that the value of cholera inoculation can be estimated by experimental, i.e., laboratory methods as distinct from the statistical methods of Ferran and Haffkin. From the facts brought forward he draws the following conclusions, viz., that "a double inoculation against cholera approaches, from the standpoint of the formation of antibodies, the blood condition met with in convalescents from cholera. As far as agglutination is concerned, a dilution of over 1 in 80 is sufficient for diagnosis.")

5. New discovery of *spirochæte pallida* (Schaudinn) in the human body and their significance in the ætiology of syphilis. (With plates.) By Dr. Karl Reuter (Hamburg). (The author here confirms the observations already published by many, of the constant presence of *spirochæte pallida* in syphilitic lesions, both in acquired and congenital cases. He has succeeded in demonstrating its existence in gummata in the latter form. He states: "The occurrence of *spirochæte pallida* in syphilis must not be looked upon as a purely chance concomitant phenomenon. Even if the future does not demonstrate that it is the cause of syphilis, the significance of its presence is not therefore lessened, because a parasite which maintains its existence in the uninjured human body, in important organs such as the pathologically altered wall of the aorta, will always remain an object of great interest to pathological anatomists. The extraordinary fineness of the organism requires the best optic instruments for its study in fresh preparations, including an apochromatic immersion lens. Microphotography will prove invaluable so as to be able to compare the results of different authors. Improvement in the present technique of examining the parasite is needed so as to collect further information as to its intimate structure.")
6. The differential diagnosis of true cholera vibrios from those which resemble them, by means of blood agar. By Stabarzt Dr. Schumacher (Hamburg).
7. Bacteria of the paratyphoid group as prejudicial and destructive to rats. (At the same time a contribution to the differential diagnosis of rat-plague.) By Dr. H. Trautmann (Hamburg).
8. Is fresh killed ox flesh agreeable to the taste and healthy? By Dr. med. and phil. Jaroslav Hladík (Vienna). (A small military commission was appointed to inquire into the allegations that flesh used immediately after slaughter was not so pleasant or easily digested as that which was hung up some days before use. The question seems important to decide, especially for soldiers on campaign, and for this purpose they experimented in the laboratory on themselves, by using freshly killed ox flesh prepared by different methods. They found that freshly slaughtered flesh is pleasant and tastes nearly as good as that which is kept, if suitably prepared. The method which recommends itself best is boiling in small pieces with the usual additions of greens, julienne, rice, potatoes, salt, or as stew in the form of gulyás. It is made into small pieces, because in this way rigor mortis will disappear in two and a half hours, when the flesh will become soft. Mincing is necessary if the flesh is to be prepared by roasting. Prepared in these ways it digests as well as any other flesh, and is suited to the camp method of cooking.)

VOL. LIV, PART II.

1. Prophylaxis in diphtheria and the significance of healthy bacilli-carriers in the spread of the disease. By Dr. med. Yngvar Ustvedt (Christiania). (This is an enquiry into the prophylaxis of diphtheria. The author lays stress on the value of some sort of quarantine for "carrier cases," and the proper isolation of cases. He looks upon prophylactic injections as very valuable.)

2. Immunization against anthrax. By Dr. F. Murillo (Madrid). (This is an account of the author's endeavours to obtain a serum of a higher potency than usual, which will be useful in medicine for healing carbuncles, but also in veterinary practice for protective inoculations. He states that time will show whether he has succeeded.)
3. On piroplasma of cattle as observed in Japan. By Dr. M. Miyajima and Dr. G. Shibayama (Tokio). (The authors understand by the name piroplasma a series of illnesses among cattle named mostly after the places they occur, viz., "Texas fever," "blood-water," "meadow-red," "red-water," "malaria of cattle," "coast fever," etc. Whether these are all caused by one or several species has not been settled. The authors succeeded in discovering an allied parasite in the blood of cattle in Japan, with this difference, that it showed no clinical symptoms of its presence. As far as their investigation went it appeared a harmless parasite, but they do not consider the question as finally settled, from want of sufficient material.)
4. On the bacteriological diagnosis of typhoid. By Dr. Heinrich Gräf (Kiel). (This is an account of difficulties encountered in the systematic examination of material sent to the Hygienic Institute, of Kiel, during the enquiry into typhoid fever in Schleswig-Holstein. The article is divided into two sections: (1) Sero-diagnostic difficulties, and (2) Experiences with culture of the organisms on litmus-agar. As regards (1) the author shows that a high agglutination power of the serum does not alone give certainty. It is also known that in about half the cases this reaction does not take place in the early days of the disease, and these show the necessity of cultivating the bacilli from the blood and stools. As regards (2) there are many difficulties, especially when one receives material without any knowledge of the age of the patient, clinical suspicions, etc. The author then describes the Drigalski-Conradi medium, and goes in considerable detail into the characters of some fourteen groups which were isolated from actual and suspected cases brought under his notice.)
5. Attempts at a rational crusade against malaria in Russia. By Dr. G. Gabritschewsky. (Two expeditions were organized, one into the Province of Woronescher and the second to the Caucasus. In these the modern views of malaria prevention were put to the test, and the results fully confirm the opinion of investigators in other lands. The results were immediate, the cost small, and the circumstances not the most favourable, as the inhabitants were very uncultured.)
6. Enquiries into the infectiousness of different cultures of the tubercle bacilli. By C. Fraenkel and Dr. E. Baumann. (The authors here examined 37 cultures of human origin, and great care was taken to ensure that the same dose was used in the experiments with each culture. Details are given of the method employed. Rabbits, rats, and mice were found, for one reason and another, unsuitable for testing the virulence, but guinea-pigs, on the other hand, were found very suitable. The general result was, that none of the cultures showed any essential difference in virulence except one, which had been kept a great many

years and was less virulent than the others. The 36 showed, without exception, a very considerable grade of pathogenicity, which did not decrease during the six years that the experiments were carried on.)

7. Immunization against typhoid by Brieger's method. By Stabarzt Dr. H. Bischoff (Kaiser Wilhelm Military Academy). (In this article, after reference to Wright's method of inoculation, and similar ones by other authors, a long description is given of the method of preparation, etc., of Brieger's vaccine. Experiments were made on 22 persons, and the following conclusions drawn:—

1. The living typhoid bacilli obtained from Bassenge and Mayer, and treated according to Brieger's method, by solution in distilled water, and constant shaking, produce a vaccine which is perfectly clear and free from living typhoid bacilli.
2. Injection of this produces a (1) general, and (2) local reaction. The first, which is short, consists of increase of temperature, disturbance of general health, and of the alimentary canal. It reaches its maximum in 6 to 8 hours, and then falls. It is similar to that which occurs after injection of killed typhoid bacilli, but is less lasting and violent. The local reaction is also less than in the case of injection of killed bacilli, although a much larger quantity of fluid is injected. Inflammations did not occur, and the pain is probably due to the lesions of the connective tissue, caused by the injection, and not to any irritative properties of the injected fluid.
3. The injection of Brieger's vaccine causes the production of specific bacteriolytic antibodies.
4. The bacteriolytic test in the persons experimented on was never over 200 to 500, and in some did not reach 50. Tests of 1 in 1000 or higher value (as given by other authors) were never confirmed in any experiments.
5. The increase of bacteriolysins follows quickly.
6. The increase of bacteriolysins is only temporary; for, as in other immunization experiments, there is, shortly after the injection, a decrease in value of the bacteriolytic test. But three months after in people who had shown at first a high percentage of bacteriolysin, there were none worth mentioning.)
8. On the pathogenic working of blastomycetes. 7th article. (A contribution to the etiology of the so-called Farcinus cryptococcicus.) By Prof. Francesco Sanfelice (Messina). (This is a continuation of previous articles on this subject, and is illustrated by very excellent tables.)

Giornale della Reale Societa Italiana d'Igiene.

ANNO XXVII.

- (No. 1.) Infantile Mortality in Relation to Diet. Eunio Lorenzelli (Children's Hospital, Parma). (He divides the children into groups: (a) those suckled by mothers; (b) suckled by wet nurses; (c) partly breast, partly cow's milk or other food; (d) those fed solely on cow's milk or other preparations. Continued in No. 2.)
- Municipal Disinfection in Milan. Pietro Ferrari.

- (No. 2.) Water Purification by the Tachiola Paterrio Method. T. Antonio. (Nos. 3 & 4.) Natural Lighting of Habitations and Schools; methods for determining amount. Alberto Graziani.

- (No. 5.) Bacillus Tuberculosis in Milk. Osvaldo Magi (University, Pisa). Caustic Soda as a Disinfectant. A. Ceradini. (A 5 per cent solution of pure caustic soda killed the *B. typhosus*, *B. coli*, and *B. diphtheriae* in five minutes, the *S. pyogenes aureus* in fifteen. A 10 per cent solution killed spore-bearing anthrax in one hour. The caustic soda usually sold is not pure, and may contain only 70 per cent of the active ingredient. A concentrated solution of 60 per cent strength will be found useful for carrying about.)

- (Nos. 7 & 8.) The Varying Specific Gravity of Milk. Alfredo Baldon (Parma). (The effect of the various constituents of the milk is considered. The specific gravity appears to be directly proportionate to the amount of fat present.)

- (No. 9.) The Crusade against Tuberculosis, Italian Statistics. A. Pisani. Research on the Air of Closed Rooms. G. F. Gardenglei.

- (No. 10.) An Enquiry into the Cleanliness of Milk, as consumed in Milan. Florentini, Ceradini, and Galli (Public Health Dept., Milan).

- (Nos. 11 & 12.) The Resistance of Pathogenic Germs to Currents of Air. C. Zonchello (University, Cagliari). (The principal conclusions to be drawn from this treatise are:—

- (1) That currents of air exercise a germicidal action on bacteria, and that the stronger these currents the more rapid is this action.
- (2) That different pathogenic bacteria have a varying resistance to currents of air, depending on the velocity, temperature, and humidity. The least resistant of those experimented on is the cholera vibrio, the most resistant is the staphylococcus pyogenes aureus. The following have an intermediate resistance in ascending order—the bacillus of influenza, the bacillus of diphtheria, Friedlander's pneumococcus, and the bacillus of typhoid.
- (3) That the factors which act in rendering even slight currents of air germicidal are neither the rapid oxidation of the bacterial cells nor their desiccation; but in addition to the factors mentioned above this last is certainly the most important.
- (4) That, considering the slight resistance of pathogenic germs to currents of air relatively weak, like those used in these researches (190 metres to the minute), it is logical to deduce from a practical point of view that the winds, independent of the fact that they disperse the germs in the air, are to be numbered among the natural means of the purification of the polluted atmosphere.)

Deutsche Vierteljahresschrift für öffentliche Gesundheitspflege.
VOL. XXXVIII, PART III.

1. Hygienic consideration on closed and open building methods, on the single house and block dwelling. (Conclusion.) By Dr. med. Gemünd (Aachen). (This is the last article on this subject, and in it the author comes to the conclusion that while the small house is the ideal dwelling, the "block dwelling," which has often to be erected on

- economical grounds, can by suitable arrangements be robbed of its unhygienic attributes and made a useful and healthy form of abode.)
2. Medical reform in Prussia. By M. Pistor.
 3. The different kinds of street-paving considered from a hygienic standpoint. By Magistratsbaurat G. Pinkenburg (Berlin). (This is the first article on the subject and will be completed in the next number.)
 4. Swakopmund at the beginning of the Hottentot rebellion, from hygienic point of view. By Staff-physician Dr. Glatzel.
 5. Influence of race and the frequency of cancer according to its prevalence in the Canton of Berne. By Dr. Karl Kolb (Munich). (Owing to the accurate methods of recording deaths in Switzerland, the author found it possible to enter into an enquiry on the alleged race incidence of cancer. The Canton of Berne is very suitable for this purpose, since it contains a large number of inhabitants of both the Latin and Teutonic races. The incidence is very carefully considered in connection with the age-periods, sexes, etc. of the population, and the author finally concludes that the cause of the varying incidence of cancer is not to be sought in racial differences, but in external influences, such as dampness of soil, habits of the people, etc. He considers this conclusion is not without significance and leads to a more hopeful view of its prevention, since the influences referred to are more or less under control.)
 6. Public baths in the government districts of Arnsberg. By Dr. Solbrig (Arnsberg.) (The author here enters into the question of the number of swimming, warm, and spray baths which ought to be provided according to the population, and the steps which have been taken to provide these in the district of Arnsberg. Spray baths for school children are recommended on account of their cheapness and effectiveness.)
 7. Water supply by placing dams across valleys. By Prof. H. Chr. Mersbaum (Hanover).
 9. The water supply of Berlin, past and future. By G. Anklam.

Zeitschrift für Hygiene und Infektionskrankheiten.
VOL. LIV, PART III.

1. The filtration of vaccine virus. By Dr. A. Negri (Pavia). (The author here describes his method of filtration of vaccine through cotton wool, paper, and Berkfeld V. & N. filters. By this means he deprived the vaccine of the ordinary bacilli and cocci, and insured its sterility. With the filtrate he made six series of vaccination experiments on the anterior chamber of rabbits' eyes, as well as on cows. All these experiments gave positive results. The author hopes that other experimenters will take up this subject, so that the question of the filtration may be finally settled.)
2. Natural pneumococcal infection in experimental animals, and experimental enquiries on the development of pneumonia. By Dr. Hugo Selter (Bonn). (The spontaneous occurrence during the last year of pneumonia among laboratory animals (rabbits and guinea-pigs) in the Hygienic Institute, in which the lungs were most frequently attacked, offered an opportunity of observing the circumstances of its occurrence. The

etiology in these cases is uncertain; but an examination of the fatal cases points to the air passages as the point of entry of the pneumococcus into the lung, either direct or by means of the lymph channels, prior to a general septicæmic invasion. To settle this point experiments were made to cause inflammation of the lungs by inhalation of pneumococci; attempts were also made by cooling and inhalation of sharp particles of dust to cause experimental pneumonia. The bacteriology of the saliva was gone into, and enquiries made into the bacteria in healthy lungs. His results are noteworthy in many respects:

1. They show that in the lungs of healthy rabbits and guinea-pigs which have not undergone any special treatment such as cooling, pneumococci and other typical bacteria (*B. cavisepticus mobilis* and *B. cuniculi immobilis*) are not infrequently found.
2. That in many cases pneumococci are to be found not only in the lungs but in other organs of apparently sound rabbits and guinea-pigs. Since the lungs and bowels as a rule do not let bacteria go into the blood, one must conclude that an active invasion takes place. It is interesting that the infection may remain latent. Such latency has been already found in the inhalation experiments with pneumococci in one guinea-pig.
3. In other cases the infection does not remain latent, but advances and kills the animal by septicæmia. Our experiences give the impression that this can take place under the influence of atmospheric factors. During two winters we have seen such pneumococcal epidemics among our animals. We have never succeeded in producing attacks by artificial means (inhalation, cooling, blowing in of dust), and are, as before, driven to the assumption of a disposition which is difficult to imitate.
4. The starting point of the "latent" as well as the "manifest" infection is the lung. This apparently draws the infection from the nose and throat, where pneumococci have already been demonstrated in an animal.
5. The analogy of these facts is evident in man. Also at times we find pneumococci in the mouth, very frequently in sound lungs, and only occasionally does a true pneumonia develop. The influences which lead to this are unknown, but cold seems to be the chief. Tizzoni and Panichi seem to have lately observed a latent pneumococcal infection of the whole human body. In four cases of fibrinous pneumonia 30, 31, and 56 days after the crisis and fifteen months after cure, they were able to cultivate pneumococci out of the blood.
6. What has been said here regarding pneumococci applies also to *B. cuniculi immobilis* and *cavisepticus mobilis* in rabbits and guinea-pigs.
7. A departure from human conditions is shown in our experimental animals, inasmuch as pneumococci are not always indigenous to rabbits and guinea-pigs, but only penetrate and cause an infection under certain circumstances which we do not know accurately.

Pneumococci furthermore have not yet become obligate parasites in experimental animals as in man.

8. Bacteria in healthy tissues and their point of entry. By Dr. Hugo Selter (Bonn). (The author states that for a knowledge of the nature and development of infectious diseases it is important to know whether the organs and blood normally contain bacteria. He next cites the experiments and enquiries of previous investigators on this point, and then proceeds to his own. He carefully examined the lungs, liver, spleen, and kidneys of fifteen animals from different stalls of the Institute, taking only those with sound organs, and found that he could recover various bacilli with which they had been fed, or had been made to inhale. He deals first with the lungs, then the intestinal canal, and finally with the skin. The results he epitomizes as follows: "(1) The lungs in general cannot be considered free from micro-organisms. Sporing bacteria are commonest; along with these pneumococci and other virulent bacteria are met with. (2) Strong inspiration can forcibly raise droplets containing bacteria from the buccal mucous membrane and carry them to the periphery of the lungs. (3) Even by chewing and swallowing a similar thing can happen. The bacteria can then go from the lungs to the bronchial glands. (4) The liver, spleen, kidneys, and blood are free from bacteria under normal conditions. (5) The microscopic intact intestinal wall is not quite impenetrable by bacteria belonging to the bowel. The entering micro-organisms are stopped by the mesenteric glands. (6) Even the uninjured skin lets bacteria through, which are caught in the underlying lymph glands. (7) The sterility of the organs and the blood rest not so much on the impenetrability of the lungs, digestive tract, and skin as the stopping power of the mesenteric and other lymph glands.")
4. Studies on plague. (Part II. The rational cure of plague serum-therapeutics, or immediate surgical interference. By Prof. Dr. Camillo Terni (Mailand.)
5. Experimental studies on the doctrine of auto-intoxication. By Dr. Hermann Pfeiffer (Graz).

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1. The experimental foundation of an antitoxic therapeutics for bacillary dysentery. By Drs. R. Kraus and R. Doerr (Vienna).
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4. On the question of hæmolysin and toxin formation of the cholera vibrio. By Dr. P. Mühleus and Dr. W. von Raven (Berlin).
5. Contribution to our knowledge concerning mallein as a diagnostic and curative agent for glanders. By Dr. J. de Haan and L. J. Hoogkamer (Java).

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STATISTICAL MEASUREMENT OF MEANS EMPLOYED TO DECREASE INFANT MORTALITY.

IT may be taken as evidence of a scientific spirit that we are anxious to proceed from the qualitative to the quantitative, and to measure the efficacy of measures recommended by us in the public interest, by statistical results. Such measures may, or may not, be sufficiently accurate for the purpose for which they are utilized. They may, furthermore, although accurate in themselves, not be able to allow for factors of variation of greater magnitude than the one which is being measured. There can be no better illustration of this than the question of municipal milk depôts. The infant mortality of an urban community which has had a milk depôt for a number of years is found to have declined. How much of this is due to cool summers, and how much to the operations of the depôt? Before one can begin to make the necessary comparisons on these lines it is first necessary to ascertain the magnitude of the operations of the depôt. If, in a community having 5,000 births annually, 500 have been fed from the depôt; if these 500 have been each fed for a whole year on the depôt milk, and if this feeding has been so successful that not a single baby has died from the results of bad feeding which might otherwise have accrued; and if it be assumed, contrary to the facts, that the sole cause of infantile mortality is bad feeding, then the infantile mortality may, under these circumstances, have declined 10 per cent, say from 150 to 135 per 1,000 births. A greater effect could only be produced if the babies fed at the depôt were specially selected. The illustration suffices to show that we have to deal with small differences, in which the factors of variation, other than depôt or non-depôt feeding, cannot be eliminated.

Even greater difficulties arise when the attempt is made to state the special mortality experience of the depôt-fed babies in terms of the total number of depôt-fed babies. A death-rate must embrace the experience of a whole year, or correct for a more limited period.

It must comprise babies of a similar age-distribution in the dépôt and the non-dépôt-fed groups; or it must make a correction for differences in this respect. If these corrections are not made the statistics are useless; and, so far, we have never seen them made with any completeness, and doubt if the conditions of work in these dépôts enable it to be done.

Although these considerations raise doubt as to the validity of comparisons between dépôt-fed babies and babies not thus fed in the same community, and, still more, between towns in which there are and are not milk-dépôts, they do not affect the main question as to the utility of a pure milk supply for babies. The question is one that must be decided on general principles. Pure milk, whether obtained from municipal dépôts or elsewhere, is an essential condition of healthy infant life; and all efforts in this direction are of value, not only because of their immediate effect on infant mortality, but also because of their wider educational effect.

THE REGISTRAR-GENERAL'S ANNUAL REPORT FOR 1905.

THE 68th Annual Report of the Registrar-General of Births, Deaths, and Marriages in England and Wales has recently been issued, and its study may be strongly recommended in connection with the subject of Infant Mortality, with which this number of PUBLIC HEALTH is largely concerned. Both the Registrar-General's report and Dr. Tatham's letter are unusually long and interesting, and contain valuable matter with which it is almost indispensable that every medical officer of health should be familiar. For the present we concern ourselves chiefly with that part of the report—marriage-rate, birth-rate, and infant mortality—which sheds light on the papers and discussion reported in another part of this issue. The marriage-rates and birth-rates in this report are corrected for age distribution of population, which greatly enhances their accuracy and comparability with those of past years.

MARRIAGE-RATES.

MARRIAGEABLE persons are those aged 15 years and upwards. In 1870-72 the marriage-rate calculated on the total population at all ages was 16.7, and in 1905 it was 15.3 per 1,000; the corresponding rates calculated per 1,000 marriageable persons were 57.2 and 46.6 respectively. The crude rate thus shows a decline of over 8 per cent, the corrected rate shows a true decline of nearly 19 per cent. Even this does not represent the total difference due to the influence of differences in the proportions of marriageable men and of marriageable women and of variations in their age constitutions. When allowance is made for these, the real decline of the marriage-rate is nearly 22 per cent. Not only are fewer persons marrying than formerly, but marriage is gradually taking place on the average at a higher age.

BIRTH-RATES.

RECENT reports of the Registrar-General, including the present one, point out that for close enquiry into the significance of variations in the birth-rate

"the number of possible mothers" is the most useful basis of calculation. Calculations made on this basis show that there is greater fertility in rural than in urban districts.

INTERDEPENDENCE OF BIRTH-RATES AND OF INFANT MORTALITY.

MUCH ingenuity is displayed in the calculation of data throwing light on this important subject. In one table is given for each county a comparison of birth-rates and the number of survivors at each age up to five years. In a second table a similar comparison is made for England as a whole, London, Lancashire, three mining and three agricultural counties; and in a third table for Salford, Stoke-upon-Trent, Barrow-in-Furness, Boroughs of Bethnal Green, Shoreditch, and Stepney, and the Boroughs of Kensington, Chelsea, and Paddington. The first set of figures shows that several counties have exceptionally high birth-rates with high child-mortality rates; while several counties having low birth-rates compare not unfavourably in respect of the upkeep of population at five years of age with the former. Similarly in comparing towns the results show that "while the high birth-rates prevailing in some of the mining counties yield up to the fifth year a proportionately larger supply of children to the population than any other counties, yet many other industrial areas, notably London and Lancashire, yield a proportional supply of children that is little above that furnished by country districts with exceptionally low birth-rates."

It would be easy to jump from this conclusion to the inference that high birth-rates are to be deprecated because they are associated with a high infant mortality. Such an inference is not justified by the association. They may both be due to a common cause, as, for instance, the prosperous conditions of urban life, enabling marriage to take place earlier and among a larger proportion of the population of marriageable ages. These same urban conditions of life, and the industrial employment of women associated with them, may be, and doubtless to a large extent are, the active cause of the high infant mortality occurring in towns. To quote the above data of the Registrar-General, as some newspapers have done, in favour of lower birth-rates is quite unjustifiable.

INFANT MORTALITY.

THE same report contains much information as to infant mortality. Attention may be drawn first to the honours list—the 32 out of the 217 chief towns in England and Wales which were credited during 1905 with less than 100 infantile deaths per 1,000 births, among which may be mentioned Guildford (65), Aldershot (71), Hereford (79), Cambridge (80), Burton-on-Trent (87), Leyton (94). With these must be contrasted the 34 towns, mostly mining and industrial centres, in which the rate exceeded 160 per 1,000. Farnworth (228) has the unenviable place at the head, next coming Burslem (205), Ince-in-Makerfield (203), Rhondda (200), Hanley (195), Merthyr Tydfil (191), Dewsbury (188), and so on.

Further tables show that whether infant mortality or the death-rate at all ages under 5 is taken as the criterion, the counties fall into the same categories as regards high or low mortality. The tables to which reference is here made furnish the primary data for an investigation of national importance. It must be possible by a careful analysis of the circumstances

of each community to arrive at a working decision as to the chief causes of excessive infant mortality. When will this be undertaken, and by whom? Generalizations on insufficient data, which are not substantiated when a wider survey is taken, will not continue always to pass muster, and we are indebted to the Registrar-General for giving us a wider basis for induction.

INFANT MORTALITY AND THE EMPLOYMENT OF MARRIED WOMEN.

THE Registrar-General takes two groups of fifteen towns, each containing respectively the lowest and highest proportions of occupied married women, and compares their birth-rates and infant mortality in two quinquennia. The birth-rate is, as might have been anticipated, lower in the towns having a high proportion of the married women industrially employed. The relationship between industrial employment of married women and infant mortality is not, however, very visible. In the first group of towns, having only 4 to 8 per cent of its married women engaged in occupations, the infant mortality in 1901-5 varied from 104 in Burton-on-Trent to 202 in Aberdare, the average for fifteen towns being 161; in the second group of towns, having from 20 to 39 per cent of its married women engaged in occupations, the infant mortality varied from 140 in Rochdale to 206 in Longton, the average for fifteen towns being 168. Evidently the result thus stated is dubious. By the calculation of co-efficients of correlations it might possibly be made significant.

DISEASES PRODUCING INFANT MORTALITY.

WE turn to Dr. Tatham's letter to the Registrar-General for accurate information on this subject. It is noteworthy that one-fifth of the total loss of life in infancy occurs in the first week of extra-uterine life, a fact which tends to moderate our hopes of affecting one-fifth of the total infant mortality, unless it be by measures affecting the mother during pregnancy. Urban infant mortality is 30 per cent in excess of rural; the excess of urban over rural mortality is only 6 per cent in the first week of life, while it is over 50 per cent in the later months of the first year. Half of this excess is due to diarrhoeal diseases, one-eighth to premature birth and congenital defects, one-eighth to pneumonia, and smaller proportions to tuberculous diseases, bronchitis, etc. These important facts bring us face to face with the conclusion that the chief way to diminish infant mortality is to prevent epidemic diarrhoea.

THE PREVENTION OF EPIDEMIC DIARRHOEA.

ON the average, three-sixteenths of the mortality under one year of age is due to diarrhoeal diseases. It is confined chiefly to hand-fed babies, and among hand-fed babies is more frequent among those fed with condensed than among those fed with fresh cow's milk. The following extract from the annual report for Brighton for 1906 illustrates this. A census of the methods of feeding of the infantile population has been gradually taken during the last four years. From this it appears that 63 per cent of all babies under one year of age are suckled only, and 14 per cent more are partially suckled. In the first six months of life 75 per cent of all the babies are suckled only, and 84 per cent are wholly or partially suckled. The deaths from diarrhoea during four years have been similarly classified in

accordance with methods of feeding, and the results are summarized as follows:—

(1) *Breast-fed babies* under one year of age have only one-twelfth, and breast-fed babies under six months have only one-sixteenth part of the share of deaths from diarrhoea, which would fall to their share were the deaths from diarrhoea evenly distributed among all the babies.

(2) *Babies fed on cow's milk*: these babies at all ages under one had 4½ times, and at ages under six months had six times as many deaths from diarrhoea as they ought to have had on the same supposition.

(3) *Babies fed on condensed milk*:* these babies at all ages under one, had 13 times, and at ages under six months, had eight times as many deaths from diarrhoea as they ought to have had on the same supposition.

It may be inferred further from the above facts that judging by this local experience, it is twice as dangerous to feed babies on condensed milk as on fresh cow's milk; that it is 54 times as dangerous to feed a baby on cow's milk; and 156 times as dangerous to feed a baby on condensed milk as on mother's milk.

THE LAMBETH MILK DEPOT.

DR. PRIESTLEY has issued a report in which particulars are given of the results of the first half year's work of the Lambeth Municipal Depot, in which 100 infants and children have been fed. He states that the Lambeth Milk Depot is run on the lines of the French type, viz.: strict medical supervision, discriminating and careful distribution of the milk only to infants and children who cannot be breast-fed, and the systematic medical and clinical study of the effect of the milk on the infants and children using it. The infants and children dealt with belong to the poorer classes, and the large majority are, at the time of commencing to use the milk, in a weakly and wasted condition, as far as general health is concerned—the most suitable cases for treatment by a municipality.

He concludes that—

1. The lines upon which the Lambeth Milk Depot is being run are proving satisfactory, more especially the medical supervision of the Depot and the infants and children using the milk, together with the systematic and careful medical study of the effects of such milk on those fed upon it.

2. The Depot has already saved the lives of several infants and children and improved the general health of others; and even allowing for the smallness of the numbers of infants and children dealt with, and their different age periods, together with the varying lengths of time during which the milk has been used, there has been amongst them a marked lessening of the infantile mortality rate.

3. The educational value of the Depot is proving important for mothers and others—the visiting of the infants and children at their homes being specially noteworthy in this respect.

4. The first six months of the work carried out in connection with the Lambeth Milk Depot has proved that infants and children properly and regularly fed (even on artificial lines) do well, and escape, not only death, but also ill-health—the common results of improper and irregular feeding.

* This in nearly every case means sweetened condensed milk.

THE REDUCTION OF INFANTILE MORTALITY WITHOUT MUNICIPAL MILK DEPÔTS.

By H. O. PILKINGTON, M.R.C.S., etc.
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THE question of Infantile Mortality is one which in recent years has not only especially engaged the attention of health officers and sanitarians, but has also aroused an unusual amount of interest amongst the general public. This interest in some cases has been aroused, and in others materially increased, by the National Conference held at Westminster in the summer of last year for the purpose of discussing the question, and, if possible, of devising remedies for evils which, it is well known, undoubtedly exist. And many of the papers read and speeches made on that occasion conveyed to my mind the impression that the writers and speakers were dealing with a subject which they thought was a new one, and one which for the first time was now engaging serious attention. But so far from this being the case, it is a subject which, since the first formation of Public Health Laws, and the first appointment of Public Health Officers, has demanded and received earnest consideration, and the very fact that so little actual progress has been made, so little improvement effected, only shows the great difficulties with which a satisfactory solution of the problem is beset. It is because the causes are numerous and varied—some obtaining more than others in certain localities—that no one single remedy can be devised; it is only by combined action, by a simultaneous attack upon each contributory cause, that anything like a complete and permanent improvement can be expected.

Briefly, then, what are the causes which lead up to this high rate of infantile mortality? And since the town with which I have to do, as medical officer of health, includes the whole list within itself, I am in a position to speak of all of them, and of the share which each individual cause takes in bringing about the total lamentable result.

(1) Any occupation which encourages the mother, or allows the mother, to continue at work whilst pregnant, or, still worse, which allows her to do so nearly, or quite, up to the time of parturition. Now, on this point I can only speak of the cotton manufacturing industry. Here, especially as regards weaving, the woman is the equal, often the superior, of the man; and so frequently the wife can earn bigger wages than the husband, the girl of eighteen or twenty bring in more money than her father. This is a condition of things

which in the future will have its effect upon the child. A girl brought up in the factory, and intended for factory work, spends little of her time at home, and takes no heed of household cares or duties. When as a married woman she enters upon the duties and responsibilities of a housewife, she does so without guidance or experience, or at any rate with only the mistaken guidance of wrong habits handed down from previous generations of cotton operatives.

In due course she does marry, generally a cotton operative like herself, so exposing her possible offspring to all the dangers of inbreeding. Becoming pregnant, she continues at work, standing for hours upon her feet, lifting heavy weights, and certainly not having the physical rest and mental repose which Nature requires at such a time. The consequences are too often abortions, miscarriages, premature births, or the birth of weakly children, who, without ever having had a fair grasp of life, still count as amongst the recorded deaths.

The too early return of the mother to work after parturition brings in its train the nursing out of the infant, the deprivation of the breast milk and the substitution of unsuitable food, the danger of cold, to which the child must needs be exposed in its removal night and morning to and from the house in which it is nursed; but, above all, the loss of the motherly attention and nursing, which nothing else can replace. Now, legislation has made an attempt to mitigate this evil, but the effort has been a very half-hearted one, requiring the mother to remain off work for one month after the birth of her child. A resolution passed at the recent National Congress was in favour of extending this period to at least three months, and that the employer should then only receive back the mother if the local authority were satisfied that proper provision had been made for the child's nursing and general welfare. This is a step in the right direction, and if it become law, and is thoroughly and conscientiously carried out, will at least give the infant the chance of its mother's feeding and nursing during the earliest and probably the most critical period of its life.

But even should this become law, there will be found numerous cases in which every effort will be made to evade compliance with its provisions; efforts made by the mother, who not only frequently prefers factory to household work, but who also misses the weekly money resulting from her labour, and efforts made also by the manufacturer, or his manager, who, especially in times of push and good trade, objects to the absence of a reliable operative.

(2) With the homes of the people, so far as structural conditions are concerned, the local authority has the power of dealing. It can

close houses which from situation, want of thorough ventilation, or dilapidated condition, are unfit for human habitation, and it can shut up cellars which do not comply with certain requirements defined by law. It can improve the closet accommodation and the condition of the backyard, and can see that the front streets and footways are properly paved and flagged.

It can also compel the landlord to keep the house in repair, and have it periodically lime-washed. But it unfortunately cannot control the general habits of the inmates, so that a house well found and well appointed may, through the careless, slovenly habits of the tenants, degenerate into something little better than a pigstye. In a home of this kind an infant's chance of life is greatly discounted. Badly nursed, seldom washed, unsuitably fed, it is more than usually liable to be injuriously affected by the cold of winter, or the heat of the summer diarrhoeal season, whilst it may be expected that the protection afforded to it during the prevalence of any infantile epidemic disease will be but slight. Such neglect is not unfrequently connected with intemperance in one or both of the parents, and yet is not actually intentional, nor does it bring the case within the jurisdiction of the officials of the Society for the Prevention of Cruelty to Children. Local authorities require greater powers to enable them to deal with tenants of this class, and the subject should be remembered whenever a town seeks to obtain additional powers from Parliament.

(3) The question of parental intemperance in connection with infantile mortality is a very important but a very complex one. Intemperance in the parents has without doubt a pre-natal influence for evil upon the child. It interferes with the process of nutrition, checks the action of the organs of excretion, destroys nerve power, and so renders a father less able to beget, and a mother less likely to bring forth, a healthy, vigorous child. But it is in its social effects, in its malign influence upon the home and upon domestic life, that it acts most disastrously as a factor in the causation of infantile mortality.

Amongst the young adults of the upper and middle classes I believe the excessive use—the abuse—of alcohol has of late diminished, but there is reason to think that, in the northern manufacturing towns at any rate, the young girls and women are gradually becoming more habituated to its use. More frequently than formerly young women may be seen entering and leaving the public house, whilst the evil example and influence in a given street or neighbourhood of one mother who drinks often leads to the downfall and degradation of others. It is because of these views, gained by enquiry and experience, and because I recognize intemperance as one cause of the high infantile

death-rate, that I have issued notices throughout my sanitary district setting forth the conclusions arrived at by the Physical Deterioration Committee, and pointing out the evil and ruinous results of drinking habits. These notices have been in the form of large posters affixed from time to time upon the walls and hoardings, whilst others of smaller size have, by permission, been affixed at the entrances to factories, workshops, churches, chapels, clubs, etc. The common lodging-houses have been supplied with copies, framed and glazed; whilst to ensure the matter being brought to everyone's notice, a leaflet has been distributed and left with every householder. It is impossible to say what, if any, good will result from this procedure, but at any rate it is one blow struck at our common enemy.

The deaths of young infants from "overlaying" are said to be often connected with intemperance on the part of the mother; and the fact that many of them occur on Saturday night, or early Sunday morning, would seem to bear out and support this view of the case. Of a considerable number of such cases with which as police surgeon I have been connected, in but few was there direct confirmatory evidence of this; in the majority the attendant circumstances and the good character of the parents warranted the death being attributed to "misadventure," though, of course, it was always connected with the foolish practice of allowing very young children to sleep in the same bed as their parents.

(4) Since the subject "Infantile Mortality" can only include and deal with the early deaths of children who have been actually alive, it would at first sight seem out of place to speak of the use—the increasing use, I believe—of abortifacients, or of other means to procure the death of the fœtus in the womb, or its premature expulsion therefrom. And yet the two subjects are so closely, so intimately allied, that it is a difficult matter to draw the line of demarcation, and to show where the one exactly begins and the other ends. The use of such drugs, so poisonous in their action, or of instrumental means, so dangerous in the hands of unskilled persons, must, should the attempted crime fail to be successful, have a disastrous effect upon the child, which thus not only comes into the world an unwelcome guest, but brings with it a heritage of disease, the fore-runner of an early death.

There can be little doubt that the lectures on these subjects which have been given, and the literature which has been extensively diffused throughout the country, have all had their effect, and that effect is seen in the birth rate, which for so many years past has been steadily declining. Those who now have recourse to the means which have been thus suggested to them are not only the unmarried girls, who

recognize that the birth of their child will be a publication of their shame, but married women who have been instructed in the principles of this "domestic economy," and have been taught how to keep a family within desirable limits. Cases are from time to time brought to light owing to the severe illness or death of the victims—the voluntary victims—of these illegal acts; but the number is but small in proportion to those seeking to make use of these mistaken means, owing to the care and secrecy exercised by all the parties interested.

(5) The social life of the working classes, their habits, their ignorance of the first laws of health, and their adherence to customs now recognized as obsolete and wrong, combine to form the principal cause of infantile mortality, especially when to that is added the mistaken kindness which prompts a parent to give an infant that for which it cries, quite regardless of the bad effect which may result. Habits handed down for generations, and practised until they have become a part of daily life, are exceedingly difficult to eradicate and overcome; and for this reason progress amongst existing parents is but slow. Still, progress has been made, and I would instance the abolition of the nightcap with which immediately after birth the little stranger was formerly invested, and of the "butter and sugar" with which its innocent stomach was outraged, precursor of many other unsuitable substances which it was doomed in after life to swallow. The dread of a draught, so characteristic of the factory operative, keeps the house ill ventilated, and the bed-room especially, stuffy and close. The mother, accustomed as a factory girl to use her home simply as a place in which to get her meals and to sleep, too often has the bed-room fireplace closed up, never thinks of opening the window, and leaves the bed unmade and the slops unemptied until the room is again required at nightfall. Time may to some extent have habituated the elders to tolerate these insanitary conditions, but on the recently born child the effect must be detrimental. And it is from a room like this that a child is frequently carried out in the cold, early hours of the morning through the streets to the house where it is nursed. If the child has the good fortune to be breast-fed, it of course receives the food which Nature intended it should have, but if it is wholly, or in part, artificially fed, then it is exposed to all the dangers resulting from want of thought, or sheer ignorance.

(6) In the opinion of some authorities insurance plays an important part in the causation of infantile mortality. No doubt in some instances the money to be obtained on the death of a child has directly led to its death, whilst in a far greater number it has induced a condition of careless indifference on the part of the mother—often in

such cases intemperate—who has recognized that the loss of the child will be a monetary gain, and who has consequently taken little or no pains in the case of an ailing infant, salving her conscience with the reflection that "if it be the will of God that it must die, it will die." But, after all, such cases are comparatively rare, and far more children are killed by mistaken kindness than by intentional cruelty or neglect.

I have always held that the insurance of children in sick or burial clubs is a form of thrift, and as such is commendable; but, at the same time, the conditions should be so framed that the security of the child is safeguarded, and there should be no possible temptation held out to a parent to make a profit by the death of her offspring. Various means have at different times been suggested for dealing with, or rather for preventing, the possible abuse of infantile insurance. One has been that the insurance companies, instead of paying over to the parents the amount due on the death of a child, should themselves arrange for and pay the necessary expenses of the funeral. But this would certainly not be satisfactory to the majority of parents. It would savour too much of *charitable* relief, of a pauper funeral, and would offer a temptation to the company to contract for the function and accept the lowest tender offered. Parliamentary enquiries have already been held on the subject, nor does there seem to be sufficient ground at present for asking that another should be instituted. Trust must be placed in the skill and discretion of the medical man who must certify the death, or of the coroner who must enquire into the circumstances of one uncertified; whilst the officials of the National Society for the Prevention of Cruelty to Children could hardly fail to hear something of a case of wilful injury or flagrant neglect. In doubtful cases the utility of a medical adviser to the coroner would be demonstrated, an appointment which I have long contended would be of the greatest service. The duties would be those of enquiring into the circumstances attendant upon deaths which are uncertified, and advising as to the necessity or otherwise for further and more formal investigation.

(7) The appointment of women health visitors, now so general in all large towns, affords a means of conveying instruction to the poorer households; and a little assistance and a few words of kindly advice, given with tact and at the right time, will often prove of great service to the mother and her infant. But since many of the children are weakly and ailing from the time of birth, this help should be given as soon as possible, and the interval of six weeks which often elapses before the birth is registered, and so brought to the notice of the

medical officer of health, not seldom renders the information useless. If the recent Westminster Conference shortens the period which may elapse between the birth and registration to a fortnight, or requires notification to be given to the health authorities at once, it will have done something towards reducing the infantile mortality. A good deal has at different times been said and written as to the most suitable kind of person to fill the post of health visitor. Some advocate the employment of a lady of education, others that of a married woman who can speak from *actual* experience of an infant's requirements; others again believe in the services of a young active woman, herself a daughter of the people, who, having been brought up in a cottage home, perhaps one of a large family, knows the difficulties with which the often overworked house-mother has to contend. The best person would probably be one who embodied all these good qualities, but since this is unattainable, one must be content with an active, sympathetic person, who, without appearing to pry too far into family matters, or without laying too much stress on the domestic failings which she will most certainly find, will act as a friend, listen to the tale of difficulties, show how things may be mended, and encourage perseverance in the right direction.

Since 1903 I have had the services of two health visitors, and their work has had its effect in reducing the amount of infantile mortality. The result of their labours may be seen in cleaner houses, especially in cleaner beds and bed-rooms, in windows left open to admit fresh air, and in the abolition of tube feeding bottles, of dummy teats, and other aids to early death.

Their duties are distinct from those of the sanitary inspector, and though I am quite in favour of their holding the certificate of the Institute—as a guarantee of theoretical training, and though in the course of their work they must of necessity come across nuisances which imperatively call for immediate reform, I should never advise their serving formal notices or taking any action of a punitive nature. This would destroy their position as advisers, would make the people suspicious of the object of their visits, reticent in giving information, and so would materially reduce—if indeed it did not altogether destroy—the value of their work. Apart from premature births, or the deaths of children congenitally diseased, a large proportion of the infantile mortality is caused by diarrhoea or diseases of mal-nutrition. But a certain number of deaths are each year caused by infectious diseases, especially those forms most commonly met with in early childhood. Measles and whooping cough are fatal in an inverse ratio to the age of the child affected, and an epidemic of these diseases

never occurs without a heavy toll being taken of lives under the age of twelve months.

Parents are singularly apathetic with regard to such diseases, partly because they will not recognize the danger, partly also because they look on these diseases as necessary adjuncts to early life; in other words, they think that every child must of necessity at some period suffer from these forms of infection. Since these diseases are not included in the schedule of diseases compulsorily notifiable, no direct information of their existence reaches the health officer, and I have therefore arranged a system by which they, as well as other minor infectious diseases such as chicken-pox, mumps, sore eyes and heads, etc., are reported from the schools to me through the director of education.

Just as the notifiable diseases are visited by the sanitary inspectors, so these are dealt with by the health visitors, who give directions as to isolation, the period of quarantine to be observed, and the exclusion from school of other children residing in the house. As an additional means of education, in those districts in which measles or whooping cough appeared to be spreading, I have had posters affixed, headed in large type with the name of the respective disease, pointing out that it is a mistake to suppose that every child must suffer from it, advocating strict isolation, and giving short instructions as to the best course to pursue should a child appear to have contracted infection. I am satisfied that this has had its effect in checking the spread of infection, and therefore has played a part in the reduction of the infantile mortality.

(8) It is especially in connection with her visits to the births, and to the deaths from infantile diarrhoea, that the health visitor has the opportunity of giving instruction as to the feeding and nursing of young children. In addition to the distribution of cards giving advice on these subjects, she can encourage a mother to continue feeding her child from the breast, or if for any reason this is impossible, she can advocate the use of milk in preference to the soaked bread, biscuits, and starchy preparations so frequently employed. She can condemn the tube feeding bottle, not only used because it does not require to be held in the nurse's hand, but can be laid by the child's side in the cradle, and if necessary she can split open the tube and show the lining of filthy, foul-smelling curd. She can urge the importance of keeping the milk in a cool place, especially in summer, of keeping it covered, and so protected from dust and flies, and well away from any strong or foul-smelling substance. The milk supply of a household is a matter of importance to all the members, but it is a matter of vital

importance to the infant who, having for any reason been deprived of its birthright—its mother's milk—ought to find the next best substitute in good cow's milk.

To ensure that every child not suckled at its mother's breast has a sufficient supply of clean, healthy, unadulterated milk would be one great step towards lowering the infantile death-rate. But, unfortunately, if even the milk be drawn from the udder of a healthy cow, it has in its passage to the consumer to pass through many hands, from each of which it may possibly gather some particle of dirt, some germ of disease. But even if delivered in a satisfactory condition at the house of the consumer, if that house be the cottage of the operative, and the season be that of a hot and rainless August, there is little chance of its long remaining uncontaminated.

To escape the kitchen fire, it is often left uncovered in the back kitchen, near to a not over-clean sink, or in close proximity to the family linen awaiting a wash. It becomes the feeding place for numerous flies, and not unfrequently forms their milk-and-watery grave. A portion when required is transferred to the feeding-bottle, sometimes a tube one, often imperfectly cleaned, or else containing the sour residue of the last meal, to which the fresh supply is added. If in addition to all this the child is seldom thoroughly washed, is swathed in clothes seldom changed and moist with sour perspiration, and if it passes a good part of its time in a cradle the straw bed of which is polluted with liquid filth, and its nights in a bed-room fouled by the breath of other occupants, it can hardly be wondered at if in the summer it falls a prey to the prevailing epidemic, or, gradually pining away, at some other time of the year dies from one of the many forms of infantile disease.

Moreover, there is the danger to which it is always exposed from unsuitable food offered to it through the mistaken kindness of careless ignorant parents. It is to combat evils like these existing, in many of the homes governed by the ill-taught mothers of the present day, that the services of the health visitor have been requisitioned; and if the field for her labours is a wide one, and the results at times not over encouraging, the object she should have in view is a great one—that of saving or improving the lives of helpless children.

(9) With the milk supply generally, authorities, urban and rural, have to a great extent the power of dealing. Under the Dairies and Milkshops Order, 1885, they can draw up and enforce regulations relating to the size, lighting, and ventilation of the shippens, the cubic space allowed to each cow, the drainage and middenstead, and the place and conditions in which and under which the milk is cooled,

strained, and prepared for delivery to the customer. The water supply or supplies, both that used by the cattle, and that used in washing and cleaning the various milk vessels and kits, also come under their control, and care should be taken to see that they are pure at their source and also kept from even the possibility of subsequent defilement.

Careful inspection, at unexpected times, would ensure at any rate a reasonable amount of cleanliness in milking, both as regards the cows, the person and dress of the milker, and the various cans and vessels through which the milk must pass. It has been proposed that greater powers should be obtained with regard to the inspection of farms and dairy cattle, but I think it better that, before seeking others, the powers we already possess should be more fully exercised. I am aware that the existing condition of things at many farms and cowsheds is anything but satisfactory, is indeed *most unsatisfactory*, but I would make use of the means at hand rather than run the risk of raising the price of an article which is practically required in every household.

I can speak with satisfaction of the improvements which in recent years, and through the energy of the sanitary inspectors, have been effected with regard to the cowsheds and dairies within the Borough of Preston. In addition to systematic inspection, advantage has been taken of every change of ownership or tenancy to effect such improvements as were possible, one result being that each establishment has now its own milk-house, which, however small it may be, is clean, cool, well ventilated, and used solely for the milk and milk vessels. The presence of bacilli, or of dirt, insects, or hairs, may be detected by bacteriological and microscopical examination, whilst chemical analysis will show if the milk is adulterated, or if it contains less than the normal amount of fat and solid constituents. More difficulty may be met with in dealing with the retail milk dealers, since they are numerous, many of them being very small shopkeepers who perhaps only dispose of one or two quarts in the day. Often the milk is exposed in shallow pans, open to dust and dirt, and in close proximity to paraffin oil, firelights, cheese, onions, blacklead, etc. They should be compelled to register, and so be made aware of their responsibility, whilst the milk pans should be provided with a covering of tin in which is a sort of trap-door through which any required quantity may be removed as required for sale.

(10) With some sanitarians the provision of municipal milk depôts, from which milk, cooled and sterilized, can be distributed for the use of infants whose mothers are unable to suckle them, are looked upon

almost as a panacea for all the evils connected with infantile mortality. Undoubtedly such institutions have their advantages. The source of the milk is known, and as far as possible its purity and cleanliness are safeguarded. It is sterilized by the most approved method, and is then delivered to the mothers in closed bottles, each containing sufficient for an infant's meal, and therefore varying in size according to the age of the child for whom they are intended. Nor does the work of the *depôt* cease there. The babies are expected to be brought each week, in order that their weight may be ascertained and duly registered. The condition of their health is supervised, and, in some cases at least, where necessary, *gratuitous medical attendance* is provided.

The very interest taken in the child by those in authority augurs well for its prosperity, and certainly assists the action of the milk supply in promoting its growth and general well-being. *Depôts* of this kind have been for some time in operation in certain continental towns, like "*Les Gouttes de Lait*" of Paris, and more recently have been introduced into this country, St. Helens setting the example, since followed on a larger scale by Glasgow, Liverpool, Ashton-under-Lyne, Bradford, Battersea, Leith, and others. But sterilized milk is, after all, unnatural milk; milk in which the subtle processes and combinations carried out in Nature's laboratory have been interfered with, and therefore it cannot altogether supply the place or do the work of pure milk. The very fact that the child has to be periodically presented for inspection forces the mother to keep it clean and tidy, but this she ought to be taught to do for her own credit's sake and for the health and happiness of the infant.

It is not unlikely that the bulk of the people who will take the trouble to go through the formalities required in order to obtain the sterilized milk, do not belong to the careless, improvident class amongst whom so many of the infantile deaths are registered. The adoption of a milk supply, sanctioned and prepared by the municipal authority, may serve as an excuse with some mothers to discontinue breast feeding, and so enable them to leave their homes and return to their various occupations. The reduced price at which the sterilized milk is sold helps to render it popular, but this, and the cost of the plant and staff required for the process, are only additional burdens laid on the shoulders of the ratepayer. The use of sealed bottles, each containing a single feed, is intended to prevent home contamination, but the condition of some of the bottles when returned shows that other substances have been mixed with the milk, whilst in certain instances the feed has been decanted into one of the ordinary tube feeding bottles.

I have referred to the reduction in the infantile mortality in Preston during the last few years, brought about, as I believe, by the adoption of the measures already mentioned. This reduction is not so great as it should or might be, nor does it bear comparison with the reduction in the general death rate at all ages. When I first entered on the duties of medical officer of health, now many years since, this latter exceeded 30 per thousand, whereas the average for each of the past five years has been a little over 17 per thousand. Dividing the past fifteen years into three quinquennial periods, the infantile death rate during the first, i.e., from 1892 to 1896, was 231; during the second, 1897-1901, 239; and during the last, 1902-1906, 176. Taking the figures for each of the last five years, the number of deaths under one year per 1000 births is respectively 188, 161, 183, 150, and 200, the rise during the past year having been caused by the severity of the diarrhoeal outbreak, joined to an epidemic of measles during the early months.

In speaking of the remedies for the various evils which, combined, bring about our heavy infantile death rate, I am of course dealing with things as they exist at the present time. But since so many of the causes spring from the ignorance of parents, or are very closely connected with that ignorance, it is evident that whilst we are right in opposing instruction to want of knowledge, we should endeavour to prevent that ignorance from being handed down to the next generation. Herein lies the great hope of a permanent and marked improvement in the future. Habits of any kind, whether for good or evil, once formed and continuously practised, become as it were engrained into the system and a part of our very lives. So the mistaken habits connected with the management of young children, handed down from generation to generation of factory operatives, are very difficult to overcome.

But instruction given to the girls now attending our elementary schools in such subjects as household management, simple cooking, cleanliness, sick nursing, and the care and feeding of babies, will have its effect when these girls themselves become wives and the mothers of the coming generation. Such instruction should be simple, practical, matter-of-fact, and should be given under the conditions, and with the appliances, that the pupil is likely to meet with in after life. It is no good teaching the girl how much nitrogen her future husband must absorb in order that he may raise so many foot-tons in a given time. It should be enough that such a kind of food is nutritious and digestible; and that this method of cooking is economical, whilst that is wasteful and extravagant. And so in a few

years when the pupil—now a girl—has a home to look after, a husband to cook for, and children to nurse and attend to, it may reasonably be hoped that the instruction she has received, and the habits she has formed, will all have their effect, and that such effect will be seen in the reduction of infantile mortality.

DISCUSSION.

THE PRESIDENT said he was sure they had all listened with very great interest to Dr. Pilkington's paper on that important subject. In regard to the question of intemperance, he noticed that Dr. Pilkington had made use of posters, and of other means of spreading knowledge as to the dangers of intemperance, especially to the health of married women and of their children. He regretted to learn from Dr. Pilkington that he was doubtful—so he understood him to say—if any good had been produced by the distribution of that kind of information. His own Committee had adopted similar resolutions, and had written to various temperance societies in the neighbourhood, pointing out that they might use the resolutions with the sanction of the Committee. The Committee themselves had not undertaken the distribution of these pamphlets, but they had authorized the local temperance societies to use the name of the Public Health Committee as agreeing with the resolutions as stated. Personally, he doubted whether very much good would be done in that way, but no harm could, he thought, result. Another very important question, it seemed to him, was the question of women health visitors. He did not quite gather from Dr. Pilkington as to what kind of health visitor he finally decided to make use of—that was to say, whether a woman who could instruct mothers in their duties in regard to their children, or whether a woman more of the same class as the working mothers, who could speak to them more from a point of equality; whether he made use of health visitors who had had special training in nursing or midwifery, or whether he simply preferred those who showed that they had tact and discretion in dealing with other people, without having any special knowledge of that kind. It seemed to him that if the important question of health visitors was to have an influence on public health, Public Health Authorities must make arrangements to obtain prompt returns of the births in the district, so that the attention of women health visitors might be at once directed to the newly born children, and that the young mother might be taught at the very beginning to look after and properly care for her infant. The immediate application of skilled advice to the mothers, as to the feeding of infants and the preparation of milk, and so on, would secure the very largest amount of good. Of course, women health visitors with some training in nursing and a knowledge of disease could do a good deal in regard to infectious fevers—especially those which were not notified—in giving mothers good advice, etc. In regard to municipal milk depôts, first of all, did they reach the right people? It was possible that the readiness with which one could get milk supplied in bottles might encourage the neglect of breast-feeding. Of course, it was extremely necessary that breast-feeding should be encouraged. Another important point was this, that the milk was not in all cases properly used. It might be poured out of the bottle in which

it was supplied, and emptied into an improper feeding-bottle. He did not wish to express a hasty opinion, but he hoped that those gentlemen with experience of municipal depôts would inform them as to the advantages of these depôts. In Bristol he had difficulty to get his Committee to take active measures against infant mortality, because the mortality during the past three or four years had varied only from 116 to 128. It was difficult to impress the fact that low rates could be improved.

DR. SIDNEY DAVIES (Woolwich) said that they had had milk depôts only for three months at Woolwich; but as there was no representative of a milk depôt present, he would give the meeting the benefit of their very short experience. Dr. Pilkington, he thought, slightly misrepresented some of them who were interested in milk depôts, in saying that they expected that a milk depôt would be all that was requisite in order to reduce infantile mortality. He should be very surprised to hear of any medical officer of health who held that opinion. Those who established the depôt at Woolwich thought otherwise. They only looked upon it as a subsidiary means of reducing infantile mortality. They all recognized that there were a very great many factors to be dealt with, and that milk depôts met only one of the factors for the most part, and pointed out the directions in other respects. Dr. Newman, of Finsbury, had laid great stress upon the importance of the milk depôt, not so much for direct effects, but its indirect effects, as being an example of how milk should be dealt with, and as a school for learning the proper management of infants. Their Woolwich depôt had been very successful in the matter of customers; and, probably, the chief reason for that was that they were the first depôt which had taken the milk to the parents' own house. They had delivered the milk at a charge of 3d. per week. He was bound to say that when that was first proposed by himself he did not think it was altogether justifiable, because the delivery to the public cost two or three times as much as what was paid for it. It had justified itself to the extent that it had set the milk depôt agoing. They had got twice as much custom as they should have had without it. A lower class of people used it than he had expected. Of course, he expected that the utterly careless and thriftless mother would not take the trouble to use it, unless particularly counselled to do so by a medical man, or anybody else. But they had a large proportion of persons who were below the average of the wage-earners in the town. There was not a large proportion of what he called the upper working-class, so that he thought they were doing good to the class which was most desirable.

DR. SYKES (St. Pancras) said he took it that Dr. Pilkington was advocating the various lines of sanitation, temperance, insurance, and so on, and that he recommended health visitors to pay attention to domestic sanitation and hygiene, and not to teach maternal duties. This, he thought, was a rather important point—in that the health visitors' duties were to be more or less wasted, so to speak, on domestic sanitation, and little or no time spent in teaching maternal hygiene. Dr. Pilkington's next point was, that cows' milk supply should be improved. This was a very large order indeed, although it was to the fullest extent to be desired. The third point was, that education in schools should be given to children—he presumed in domestic economy, because, as he had said elsewhere, young girls could not be taught the hygiene of *motherhood*. Dr. Pilkington objected to milk depôts on various grounds. He (Dr. Sykes) did not say there were not objections on some grounds. Personally,

he had no objection to milk depôts, except that he thought they began at the wrong end. Dr. Pilkington did not mention anything to get over his main difficulty, namely, the separation of the mother from the infant to work in the factory, and the reason why he (Dr. Sykes) particularly wished to speak on this point was because of a very long conversation he had had with Dr. Templeton of Dundee, and he realized the difficulty that Dr. Pilkington had through what Dr. Templeton had told him. When they got a town in which women and girls could earn double the wages of men, as in the jute factories of Dundee, they had a tremendous difficulty to contend with. He should have thought that all those medical officers of health who were engaged at work in towns with that enormous social difficulty would, first of all, take some step to overcome it, because he was certain, milk depôt or no depôt, if this social difficulty still remained, they would get no farther forward. He would try to prove this from certain figures he had taken from the Registrar-General's returns. The suggestion he had made—but one or two manufacturers had told him that it was impracticable—was, that instead of having public nurseries, or putting the children out to be nursed, they should have factory nurseries, nurseries in the factory, where the mother could suckle her own child at intervals. He wanted to disclaim at once that he had any idea that infantile mortality could be overcome by any single method. Each locality had to be considered by itself. He also strongly objected to a county council or county borough enforcing a universal panacea. He believed that one county borough, or even parts of the borough, had to be treated differently from another. Each neighbourhood and class must be judged by itself. He wanted to put before the Society certain figures of comparison. The first thing to be noted was that the maximum infantile mortality occurred in the third quarter of the year. In Buchan's diagram, beginning in January, there was a dip in curve between the spring and the winter, and right in the middle of it there is a curve in the summer of the year like a peak of the Matterhorn, which is entirely due to infantile mortality from abdominal diseases in the third quarter of the year. These diseases are typified by diarrhoea. The main cause of this is artificial feeding, as everybody agrees. This has its greatest effect in the summer quarter of the year. If they take statistics of the third quarter of the year, they have the best index of the effect of the artificial feeding of infants; that is to say, comparing the different districts and localities with one another as to how they fared. They must remember that the main question is the best method of feeding infants during the hot weather, that is, in the third quarter of the year. Dr. Dawson Williams had also pointed out that the main question was hot weather and feeding. In order to get rid of the difficulty of temperature he was going to compare a number of places in the same year with each other, instead of comparing one year with another. If they compared one place with another during the same year, the places were, at any rate, all approximately subjected to a similar temperature, and, arranging them in order of merit, commencing with the lowest mortality first, they got a good idea of the progress made. He had taken the years 1904, 1905, and 1906, and the 76 large towns according to infantile mortality, and classified them in order of merit; and he would give them information in regard to certain of these towns, and also the boroughs of the Metropolis taken in the same manner. With regard to the 76 large towns the figures were uncorrected as to public institutions; but

in regard to the 29 London boroughs they were corrected in regard to public institutions. This was the result in order of merit:—Taking Preston first, which relied for improvement mainly upon sanitation, the infantile mortality for the third quarter of the three years 1904, 1905, and 1906, of that town stood in the first year, 34th; in the second, 57th; and in the third, 71st. So that Preston had been going from bad to worse. Then he took Huddersfield with the *sovereign* remedy, which had been in vogue for two years, and the results were that Huddersfield, in 1904, was 21st; in 1905, 12th; and in 1906, 48th. Then he took certain towns with milk depôts. St. Helens, in 1904, was 55th; in 1905, 36th; and in 1906, 54th—gone back to where it was in the first year. Liverpool, in the first year, was 73rd; in the next, 60th; and in the last year, 59th. Bradford was 49th in 1904; in the next, 40th; and last year, 38th. Bradford had improved slightly; not very much. Burnley in 1904, was 70th; in 1905, 68th; and in 1906, 75th; last but one. Burnley had gone back. Leicester was 50th, in 1904; 59th, in 1905; and 58th, in 1906—not a very large improvement there. Then coming to London; they found that Lambeth, in 1904, was 13th of the Metropolitan boroughs; in 1905, 15th; and in 1906, 14th. Battersea, in 1904 was 15th; in 1905 was 24th; and in 1906 was 16th. They must remember that all towns in all districts had been making efforts to reduce infantile mortality, therefore these comparative figures were more valuable in showing which was improving fastest. Finsbury, in 1904, was 16th; in 1905, 17th; and 23rd, in 1906. So much for the localities with milk depôts. In London, with the corrected rate, without a milk depôt, St. Pancras, in 1904, stood 25th; in 1905, stood 18th; and in 1906 was 13th. Compared with the 76 large towns (uncorrected rates) St. Pancras came after the 39th, in 1904; after the 33rd, in 1905; and after the 15th, in 1906. This was very marked—from 39th to 15th—even more marked than in London—25th to 13th. He had another comparison to make. Ashton-under-Lyne has a milk depôt. Wakefield has not. Ashton stood, in 1904, 31st; in 1905, 130th; and in 1906, 119th of the 142 smaller towns. (Neither Wakefield nor Ashton-under-Lyne reaches the population of the 76 large towns.) Wakefield, on the other hand, was 79th in 1904; in 1905, 58th; and in 1906, 36th. From 79th to 36th Wakefield had jumped up. Wakefield had pursued exactly the same methods as St. Pancras. It was a very remarkable fact, working, consciously or unconsciously, exactly on the same lines. Everyone who wanted to read what Wakefield has been doing, should read Mrs. Marguerite Le Boileau's pamphlet. It is well written, and puts the whole matter in a nutshell. Neither Wakefield nor St. Pancras suffered from the trouble that Dr. Pilkington had to deal with. They have practically no women's factories. There were some few women who worked casually in Wakefield, just the same as in St. Pancras—laundry work and charring. Otherwise, they had not got the factory labour trouble to contend with, and he clearly understood that if they had, in all probability they would not have those good results. They would see, therefore, that so far as these towns were concerned, all those places having depôts had not shown up to the present, from the point of view of feeding in the third quarter of the year, that they were improving the mortality rate. On the other hand, they had rather gone back. The simple remedy was for the inspector or health visitor to teach mothers the art of motherhood, and to get them as much as they could to breast-feed their infants. It was

exceedingly difficult to ascertain by figures whether breast-feeding had increased or not. What they had to do to get correct statistics was first to know how the whole of the infant population was fed at various ages of the first year, before they could do anything. Otherwise, their statistics would not be reliable. From observation in St. Pancras the number of mothers breast-feeding was very much increased from what it was formerly; and that being so, he thought they must be satisfied by saying it was increasing, without going back upon figures. It could be still increased. Mrs. Boileau gave 58 as the last percentage. He thought that was, comparatively speaking, low. He was inclined to think there was no reason why breast-feeding should not be increased in such places as Wakefield and St. Pancras, certainly up to 80 per cent, if not more. If that was so, that would be largely the solution of the problem. If all the gentlemen connected with the large manufacturing towns, where they had a great difficulty with women's labour, were to direct their attention to that social and industrial question, some good would come of it. He should like to hear a gentleman read a paper upon the industrial and social side of the question, apart from milk depôts.

DR. H. MEREDITH RICHARDS (Croydon) thought there was some fallacy lurking in the statistical statement from Dr. Sykes. It was quite unfair to compare town with town in the way Dr. Sykes had suggested. The problem depended upon multiple causes; and he believed it was quite true in logic that they could not by methods of statistics treat problems in which multiple causes were concerned. They must rely not on inductive methods, but on deductive methods; and he was quite certain that the differences between the towns mentioned would disappear when the temperature and rainfall and industrial conditions were taken into account. In Croydon, as distinguished from Brighton, last summer, their infantile mortality went up marvellously, and they had the largest for many years. Dr. Pilkington had spoken about the benefit of teaching children in schools the care of infants. He was not at all sure that the child of thirteen could receive the best training. Children of that age were so sensitive, that if they were taught personal hygiene they would take an interest in keeping themselves tidy, but would not take an interest in feeding babies. He should like to try—it had been tried in one other place in this country—the compulsory notification of diarrhoea. If a few towns could work it up they could have compulsory notification of phthisis. One thing which had struck him, while going about the country in his summer holiday, was what could be done by infantile dispensaries. They were becoming absolutely necessary in our large towns. They knew how often mothers postponed calling in medical men, partly because they had not the necessary fees, and partly because they did not recognize how easily a baby might contract a fatal disease.

DR. R. MUSGRAVE CRAVEN (Westmoreland) said the whole question resolved itself into a matter of educating the mothers how to be mothers: not mothers of upper classes, because their children seldom died. It had been suggested that medical officers of health in towns where there are many female employees should bring forward the question of mothers engaged in mills. If they told an employer not to employ a woman at £1 or 15s. per week, and told him to employ a man at 30s., he would reply that competition with foreign manufacturers was so keen that he could not live unless he employed female labour. As to pure milk, the farmer ought to have proper accommodation for his stock to maintain

cow's milk pure. They might as well go and talk to the Parliament they had eighteen months ago about improving the farm buildings, as go to the present Parliament and talk about the limitations of female labour. For years the tendency had been to employ more females. He would give them a case in his own town. The shoe-finisher, five years ago, could earn £3 to £4 a week. When the American brought out machinery, the English manufacturer had to have a machine, and as soon as he introduced it, one man at 25s. virtually did the work of four. Thus women became employed in greater proportion; and if the men could not keep them as wives, they would remain single. In England and Wales the proportion of females to males between twenty and forty years of age is 106 to 100; in his own town it was, in 1891, 112 to 100, but in 1901, 132 to 100. Result, with such a state of affairs: decrease in wages, in birth-rate and, ultimately, in morality. He very strongly advocated educated women to do the work of health visiting; for thus they ought to diminish sickness and vicious habits, thereby increasing the prosperity and happiness of every member of the household.

DR. BUTLER (Willesden) said an admirable feature of the paper was the sense of proportion in the perspective of the values of the factors influencing infantile mortality. In his eminently practical paper Dr. Pilkington had shown which of these factors were most dominant, and the methods by which they could most easily be controlled. What also struck him was, that the causes and methods of remedy in operation in Preston were applicable to the whole country. There was great scope for uniformity of action by medical officers of health, and nothing had shown more clearly than the paper they had had that night that there might be local conditions requiring particular measures; but that these were not the chief and outstanding factors. Infantile mortality was being reduced by removing the ignorance of parents and stimulating a greater interest in child-rearing. The influence of infant insurance upon mortality was a comparatively minor one. He had for two years made investigation into this question, and he found that babies insured survived in greater proportion than those not insured. Generally speaking, it was the industrious and provident class that insured; and among the working-classes that section which did not insure in any degree had a higher infantile mortality than the insuring class. Another fact which had recently struck him was the introduction into a household of infectious diseases by the elder members of a family. He thought that if they could get statistics they would find that first children in a household survived infectious diseases in infancy in a greater degree than those who came later. The first children had nothing the matter with them until they went to school, where they got infectious diseases, such as whooping-cough. They survived at the later age-period at which they were attacked, but the babies at home succumbed to the disease. The attempt to deal with the whole of the milk question was obviously a desirable thing; but it was not the effective way to modify infantile mortality. We might spend large sums of money in improving the milk supply, but when we had done that we should not have touched essentially this question. The milk depôt would supply the hand-fed infants with a means of escaping death by zymotic diarrhoea, but that was only one, and a subsidiary factor in infantile diarrhoea. After all, the children of the better classes, who probably artificially fed their children in a greater degree than the working-class, were those children who did not die. It

was among ignorant people that the deaths occurred. This was not an argument for hand-feeding, but for breast-feeding, which was the only proper thing. It did show this, that hand-feeding could not be carried out under the ignorant conditions that prevailed in the ordinary home. The remedy of this ignorance of the rudimentary conditions of domestic hygiene, as it had been suggested, lay in the schools. The health visitor was helpless if she went to a mother who had had many children. Catch them young, and something could be done with the mothers; after they had acquired habits they were unteachable. After all, one was doing so little in tackling this profound mass of ignorance by the method of health visitation. Nothing was more important than the work of the health visitor at the present time, but if we were to eradicate the chief cause of infantile mortality it had to be in a more universal training of future mothers. The factory girl had really a prototype in every town in the country. Although girls did not in all towns go to factories they went to other employment, and really had no training in the management of the home. The first thing that was required was not necessarily instruction in the rearing of children, but in the rudiments of domestic economy, in elementary cooking, and managing a home. If that could be done, if girls could only be taught to run a household, even without children, it would be removing some of the principal causes of infantile mortality.

DR. H. BEALE-COLLINS (Kingston) said the employment of women was urgent, and that was something beyond the province of medical officers of health. Whatever they could do, he thought they might ameliorate the difficulty. He thought they ought to consider what was being said by the women themselves. At the present moment they heard a very great deal about the agitation of women for the franchise, and he understood one of the great arguments they put forward was, that they would be able to deal with that question if they got the franchise. He was not going to say that he was a supporter of the movement, but he thought they all ought to consider very seriously what these women had to do with the suffrage. The women ought to know more about their own sex than men did; and he thought most men would be of opinion that if women had their own way they would not go out to work. Very few girls went out of their own accord, but did so only to get money; the money they got at home was not sufficient for their requirements. If women had the power to say whether they would go out to work or not, they would say "Stop at home."

DR. PILKINGTON, in replying to the discussion, thanked the meeting for the attention paid to him. He did not trouble them with figures, for he had never seen figures that could not be controverted. For instance, if they said 58 children were breast-fed, it depended entirely upon what period they took. The President had asked him as to the health visitors. He would be able to answer better in a year from now than at present, because he had two excellent visitors who, if the person of the house could not clean the house, would clean it, and show how it was to be done. Now he had an educated lady; and in twelve months he would tell if she was successful. There was one great danger in knowledge of nursing. The visitors might interfere with the treatment of the child; whereas, if a doctor had control of the child, the health visitor ought not to touch it or look at it.

In answer to Miss Bibby, Dr. Pilkington said there was no system of infantile mortality insurance in Preston.

CLEAN MILK FOR NEW YORK CITY.

A MILK CONFERENCE called by the New York Association for improving the condition of the poor was called in November, 1906, and the excellent report of its proceedings is now published. It is not proposed to give a full account of its proceedings; but American physicians above all are practical, and in view of the necessity for a general survey of the whole subject, we think some good may be done by reproducing a part of the "programme" of the Conference. It is as follows:—

POINTS OF AGREEMENT.

CLEANLINESS IS THE SUPREME REQUISITE, FROM COW TO CONSUMER.

Cows must be healthy, persons free from contagious diseases, premises clean, water pure, utensils clean, cans and bottles sterile, shops sanitary.

TEMPERATURE IS SECOND ESSENTIAL.

50° F. or lower at dairy.
45° F. at creamery.
45° F. or less during transportation.
Not above 50° when sold to the consumer.

AS TO PASTEURIZATION.

Not necessary for absolutely clean milk.
Destroys benign as well as harmful germs.
Disease germs develop more rapidly than in pure raw milk.
True, 155° for 30 minutes to 167° for 20 minutes.
Cost per qt., estimated, $\frac{1}{4}$ to $\frac{1}{2}$ ct.
Commercial, 165° for 15 seconds.
Cost per qt., negligible.

AS TO INSPECTION.

Some inspection needed within the City.
Some inspection needed of dairy and creamery.

WHAT NEXT STEPS SHOULD NEW YORK TAKE?

SKIM MILK.

Should its sale be permitted?
Under what conditions?
How would this affect price of whole milk?

PASTEURIZATION.

Should pasteurization be made compulsory?
For what portion of the supply?
At whose expense?
Would it increase price of milk?
Does it render inspection unnecessary?
Does it reduce need for inspection?
Should sale of repasteurized milk or cream be permitted?
Should bottles show whether true or commercial pasteurization is used?

INFANTS' MILK DEPÔTS.

- Should they use pasteurized or clean milk?
- Are municipal depôts desirable?
- Should private philanthropy support depôts?
- How many depôts would be required in New York City?
- Is Rochester experience applicable to New York City?
- What educational work is possible in connection with milk depôts?

MODEL MILK SHOPS.

- What may safely be sold in connection with milk?
- Should law discourage other than model shops?
- Are present sanitary laws rigid enough?
- Should private capital be encouraged to establish shops?
- Is it practicable to prohibit use of cans?
- What provision can be demanded for proper refrigeration?
- What for receiving milk before business hours when delivered from stations?
- What for sterilization of utensils and bottles?
- What for attendants' dress and care of person?
- Would such restrictions increase price?

INSPECTION.

- Is it practicable by inspection alone to secure a clean milk supply?
- Will it protect against more dangerous forms of infection?
- How many inspectors does New York City need?
- Within the City?
- Among country dairies and creameries?
- How many inspectors should the State employ?

LEGISLATION.

- What needed as to diseased cattle?
- What as to disease of persons producing or handling milk?
- Is present sanitary code sufficient?
- Shall law require sterilization of all milk cans and bottles by milk company or creamery before returned to farms or refilled?
- Shall sealing cans at creameries be required?
- Shall transferring from one can to another or from can to bottle in open street be made a misdemeanour?
- Shall pollution of milk cans and bottles be made a misdemeanour?
- Shall bacterial standard be established?
- Is State supervision now adequate?
- What further legislation is needed?
- Does present law prescribe adequate penalties?

EDUCATION.

- Should State system of lectures before agricultural institutes be extended?
- Should Maryland plan of travelling school be adopted as means of reaching producer?
- What can be done to assist Teachers' College in its plan for milk exhibit?
- What can be done to teach mothers to detect unclean milk and to care properly for milk purchased?
- How can tenement mothers keep milk at proper temperature?
- Can nothing be done to increase the supply and cheapen the price of ice?
- Is it desirable that a local committee be formed to co-operate with the Department of Health and County Medical Society?

It would be difficult to give a more admirable summary than the preceding of the various problems involved in a clean milk supply. Equally practical are the schemes for recording the results of inspection of city dairies and of cow-sheds which are here reproduced:—

DIRECTIONS FOR SCORING.

MILK ROOM.

- LOCATION.**—If not connected by door with any other building, and surroundings are good, 10; when connected with other rooms, such as kitchens, stables, etc., make deductions according to conditions.
- CONSTRUCTION.**—If good cement floor, and tight, smooth walls and ceiling, and good drainage, allow 10; deduct for cracked or decayed floors, imperfect wall and ceiling, etc.
- CLEANLINESS.**—If perfectly clean throughout, allow 15; deduct for bad odours, unclean floor and walls, cobwebs, unnecessary articles stored in room, etc.
- LIGHT AND VENTILATION.**—If window space is equivalent to 15 % or more of the floor space, allow 5; deduct 1 point for every 3 % less than the above amount.
- EQUIPMENT:**
 - Arrangement.*—Allow 3 points for good arrangement; if some of the equipment is out of doors or so placed that it cannot be readily cleaned, make deductions according to circumstances.
 - Condition.*—If in good repair, allow 3 points; make deductions for rusty, worn-out, or damaged apparatus.
 - Construction*—
 - Sanitary:* If seams are smooth, and all parts can be readily cleaned, allow 2. Deduct for poor construction, from sanitary standpoint.
 - Durability:* If made strong and of good material, allow 2. Deduct for light construction and poor material.
 - Cleanliness.*—If perfectly clean, allow 5 points; make deductions according to amount of apparatus improperly cleaned.

MILK.

- HANDLING.**—If milk is promptly cooled to 50° F. or lower, allow 12 points or if pasteurized at a temperature of 149° F. or above and promptly cooled to 50° or lower, allow 12 points. Deduct 1 point for every 2° above 50°. If milk is pasteurized imperfectly, deduct 6 points. If milk is improperly bottled or otherwise poorly handled, make deductions accordingly.
- STORAGE.**—If stored at a temperature of 45° F. or below, allow 8 points. Deduct 1 point for every 2° above 45°.

SALES ROOM.

- LOCATION.**—If exterior surroundings are good and building is not connected with any other under undesirable conditions, allow 2; for fair conditions allow 1; poor conditions, 0.
- CONSTRUCTION.**—If constructed of material that can be kept clean and sanitary, allow 2; for fair construction allow 1; poor construction, 0.
- EQUIPMENT.**—If well equipped with everything necessary for the trade, allow 2; fair equipment, 1; poor equipment, 0.
- CLEANLINESS.**—If perfectly clean, allow 4 points; if conditions are good, 2; fair, 1; poor, 0.

WAGONS.

- GENERAL APPEARANCE.**—If painted and in good repair, allow 2 points; for fair condition, 1; poor, 0.
- PROTECTION OF PRODUCT.**—If product is iced, allow 3 points; well protected but not iced, 1; no protection, 0.
- CLEANLINESS.**—If perfectly clean, allow 5; good, 3; fair, 2; poor, 0.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
Dairy Division.

SANITARY INSPECTION OF CITY MILK PLANTS.

Owner or manager: Trade name:

City: Street and No.: State:

Number of wagons: Gallons sold daily: { Milk,
Cream, }

Permit or licence No.: Date of inspection:, 190

	SCORE.		REMARKS
	PERFECT	ALLOWED	
MILK ROOM.			
Location	10		
Construction—			
Floor (3)	10		
Walls and ceiling (3)			
Drainage (4)			
Cleanliness	15		
Light and ventilation	10		
Equipment—			
Arrangement (3)	15		
Construction—			
Sanitary (2)			
Durability (2)			
Condition (3)			
Cleanliness (5)			
MILK.			
Handling (12)	20		
Storage (8)			
SALES ROOM.			
Location (2)	10		
Construction (2)			
Equipment (2)			
Cleanliness (4)			
WAGONS.			
General appearance (2)	10		
Protection of product (3)			
Cleanliness (5)			
Total	100		

Sanitary conditions are—Excellent: Good: Fair: Poor:

Suggestions by inspector:

Signed:

Inspector.

DIRECTIONS FOR SCORING.

COWS.

CONDITION AND HEALTHFULNESS.—Deduct 2 points if in poor flesh, and 8 points if not tuberculin-tested. 10
CLEANLINESS.—Clean, 5; good, 4; fair, 2; bad, 0. 5
WATER SUPPLY.—If clean and unpolluted, 5; fair, 3; otherwise, 0. 5

STABLES.

CONSTRUCTION.—For cement floor (a)* in good condition, allow 2 points; fair, 1; poor, 0; wood floor (b) or other material in good condition, 1; fair, $\frac{1}{2}$; poor, 0; good manger (c), 1; good manger (d), 1; box stall (e), 1
CLEANLINESS.—If thoroughly clean, including floor (a), windows (b), and ceilings (c), 5; good, 4; medium, 3; fair, 2; poor, 1; bad, 0. 5
LIGHT.—Four square feet of glass per cow, 5; 1 point off for each 20 % less than 4 square feet per cow. 5
VENTILATION.—Good ventilating system, 4; fair, 3; poor, 2; bad, 0. 4
CUBIC SPACE PER COW.—If 500 cubic feet or over per cow, 3; less than 500 and over 400, 2; less than 400 and over 300, 1; less than 300, 0
REMOVAL OF MANURE.—Hauled to field daily, 2; removed at least 30 feet from stable, 1; otherwise, 0. 2
STABLE YARD.—In good condition (a), $\frac{1}{2}$; well drained (b), $\frac{1}{2}$; otherwise, 0. 1

MILK HOUSE.

CONSTRUCTION.—Tight, sound floor, and not connected with any other building (a), well lighted (b), well ventilated (c), 2; (d) if connected with another building under good conditions, 1; otherwise, 0; (e) if no milk house, 0. 2
EQUIPMENT.—Hot water for cleaning utensils (a), 1; cooler (b), 1; proper pails (c) and strainers (d) used for no other purposes, 1. 3
CLEANLINESS.—Interior clean, 5; good condition, 4; medium, 3; fair, 2; poor, 1; bad, 0. 5
CARE AND CLEANLINESS OF UTENSILS.—Clean (a), 3; kept in milk house or suitable outside rack (b), 2; otherwise, 0. 5
WATER SUPPLY.—If pure and clean running water, 5; pure and clean still water, 3; otherwise, 0. 5

MILKING.

ATTENDANTS.—Healthy 5
CLEANLINESS OF MILKING.—Clean milking suits, milking with clean dry hands, and attention to cleanliness of udder and teats while milking, 10; no special suits, but otherwise clean (a), 7; deduct 4 points for uncleanly teats (b) and udder (c) and 3 points for uncleanly hands (d) 10

HANDLING THE MILK.

PROMPT AND EFFICIENT COOLING.—If prompt (a), 5; efficient (b), if 50° F. or under, 5; over 50° and not over 55°, 4; over 55° and not over 60°, 3; over 60°, 0; if neither prompt nor efficient, 0. 10
STORING AT LOW TEMPERATURE.—If 50° F. or under, 5; over 50° and not over 55°, 4; over 55° and not over 60°, 3; over 60°, 0. 5
PROTECTION DURING TRANSPORTATION TO MARKET.—If thoroughly protected (iced), 5; good protection, 4; partly protected, 2; otherwise, 0. 5

SCORE.

If total score is 90 or above and each division 85% perfect or over, the dairy is EXCELLENT (entitled to registry).

If total score is 80 or above and each division 75% perfect or over, the dairy is GOOD.

If total score is 70 or above and each division 65% perfect or over, the dairy is FAIR.

total score is below 70 and any division is below 65% perfect, the dairy is POOR.

* The letters a, b, c, etc., should be entered on score card to show condition of dairy, and when so entered should always indicate a deficiency.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY.
Dairy Division.

SANITARY INSPECTION OF DAIRIES.

Owner or lessee of farm :
Town : State :
Total No. of cows : No. milking : Quarts of milk produced daily :
Is product sold at wholesale or retail :
If shipped to dealer give name and address :
Permit No. : Date of inspection : 190

	SCORE		REMARKS
	PERFECT	ALLOWED	
COWS.			
Condition (2).....	10		
Health (8).....			
Cleanliness.....	5		
Water supply.....	5-20		
STABLES.			
Construction.....	5		
Cleanliness.....	5		
Light.....	5		
Ventilation (4).....	7		
Cubic space per cow (3).....			
Removal of manure (2).....	3-25		
Stable yard (1).....			
MILK HOUSE.			
Construction (2).....	5		
Equipment (3).....			
Cleanliness.....	5		
Care and cleanliness of utensils.....	5		
Water supply (Temp. ....°F.).	5-20		
MILKERS AND MILKING.			
Health of attendants.....	5		
Cleanliness of milking.....	10-15		
HANDLING THE MILK.			
Prompt and efficient cooling.....	10		
(Temperature of milk: ....°F.).			
Storing at a low temperature.....	5		
Protection during transportation.....	5-20		
Total score.....	100		

Sanitary conditions are—Excellent : Good : Fair : Poor :
Suggestions by inspector :

Signed :

Inspector.

The method of scoring here suggested, subject to modification to meet the requirements of the differences between English and American conditions, is one which might be adopted with great advantage in this country.

THE CAUSES OF INFANT MORTALITY.*

By HAROLD SCURFIELD, M.D.,
Medical Officer of Health, Sheffield.

THE causes of infantile mortality may be distinguished as follows :—

(1) *Causes affecting the Unborn Child through the Pregnant Mother, amongst which the most important are :—*

- (a). Alcoholism, resulting in epileptic, weakly, and malformed children, and also causing abortion, "still-births," and inability to suckle.
- (b). Syphilis, resulting both in abortion and diseased children.
- (c). Factory work.
- (d). Lead poisoning.
- (e). Diseases of the heart and kidneys.
- (f). Injuries to the abdomen.
- (g). Fevers and high temperatures.
- (h). Violent emotional disturbances.
- (i). Malnutrition of the mother from any causes.

(2) *Causes Outside the Home.*

Under this head comes a dirty milk supply, and anything which renders the surroundings of the home unnecessarily dirty or offensive, such as badly paved yards and streets, slops thrown on the streets, and privy middens and offensive ashpits close to the houses.

(3) *Causes Inside the Home.*

These are undoubtedly the most important causes of infantile mortality. Amongst them may be enumerated :

- (a). Dirty houses.
- (b). Badly constructed houses.
- (c). Overcrowding, with its consequences of bad air and dirtiness.
- (d). Drinking habits of the parents, leading to dirtiness of the home, neglect of the children, and to deaths by overlying.
- (e). Ignorance of the parents as to rearing of infants.
- (f). Improper or dirty food.
- (g). The inevitable dangers of bottle feeding.
- (h). Employment of mothers outside the home.

The following are some of the measures by means of which an improvement is to be expected :—

(1) *Educational.*

- (a) Advice by women inspectors and midwives to the mothers and

* From a special report to the Sheffield City Council.

expectant mothers. The help of voluntary agencies such as district visitors and The Guild of Help should be obtained in this matter. Early notification of births is to be applied for, and the increase of the staff of women inspectors from 7 to 10, and the training of all of them in midwifery will enable the work under this heading to be carried out in a much more satisfactory manner.

- (b). Education of children in the higher standards of the elementary schools in hygiene, temperance and domestic economy. Continuation of such education after leaving school. On the permanent staff of every elementary school there should be a teacher qualified to instruct in these subjects, who should be supplied with the apparatus necessary to make the lessons interesting.

(2) *Measures for the better Protection of Infants.*

- (a). Extension of the provisions of the Infant Life Protection Act to all "farmed-out" infants.
- (b). Enquiry as to the operation of infant insurance. It might be well to support the resolution passed by the National Conference on Infantile Mortality asking for such an enquiry.
- (c). Removal of infants from unfit parents. It might be possible, by better co-operation between the Boards of Guardians and the National Society for the Prevention of Cruelty to Children, for the former to relieve the Society of the duty and cost of adopting children, and to leave to the Society only the duty and cost of supervising and prosecuting cruel and neglectful parents.
- (d). Better care of illegitimate children. The death-rate among illegitimate children in Sheffield, as elsewhere, is double that of legitimate children.
- (e). Reduction in the number of uncertified deaths. It will be noticed that last year there were 77 infants under one year buried merely on the strength of the statement of the parents to the Registrar. During last year the average percentage of uncertified deaths in the whole of the 76 towns was 1.1, while in Sheffield it was 2.6.
- (f). Registration of still-births.

(3) *Measures Operating through the Mother.*

- (a). A simplified scheme for the feeding of pregnant mothers when necessary. This is carried out in several places by voluntary agencies.
- (b). Prohibition of Factory work for a considerable period before

and after confinement. A resolution on this subject was passed by the Congress already mentioned, and might usefully receive the support of the Committee.

- (c). A scheme for the feeding of nursing mothers when necessary.
- (d). Crèches and cradle rooms in factories. There is already a crèche in Sheffield, and the reports of the women inspectors show that not many of the women in Sheffield go out to employment during the nursing period. It is questionable whether any system which might make it easier for the mother to go out to work when she ought to be at home looking after her baby is not a mistake.

(4) *Measures for Providing a Pure Milk Supply for Infants which cannot be Breast-fed.*

- (a). Municipal Infant Milk Depôts. It might be well to hear the evidence of someone who has experience in the working of these institutions such as Dr. McCleary (formerly of Battersea), more particularly as to the possibility of getting the infants who most need it supplied with such milk. The price at which such milk is sold appears to be too high. In any case the working of such depôts must not be expected to pay its way, but must be looked upon as an expenditure justified in the interests of public health and education. It would appear that Parliamentary powers are required before these can be established.
- (b). Improvement of milk supply generally. The resolutions proposed by the National League for Physical Education and Improvement ought to receive the support of the Committee. They are as follows:—

"1. That a Bill be drawn up for the purpose of transferring the supervision of the Milk Supply from the Urban and Rural District Councils to the County Councils.

"2. That instead of the present system of registration of cowkeepers, a system of annual licences should be substituted, renewable only if the premises are kept in sanitary condition—as in the case of slaughterhouses—and as provided in the Liverpool Improvement Act, 1867, pages 16, 17, 18.

"3. That throughout the amended Dairies, etc., Order and the Regulations made under it, the responsibility of carrying out all structural alterations should be placed upon the owner.

"4. That the powers of the Special Act relating to Tuberculosis and Milk at present given in Sheffield, Manchester, Liverpool, and elsewhere, should be extended to the whole country."

(5) *Measures for Promoting Cleanliness Outside the Homes.*

The epidemic of diarrhoea which attacks the infant population at the end of every summer is due to the infective properties of the dirt at that period of the year. It is therefore very necessary that scavenging should be efficient at this period. From the beginning of July to the end of September there ought to be no dry sweeping done in the crowded parts of the city. In every case the water-cart should precede the sweeping-brush or sweepers. In addition to this the streets in the crowded districts should be swilled two or three times a week. For this purpose it is very necessary that the streets in the worst localities should have a good impervious paving. In the new Corporation Bill there is a proposal which ought to enable the Corporation to insist upon common yards being kept in a cleaner state than they are at present.

THE DIFFICULTIES OF RURAL HOUSING.

THE difficulty of obtaining decent cottages is well nigh insuperable. The Bradwell experiment is not a conspicuous success. The six cottages erected in 1904 at Bradwell, under the H. W. C. Act, cost £1,450, and the annual payments are:—

Repayment of Loan	..	£81	2	9
Rates and Repairs	..	14	13	0
		£95	15	9

The rents amount to £54 12s., leaving £41 3s. 9d. to be raised out of the local rates. As the assessable value is £3,619, the addition to the rate is 2½d. in the pound. This is too much for six cottages, and has deterred other parishes from following the example of Bradwell. Unless cottages can be built much more cheaply, or the burden be laid on a wider area, there are few districts which will not prefer to remain in their present unsatisfactory condition. Cottages are wanted in Little Totham, Tolleshunt D'Arcy, Latchingdon and other parishes, to replace old ones which are now barely habitable, and we have to make a choice of two evils, either to allow the old properties to be patched up and inhabited, or to close them and drive the inhabitants into the workhouse or into the towns. The former evil appears to me to be the less, so the people remain.—*From Dr. Thresh's Ann. Rep. for Maldon, Essex.*

ANTHRAX AND IMPORTED ANIMAL PRODUCTS.

(A RECORD OF TWENTY-ONE CASES IN THE
PORT OF LIVERPOOL.)

By WILLIAM HANNA, M.A., M.B., D.P.H.;
Assistant Medical Officer of Health, Port of Liverpool.

THE continued prevalence of anthrax in Great Britain, especially in industrial centres, ought to awaken increased interest in the subject of preventive measures against this disease. In this connection it may prove useful to record some cases of this well-known disease which have occurred amongst those engaged in handling imported hides, hair, and wool during the past three years. The majority of these occurred in the Port of Liverpool, and chiefly amongst dock labourers.

Anthrax is a disease which has been known in its clinical aspects for a very long time, and is of the widest geographical distribution. Towards the end of the 18th century it seems to have been first recognized on the Continent in the human subject, and is referred to in writings as chiefly affecting those engaged in the trades of tallow-chandlers, horse-hair and wool workers.

Since 1849, when the bacillus was first observed by Pollender, our knowledge of its life history has been greatly extended, and for this we are chiefly indebted to the investigations of Koch: in addition, the well-known researches of Pasteur and other French bacteriologists on the attenuation of the bacillus for the purpose of inoculation against the disease are of epoch-making importance.

In this country the subject of industrial anthrax has been carefully investigated in recent years by Dr. Russell, Mr. Spear, Dr. Legge, and others. The results of their enquiries, and the experience gained from observations extending over a very long period, have proved that the traffic in foreign animal products is a dangerous one for man and animals. The usual precautionary measures as to the disposal of the carcasses of animals which have died of anthrax cannot be assured in such foreign countries as Persia, China, Siberia, and Asia Minor, either from the cases not being diagnosed or from the want of precautionary regulations. As a result, very large numbers of hides and much hair and wool from animals which have died from this disease are imported into this country from different parts of the

* Read before the North-Western Branch of the Incorporated Society of Medical Officers of Health, at Manchester, February 15th, 1907.

world, and manufactured into various finished articles, such as leather, hair-cloth, carpets, cloths, blankets, rugs, felt, brushes, etc.

As is well known, the spores of this bacillus are extremely resistant to physical and chemical agents; in addition, countless numbers of them are enclosed in the dried-up blood-clots and serous discharges which saturate such animal products as hides, hair, and wool obtained from animals which have died from this disease.

The methods at present in use for curing hides and skins do not destroy these spores. Much of the colonial and some other wools imported into this country are, as a rule, obtained from animals which have been washed before shearing, and the risks attending the handling of these wools are very small as compared with other varieties of wool and hair, such as mohair and Persian wool, which are imported in a very dirty and dusty condition, and may include fleeces from animals which have died from anthrax.

The dust arising in the sorting and other manipulations of imported animal products is the chief harbour for the spores, and is always to be found in more or less quantity where these operations are carried on. Where much dust is generated, the spores are easily carried into the mouth in breathing or swallowing, but more usually it collects upon the clothing or finds an entrance into the broken skin by a cut or bruise, or a scratched pimple, being deposited there from the air or carried and rubbed in by the dusty fingers or clothing. It would appear also that workmen who have had a recent shave and show numerous small points of raw skin would be suitable subjects for infection. The most frequent sites for the malignant pustule are the uncovered parts of the body, especially the neck and face.

Our knowledge of the epidemiology of this disease is extending, and it can be readily realized by what a variety of channels the spores of this bacillus may be disseminated. It is therefore not a matter of surprise, considering the extreme resistance and inaccessibility of the spores and the constant importation of infected material, that we have not, as yet, been able to stamp out the disease.

Anthrax is a common disease amongst cattle, and is co-extensive with their presence in all parts of the world, but outside Europe our knowledge of the extent of its prevalence is still far from satisfactory; especially is this the case as regards China, Siberia, Persia, Africa, and South America.

Recent official figures record the fact that about 1,000 cases of anthrax in animals occur annually in Great Britain, but four times as many cases occur in each of the countries, Germany, Italy, and Asiatic Russia. In European Russia and in the Caucasus the number of cases

approximates to no less than 40,000 a year. In these countries, however, it must be remembered, the number of animals is very much larger than in Great Britain. In Africa and South America anthrax also exists, and in India the districts of Burma and Madras seem to be most seriously affected.

A few reports of Consular representatives which have been obtained on outbreaks of this disease in various countries are interesting, and show its wide-spread distribution both in man and animals.

August, 1902: "In the village of Aksai, province of Astrakhan, at the end of June there were discovered in one family several cases of acute infectious disease, declared by the surgeons to be anthrax. Similar cases of sickness appeared in other houses of the village, and plague was suspected, but a Government bacteriologist was sent, who made clear that the disease was anthrax. The Governor of Astrakhan arrived with a special medical staff, and preventive measures were adopted. The total number of cases was 26, of which 16 ended fatally."

April, 1903: Consul Bornholdt, of Riga, reports the occurrence of three cases of anthrax amongst the workers in a factory at Libau. The infection was traced to the handling of Siberian sheepskins.

December, 1903: "In November a disease broke out amongst the inhabitants of the Department of Intibuca, Honduras, and became general over the town of Esperanza; a large number died. At first the disease was variously diagnosed, but was subsequently proved to be anthrax. Amongst the suggestions made by the advisory committee of local medical men regarding notification, inspection of cattle ranches, and ploughing up infected ground, was one recommending that when a person died from anthrax the body should be buried five feet deep in quicklime, and the clothing and all personal articles burned."

September, 1904: "An epidemic of anthrax has occurred amongst cattle in Siam, and several persons have died from the disease."

February, 1905: "In the Government of Viatka (Volga), from February 8th till 17th, 1905, 32 cases of anthrax have been reported."

The term "wool" in the technical sense includes wool and hair of the sheep, goat, mohair (Angora goat), camel, llama, and alpaca. Colonial sheep's wool is not of a dangerous character, and during seven years no case of anthrax has been reported amongst those handling it. The most dangerous are the dusty wools and those containing fallen fleeces (i.e., fleeces of dead animals) amongst them. It has come to light that these fleeces are frequently divided up by those who make up the bales abroad, and that portions are put into bales of good wool,

thus spreading the contamination of anthrax. The wool of these fleeces is dull and lustreless and has lost much of its elasticity; such wool comes chiefly from Asia Minor and Persia.

The following are very dusty wools: Mohair, Persian, Camel-hair, and Cashmere. Mohair is obtained from a species of goat in the neighbourhood of Van in Kurdistan; also from Turkey and the Cape of Good Hope; the wool is long, coarse, and very dirty. Persian wool is a very fine, but very dusty wool. Camel-hair is imported from Russia, Siberia, and China, and Cashmere is obtained from the Thibet goat.

The wool imports into Liverpool are large, and the following table gives the number of bales imported during the years 1903, 1904, and 1905:—

	1903.	1904.	1905.
East Indian	103,564	125,493	114,579
Asia Minor	4,371	3,811	2,535
Egyptian	5,618	6,842	6,514
Turkey (sheep's)	14,379	16,674	13,740
„ (mohair)	69,149	55,614	47,556
African (Morocco)	10	39	—
Spanish	1,867	1,335	1,330
Portuguese	12,350	9,461	8,919
Iceland	4,844	—	336
River Plate	42,642	15,881	29,699
South America (West Coast)—			
Sheep's	33,332	31,886	31,879
Alpaca	29,779	27,369	25,341
Sundries	102,021	78,847	75,906
	*(99,930)	*(69,323)	*(60,384)

Another dangerous animal product is horse-hair; it comes chiefly from European Russia, Siberia, China, Mongolia, and other countries. Russian and Siberian mane- and tail-hair is much cheaper than that from other countries, and therefore much in demand. The hair is collected by agents, who buy it from knackers and others at various country markets. It is sorted out, packed in bags without any cleaning, and sent direct through Riga, Hamburg, or Antwerp, to England. Some Russian hair imported into England comes via Austria, where it has undergone a preliminary cleansing. China white tail-hair comes into this country in a much cleaner condition than the other varieties of horse-hair, from the fact that it has already been washed and partly drawn before it is imported: the danger in handling it is therefore proportionately diminished.

* Persian, Syrian, and Russian, in transit.

As regards cow-hair, the most comes from the large slaughter houses on the River Plate, and is used in making felts, horse-cloths, etc. The usual processes in a hair factory in connection with which infection may arise are the opening of bales and sorting the hair; this is then washed in hot water, soap, and soda; it is then wet-heckled to remove dirt and combings, and then dried. To get mane- and tail-hair into long skeins or tails containing hairs of the same length, it is pulled or drawn, and finally made into bundles or twisted into ropes.

Pigs' bristles and pigs' wool, which is the soft hair from the stomach and sides of the pig, are also amongst the animal products which sometimes convey anthrax, and particularly that coming from Russia. The pig is not a very susceptible animal to this disease, and it has been stated that the disease does not occur in the manipulation of pigs' bristles, but from German experience it seems that it may occur. Pigs' hair is treated in the same way as horse-hair—dyed, washed, dried, and packed in sacks or bales.

The imports of horse-hair, cow-hair and bristles during the year 1905 were as follows:—

There were 509 bales of horse- and cow-hair, each weighing about 6 cwt., imported into Liverpool; they came chiefly from South America (River Plate and Rio Grande), but in smaller quantities from Russia and other countries. There were also imported 5,419 packages of hide-hair, which includes a mixed lot of hair taken from the hides in the preparations for tanning. Hogs' hair and bristles, to the amount of 2,278 bales, each weighing approximately about 4 cwt., were imported from the Western States of America, the West Coast of South America, and the Continent.

Hides are collected by agents, who buy odd lots at markets and fairs held in various countries. They are sent to seaports for transmission to this country. Before shipment they may be sorted according to quality, etc., and a consular or veterinary certificate may be required as to their freedom from disease. This is a safeguard that is required in the case of those imported into the United States, but its value as to the presence of disease is very doubtful.

Foreign hides are cured abroad in many ways, which vary according to the country of origin, and they arrive in this country either as dry or wet salted hides. The curing may be either by drying in the sun—and this is especially the case with African, East Indian, and many South American hides—or the hides may be salted with salt and saltpetre, or put into a brine bath, or cured in solutions containing arsenic or lime. Hides from some parts of the world, e.g., India,

may be soil-cured, i.e., rubbed with soil which contains a large amount of nitre, and dried.

Dry hides are usually folded lengthwise, with the fleshy side outwards, and they may be imported loose or in bales. The smaller skins of sheep and goat are usually sun-dried, but salt and arsenic may also be used. They are packed in bales under pressure, and covered over with canvas coverings. These dry hides are very dusty and hard, and they require much soaking to soften them before they are passed through the tanning processes. Wet hides are cured by being strongly brined with salt solution, and can be stacked in this condition for a considerable time. Finally, for shipment each hide is folded into a small bundle and tied with rope. On arrival at the docks the hides are usually swung up through the hatchway on to the quay and wheeled into the dock sheds, or carried in the labourer's hands, or on his shoulders, and stacked. If not carted off immediately to hide markets and elsewhere, they may remain in sheds for some time.

Frequent re-sales and re-shipments occur, and hides may arrive in Liverpool from France and other Continental countries, although derived from such countries as China and South America.

The annual importation of raw hides into the Port of Liverpool is a very large one. The total import of dry hides and salted hides for 1905 was approximately 850,000. These imports came chiefly from the River Plate, West Coast of South America, Brazils, West Africa, Continent of Europe, and East Indies. No China hides were imported during the year 1905. East Indian kips and buffalo hides constituted a large percentage of the imports; there were 211,197 East Indian kips and 87,407 buffalo hides from Singapore and Batavia.

From West Africa the imports for 1905 were much larger than during the previous year—17,042 hides were imported; from Madagascar and Egypt there were imported 2,600 and 3,339 hides respectively.

The import of heavy salted hides from Italy, Germany, France, Holland, and Portugal amounted to 194,000. In addition to the above, there were also imported during 1905, 371,139 undressed goat and sheep skins; the former (goat skins) came chiefly from North Russian Ports, France, Morocco, Cape of Good Hope, Aden, and India. The latter (sheep skins) came from the Argentine Republic, Cape of Good Hope, Victoria, and New Zealand.

The accompanying table, compiled from reliable trade returns, gives the number of hides imported into Liverpool from different parts of the world during 1903, 1904, and 1905.

	River Plate.		Ox and Cow.						North America
			Rio Grande.		West Coast, etc.		Brazil.		
	Dry.	Salted.	Dry.	Salted.	Dry.	Salted.	All Sorts.		
Total, 31st Dec., 1905	22,971	176,510	—	—	23,941	19,470	69,557	3,217	
" " " 1904	25,648	42,478	—	—	28,656	11,697	49,408	85,079	
" " " 1903	38,801	55,753	—	—	18,404	8,932	20,484	41,128	

	West India.	French, etc.	Italian.	German, etc.	Spain and Portugal.	East India.	Horse Hides. R. Plate.
Total, 31st Dec., 1905	2,096	10,425	143,024	28,138	9,539	298,606	1,000
" " " 1904	3,207	6,223	127,739	45,948	5,526	170,105	—
" " " 1903	1,118	26,338	157,550	112,244	1,154	198,768	—

The number of cases* of anthrax arising in association with the foregoing animal products which are dealt with in this paper are twenty-one in number. Thirteen of these cases were dock labourers and carters who were engaged in discharging the cargoes of ships in dock, and all, with one exception, were infected during the unloading or carting of hides either loose or in bales. Three of the twenty-one contracted infection in handling horse-hair in hair factories, whilst three were engaged in handling or sorting wools, such as sheep's wool and goat-hair. Another case was a hide porter who was infected in a hide merchant's establishment during the handling of hides and skins. An instructive case is that of a labourer who had been engaged in brushing up the holds of a vessel from which bales of skins had been discharged; he was the only one who contracted the pulmonary form of the disease. Another interesting case was that of a female bag-mender who worked amongst second-hand bags; the particular bags she was engaged upon were stated to have contained rice meal and cotton seed. There is a strong probability, however, that other bags which had contained wool or hair may have been given to her to mend. This case is comparable with two reported at Hamburg, where infection arose in mending tarpaulins which had covered sheep's wool.

From an examination of the figures in the reports of Dr. Legge, of the Home Office, it will be seen that anthrax-infected hides come from almost all parts of the world, but the principal sources of supply are China and the East Indies. Four of the twelve hide cases occurring in Liverpool were infected in handling West African hides from

* See pages 448 and 449.

Bathurst and Sierra Leone. The number of hides imported into Liverpool from West Africa is a comparatively small one, viz., 17,000 for 1905, and it must therefore be considered that the number of cases of infection from these hides is rather a high one.

Since the occurrence of these cases Messrs. Elder, Dempster & Co. have done all that is possible to safeguard the workmen handling these hides, by providing and enforcing the wearing of gloves and protective coverings for the head and shoulders, subsequently disinfecting them with perchloride of mercury. Representations have also been made to the Governor of the Gambia as to the need for proper veterinary supervision of cattle in the colony.

Hides from South America gave rise to four cases, two arose from handling skins from Mediterranean ports, and dry hides from Rangoon were responsible for another case. The sources of the material in the other cases of hide infection were not discovered.

The anthrax cases arising from handling wools were due to infected sheep's wool from the East Indies and goats' hair from Karachi.

Horse-hair gave rise to infection in three cases amongst those employed in a horse-hair factory, and the material was derived from Russian sources.

The uncovered parts of the skin were, in nearly all cases, affected in the external form of the disease, the neck in eleven cases, the cheek in four, the chin in one, the forehead in one, the nose in one, and the shoulder in one. In the latter case the man was struck on the shoulder by a box, and his skin injured by a projecting nail: he had been handling dry Rangoon hides about the same time, and carried the infection to the wound with his dusty fingers. In the case of dock labourers the pustule was mostly on the neck, due probably to carrying hides on the shoulders. In regard to the mortality amongst the twenty-one cases, they were all severe types of the disease, and there were fourteen deaths.

It seems possible that many slight forms of the disease may be overlooked by the patients or undiagnosed by the medical attendant. This neglect on the part of the workmen will not occur to such an extent amongst wool and hair sorters and amongst those who are constantly employed in one special branch of work and have come to know something of the disease and its dangers. Amongst dock labourers, on the other hand, who are constantly changing the character of their work, this elementary knowledge of the disease is wanting.

The oversight on the part of the medical man can be accounted for by the comparative rarity of the disease; and in many instances

the fact that many practitioners are not aware that the law requires the disease to be notified to the Home Office, contributes to cases being overlooked. It seems, therefore, probable that only the severe cases come to the notice of the Home Office and Health Authorities: cases where the patient has been admitted into hospital for operation, the disease diagnosed and notified to the Home Office, or in cases where the death has been registered.

Samples of hair and hides, amongst which the patients worked, have frequently been taken for bacteriological examination, but in few cases have any positive results been obtained. In many cases, owing to delay in notification and other causes, it happens that by the time the case has come under notice of the Health Authorities, the hides have either reached the tanning pits, or have been re-shipped to America and other countries, hair in bales has already been divided up and scattered, so that it would be quite impossible to trace infected material.

In the case where infection occurred in handling Karachi goat-hair, when enquiries were made it was found that the suspected bales had already been exported to Smyrna in Asia Minor. The same occurred in the case of the Rangoon hides, and the stevedore who assisted in loading the hides outward to America developed the malignant pustule and died within three days from the sailing of the ship. In some cases, however, the bales of hides or skins have been traced and reported to the manufacturers concerned. To overcome this delay in dealing with infected material, it has been recommended by the Liverpool Council that anthrax be placed amongst the diseases notifiable under the Infectious Diseases Notification Act, 1889.

This danger from anthrax is to be found wherever foreign animal products are handled, and it is interesting to note that at Hamburg, a city where the greatest attention is given to the danger of anthrax from hides and hair, the total number of cases registered during the ten years ending July, 1905, was sixty-three. In forty-three of these the infection was due to handling foreign salted and dried hides and skins; three had handled skins of local origin, and three had been working with horse-hair and bristles, another case was infected when repairing tarpaulins which had been used as coverings for a load of sheep's wool from South Africa. In the remainder it was impossible to assign the precise source of infection. At Hamburg, the figures for the year ending December 31st, 1905, give a total of thirteen cases, with seven deaths; seven of these thirteen cases were due to hides which came for the most part from South America, and one had been repairing wagon covers which had been used to protect animal products in railway wagons.

No.	Approximate Date of Sickness.	Sex.	Occupation.	Material.	Origin of Material.	Character of Disease and Situation of Pustule.	Severity and Result.	Information elicited at Inquests or Elsewhere.
1	1903. Nov. 9 ...	M	Dock labourer ...	Bales of skins ...	West Coast of Africa ...	Pulmonary anthrax ...	Death ...	The deceased assisted in brushing up the holds of the vessel in which the skins had been stored.
2	1904. April 12 ...	F	Hair sorter and washer ...	Horse-hair ...	Source unknown	Chin ...	Death ...	The deceased worked amongst wool six days previously.
3	May 21 ...	M	Dock labourer ...	Wool ...	Source unknown	Neck ...	Death ...	Leather gloves were supplied by the Shipping Co., and worn by the deceased.
4	June 3 ...	M	Hair washer ...	Horse-hair ...	Russia ...	Under the ear ...	Death ...	Deceased's duty at warehouse was sweeping up loose wool, and removing same to sorting room.
5	July 3 ...	M	Dock labourer ...	Hides, dry ...	Sierra Leone and Bathurst ...	Neck ...	Death ...	
6	July 19 ...	M	Wool warehouse-man ...	Wool ...	Source unknown	Chin ...	Death ...	
7	1905. April 30 ...	F	Wool sorter ...	Wool ...	East Indian ...	Forehead ...	Recovery	
8	July 3 ...	M	Dock labourer ...	Hides, dry ...	Pernambuco, and Massio, and Cabadello ...	Neck, with rapid generalization ...	Death ...	
9	Oct. 7 ...	M	Dock labourer ...	Hides, dry ...	Bathurst ...	Neck ...	Death ...	
10	Oct. 30 ...	M	Dock labourer ...	Hides, dry ...	Source unknown	Left cheek ...	Severe recovery ...	
11	Nov. 29 ...	M	Dock labourer ...	Hides, dry ...	Peru ...	Neck ...	Death ...	No gloves worn or other precautions taken.

12	1906. Jan. 28 ...	M	Dock labourer ...	Hides, dry ...	Brazil ...	Neck ...	Recovery	It was stated that it was not usual to wear gloves.
13	Feb. 22 ...	M	Dock labourer ...	Hides and skins ...	Lisbon, Oporto, and Mediterranean Ports ...	Neck ...	Death ...	
14	July 4 ...	M	Dock labourer ...	Hides, dry ...	Parahyba ...	Cheek ...	Recovery	This patient when he took ill was working on a grain ship in B head, but a few days previously had worked among dry hides. Gloves are worn in handling hides.
15	July 25 ...	M	Hide porter ...	Hides and skins ...	Sources unknown	Cheek ...	Recovery	Patent was stated to have worn gloves.
16	Aug. 18 ...	M	Dock labourer ...	Hides, dry ...	Bathurst ...	Nose ...	Recovery	No gloves worn, but respirators and overalls supplied to those who sweep up warehouse.
17	Oct. 5 ...	M	Wool warehouse-man ...	Goats' hair ...	Karachi ...	Cheek ...	Recovery	No gloves worn. No gloves worn.
18	Oct. 23 ...	M	Hair heckler ...	Horse-hair ...	Russia ...	Neck ...	Death ...	
19	Dec. 5 ...	M	Carter at the Docks ...	Goat skins, dry ...	Marseilles ...	Neck, extensive cedema ...	Death ...	
20	Dec. 8 ...	M	Stevedore ...	Hides, dry ...	Rangoon ...	Shoulder ...	Death ...	Gloves provided but not worn.
21	Dec. 16 or 17 ...	F	Bag-mender in bag and sack warehouse ...	Bags ...	Source unknown	Neck ...	Death ...	The firm dealt in secondhand bags, which before the firm received them contained rice meal, cotton seed, palm kernels, and grain. There was a suspicion that the particular bags on which deceased worked had contained hair.

The measures adopted at the present time to prevent infection from this disease may shortly be reviewed.

Under the Factory and Workshops Act, 1901, Section 73, it is required that every medical practitioner attending on or called in to visit a patient whom he believes to be suffering from anthrax contracted in a factory or workshop, shall notify the case forthwith to the Chief Inspector of Factories at the Home Office. This notification starts the usual routine enquiries and preventive measures taken by the Medical Officer of Health and the local Inspector of Factories.

The Secretary of State may, under this Act of 1901, in pursuance of the powers conferred on him by Section 79, make regulations regarding the handling of dangerous material, which shall apply to all factories and workshops where dangerous trades are carried on.

The regulations under this Act in force at the present time for the express purpose of reducing the amount of dust and the likelihood of infection during the sorting and handling of wool, goats' hair and camel-hair, are very complete. The different classes of wool and hair which are known to be dangerous are scheduled, and special precautions are laid down for the opening, sorting, etc., of bales of these wools. These dangerous wools include Van mohair, Persian locks (an inferior quality), and Persian (including Karadi and Bagdad), if not subjected to the processes of willowing and sorting. Dusty and dangerous wools are required to be thoroughly steeped in water in the bale before being opened. These wools shall not be opened for sorting or manipulation except by men skilled in judging of the condition of the material.

The other wools and hair which are required to be opened either after steeping or over an efficient opening screen,* are alpaca, pelitan, East Indian, Cashmere, Russian camel-hair, Pekin camel-hair, and Persian (including Karadi and Bagdad), if subjected to sorting and willowing. All damaged wools, hair, or fallen fleeces, if of the kinds named, shall, when opened, be damped with a disinfectant and washed without being willowed.

In sorting dangerous wools and hair, this process must be done in the case of alpaca, pelitan, etc., and all mohair except Van mohair,

* 1. Area of screen in existing screens to be not less than 11 square feet; area of screen in those hereafter erected to be not less than 12 square feet; nor shall length or breadth be less than $3\frac{1}{4}$ feet.

2. At no point of the screen within 18 ins. from the centre shall the velocity of the exhaust draught be less than 100 linear feet per minute.

over an efficient sorting board* with mechanical exhaust draught and in a special room for the purpose. Van mohair and Persian locks shall be sorted only in the damp state and after being washed.

No damaged wools or hair of the kinds scheduled as dangerous shall be sorted except after being washed, and in the willowing of dangerous wools this shall only be done in a proper machine with mechanical exhaust draught to draw dust away from the workman, and in a special room for the purpose.

Further, rules are laid down regarding the storage of wool and hair, the air space (1,000 cubic feet per person), the air inlets, and the temperature, which shall not fall below 50° F. All bags which have been used for packing wool or hair shall be picked clean and not brushed, all clippings, etc., shall be removed for disinfection or destruction. Dust from opening screens, sorting boards, etc., shall be discharged into proper receptacles and not in the open air. Overalls and respirators shall also be provided for those engaged in the work of collecting and removing the dust, the floors of various rooms shall be sprinkled daily with disinfectant after work and swept immediately, and lime-washing shall be done once a year. In connection with the rooms for handling dangerous wools there shall also be provided suitable places for washing and for the storage of food and clothes, and persons having open cuts or sores shall be prohibited from working in the rooms when dangerous wools are manipulated. According to Dr. Legge a marked reduction in the risk of anthrax is seen as a result of scheduling dangerous wools. When Mr. Spear made his enquiries in 1882 Van mohair was the wool which was placed first on the list of noxious wools as regards anthrax. At the present time, from Dr. Legge's figures, this wool appears third on the list, and he points out that this is in all probability due to it being classed as a dangerous wool and scheduled to be sorted while damp.

It is interesting to note, in connection with preventive measures, that an Anthrax Investigation Board was established over a year ago at Bradford, to enquire into the origin and spread of anthrax, and, in the interests of all concerned, to devise means for diminishing the risks attached to the manipulation of dangerous wools.

* The sorting board shall comprise a screen of open wire work, and beneath it at all parts a clear space of not less than 3 inches in depth. Below the centre of the screen there shall be a funnel, measuring not less than 10 inches across the top, leading to the extracting shaft, and the arrangements shall be such that all dust falling through the screen and not carried away by the exhaust can be swept directly into the funnel. The draught shall be maintained in constant efficiency whilst sorters are at work, and shall be such that not less than 75 cubic feet of air per minute are drawn by the fan from beneath such sorting board.

It appears likely that the Secretary of State will shortly schedule amongst dangerous wools those of East Indian origin, the danger attending the manipulation of these wools being not inconsiderable. Out of 126 reported cases of anthrax in the woollen, worsted, and felt industries, between January 1st, 1900, and November 20th, 1906, there were 17 in which East Indian wool was the most likely cause. There is some reason to believe that wools of Persian origin find their way to such ports as Bombay and are shipped amongst those classed as East Indian. Much opposition has been raised to the proposed regulations by those in the wool industry, who point out that no real case has been made out as to the noxiousness of East Indian wools, and that it is only in very small quantities that Persian wools find their way amongst East Indian. Much might be done to diminish the risk of infection if some precautions were taken by those who make up the bales to see that fallen fleeces and damaged or inferior wools were not incorporated in the bales of good wool, but packed separately.

Although no special regulations exist for the handling of horse-hair and bristles in hair factories, the question of preventive measures has not escaped the notice of the Chief Inspector of Factories. Efforts have already been made to control the risk of anthrax arising in connection with horse-hair by the manufacturers themselves. In 1899 they resolved to buy none of the dangerous Russian, Siberian, or Chinese hair unless sufficient guarantees were given by the seller that the hair had been properly disinfected. In a circular letter issued in 1900 by the Chief Inspector of Factories it was pointed out that there were doubts as to whether this disinfection could be carried out in practice and that such a guarantee would be of little value. Pending enquiry into the question of steam disinfection, he recommended other means of dealing with the untreated horse-hair so as to reduce the risk. These were the opening and sorting of the hair over tables with a mechanical down draught, the covering of the carding and dust-extracting machines, the collection, removal, and destruction of the dust by heat, the exclusion of work-people with cuts and wounds, and the provision of proper washing accommodation.

It is understood that special rules are now in course of preparation in connection with this industry. Pending the issue of these rules, it has been recommended that dangerous Siberian, Chinese, and Russian hair should be thoroughly steeped in water or in a disinfectant before opening and sorting. From experiments made in Liverpool this steeping does away with a great amount of the dust which formerly arose in this process. Some difficulty, however, is being experienced

with the workers, who are very unwilling to do the work at the former prices, and it is stated by the sorters and drawers that certain disinfectants recommended render the hair sticky. These difficulties are, however, met with amongst workmen engaged in nearly all dangerous trades, and they are slow to recognize the advantage of any particular safeguard. One cannot but think that good results will follow the steeping in water of all horse-hair bales and the sorting of the hair in a damp state.

Disinfection by steam has also been recommended, but is only done in some factories. Hair workers state that it deteriorates the quality of the hair, makes it brittle at the ends, and the material loses its elasticity. These statements coincide with the results obtained by Messrs. Webb and Duncan, of Worcester, in their exhaustive experiments. They have pointed out, however, that the results to a large extent depend on the pressure to which the hair is subjected during disinfection. They also found that bristles change colour and lose weight through brittleness and that white hair is also discoloured. The danger of anthrax is much lessened when, as in the case of China white hair, the material has been already washed, or in the case of bristles where the pigs have been scalded before the bristles are collected.

The Medical Board of Hamburg, as early as 1874, drew attention to the illness and carbuncles which arose amongst those cleaning, combing, and sorting Siberian horse-hair, owing to infection of anthrax adhering to the hairs, and advised :—

1. No food to be partaken of where such hair is stored or worked.
2. Thorough cleansing of the hands, etc., after finishing work.
3. Persons with open sores or abrasions to abstain from work.
4. Immediate medical advice to be obtained when first symptoms appear.

Legislation was first introduced in Germany in 1899, and was subsequently amended by an Act of 1902. This concerned the arrangements and methods of work in horse-hair spinning mills, hair and bristle dressing and brush factories. The regulations under this Act apply to all premises where horse- or cow-hair, pigs' bristles or pigs' wool, or goat-hair are treated or worked, or where they are made into brushes, brooms, etc. Firstly, it is required that the material shall be disinfected before being used in manufacture, and choice of three methods is given :—

1. Material is subjected for half an hour to current of steam at a pressure equivalent to 17 lbs. (220° F).
2. The hair is boiled for a quarter of an hour in a 2 per cent solution

of permanganate of potash, and subsequently bleached in 3-4 per cent sulphurous acid.

3. The hair is boiled in water for at least two hours.

Where the material can be shown to have been already properly disinfected before coming into the manufacturer's hands, or, in the case of white bristles which are subjected to further bleaching processes or have been already bleached before coming into his hands, no disinfection is required. Prior to this disinfection only such processes shall be carried out as are necessary for judging of the quality and condition of the material, or the unpacking and conveying of it to the apparatus.

No workmen with external cuts or sores, especially on the neck, face, or hands, shall be employed on this work.

A register shall be kept of the amount, source, and country of origin of hair, bristles, and wool, and the duration and mode of disinfection employed, and if no disinfection is carried out, the reason for this. Bales of material requiring disinfection shall be kept in special lock-up rooms.

In Germany, for large factories where over ten persons are employed, special regulations have been made. First, as regards the character of the floors, walls, and ceilings, so that dust may be easily removed by the wet method. The surface of the walls and ceiling, unless having a smooth washable surface such as paint, shall be limewashed once a year. In addition, when the development of considerable quantities of dust is incidental to the operations, 530 cubic feet of air space shall be allowed to each workman.

In horse-hair factories and hair and bristle dressing workshops, sorting and heckling shall be done in a special room, and the dust created shall be collected and destroyed. Mixing, willowing, and heckling machines shall be covered over and provided with efficient dust-extracting apparatus, and if the dust be from materials such as cannot be subjected to disinfection without serious damage, it shall be burnt.

Sufficient and suitable overalls and head coverings shall be provided for the persons employed in the preliminary manipulation of non-disinfected material. These overalls shall be kept in a special place, and disinfected regularly once a week. Facilities shall be provided for the persons engaged to have a warm bath twice weekly. Lavatories and cloak-rooms shall also be provided. A written agreement shall also be entered into with the work-people regarding the wearing of overalls, the partaking of food outside the work-rooms, and the washing of the face, neck, and hands before meals. Employers may also

dismiss without previous notice any worker who persists in disregarding the rules.

Elaborate experiments have been made by the German Imperial Health Office, and also by Mr. Webb of Worcester, on the disinfection of hair, especially in regard to its effects on the material. It has been found that hair suffers no damage in disinfection by saturated steam, if the pressure does not exceed $2\frac{1}{2}$ lb. above atmospheric pressure (i.e. 220° F.). The German rules have been in force since 1899, and no difficulty has been experienced. The only unavoidable damage which occurs is that white hair is turned yellow even at low pressures, bristles become brittle, and those that are white are coloured slightly yellow.

Before special rules are issued for hair and bristle factories in this country, the whole question of soaking the hair or disinfecting it by steam will, no doubt, be well considered by the Home Office authorities in conjunction with the representatives of the various hair industries.

There remains now to be considered the nature of the precautions to be taken in connection with the handling of hides and skins. The risks arising from infected hides and skins are almost as great as those connected with the wool trade. From Dr. Legge's figures for the years 1899-1904, the number of cases is 88 for the wool industry and 86 for the hide and skin trade.

The special rules suggested in 1898, under the Factory and Workshops Act, included the sorting of all foreign hides and skins and dry East Indian hides and skins. Much opposition was, however, raised by the trade, and it was decided by the Secretary of State, in view of this and of the records available at that time as to the countries of greatest risk, to limit the rules to hides and skins from China and the West Coast of India. In addition, the compulsory wearing of gloves and overalls was omitted, these protective garments being simply recommended to those concerned, and the wearing was not made compulsory.

The amended rules came into force in 1901, and the occupier is required to make arrangements in connection with the storage of food, washing and dressing accommodation, and publishing the rules. The workmen are also directed regarding the storage and partaking of foods, and their attention drawn to the danger of working amongst hides and skins with wounds or scratches on the body. A foot-note is appended recommending the wearing of suitable overalls for protecting the neck and arms; the wearing of gloves is also advised where the character of the work permits.

Protective gauntlets and gloves have been provided in Liverpool

by many shipping firms and others for their workmen, but the difficulty of getting the men to wear them is great, and the responsibility of seeing that they are worn when there is no personal supervision is one that employers do not care to undertake. Many of the gloves worn are unsuitable in shape for such a purpose; the gauntlet form is no doubt the best, but the form of glove needs much improvement.

There can be no doubt that gloves are a protection, but they may also harbour infection by dust finding its way into the interior. Some companies disinfect the gloves after use with perchloride of mercury.

Notices have also been drawn up by the Chief Inspector of Factories and posted up in places where China and East Indian hides and skins are handled, drawing attention to the disease, how it is communicated, to the need for prompt recognition of the early signs of the disease, and immediate attendance at a hospital.

This notice was supplied in 1902 to the Liverpool Shipowners Association, who had it printed and posted up over the docks. During the year 1906 a further excellent notice has been issued by the Home Office, with three coloured representations of the malignant pustule in various stages.

In the beginning of 1906 the cases of anthrax became so frequent that the Port Medical Officer, Dr. Hope, issued a circular letter drawing the attention of shipowners and others to the rules and recommendations which had been prepared by the Chief Inspector of Factories to avert the danger, and especially with regard to the wearing of suitable gloves and overalls, and this was no doubt productive of some good.

The recommendations for handling hides at large foreign seaports are of interest. In German ports, and especially at Hamburg, where so many cases have occurred, the measures taken, as in our own country during past years, have been chiefly directed towards calling the attention of workmen and others to the risks connected with the occupation, and to induce them to cleanse places where hides and skins are stored, also to the need for personal cleanliness after work, and to protect the hands, arms, and neck with gloves and overalls, and to prevent workmen with sores and cuts from handling such materials.

In 1891 the Imperial Chancellor issued a notice with regard to injury to health arising in the trade of foreign hides, and it was recommended as follows:—

1. Store places for hides should be at some distance from habitations, and animals should be prevented from having access to these places.

2. Sheds and buildings serving for storage of fodder and straw are

3. Stirring up dust in sorting, packing, and handling hides should be avoided.

4. Places where foreign hides have been stored should afterwards be cleansed and disinfected at proper intervals.

5. Bark used in tanning processes, hair and waste straw, etc., used in packing animal products, should be burnt or disinfected.

6. Persons with cuts, wounds, etc., should not be admitted to work with hides.

7. Personal cleanliness, especially of face, hands, arms, hair, and beard should be attended to before leaving the locality of work.

8. Cleansing of store places, etc., should be done in the wet form.

9. The disinfectants recommended are:—

Chloride of lime—1 part fresh chloride of lime and 3 parts water.

Carbolic sulphuric acid—2 parts crude carbolic acid, and 1 part crude sulphuric acid, and 4 parts water.

A notice was issued in April, 1902, by the Medical Board of Hamburg, and posted up in conspicuous situations in work-places. A further caution was issued in June of the same year, with a description of the first signs of the disease. This was communicated by the Union of Dock Labourers and other workmen to its members.

At Marseilles and Antwerp the British Consul reports that cases are very rare and no precautions are adopted to prevent infection. At Genoa it is reported that no special sanitary regulations for the handling of hides have been issued, but the following recommendations were issued to those engaged in the work:—

1. To abstain from handling hides when they have cuts or abrasions of the skin.

2. To disinfect the hands and uncovered parts of the arms, by washing them in 1 in 1,000 corrosive sublimate every time they have handled hides.

3. To protect the shoulders and neck with a wadded covering when they carry hides on the shoulders.

From further enquiries which have been made it is essential, according to Federal law, that all hides imported into the United States of America must be disinfected before shipment in the country whence they are exported, except such countries as are free from contagious or infectious diseases of animals. Unless the imported hides are accompanied by a consular certificate stating that they have come from an anthrax-free country or have been disinfected, they are not allowed to be landed.

A circular of the United States Treasury Department, dated 1901, directs all Customs officers, with a view to prevent the introduction

and spread of contagious or infectious diseases amongst the cattle of the United States of America, to treat as prohibited importations all hides of cattle, calf-skins, hide-cuttings, etc., except such as have been drysalted, arsenic-cured, or lime-dried after soaking for forty days in strong solution of lime, and except abattoir hides, the product of Sweden, and Norway, and Great Britain, in all cases where the invoices are not accompanied by proper certificates of disinfection.

The Board of Health of New York, under Section 152 of its Sanitary Code, has power to prevent the unloading of foreign hides at any pier or wharf, without, or otherwise than according to, a permit from the Board.

It would seem then, that, in the United States the authorities regard the drysalting and arsenic- or lime-curing of hides sufficient to render them innocuous, and the British Consul General at Boston has made enquiries and finds that this is the case with hides from India, but that great care is exercised in handling hides from China. From the answers obtained from the authorities it does not seem that there are any special local sanitary regulations for the handling of hides.

Dry hides, whether sun-dried or treated with arsenic or lime, are more often responsible for causing infection than the wet kind; and it was suggested some years ago by Dr. Hamer, that the substitution of wet for dry hides would be followed by a decrease in anthrax cases. Unfortunately, according to trade returns, no marked effort seems to have been put forth, so far, by importers, to effect this evident means of prevention. Dry hides are much lighter than wet ones, and this is a factor which appeals very forcibly to importers.

The suggestion is made that if hides and skins were imported in large bales properly covered over and tied up, so that mechanical means of removal from holds and elsewhere would be required, it would materially aid in diminishing the risk of infection, at least at the docks, from the reduction of manual labour. In hide markets and tanneries, where the bales would be opened and the hides sorted, the risk would still exist.

So far, then, our methods of prevention, short of the disinfection of the hides, which cannot, in the opinion of many, be carried out in a practical and effectual manner, may be summarized as follows:—

1. Notices and circular letters to educate workmen and their employers as to the nature and fatality of the disease and early attention to medical treatment.

2. All foreign hides from infected or suspected countries ought to be scheduled under the special rules; gloves to be worn and disinfected after use.

3. Dry hides and skins ought to be imported only in large and in canvas-covered bales, requiring mechanical means for removal.

4. The substitution of "wet" for "dry" hides.

5. No hides to be carried on the shoulders.

6. All sheds and store places, after the storage of hides or skins, ought to be thoroughly wet-cleansed and disinfected.

7. Infected material ought to be traced to its source of origin and representations made through the proper channels to the Governments concerned, recommending a close veterinary inspection of cattle, with a view to eradicate the disease.

Recommendations 6 and 7 ought also to apply to infected wool and hair.

The inclusion of anthrax amongst the diseases notifiable under the Infectious Diseases Notification Act, 1889, would be a step in the right direction, and would enable Health Authorities to follow up and deal promptly with infected material. It has been recommended that the disease be placed amongst the compulsorily notifiable diseases under this Act in Liverpool.

This record of a series of cases of anthrax and the short review of our present methods of preventing infection may assist in arousing interest and suggest improvements in our administrative methods.

RETURNS OF OUTWORKERS UNDER THE FACTORY ACT.—On February 22nd, at the Guildhall, several tailors and clothiers were summoned, at the instance of one of the City of London sanitary inspectors, for neglecting to send to the Court of Common Council (the local authority) a list of the names and addresses of all persons employed by them outside the workshops. Mr. T. G. Vickery, who prosecuted on behalf of the Public Health Department, pointed out that under the Factory and Workshop Act, 1901, the occupier of every workshop or factory was required, on or before February 1st and August 1st in each year, to supply the local authority with the names and addresses of persons employed by them as outworkers. Certain trades were specified, and the object was that the sanitary authorities should have complete control over the homes of people engaged in making articles of clothing for the purposes of trade in their own houses. Last October the Home Office issued a circular to all local authorities, impressing on them the necessity of seeing that the provisions of this section were carried out, and the object of these prosecutions was to make it widely known to those concerned what they were required to do, and to act as a warning to other defaulters. It was as much for the protection of the general public as for the individual outworker that the Act should be rigidly carried out. The Alderman, observing that these cases were intended to act as a caution, imposed only nominal fines. Future offenders would be dealt with in a different manner.

REVIEWS.

THE MEDICAL ANNUAL: A Year Book of Treatment and Practitioner's Index, 1907. 25th Year, pp. 700.

This most useful book becomes increasingly valuable each year. Not only does it enable the busy practitioner to keep himself abreast of the most modern developments of medicine, but it is a reliable guide as to the new books of the year in each branch of medicine, lunatic asylums, inebriate institutions, hydropathic establishments, officials of Government departments, educational vaccination stations, periodicals, and useful trade information. The present volume is rich in articles of medical value and importance. Among the chief of these are those by Dr. Easterbrook on Alcohol and Insanity, Mr. Handley on Cancer, Dr. Hill on Infant Feeding, Dr. Hadley on Phthisis, Dr. Stephens on Plague, Dr. Watson Williams on Diseases of the Sinuses, Dr. Walker on Syphilis, and many others. There are over ten full-page coloured plates excellently executed. Dr. Priestley contributes a special article on Sanitary Science, in which such subjects as carrier cases of diphtheria, the compulsory notification of phthisis, health societies, infant mortality, milk depôts, the standardization of disinfectants, preservatives in milk, and the school feeding of children are clearly and succinctly summarized.

FOOD AND HYGIENE: An Elementary Treatise upon Dietetics and Hygienic Treatment. By W. Tibbles, M.R.C.S., etc. Rebman, 1907. 8s. net. Pp. 672, size $5\frac{1}{2} \times 8$.

This is an elementary, though very full treatise, on food in health and disease. A large amount of information has been collected, and much instruction may be derived from its pages, though it is doubtful whether the author has not given too much for the digestion of the public and too little for the professional man in want of exact guidance. The first part consists of eight chapters dealing with the different varieties of food and their digestion, vegetarianism, feeding of infants and children, and of adults. Part II describes the various foods in detail in ten chapters, also discussing stimulants and water supply. In Part III the hygiene and food needed in sickness are discussed.

As already stated, interesting and useful information may be culled in every chapter, but the book suffers from lack of systematization. Although the date is that of the present year, we have failed to discover any mention of the names of Fletcher and Chittenden, and the economy of nitrogenous food receives scant consideration.

DOUGLAS'S ENCYCLOPEDIA, 2nd Edition (Douglas & Sons, Putney), pp. 634.

Although this encyclopædia has been prepared chiefly for bacon curers, meat purveyors, and the various food industries, it contains much information with which it is most desirable that the medical officer of health and meat inspector should be practically acquainted. The first article deals with abattoirs in thirty-eight pages, and is full of information dealing with all parts of their work, structure, methods of killing, methods of testing meat, and so on.

Food preservatives, knackers' yards, pig feeding, ptomaine poisoning, and the various diseases of animals are all described. We can recommend the book as most useful for reference.

EMPLOYMENT PICTURES FROM THE CENSUS. By M. G. Spencer and H. J. Falk, M.A. With a Preface by Prof. C. S. Loch, D.C.L., LL.D. P. S. King & Son. Pp. 101. Price 2s. 6d. net.

It is to be feared that the utility of the Census is but imperfectly appreciated by the general public, who appear to be disposed to regard it as little more than a somewhat useless inquisition into their private affairs which is carried out decennially at considerable cost to the taxpayer. It is perhaps not surprising that such views should be held, for, as far as the public are concerned, the immensely valuable results of the Census are practically buried in Blue-books which, whatever their merits, are hardly suited for the perusal of the general reader. We welcome, therefore, such books as these *Employment Pictures*, which present certain selected groups of Census statistics in an accessible and attractive form.

The object of the book is to set out in diagrammatic form some of the chief facts in the Census relating to occupations. In the first part the variations in the age and sex constitution and in some of the occupations of the population of England and Wales at each Census of the last three decades are shown, but the greater part of the book is taken up with an analysis of the occupation statistics of London at the Census of 1901. The local distribution of the various occupations in London is shown in considerable detail and in a highly interesting way. The diagrams for the most part are admirably constructed, but it is perhaps unfortunate that so much use has been made of the method of indicating varying quantities by different segments of a circle. This lacks clearness for comparative purposes unless the variations extend over a wide area. The book, however, is a sound and useful piece of work, and we hope it will be widely studied.

DIFFICULTIES OF SANITARY OFFICIALS.—The difficulties which sanitary officials meet with in connection with the administration of certain sections of the Public Health Acts were once more illustrated during the recent hearing of a case before a Metropolitan Police Magistrate. The carcass of an ox admittedly tuberculous was found in a Battersea slaughter-house by the medical officer of health for the borough. When the owner of the carcass was prosecuted he denied that it was intended for sale, and the magistrate, agreeing with this view, dismissed the summons, ordering the borough council to pay £10 10s. costs.

TREATMENT OF CROYDON SCHOOL CHILDREN FOR RINGWORM.—During the six months in which the scheme for treating school children affected with ringworm has been in force in Croydon, 167 cases have been dealt with, at a cost of £50. The Town Council has decided to continue the scheme for another year.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

GENERAL MEETING.

A GENERAL MEETING of the Incorporated Society of Medical Officers of Health was held at the Offices of the Society, No. 1, Upper Montague Street, Russell Square, London, W.C., on Friday, March 8th, 1907. Present: Dr. D. S. Davies (in the Chair), Drs. J. E. O'Connor, G. Quin Lennane, F. T. Bond, W. W. Stainthorpe, W. H. Symons, W. Gruggen, C. W. F. Young, A. E. Porter, W. J. J. Stewart, R. A. Dunn, F. Fremantle, H. Stott, R. Farrar, G. F. McCleary, M. J. Rees, J. E. Robinson, A. G. R. Cameron, W. Butler, H. B. Collins, J. A. H. Brincker, F. A. Wille, Herbert Jones, E. C. Seaton, J. T. C. Nash, H. E. Corbin, R. Dudfield.

Minutes.—The minutes of the previous ordinary meeting, held on February 8th, 1907, and printed in the March number of PUBLIC HEALTH, were taken as read, were approved and duly signed by the Chairman.

Correspondence.—Letters regretting inability to attend the meeting were read from Drs. Joseph Groves, E. M. Smith, G. Wilson, J. S. Tew, and T. W. H. Garstang.

Elections.—The following candidates having been duly nominated and balloted for, were declared by the President to be unanimously elected.

AS FELLOWS.

Barwise, Sidney, M.D., Driffield, M.O.H. for Derbyshire.

Close, John B., M.D., 2, Pryme Street, Hull, Assistant M.O.H. for County Borough of Hull.

Cook, John H., M.D., Clacton-on-Sea, M.O.H. for Clacton-on-Sea.

Crawford, John, M.B., D.P.H., Cupar, Fife, Assistant M.O.H. for Fife County Council.

Dowling, Arthur, L.R.C.P., Haydock, Lancashire, M.O.H. for Haydock Urban District.

Fraser, Peter, M.D., Carnarvon, M.O.H. for Carnarvon County Council.

Hall, Octavius, L.R.C.P., D.P.H., Devonport, M.O.H. for Devonport County Borough.

Harper, Frances M., M.B., D.P.H., Greenfield Road, St. Helens, Assistant M.O.H. for St. Helens County Borough.

Howard, Thomas, M.B., B.A., Portland, Dorset, M.O.H. for Portland Urban District.

Lennane, G. Q., F.R.C.S., D.P.H., Town Hall, Battersea, M.O.H. for Metropolitan Borough of Battersea.

Nunn, P. W. G., L.R.C.P., Bournemouth, M.O.H. for Bournemouth County Borough.

Prior, J. R., M.B., D.P.H., Hornsey Isolation Hospital, Muswell Hill, N., Assistant M.O.H. for Hornsey Urban District.

Robinson, T., L.R.C.P., D.P.H., Leicester, M.O.H. for Leicester C.C.

Stegman, E. J., M.B., D.P.H., Isleworth, M.O.H. for Isleworth U.D.

Willis, J. G., L.R.C.P., D.P.H., Bishop Auckland, M.O.H. for Auckland Rural District.

Wheeldon, F. J., M.R.C.S., 76, Long Street, Middleton, Lancashire M.O.H. for Middleton Municipal Borough.

Nominations.—The Hon. Secretary read a list of nominations for membership of the Society.

Colonial Conference in London.—The President called the attention of the members to the fact that the Special Committee appointed at the previous meeting of the Society were engaged in making arrangements for a deputation to His Majesty's Government in accordance with the resolution of the Society, and hoped that members would do all in their power to make a success of the dinner to Sir Joseph Ward, which had also been decided upon. The date of the proposed dinner would depend upon the engagements of the Colonial Premier, but the Committee had provisionally fixed upon Friday, April 12th, for the function.

Dr. F. FREMANTLE proposed that in the event of Sir Joseph Ward being unable to attend a dinner he should be offered a lunch. This was seconded by Dr. H. Stott, and passed unanimously.

Dr. J. E. O'Connor then read a paper on "Combined Sanitary Districts."* In the subsequent discussion the following members took part: The President, Drs. Gruggen, Stainthorpe, Dunn, Cameron, H. Jones, Porter, and Collins. Dr. O'Connor having replied, a hearty vote of thanks was accorded to him by acclamation.

Yorkshire Branch.—THE ANNUAL DINNER of the Yorkshire Branch of the Incorporated Society of Medical Officers of Health was held on Wednesday, March 6th, 1907, at the Hôtel Metropole, Leeds. There was a large gathering of about fifty members, presided over by Dr. E. M. Smith, the Medical Officer of Health for York, the Guest of the evening being Dr. B. A. Whitelegge, C.B., His Majesty's Chief Inspector of Factories.

After "The King" had been suitably proposed by the PRESIDENT, and heartily honoured by the Company, DR. WHITELEGGE rose to propose the toast of "The Sanitary Authorities of Yorkshire," in which he included all bodies engaged in any phase of public health work. Incidentally he claimed that he himself had not discarded sanitary work, because the department which he represented had a very real and very direct bearing on the public health. He recalled the time when he was more closely in touch with the sanitary authorities of Yorkshire, and he looked back with satisfaction to the work of a body of men who gave him a very high impression of Yorkshire business capacity and Yorkshire straightforwardness, and, moreover, of Yorkshire kindness to public officials, who were recognized as trying to do their best under difficult circumstances. He coupled with the toast the names of the Lord Mayor of York, and of the Chairman of the Leeds Health Committee.

ALDERMAN SAMUEL BORDER, J.P., wearing his Chain of Office as Lord Mayor of York, responded to the toast, and made special reference to the good work which had been done by the York Health Committee in recent years, largely assisted by the splendid services of Dr. Smith, the medical officer of health. He instanced with pleasure the declining death-rate of the city, mentioning that whilst in 1897 it was 17·5 per thousand, in 1905 it had fallen to 14·2, and in 1906 it only reached 14·0.

DR. HEALD, Chairman of the Health Committee of the Leeds Corporation, also responded to the toast, and while he claimed that sanitary authorities were steadily and surely advancing in the saving of life and health, he

* The paper and discussion will be published in the May issue of PUBLIC HEALTH.

mentioned a few of the difficulties at present in the way, especially the difficulty of protecting from contamination the milk supply of the people, whether in the cow-shed and the dairy, or in its transit to the towns, or in the hands of the retailer, or finally in the house of the consumer. An exhaustive enquiry is now being undertaken conjointly by the County Councils and the County Boroughs, and he hoped it would result in showing not only where the fault was, but how it could best be avoided. At present there were administrative and financial difficulties in the way of local authorities to prevent them going as far in this matter as they would like, but he was delighted to know that the President of the Local Government Board was in earnest in his intentions to remove some of the difficulties, and to permit much more to be done to improve the health and status of the children. Dr. Heald also referred to another new work which he considered had a great future before it, viz., the medical inspection of schools, and the control of infectious sickness in schools. Although it might be said that this great measure would do damage to the medical profession, it was bound to be undertaken, and the only question was by whom. In his opinion it was distinctly the province of the Health Department of the local Sanitary Authority, and if the work were to be properly carried out on these lines, much needless suffering would be avoided, and outbreaks of zymotic disease in schools would be promptly checked.

COUNTY COUNCILLOR E. J. CROSSLEY, J.P., next submitted the toast of "The Society of Medical Officers." He claimed to know something of the work of medical officers of health, seeing that he had been chairman of a local health committee for fifteen years, and was at present vice-chairman of the West Riding Sanitary Committee. He humorously remarked that it was the laymen who supported the professional men, and whilst the latter got the pay, the former received the kicks of the ratepayers. He thought the work of medical officers was becoming more appreciated, and was undoubtedly growing rapidly. The Society of Medical Officers, which, he understood, originated in Yorkshire, was now well able to look after itself, and comprised some 800 members throughout Great Britain.

DR. E. M. SMITH responded for the Society, and remarked that its members, being in the middle of the rapidly moving current of affairs connected with the public health, could not always see exactly what was being achieved, but there was no doubt that solid work was being done for the welfare of the Nation and of the Empire, and if the Empire was to decline it would not be the fault of those who were working in the public health service. Quite recently Alderman Broadbent, whose good work at Huddersfield is so well known, stated that all he had done from a public health point of view was due to his contact with medical officers of health.

DR. J. R. KAYE, as Honorary Secretary, also replied for the Society, the position of which, he stated, was satisfactory from the point of view of membership and finances.

The toast of "Our Guest" was then felicitously proposed by DR. JOHNSTONE, of Ilkley, who expressed the great pleasure of the members in seeing Dr. Whitelegge amongst them once more. He referred to Dr. Whitelegge's pioneer work from 1889 to 1896 in the establishing of the County Health Department, when he laid the foundations of a great reputation which had subsequently grown, and had received recognition at the hands of the State, but which merited a still larger share of appreciation.

DR. WHITELEGGE suitably returned thanks, and spoke of the great

increase of sanitary work in the West Riding since he left it, remarking jocularly that it would seem he escaped only just in time. He mentioned the early days of the enquiry into cow-shed sanitation, the investigation of lead-poisoning, and the difficulties of sewage disposal, all of them matters which were now in a far more advanced condition than when he left. He repeated that he had by no means deserted the public health service, and it was his great pleasure to be constantly in touch with medical officers of health.

The concluding toast was that of "The President," briefly proposed by DR. CAMERON, and responded to by DR. SMITH.

Apologies were read from absent members, and during the evening special reference was made by the President to the case of Dr. W. L. Hunter, who had been compelled for reasons of health to give up his work at Pudsey. It was decided to send him a message of sympathy and an assurance that the Society had remembered on that occasion his good comradeship in the past and his helpfulness as a colleague.

The musical programme of the evening included songs by Dr. C. Porter, of Leeds, Drs. Kaye and Clayton, of Wakefield, and Mr. J. Green, of Horbury; also a recitation by Dr. J. L. Milne, of Mirfield.

North-Western Branch.—An ordinary meeting of the above Branch was held at the Chemical Club, Victoria Hotel, Manchester, on Friday, February 15th, 1907. Present: Dr. Alfred Greenwood, President (in the Chair); Drs. Garstang, Laird, W. Hanna, Welsh, Knyvett Gordon, Buckley, Kerr, Goldsmith, Brindley, Sergeant, Barlow, Deans, Hitchon, Buchan, Hulbert, Wheeldon, Niven, Margaret M. Smith, Holt, Fraser, and M. Young. Letters of apology for absence were read from Drs. Herbert Peck, A. E. Thomas, H. E. Edlin, and W. Berry.

The minutes of the last meeting were read, confirmed and adopted.

It was unanimously resolved that a vote of sympathy and condolence with the widow and family of the late Dr. J. G. Gornall, of Warrington, be forwarded by the Hon. Sec., and that the Branch place on record its high appreciation of the services rendered by him to the public health.

Dr. Wheeldon, medical officer of health, Middleton, and Dr. Kingsford, Assistant medical officer of health, Liverpool, were unanimously elected members of the Branch.

It was unanimously resolved that the Society's attention be drawn to the arbitrary removal of the names of certain gentlemen from the list of members of the Society, as carried out under Article 33 of the Society's Articles of Association, such removal being, in the opinion of this Branch, likely to work detriment to the Society, and that this Branch suggests that members thus in arrear be duly notified of the fact before any such removal of their names; and further, that this Branch deems it desirable that the Honorary Secretaries of the Society should communicate to the Honorary Secretaries of Branches each year a list containing the names and addresses of any members of their respective Branches who shall happen to be in arrear with subscriptions.

A letter was read from the Executive Secretary of the Society enclosing a communication from the Worshipful Company of Plumbers. Resolved that this Branch is in entire agreement with the proposals of the Worshipful Company of Plumbers as contained in their communication dated 10th November, 1905, and further thinks it desirable that this Society should

be represented by at least one member on each District Council of such Worshipful Company.

The Branch considered a resolution forwarded by the Society relating to the advisability of the Society drawing up a memorandum upon the management and feeding of infants for distribution by Registrars of Births. Resolved that in the opinion of this Branch such memorandum should be drawn up by the Central Society.

Dr. Hanna, Port Sanitary Medical Officer, Liverpool, then read a paper on "Anthrax and Imported Animal Products." A cordial vote of thanks was accorded to Dr. Hanna for his paper.*

Sir William J. Sinclair then read a paper on "The Need for Municipal Hospitals for Cases of Puerperal Fever and Abnormal Labour." An interesting discussion followed, in which Drs. Knyvett Gordon, Niven, Barlow, Sergeant, Garstang, Greenwood, Brindley, Buchan, and others took part, to which Sir William Sinclair replied. A cordial vote of thanks was registered to Sir William Sinclair for his paper.

CEREBRO-SPINAL FEVER.—Serious outbreaks of cerebro-spinal fever have occurred in Belfast, Glasgow, Edinburgh, and Dublin. There have been isolated cases in London (Borough of Lambeth), Chesterfield, Dundee, Paisley, Leith, and Longton in the Staffordshire Potteries. In connection with the last-named town it is of interest to record the evidence which was given on February 15th, by Dr. George Reid, medical officer of health of Staffordshire, at a Local Government Board inquiry held for the purpose of deciding as to the advisability of joining the Borough of Longton to that of Stoke-on-Trent. He said that it was impossible to find words to describe the condition of Longton from a sanitary point of view. In many cases the dwelling-houses were dilapidated, the yards were generally unpaved, and where they were paved the paving was broken. The drainage was very defective and often saturated the badly paved yards. Ashpits overflowed on to the yards and frequently the yards were practically paved with refuse and ashes.

DR. J. GUEST GORNALL, who died on February 4th, at the age of 40, of Bright's disease, had been medical officer of health of the County Borough of Warrington since 1901. He succeeded to the post on the death of his father, Dr. J. H. Gornall, to whom he had acted as assistant for several years. During the small-pox outbreak of 1892-3 Dr. Guest Gornall was medical superintendent of the Warrington small-pox hospital, and had under his care 674 cases, with 65 deaths. The extremely valuable report which he subsequently made upon the Warrington outbreak stamped him as a careful and observant epidemiologist, and the administrative work which he has carried out in Warrington during the past few years makes his early death a distinct loss to the public health service.

DR. JAMES LITTLE, medical officer of health of the urban district of Maryport, Cumberland, died of phthisis on January 29th, at the age of 54. Although engaged in private practice, Dr. Little took a keen interest in his public health work, and to him is due in large measure the improvements which have been made in the Maryport water supply.

* This paper is published in the present issue.

CORRESPONDENCE.

DUTIES OF WHOLE-TIME MEDICAL OFFICERS OF HEALTH.

To the Editor of "PUBLIC HEALTH."

DEAR SIR,—In your March number you have a paragraph relating to the fact of my acting as the Honorary Secretary of the Coventry Division of the British Medical Association in my leisure time. The paragraph sets forth briefly the circumstances under which the Coventry City Council referred to the Local Government Board to enquire the opinion of the Board as to whether I, as a whole-time medical officer of health, was justified in so acting. The reply of the Board to the effect that they took no exception to this course, provided that the Council were satisfied that this did not bring me "into inconvenient conflict with the Council or their constituents" raises a question very important to whole-time officers.

Speaking for myself, it may be premised that in the course of my official duties I am not preserved from "inconvenient conflict with the Council or their constituents." Probably this position is not exceptional. I have recently had to report to the Local Government Board regarding the unusual incidence of diarrhoeal mortality in this city; I have reported succinctly that 70 or more deaths among infants last summer in this city were due to a refuse tip, i.e., to the want of a dust destructor, concerning which urgent representations have been made in the annual reports of the medical officer of health for twenty-two years past, i.e., that the deaths were due to the default of the Council. With the individual members of the Council a similar position pertains; I find that since I have held my present office the present and past members who, while they were members of the Council, have received notices from my department amount to three-fourths of the number of the Council; I have recently even had to condemn property belonging to my own chairman. With the constituents I am continually brought into conflict in the ordinary course of my duties. But the punctilious point arises, and is emphasized by the Board, that in my leisure time—if I have any—I must steer clear of conflict with the Council or their constituents; this may be very well as a counsel of perfection, but if carried into practice it means that a whole-time officer must do nothing in his leisure time to which any ratepayer might object; even his religious opinions must be subject to the same test, and he must confine his leisure to such innocuous occupations as rolling his lawn. In regard to their own inspectors the Board has expressed (*House of Commons, March 13th, 1905*) quite a different opinion, and has stated that they may even hold paid appointments outside their office hours.

I venture to suggest that the principle is one of far-reaching consequence, to which our Society should be alive. It may be suggested, in effect, that a whole-time officer has no really leisure time at all, and there is nothing to prevent the principle of "inconvenient conflict" being applied, and with vigour, to part-time medical officers of health, and more especially when their appointments are for limited periods. The fiat of the Board has been laid down that the "leisure time" of a medical officer of health must be spent in a way to which no ratepayer could take exception; and therefore he must not take a part in the activities of any social, religious,

or scientific society which does not conform to this standard. And as few societies—not even excepting our own Society—meet with the approval of everyone, the proper employment of one's leisure will afford a problem which may fittingly occupy the whole of that time.

I am, yours faithfully,

March 18th, 1907.

E. H. SNELL.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

* * *

JOURNALS.

Sanitary Record. R.A.M.C. Journal, March. Australasian Medical Gazette, January. Glasgow Medical Journal, March. Hospital. Journal of Royal Sanitary Institute, March. Journal of Tropical Medicine. Medical Temperance Review, March. Canadian Practitioner, February, March. Local Government Officer. Journal of Royal Institute of Public Health. Local Government Journal. Birmingham Medical Review. Giornale della Reale Società Italiana d'Igiene. La Technique Sanitaire. American Journal of Medical Sciences. Water. Medical Review of Reviews, February. Transvaal Medical Journal. The Post-Graduate, New York, No. 2, February, 1907.

ANNUAL AND OTHER REPORTS.

Ilminster, Annual, Dr. Maidlow. Durban, Annual, Dr. Murison. St. Thomas' R.D., Annual, Dr. Farrant. St. Anne's-on-Sea, Annual, Dr. Booth. Swinthorpe, Annual, Dr. Behrendt. Proceedings Metropolitan Asylums Board. Registrar-General's Weekly Returns. Experiment Station Record, Washington, U.S.A., January, 1907. Salford Quarterly Health Bulletin, Dr. Tattersall. State of Rhode Island Special Bulletin on Sanitary Legislation, 1906, Dr. C. V. Chapin. Fifty-first Annual Report upon Births, Marriages and Deaths in the City of Providence, U.S.A., for the year 1905, Dr. C. V. Chapin. City of Aberdeen, January, Dr. Hay. Keighley, Annual, Dr. W. Scatterty. Richmond, Annual, Dr. Crocker. Glossop-Dale R.D.C., Annual, Dr. D. J. Mackenzie. Reigate Borough and R.D.C., Annual, Dr. A. E. Porter. Registrar-General's Weekly and Quarterly Returns. Bulletin du Service de Santé et de l'Hygiène, December, 1906. Borough of Sutton Coldfield, Annual, Dr. A. Bostock Hill. Kingston-upon-Thames, Annual, Dr. H. Beale Collins. Plague in Calcutta, 1906, Drs. T. F. Pearse, W. C. Hossack, H. M. Crake. Metropolitan Asylums Board. Medical Examination of State Children 1906, Tasmania, Dr. J. S. C. Elkington. Outbreak of Milk-borne Typhoid, Tasmania, Dr. J. S. C. Elkington. Whitby U.D., 1906, Dr. W. E. F. Tinley. Goole U.D.C., 1906, Dr. A. M. Erskine. Ashton-in-Makerfield U.D.C., 1906, Dr. N. Hannah. Doncaster R.D.C., 1906. Barnes U.D.C., 1906, Dr. F. G. Crookshank. Plympton St. Mary R.D.C., 1906, Dr. S. N. Scott.

LA TUBERCULOSI (Illustrated).

Drs. Valtorta and Fanoli. Milan, 1907. Ulrico Hoepli.

MANUALE DELL'IGIENISTA (Illustrated).

Drs. Tonzig and Ruata. Milan, 1907. Ulrico Hoepli.

MANUALE DELL'IGIENISTA.

Prof. Angelo Celli. 3rd Edition. Vols. I and II, 1906.

PAMPHLETS.

By-Laws with respect to Slaughter-houses issued by the County Borough of Stockport.

R. ASHLEIGH GLEGG, M.D., D.P.H., has been appointed assistant medical officer of health for the County of Ayr.

PUBLIC HEALTH

The Journal of the Incorporated Society of
Medical Officers of Health.

VOL. XIX. No. 8.

MAY, 1907.

THE SECOND INTERIM REPORT OF THE ROYAL COMMISSION ON TUBERCULOSIS.

THE Report issued by this Commission, in January of the present year, embodies results of great practical importance. In particular it proves, once for all, that a certain number of cases of human tuberculosis, especially of tuberculosis in children, are the direct result of the introduction into the human body of the bacillus of bovine tuberculosis; and there can be no doubt, in the words of the report, that "in the majority of these cases the bacillus is introduced through cows' milk."

The extremely protracted and laborious experiments respecting human tuberculosis, the results of which are summarized in the report of the Commission, include a complete and exhaustive investigation of material from sixty cases of human tuberculosis; and unless the original source and anatomical distribution of the lesions of these sixty cases are carefully borne in mind, it is not unlikely that an exaggerated notion may be created as to the proportion of total human tuberculosis which is caused by infection from bovine sources. Of these sixty cases, fourteen, or about 23 per cent, contained the bovine bacillus. If this proportion is a fair average proportion for all cases of human tuberculosis, it follows that the relative importance of infection from bovine disease is much greater than most pathologists or administrators have hitherto been prepared to admit. It should be noted, however, what were the sources as stated in the Commission's report, of the strains of bacilli of human tuberculosis which were made the subject of detailed experimentation. Of the total number, 4 were derived from sputum, 10 from lesions of lungs in primary pulmonary tuberculosis, 1 from a case of general tuberculosis in a child in which the primary seat of disease was undiscoverable, 4 from

tuberculosis of the bronchial glands in children, 9 from tuberculosis of the cervical glands, and 19 from cases of primary abdominal tuberculosis, in which there was some distinctive feature demonstrating the primary origin of the disease. Ten cases were tuberculosis of joint or bone, and there were single cases of lupus, and of tuberculosis of the kidney or testis.

It will be seen that only 14 out of the 60 subjects of experimentation, or about 23 per cent of the total number, were cases of primary pulmonary tuberculosis, i.e., cases in which infection from other cases of human tuberculosis might most reasonably be expected to have occurred. In our national returns 70 per cent of the total deaths from tuberculosis are ascribed to pulmonary tuberculosis, although it is not certain that in all these the pulmonary disease was primary. If this be assumed to be the case, then inasmuch as the experimental cases contain a proportion of pulmonary cases which is only one-third as large as that in the national returns, the percentage of infection of bovine source needs on this account to be reduced by one-third, that is, roughly, from 23 to 7.

From another standpoint we find that of the total 60 cases, 19 were cases of primary abdominal tuberculosis, and 3 of tuberculosis of the cervical glands. Of these 22 cases, 10 of the abdominal, and 3 of the cervical cases showed bacilli belonging to the bovine, and 9 to the human type of tuberculosis. The only other bacillus in the 60 cases belonging to the bovine type was obtained from a specimen of human sputum. Thus 13 out of the total 14 bacilli of the bovine type were obtained from disease which on other grounds—occurrence in early life and anatomical distribution—might have been expected to be more likely to be derived from infective cows' milk than from a human source. But in the Registrar-General's death returns abdominal tuberculosis and scrofula appear as the cause of death in only one-tenth of the total deaths from tuberculosis. If, therefore, subsequent investigation on a still larger scale should confirm the data embodied in the present report of the Royal Commission, it follows that not more than one-tenth of the human death-toll from tuberculosis is likely to be derived from bovine sources.

These tentative estimates are not given with any idea that they possess quantitative value, but to warn against any exaggerated conclusions as to the amount of human tuberculosis which can with reasonable probability be ascribed to cows' milk. This cannot as yet be stated. The Royal Commission's report shows that cows' milk is a source of danger to man. In the words of the report: "These facts indicate that a very large proportion of tuberculosis

contracted by ingestion is due to tubercle bacilli of bovine source" (no italics in the original).

It needs to be borne in mind also that, although the experiments of the Royal Commission up to the present date do not warrant any conclusion on this point, it may possibly be proved eventually that infection by cows' milk plays a much larger part in producing human tuberculosis than can be inferred from the preceding data. No such conclusion is justified at the present time; the balance of evidence, notwithstanding Von Behring's name, distinctly favours the view that human tuberculosis is chiefly caused by human tuberculosis. But this conclusion will need to be revised if further experimentation should show, in the words of the Commission's report, that possibly "bacilli from a bovine source entering a human body in scanty numbers may become lodged there without immediately provoking a generalized progressive tuberculosis," and that possibly after a long stay in the human body, "their character may become so fixed that they cannot be distinguished from bacilli conveyed directly from man to man." The Commission's report refrains very wisely from making any premature statement as to this possibility, which would carry with it very far-reaching consequences.

The further investigations of the Commission will be awaited with the greatest interest. In the accurate and complete investigation of this important disease time is an important element, and it may be that ten years or even more may be required before the momentous question indicated in the last paragraph can be settled satisfactorily. It would be worth the work of twice ten years could it be settled once for all; and we trust that the labours of this Commission, already fruitful in results, will not be impeded either by false economy or by any attempt at injudicious hurry. There is no reason to think that the work of the Commission will be thus thwarted.

Meanwhile the duty of administrators is not to neglect bovine infection as a source of tuberculosis, but to take every opportunity for securing means for its control; while at the same time continuing and extending the measures against infection from human sources, which probably will always be our chief means for diminishing tuberculosis.

PHTHISIS: COMPULSORY NOTIFICATION.

THE Town Council of the City of Edinburgh, acting on the recommendation of the Health Committee, decided, on the 18th December, 1905, to apply

to the Local Government Board for Scotland, for sanction to add consumption to the list of diseases scheduled in the Infectious Diseases (Notification) Act, 1889. Sanction, doubtless, will be given, the Board having in their circular letter to the Local Authorities on the "Administrative Control of Pulmonary Phthisis," intimated that they would be "prepared to give favourable consideration to any application for their approval, provided they were satisfied that the Local Authority were in a position, and were ready, to deal effectively with the cases notified to them." The Town Council are in a position, and are ready, to comply with the condition, having made provision for the isolation and treatment of patients by setting apart beds in special wards in the City Hospital. The system of voluntary notification had been tried in Edinburgh, and proved a failure; as also in Glasgow, the Corporation of which city lately resolved to add consumption to the list of compulsorily notifiable diseases. In the Royal Borough (of Kensington) confession of comparative failure of voluntary notification has again to be made; only 252 cases having been reported in 1906, the deaths from consumption being 214. It is to be desired that notification should be made compulsory in London, and other places, upon the application of Local Authorities; but the Local Government Board are of opinion that consumption is "not a disease to which compulsory notification could with advantage be applied"—a view which appears to be shared by the London County Council. On the other hand, the principle has received the approval of the International Congresses of London and Paris, the Society of Medical Officers of Health (Metropolitan Branch), Professor Koch, the Milroy Lecturer (1903), and a host of other medical experts. Personally, I adhere to the opinion expressed in these reports on several occasions during the last six years, that compulsory notification is indispensable to success in the administrative control of phthisis; which, year by year, is the cause of more deaths than all the scheduled notifiable diseases combined. As regards London, however, it has regretfully to be admitted that the Local Authorities are not in a "position," and are not "ready" to deal "effectively" even with the cases voluntarily notified to them; practically no provision, outside the Poor Law Infirmaries, having been made for the isolation and treatment of sufferers. But this cannot be imputed to indifference, as, with almost complete unanimity, they have, on more than one occasion, requested the Local Government Board to give sanction to the Asylums Board to utilize their superfluous hospital accommodation for sanatorium purposes. That sanction has, so far, been withheld; and it must be confessed that the Managers do not appear anxious to undertake the duty. Had they pressed the matter, it is not probable that sanction would have been withheld. The Society of Medical Officers of Health (Metropolitan Branch) in 1905 urged that the Gore Farm Hospitals should be utilized for this purpose; but now these institutions, with their 1,850 beds, have been appropriated for the reception of convalescent fever and diphtheria patients. There is available, however, the Southern Convalescent Hospital, at Carshalton, recently handed over by the contractors, which might be utilized as a sanatorium. The total cost of this institution, including land and furnishing, has exceeded £300,000; but it does not appear to be required for the purpose for which it was built. What better use could be made of it than to put its 800 beds at the service of the consumptive poor of London? *

* From Dr. T. Orme Dudfield's Report for Dec., 1906.

SUCCESSFUL VOLUNTARY NOTIFICATION OF PHTHISIS.

In the *Journal of the Royal Sanitary Institute* for Feb., 1907, a comparison is made between the notifications of phthisis secured in different urban communities, some having compulsory and some voluntary systems of notification. The notifications are stated in terms of the deaths from phthisis, it being assumed that the number of deaths from phthisis in each place will vary in accordance with the number of cases of this disease; and that this, therefore, is a more accurate measure of the amount of notification than a statement of the number of cases of phthisis in terms of the population. Thus stated, the following are the notification rates in the most recent years available: in New York (compulsory notification) 265 per 100 deaths; in Sheffield (compulsory notification) 154 per 100 deaths from phthisis. In Manchester and Liverpool (voluntary notification) the notifications were 142 to 150 per 100 deaths; and in Brighton (voluntary notification) 200 per 100 deaths. The conditions of New York are scarcely comparable with those in this country; and it must be added that the experience of compulsory notification in Sheffield is very short. There can, however, be little doubt, in the words of the paper mentioned above, that the ample provision of sanatorium accommodation has been a chief determining cause of the greater success of notification of phthisis in Brighton.

COMPULSORY NOTIFICATION OF PHTHISIS IN BOLTON.

UNDER Section 52 of the Bolton Corporation Act, 1905, compulsory notification of phthisis came into force on October 9th, 1905. The year 1906 is thus the first complete year of compulsory notification. During this year 262 cases, i.e., 145 per 100,000 of population, or 129 notifications per 100 deaths from phthisis, as compared with 154 per 100 deaths in Sheffield in 1905. Dr. Gould reports that inspection is made by the sanitary inspector "unless the medical attendant objects, and is willing to supply the information asked for. Cleaning and disinfection are done by the Corporation and leaflets distributed. No complaints have been received either from relations or from medical practitioners."

PHTHISIS IN SHROPSHIRE.

DR. WHEATLEY has issued an interesting report on phthisis in this county, which will repay study. He reviews the measures which appear to have brought about the past decline of phthisis, and discusses in detail the various measures now desirable in the campaign against it. He classifies the measures as follows in what in his opinion is the order of their importance:—

- (1) Notification, with subsequent action: (a) investigation, (b) disinfection (c) education, (d) supervision.
- (2) Education—
 - (a) By Sanitary Authorities.
 - (b) By County Council.
 - (c) By Education Authorities.
 - (d) By Institutional Authorities.
- (3) Isolation of advanced and dangerously infective cases.
- (4) Sanatorium treatment for curative and educational purposes.
- (5) Tuberculosis dispensaries or other means for encouraging early diagnosis of the disease, and material help where necessary.

He deprecates the idea that notification is dependent for its efficacy

principally upon the provision of hospitals or sanatoria, considering that the improvement and proper supervision of the home life of the consumptive will always remain the most important factor.

The somewhat scanty statistics of the county show that in the past about 8.5 per cent of the advanced cases of phthisis have passed a considerable portion of the most infectious part of their illness in workhouses; and while not expressing an opinion on the general question, he does not consider that these figures (and the further figures as to asylums) confirm the conclusion that segregation in these institutions has been in Shropshire a predominant factor in the decrease of phthisis. Evidently the general question cannot be proved or disproved by these figures. Phthisis may prove fatal at the end of many years after infection, and in a different county from that in which infection was received. The annual decline of phthisis over a long series of years has been roughly about 1 per cent, and in Shropshire more than 3 per cent of the cases have been segregated in institutions during the most infectious part of their illness.

THE PROPORTION OF TOTAL DEATHS FROM PHTHISIS OCCURRING IN PUBLIC INSTITUTIONS.

STATISTICS have been previously published showing the large amount of institutional treatment of advanced cases of phthisis. Thus in Cincinnati in 1902-04 34.6 per cent, and in San Francisco 38 per cent of the total deaths from phthisis occurred in public institutions; while in 1899 in London 31.4 per cent, and in the years 1901-04 20.2 per cent, in Sheffield 26.1 per cent, and in Salford 27.6 per cent of the total deaths from this disease occurred in public institutions. To this list can now be added the returns for the metropolitan borough of Finsbury given in Dr. Newman's annual report for 1906. This disease caused 232 deaths during the year, of which 85 occurred in the Holborn Union Workhouse Infirmary, and 58 in other institutions. Dr. Newman adds: "From this table it will be seen that more than half the deaths from this disease in Finsbury occur in institutions, and, with few exceptions, poor law institutions. This means, in the first place, that more than half the deaths are of the very poor, and, secondly, it means that more than half of the advanced and dying cases of this disease are isolated from the community, and in this way a large body of infection is removed from the district, which is a matter of the greatest importance as a means of prevention of the spread of the disease."

THE DANGER FROM ADVANCED CASES OF PHTHISIS.

DR. SAVAGE, in his annual report for Colchester, states that on April 30th, 1906, a conference of the Sanitary Committee and a deputation representing the Board of Guardians was held to consider this and other questions affecting tuberculosis amongst the poor. As a result it was resolved that the poor law medical officers in Colchester should notify to the medical officer of health all cases of consumption amongst paupers.

At this conference Dr. Savage pointed out the danger arising from these advanced poor and pauper cases, and gave it as his opinion that no outdoor relief should ever be given to such cases, but that when paupers they should be admitted as early as possible into the Union. It is very important to deal with this class of advanced case either in this way or, better, in special institutions provided for the purpose. The importance of restricting and, if possible, preventing outdoor relief for cases of phthisis can scarcely be exaggerated, as it is under such conditions of poverty that domestic infection chiefly occurs.

A MUNICIPAL CLINIC FOR THE TREATMENT OF PHTHISIS.

THE City of New York has added to its armamentarium against phthisis a municipal clinic for the treatment of communicable pulmonary diseases, of which Dr. Jno. S. Billings, Jun., is the director, and the fully illustrated first report of this new department has recently been published. This municipal clinic or dispensary has been established for assisting in the following objects:—

1. *The Early Recognition and Accurate Diagnosis of Pulmonary Tuberculosis.*—It is now generally admitted that tuberculosis is frequently a curable disease and that incipient tuberculosis, under favourable conditions, tends to recovery: but to ensure such recovery, the diagnosis must be made at the earliest possible moment. Not only should careful physical examinations be made, together with repeated sputum examinations as required, in connection with the clinical history, but in addition when necessary, the tuberculin test, X-ray examinations, and radiography should be employed to assist in arriving at an early and correct diagnosis.

2. *The Intelligent Supervision of Patients Under Treatment.*—This supervision should include not only hygienic and medical treatment, but also the furnishing of circulars of information in various languages (English, German, Yiddish, Italian, Chinese, Ruthenian, Polish, Hungarian, and Russian), containing information as to the nature of the disease, and careful instructions as to the precautions necessary to be taken to prevent the infection of others. Paper sputum cups, paper handkerchiefs, and proper food (milk and eggs), should be supplied to indigent and needy cases.

3. *The continued Observation at their Homes of Indigent, Needy, and Ambulatory Cases, including all those discharged from the Public Institutions of the City.*—A special staff of trained nurses should visit the patients at their homes to see that the instructions given are being observed, that the sanitary surroundings are satisfactory, and to afford such assistance as is required. Suitable cases should be referred to the various charitable organizations for food, fuel, ice, etc. Special attention should be paid to the children in the families of tuberculous persons, and every effort made to prevent their infection.

4. *The Removal of Cases Requiring such Care to Hospitals or Sanatoria.*—These cases fall under four heads: (a) Advanced or bed-ridden consumptives, with profuse expectoration, who will not or cannot take the necessary precautions against spreading the disease, and whose presence at home is a menace to others in the family; (b) Consumptives who are able to get about, but are unable to work and are entirely dependent upon their earnings for their livelihood; (c) Incipient cases, who stand a good chance of recovery if removed to sanatoria outside of the city; (d) Consumptives living in lodging-houses and those having no home.

5. *The Provision of a Municipal Institution where Cases of Tuberculosis may be referred.*—(a) By physicians (indigent patients, etc.); (b) By institutions (on the discharge of consumptive patients from hospitals or sanatoria); (c) By the various charitable organizations throughout the city which keep tuberculous cases under observation; (d) By other persons doing individual charitable work who may come in contact with such persons, and (e) By other city departments.

6. *The Extension and Strengthening of the Sanitary Control of Tuberculosis Among the Poor by the Department of Health.*

7. *The Care of Laryngeal Cases.*—The involvement of the larynx is one of the saddest complications of pulmonary tuberculosis, and the pain, distress, and discomfort of the patients are great. While the prognosis in these cases is extremely grave, yet under proper treatment recovery takes place in some instances, and in most the distress of the patient can in some degree at least be relieved.

6,454 new patients have been treated in the dispensary, of which 2,921 proved to be pulmonary phthisis. An exact record is kept of the condition of each patient. Home conditions are investigated by one of the clinic nurses, and cases needing financial or other assistance are referred to various charitable organizations. Milk and eggs are issued through the New York Diet Kitchen Association to deserving and needy cases on the recommendation of the attending physicians. The results obtained during the first two years' work of the clinic are summed up in the following remarks:—

Many new cases of tuberculosis have been brought to the knowledge of the Department of Health; many cases have been sent to hospitals, benefiting both the patients and their families; sanatorium treatment has been made available for a large number of incipient cases, which have thus been put on the road to recovery; and many cases have been assisted directly by the furnishing of extra diet, and indirectly by reference to charitable organizations, so that the clinic has rendered the Department of Health great assistance in the fight against tuberculosis. In order to bring tuberculosis thoroughly under control, three things are essential: First and foremost, the education of the people as to the nature of the disease, and the procedures to be adopted to avoid its contraction; secondly, the early recognition and removal of all cases to favourable conditions and surroundings; and, lastly, the location and disinfection of all infected houses and premises. As yet it is impossible exactly to estimate the amount of good done by the establishment of such a clinic as the one here described, or indeed of any particular measure adopted against the disease. The campaign is only fairly started; time enough to devise exact means of determining results, when such results begin to be attained.

THE COMPULSORY REMOVAL OF CONSUMPTIVES IN NEW YORK.

COMPULSION in regard to the isolation of consumptives is repugnant to British ideas, and rightly so in the vast majority of instances, though there is a residuum of cases, especially vagrants and the like, who frequent casual wards and common lodging houses, for whom such compulsion would be welcomed. It is interesting to compare American sentiment and experience on this point as judged by remarks made by Dr. Knopf at a conference of Sanitary Officers of the State of New York held a few months ago. He says: "New York was the first city in the world which enacted the compulsory removal law in regard to tuberculosis. That is to say, if in the opinion of the inspector, the physician in charge, or the visiting nurse, the tuberculous patient is a menace to his fellow men he is removed to a hospital whether he likes it or not. Now you may think that those cases are refractory and might not do well in the hospital. Not at all. It is my privilege to be on service as attending physician for six months in the year at the Riverside Sanatorium for Consumptives, which is in charge of the New York City Health Department. Half of these patients are there against their will, and you would be surprised what a change it makes in their condition to remove them from the dark, dreary tenement houses—where they have neither

light, air, nor decent food—into a clean bed, plenty of air day and night, and give them good food, including eggs and milk. We never lock up the eggs. We tell the patients 'Go and help yourselves.' They can drink all the milk they wish. You would be surprised what results we obtain there in spite of the cases being, in the majority, far advanced, and in spite of their being forced to go there. If they recover, in not a few instances they become better men and women. The results as a whole are most satisfactory. Thus I beg of you not to be alarmed when you hear the words 'Compulsory removal.' It is the most humane and scientific way of treating the consumptive poor, who are a menace to their neighbours, without food and air, or entirely homeless."

VOLUNTARY NOTIFICATION AT BRADFORD.

THE City Council of Bradford, at a recent meeting, agreed to the adoption of voluntary notification of phthisis. In the course of discussion it was pointed out that the city already had at Eastby a rate-maintained sanatorium for consumptives, under the control of the Board of Guardians, which was maintained at a cost of about £2,000 a year; a sanatorium for women and children at Eldwick, costing £1,000 a year, and, in addition, sixty patients in the workhouse, whose cost was estimated at 6/- to 7/- per head per week. An important point respecting the Poor-Law Sanatorium at Bradford is noteworthy. A circular has been sent to every doctor in the city stating that it was only necessary to notify the clerk to the Board of a case of consumption, and the patient could be taken straight from his home to the sanatorium without first going to the workhouse.

VOLUNTARY NOTIFICATION AT SALFORD.

THE Town Council of Salford, on the recommendation of Dr. Tattersall, have decided not only to adopt the voluntary notification of phthisis, but also to appoint a medical inspector for visiting the notified cases at a salary of £200, and to provide a small hospital of eight beds, where patients may be treated for a few weeks, with the object of teaching and training them practically in the methods of preventing the spread of infection.

A BIRMINGHAM SANATORIUM FOR CONSUMPTIVES.

THE City Council of Birmingham has decided to acquire, at a cost of £17,000, a site on the Cotswold Hills for a sanatorium for consumptives. It is proposed to begin with 40 patients, the total yearly cost of whom is estimated at £4,220, or a rate of one-third of a penny in the pound.

TUBERCULOSIS AND ALCOHOLISM IN CANADA.

TRIBOULET (*Bull. de l'Acad. de Med.*, Paris LXXI, 4) remarks that it seems strange that in the vast area of Canada, and with the comfortable homes of the inhabitants, "overcrowding" is a prolific source of tuberculosis as much as in the crowded cities. Most of the rooms in the houses are kept shut up in the summer to keep out the sun and dust, and in winter to keep out the cold, and the family congregates in a single living room. If one member of the family contracts tuberculosis the contamination of the whole family is almost inevitable. There is no segregation of the tuberculous in hospitals. The death list from tuberculosis in Montreal was 700 during 1903, with a population of 300,000, and 2,200 tuberculous individuals were recorded. Alcoholism, on the other hand, is rare.

COMBINED SANITARY DISTRICTS.

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THROUGH the courtesy of colleagues, I have been enabled to collect particulars respecting various obligations attaching to the position of medical officer of health in twenty of the larger Combined Sanitary Districts. I have also obtained information concerning certain details of sanitary administration as to which the procedure in these districts is far from uniform. I propose while collating these data and supplementing them by observations based on my own experience, to consider certain attributes of Combined Sanitary Districts under five headings, viz:—

I.—The Advantages of Combined Sanitary Districts.

II.—Defects in their Administration.

III.—Their Differences.

IV.—The Local Government Board's power to compulsorily combine Districts.

V.—Recommendations suggested by the foregoing.

I shall endeavour to treat my subject as briefly as is compatible with the provision of ample material for subsequent discussion.

I.—ADVANTAGES OF COMBINED SANITARY DISTRICTS.

The theory and practice of Hygiene embrace so wide a field more or less foreign to the education of a physician, that special training and experience in this extension of the medical profession are now regarded as essential to efficiency in the discharge of most of the duties devolving on a medical officer of health. Eighteen years have elapsed since the Legislature, while requiring some evidence of efficiency from those appointed to the health officership of our larger centres, took the somewhat anomalous view that the sanitary interests of districts, or combined districts, possessing populations under 50,000 needed no such safeguard. As a consequence we find that, save in respect of such districts as have entered the larger combinations, the vast majority of rural sanitary authorities, and most of the lesser urban, appoint as their medical officer of health a general practitioner, who, however excellent his professional qualifications and attainments, is admittedly untrained in sanitary science. Apart, however, from considerations of efficiency, practitioners who are medical officers of

health in small urban districts, and to a less extent in rural, are liable to find themselves confronted with many duties in direct conflict with their professional interests. The position, for instance, of the health officer one of whose best patients, a large owner of insanitary property, dominates the District Council is not altogether enviable. Nor is it satisfactory, as is of constant occurrence in country towns, to be called upon to visit the patients of professional opponents. The normal result of these and many other disabilities attaching to the retention of general practitioners as medical officers of health is delegation of many of the latter's duties to sanitary inspectors.

If the position of the practitioner be difficult what must be that of a sanitary inspector who, with no one to instruct or advise him, must bear the brunt of sanitary administration in a district ruled by reactionists? He is confronted at every turn by private interests conflicting with the sanitary improvement of his district, and must year by year undergo the ordeal attaching to his reappointment or otherwise, by a Council swayed by so-called economists who have sought municipal honours for the express purpose of protecting either their own or their neighbour's insanitary property. There are many instances where officials so circumstanced have consistently done their uttermost to discharge their duty efficiently, and still succeeded in retaining their position. The only way, however, for so honest an official to secure an increase of salary is to obtain another appointment. The inspector who has the temerity to tamper with the insanitary property of his chairman or other influential member of his Council would do well to obtain that other appointment before the expiration of his year.

Contrast the position of an inspector so circumstanced with that of his colleague in the combined district, acting under the instructions of a qualified and experienced medical officer of health. The inspector in a combined district has at his back an official who is, or should be, in a position to encourage every reasonable effort towards the sanitary improvement of his district, who has no other avocation to which his official duties can be subordinated, and who is essentially extraneous from the personal or party considerations affecting any one of the dozen districts, much less of the two or three hundred parishes, for which he acts. The inspector knows, or should know, that in all difficulties, whether technical or personal, there is a co-official ready to advise him, instruct him, and accept responsibility. Such an inspector can do his duty dispassionately, and need have no fear that its diligent discharge will prejudice his advancement. The mainstay of the combined district medical officer is the multiplicity of

Authorities for which he acts. An official acting for twelve or fourteen Authorities which have nothing in common save himself, exercises an impartiality and enjoys a degree of independence which, I submit, is unattainable by the official of a single district, however large.

The combined districts appointing whole-time medical officers of health embrace but little more than a sixth of the country's area. Efficiency in rural sanitary administration would, in my opinion, be most easily and effectively attained by combining up the remainder of the lesser urban and rural districts, subject, however, to the removal of disabilities to which I shall presently direct attention. There is no need whatever for the sweeping alterations in Local Government recommended in the recent report of a Select Committee on Housing of the Working Classes: alterations which, apart from the wide-spread dissatisfaction they would engender in the precise class they are intended to ameliorate, are open to many administrative objections, not the least of which is an anomalous differentiation with regard to rural and urban districts. Had that Committee obtained evidence from members of this Society who are engaged in the administration of the Public Health Act in country districts, it would have learnt that the necessity for administrative improvement is even greater in the small urban districts, which it leaves untouched, than in the rural, which it would extinguish. If it had before it such evidence as I shall presently adduce as to the disabilities under which even combined district medical officers suffer, it might have spared its censures on officials who are the victims of inept legislation, and directed a little more attention to the supine indifference of successive Governments to matters of such national importance as the administrative supervision of the Public Health.

The County too, much less such of it as is comprised in rural districts, is not a suitable unit for the apportionment of duties among medical officers of health. If it were to be adopted throughout England it would mean that some medical officers of health would have ten times as much or as little to do as would others. Moreover, I myself fail to see that the County Councils have on the whole shown any conspicuous alacrity in discharging such public health functions as they already possess.

What is really required in addition to the creation of combined sanitary districts is the abolition of parochial committees. Their extinction would not modify the existing administrative areas, nor do I believe that it would meet with disapproval save from reactionists who, owning insanitary property and regarding self-preservation as a first law, are elected to the Parish Council and become members of

the parochial committee. A more exhaustive enquiry might have satisfied the Select Committee that in many rural districts it is quite the routine to refer complaints and official reports from district councils to parochial committees, by whose advice the Councils are very commonly guided.

The only measure of enlargement of units for sanitary administration which would not in my opinion meet with popular disapproval would be the uniting for sanitary purposes of districts within the same Union. Ninety per cent of the smallest rural sanitary districts are those which have been chopped off Unions by county boundaries.

In grouping districts with regard to their supervision by a single medical officer of health, regard should of course be had to their area, population, and facilities for travelling. My own experience leads me to infer that with clerical assistance one medical officer could supervise a combined district of 500 square miles and 100,000 population. With a smaller population he could act for a much larger area, and vice versa.

Combination of sanitary districts, while facilitating and promoting the best interests of Local Government, in no way interferes with the administrative powers of existing Authorities.

II.—DEFECTS IN ADMINISTRATION.

The very extent of area and multiplicity of Sanitary Authorities to which I have attributed certain of the foregoing advantages creates for the medical officer of health concomitant disabilities. The latter are, however, remediable and should be contemplated in any scheme for the efficient sanitary administration of rural England.

(1) Under this heading I would primarily advert to the amount of purely clerical work involved in the discharge of one's duties in a large combined district. The average daily correspondence I compute to be at least double or treble the amount which attaches to an appointment in an urban district of equal population. The reason for this is obvious. A large proportion of the correspondence is with sanitary inspectors and other officials in the separate sanitary districts. Most, nearly all, indeed, of this business would in the urban district be despatched at the Health Office, while much of the remainder would be dealt with by interview elsewhere or through the telephone. The routine office work, keeping of registers, statistics, and so forth, dealing as it does with so many administrative units, is, or should be, far more considerable than that of the urban district.

There are ten combined districts in England and Wales with populations of over 100,000. In so far as I can ascertain, clerical

assistance is only provided in one. Yet I should be surprised indeed to hear of a single town of this population whose medical officer of health has not either a special clerk, or at very least a sanitary inspector detailed during part of his time for clerical duties. I myself estimate that approximately half the time which I devote to my official duties is absorbed in work which could be efficiently carried out by an intelligent clerk acting under my directions. And in this estimate I take no account of clerical aid which I frequently employ at my own expense or of analogous assistance rendered by members of my own family. The practical inference is that with a single clerk the combined district medical officer could do duty for twice the area, or, better still, devote double the time to personal supervision of the sanitation, housing, and health interests of his districts. It is unnecessary to labour the extravagant aspects of a policy which sanctions the absorption of half a medical officer's time in the duties of a clerk. The most obvious result of this short-sightedness is diminished efficiency. I doubt if there is, with the sole exception above cited, a single medical officer of health to a large combined district who does not over and over again deplore his inability to visit some outlying parish on account of purely clerical duties which cannot be postponed. Times out of number duties are delegated to sanitary inspectors which would receive individual attention were it not for this and one other cause to which I shall presently refer. The provision of clerical assistance is, I submit, necessary and proper for the efficient administration of the Public Health Act, and in the light of Sections 189 and 190 of that Statute, the wording of which is peremptory, the Sanitary Authorities included in many of the larger combinations are defaulting.

(2) It is not solely the absence of clerical assistance that we have to deplore. We have to provide our own offices and our own office furniture, usually, it is true, in our own residences, but by no means invariably. I have myself paid rent for an office, and I know of an instance where a medical officer actually pays one of his Councils for this accommodation!

I have records before me referring to twenty of the twenty-two largest combined districts in England and Wales, and find that the Sanitary Authorities make provision for their medical officers as follows:—

A clerk is provided in one combined district; an office in three; office furniture in two; official stationery in ten; postal expenses in nine; a laboratory in one; chemicals and apparatus in three.*

* In one other district the medical officer of health has a laboratory at the General Hospital, to which he is Bacteriologist.

The only necessities provided uniformly by the Sanitary Authorities are the office books specified in the Order of the Local Government Board, and even these I have known to be refused. The medical officer pays for his official stationery in ten instances, and pays postal expenses, which are usually heavy, in nine. This is an inducement to employ the cheapest stationery procurable, to use every conceivable device for reducing to a minimum the official correspondence, and to conduct as much as possible of that minimum on post-cards.

Turning to that most essential part of a health officer's equipment, a bacteriological laboratory, this is provided by a solitary Authority. The rest of us can conduct bacteriological investigations in our own homes at our own expense, pay rent for laboratory accommodation, or systematically shirk that most important extension of our official duties. Even the cost of reagents, apparatus, and up-keep is defrayed by the Sanitary Authorities in only three instances.

(3) In this category I now come to the heaviest and most important item in the expenditure of a medical officer to a large combined district, viz.: travelling expenses. Many of the combined districts are of very wide area, frequently over forty miles across, and with numerous villages several miles from their nearest railway stations. The medical officer's duties involve his constantly travelling throughout this area. Those amongst us who are good cyclists, who can ride their thirty or forty miles with impunity, can get over this item with its accessory expenses for well within £1 a week. Such cases are, however, the exception, and I infer from my own experience, and from what information I have received on the subject, that the travelling expenses in the larger combined districts must average over £100 a year. In not a single instance is this expenditure defrayed by the Local Authorities. This extra tax on the income of a medical officer is nothing more nor less than a direct incentive to neglect his duty. A combined district medical officer is obliged to pay such visits to towns, villages, areas, and houses, as are specifically directed by one or other of his Councils, as are required by order of the Local Government Board. He has, moreover, to attend numerous meetings of his Authorities, committee meetings, enquiries, and so forth, which are frequently at the opposite end of his district from that which he must visit the same day. For the rest, that is for the major part, he uses his own judgment as to what epidemics, outbreaks, cases, what circumstances, call for his personal supervision or inspection. The salient point to which I would direct attention is that under the present system he must pay, and pay handsomely, for doing his duty, and

that the better he does it the poorer he is. I wish to impress that under such ill-contrived conditions a combined district medical officer of health must be little short of a Cato to do his duty thoroughly. It may be argued that the medical officer of health enters on his contract with his eyes open, with an implied obligation to do his duty efficiently, with the express stipulation that he shall pay his travelling and other expenses; that he must have known, or had he used reasonable diligence, might have known, that his various expenses would amount to a fourth, a third, a half, or whatever the proportion may be, of his salary. All this I readily concede. Such contentions, however, do not touch even the fringe of the principle involved. I condemn the practice of penalizing diligence. It is tantamount to subsidizing indolence; a most dangerous procedure, clearly contrary to public policy, which would never be permitted to permeate our social system. You may accept my assurance that it is by no means difficult in a combined district to substantially curtail one's travelling expenses by the simple expedient of stopping at home. Far from pressing you to visit your districts, many councillors would prefer you to keep away. Your arrival in a village too often prodromes a public or private, perhaps personal, expenditure which the district councillor is interested in averting.

(4) There are other disabilities attaching to the office under consideration which, though not peculiar to it, are sufficiently pronounced to merit our attention. I allude to the administrative difficulties which occasionally arise through the inefficiency of co-officials: difficulties with which the medical officer of health to a metropolitan or large provincial borough is comparatively unacquainted. I at once concede that many of our co-officials are as efficient in their respective capacities as we are in ours. I concede that we ourselves are not all paragons of perfection in the practice of preventive medicine. The State, however, does insist that a medical officer of health shall furnish satisfactory evidence of a fairly liberal education or experience in the theory and practice of hygiene before being eligible for the larger appointments, and under no circumstances can the position be filled by any other than a duly qualified and registered medical practitioner. As to our co-officials, it is otherwise. To be eligible for their positions the State requires no evidence whatever of professional or technical efficiency. The gentleman who is ordinarily regarded as the principal official and legal adviser of a local authority need have no forensic qualification whatever. Like most of a Council's business, the recommendations and applications of a medical officer frequently filter through the clerk, and it is exceedingly harassing to have either or both

frustrated by the legal advice of a gentleman who is not a lawyer. I am not attacking the unqualified clerk in the abstract. He may be, and I believe, usually is, an excellent official, so long as he confines himself to his strictly clerical duties. I am merely deploring the fact that sanitary authorities should systematically accept legal advice from any one save solicitor or counsel. A health officer is thereby liable to be heavily handicapped in the discharge of his official duties. The unqualified clerk, if the phrase be permissible, is likely to remain. Nothing save an Act of Parliament can secure his exclusion from future appointments. It is however within the province of the Local Government Board to insist that the position of clerk to the Joint Committee of a combined sanitary district should be held by no one save a duly qualified solicitor.

As to the heterogeneous mass of avocations from which our surveyors and sanitary inspectors are sometimes selected, I need only allude to the increased difficulties which may beset a combined district medical officer through the inefficiency of either. A surveyor who has been, e.g., a commission agent or a joiner, or a sanitary inspector who has been a butcher, and who hold no other qualifications for their respective offices, are not likely to be of material assistance in approaching such sanitary matters as ordinarily call for a consultation with the one or the other. True, in combined districts we strive, and with no small measure of success, to secure qualified inspectors. And the Local Government Board is of no little assistance in refusing to subscribe to the appointment of unqualified persons. Such safeguards, if I may so style them, are, however, utterly insufficient. The Legislature should rectify so manifest a mistake. If efficient, sanitary inspection is a *sine qua non* in our larger towns whose most junior inspector is in attrition with his Chief, is there not an *a fortiori* case for the combined district whose medical officer resides perhaps twenty or thirty miles away?

Sanitary officials do not work in water-tight compartments. There are no closed bulkheads separating the medical officer of health from the surveyor on the one hand and the clerk on the other. We have habitually to consult together and assist each other as far as possible. Is it not reasonable on our part to urge that the State should insist upon their education, training, and qualification as strictly as it does upon ours?

(5) The disabilities resulting from insecurity of combination and of tenure are sufficiently well known to need but passing comment. There is such unanimity on the subject among medical officers of health that any dissertation would be merely reiterative. I confine

myself to expressing my conviction that insecurity and the fear of financial loss have contributed more than all other causes to the retardation of sanitary reform in rural England. Sanitary officials should be in a position to do their duty thoroughly without reference either to party feeling or pecuniary interests. Security of tenure is insufficient unless some guarantee is afforded that the diligent discharge of one's duty would not be prejudicial to advancement.

(6) It is to be regretted that such facilities as are afforded for the appointment and payment of deputy medical officers of health are confined to cases of illness and "unavoidable absence," whatever that may mean. For it is quite in accordance with the policy of depletion which is consistently applied to a combined district medical officer's salary, that even a day's holiday in a year cannot be obtained without appointment at one's own expense, or its equivalent in obligation, of a deputy. And even though qualified in public health, and actually acting for an adjoining district, a permanent deputy will not be sanctioned by the Local Government Board. One who combines during seven days a week the administrative obligations and responsibilities of a medical officer with the duties of a clerk, who is constrained in many instances to work during the greater part of Sunday, is assuredly entitled to some little consideration, if not for himself, at least for his public, as to the physiological necessity for reasonable relaxation.

Postal expenses, printing, typewriting, clerk, office, laboratory, apparatus, reagents, telephone, telegrams, travelling. At every turn it is Pay! Pay! Pay! for the privilege of doing your duty, and when your salary has been sufficiently squeezed you are graciously allowed a few weeks' holiday, provided you pay, or otherwise succeed in securing, a deputy. I commend the consideration of this little catalogue in any departmental enquiry which may be deemed expedient as supplemental to the investigations of the Select Committee on Housing of the Working Classes.

III.—DIFFERENCES.

Under this heading I propose to direct attention to certain diversities in the sanitary administration of combined districts.

(1) Although the constitution of Joint Committees is regulated by the Local Government Board, I find that their relation to the executive duties of medical officers is very variable. Thus, in the twenty combined districts to which I have adverted Joint Committees meet as follows :—

Twelve meet only for re-appointment of medical officer of

health ; two meet yearly to consider annual report ; one meets twice a year ; one meets three times a year ; one has met four times in sixteen years ; one has not met since 1897 ; one has not met since 1880 ; one has not met for many years.

It is sufficiently obvious that a Committee which meets three times a year must be more actively and intimately in touch with the duties of a medical officer than would be possible did it meet only for his re-appointment.

(2) A class of dissimilarities which I associate with the foregoing may be illustrated by the manner in which annual reports are published. In ten combined districts they are published jointly, i.e., under one cover. In ten they are published separately, and a large proportion of the latter are never printed.

From my own experience in turning out thirteen separate annual reports I can only say that it would save endless reiteration if these were produced under one cover, certain generalizations and matters of common import preceding the text and tables devoted to separate districts. And I am further of opinion that, subject to its clerk being a solicitor, a Joint Committee should meet at least once a year, and adjourn, if necessary, for careful consideration of the annual report.

I think I am right in suggesting that the majority of rural district councillors never look at an annual report, and that there are many who either cannot or will not take an intelligent interest in its contents.

(3) It needs but a cursory glance at the area and population of the various combined districts to convince one that there is no co-relation whatever between a medical officer's salary and the extent of his obligation and responsibilities.

Comparison between the salaries of uncombined rural districts furnishes, as is to be expected, a still more striking illustration of the chaos which results from excessive decentralization in matters of such national import as the supervision of the public health. Indeed, the Church itself is scarcely productive of greater anomalies of stipend than is the sanitary medical service of rural England. The combined district salaries would not, on the whole, compare unfavourably with those of other large appointments, were it not for their wholesale depletion by the series of charges to which I have adverted.

(4) The duties of a medical officer of health vary considerably, not only in the various combined districts, but in the separate districts of one combination. This is most noticeable with reference to attendance at Council meetings. It appears that some district Councils require their medical officer to be present at every meeting, or nearly

every meeting, whereas others never expect him to be present unless there is some special business rendering his attendance essential. In some combined districts attendance at meetings is so frequent and systematic that a very considerable proportion of the time which remains after discharge of purely clerical duties is absorbed in this manner. Between unreasonable insistence on his presence, and a contentment that he should remain away altogether, there is every possible gradation. I think I am right in suggesting that there is a tendency to one or other of these extremes pervading many of the combined districts. In some, however, as in nearly all my own districts, attendance at meetings is encouraged, but never required without sufficient reason.

Another instance of variability is furnished by the tendency or otherwise of Councils to consult their medical officer of health on matters of practical sanitation, such as construction of sewers, sewer ventilation, and so forth. Some of my own Councils consult me as a matter of routine in such matters, others never.

Yet another illustration is afforded by those authorities who stipulate for the inclusion of analytical work in their medical officers' contractual duties. This may mean some two or three hundred analyses a year, no small matter either in time or expense. It leads, in at least one instance with which I am acquainted, to the medical officer of health devoting several hours every Sunday to this duty, to a considerable increase in his water and gas accounts, to additional rent, and to a by no means insignificant expenditure on apparatus and reagents.

IV.—THE LOCAL GOVERNMENT BOARD'S POWER COMPULSORILY TO COMBINE DISTRICTS.

I am indebted to Mr. Herbert Jones for records of an enquiry as to the number of the larger combined districts which were formed by compulsory Order under Section 286 of the Public Health Act, 1875. The particulars refer to fifteen large combined districts; but in only five of these, and never since 1877 until last year in the case of the Gloucestershire combined district, is there any indication of the Local Government Board having exercised this power. In one other instance it would appear that the combination, though technically voluntary, was only formed after the Board had directed attention to the provision of the Statute. The figures, though incomplete, indicate an initial disposition on the part of the Board to exercise its statutory authority. It is generally believed that its failure to show any subsequent desire to combine districts is essentially attributable to the county clause in Section 286, which, viewed in whatever light, cannot be regarded as

otherwise than unfortunate. The duties of a combined district medical officer of health being essentially unaffected by the county or counties in which his districts happen to be situated, it is difficult to understand why this inhibition of the Local Government Board's power has not long since been removed. The removal of this restriction is a condition precedent to the adoption of a measure which, for reasons already enumerated, I place in the forefront of the following recommendations.

V.—RECOMMENDATIONS SUGGESTED BY THE FOREGOING.

(1) Districts not requiring the exclusive services of a medical officer of health should be combined for this purpose.

(2) Security of tenure, with supervision of salaries by the Local Government Board.

(3) Abolition of the impolitic system of penalizing a combined district medical officer of health for doing his duty by compelling him to pay away a large proportion of his salary in official expenses.

(4) Provision of clerical assistance, with furnished office and accessories.

(5) Allowance of one month's holiday per annum, with payment of a deputy during that period.

(6) Selection of none save solicitors for the clerkship of combined district Joint Committees.

(7) Subject to the provision of paragraphs 2, 3, and 6, Joint Committees should meet periodically, e.g., in the first week of April and October for consideration of the annual reports and joint recommendations of the medical officer of health, and to receive an account of his official expenditure.

The chaotic and disorganized state of our sanitary medical service has long since become a by-word, and to touch even cursorily on any save its most salient imperfections is beyond the scope of so short a paper. That the public, and especially the poor, would be the first to benefit by its improvement is admitted by all sanitarians, and is even emphasized in the recent report upon Housing of the Working Classes to which I have adverted. I trust that in any scheme for its proper organization the opinions of those who are experienced in rural as well as in urban administrative duties will not be overlooked, and that the advantage of combining districts for the appointment of medical officers of health will claim the careful consideration to which it is entitled.

DISCUSSION.

THE PRESIDENT (DR. D. S. DAVIES) said the great point of interest to him as an urban medical officer was that it had told him a great many things of which he was quite unaware. It was very difficult for those working in urban districts to grasp the disabilities of such a position as had been disclosed in the paper. That a medical officer of health should have to waste a large part of his time in doing his own clerical work, that he should have to provide his own office, stationery, and pay his own postal and travelling expenses without any proper allowance being made for those purposes was almost incredible. In any large town those things which had been mentioned were without question supplied to the medical officer for the efficient performance of his duties. The various difficulties that had been brought so vividly before them with regard to the troubles that were found in the indolence of parochial committees, and in regard to the fact that an unqualified clerk or a man who was not a solicitor often advised those authorities upon legal questions, were also almost unknown to them, although he had come across instances where authorities had suffered severely by following the advice of a clerk who was not a trained lawyer. Other points pressing heavily upon medical officers in those positions were the insecurity of combinations themselves and the insecurity of tenure of office. They could sympathise with Dr. O'Connor as to the appointment of a deputy medical officer of health. He believed the Local Government Board was now taking up this question, and that circulars were being sent round to some districts upon the subject. In districts consisting of a good many authorities there must be considerable variation as to the dates of meetings. It was a pity that those matters were not more definitely regulated, and that the number of meetings and the questions to be considered were not determined, so that uniformity could be secured.

THE HONORARY SECRETARY (DR. HERBERT JONES) pointed out that two months ago a committee of the Society was formed with a view, when the time came, of placing before the President of the Local Government Board their views on the Bill which it was expected he would introduce into the House. A communication was read from the Public Health Committee of the British Medical Association asking that their Society should help in placing the views of medical officers of health before the President. He expressed the hope that in the discussion the Committee of their Society would have some help given them as to the views which the members would wish placed before the President.

DR. W. GRUGGEN (Middlesex and Herts C.S.D.) mentioned that when he first took over his district the salary was equal to £900 a year. Since then the district had gradually gone to pieces, and his salary now amounted to £400 odd. As an instance of what took place, a medical officer of health might suggest in a certain small town that had grown and where building was going on, that a sewerage scheme should be promoted and that the Rural Council should take it up. There would be considerable opposition, and the medical men in the town, who might have to pay towards the scheme, might object very strongly to having a service forced upon them, and might say that if they had got to pay, why should they not do the work themselves instead of the Rural District? After much abuse of the medical officer of health, calling in of expert opinion, and the consideration of a number of schemes, eventually they formed an urban district. The medical men in the town took over the work, and thus a portion of the salary of the medical officer of health went. There were

other cases where urban districts were formed and remained in the combination. The districts tended to go on increasing, but there was no addition in the salary of the medical officer of health, and until they got fixity of tenure that must remain so.

DR. STAINTHORPE (Gainsborough C.S.D.) said that as a medical officer of health holding a combined appointment for about twenty-five years he could bear out very much of what had been told them. He agreed with Dr. O'Connor almost entirely, but would not agree to abolish parochial committees altogether. They did good work sometimes, and his own experience was that very frequently Councils took their own line quite independent of the parochial committee. In his combination there were five urban districts and one rural. He did not at first hold them all, but the Local Government Board proposed that the urban districts outside the combination should join it, and they eventually did so. When he first went, in addition to being medical officer of health he was appointed medical officer of some alms-houses, for which he received £50 a year and a house, etc., equal to another £50. Unfortunately the Authority could not continue the payments on account of depreciation, and he was also obliged to leave the house, and therefore he lost £100 a year. He was worse off now than twenty-five years ago. In addition there had been a large increase in the size of the districts, 100 per cent increase in the work, and an enormous increase in the expenditure. He did not think that clerical assistance would help him much, a great deal of his work being technical. He doubted whether a combined district of 500 square miles could be covered effectively by one man, but if it was to be done there must be a considerable change in the inspectors of nuisances and in the duties of medical officers of health as laid down. A large proportion of their work could be carried out by less skilled men than medical officers of health. If Authorities would combine to supply a surveyor and an inspector, instead of having a man who was both surveyor and inspector, and sometimes a collector as well, the work would be much better done. He provided his own office, expenses, stamps, telephone and typewriter, and the only thing allowed him was stationery. He had no laboratory. He reckoned that at least 25 per cent of his salary was expended in travelling and other expenses. Finding that the cost of horse keep was heavy he took to cycling, but was unable to continue as he grew older, so he tried a motor car. It was impossible for him to do his work unless he had something of the kind. The inspection of cowsheds, factories and workshops had placed something like 400 places on his list. Another point to be taken into consideration was that at the present time, unless by special resolution of the Council, the medical officer of health had nothing essentially to do with the inspector of nuisances, and he felt most strongly upon the point. There should be some regulation by which the inspector should work under the medical officer of health and should take his instructions from him. With regard to travelling expenses, when a man took an appointment he understood there was certain work entailing such expense, but, as in his case, the work might increase enormously and he might be getting the same or rather less salary, and yet be getting nothing for travelling expenses. He agreed that there should be legally qualified clerks, and that was so in his district. The inspectors, too, were men who had had good training. His combined Committee did not meet except when there was a re-election, any changes in the tenure, salary, etc. His plan for annual reports had been to make out a general report which would apply to each district, and a special one for each district, and they

would be considered by the Councils separately. He attended all monthly meetings and sometimes committee meetings. He was of opinion that the medical officer of health should attend such meetings, because matters might come up which it was desirable he should know of, and it was time well spent.

DR. R. AYTON DUNN (East Herts and Essex) quite agreed that one of the greatest difficulties, next to the insecurity of tenure, was the insecurity of combinations themselves. In the first instance he was appointed for three years for four urban and five rural districts. At the end of the three years he did not think he was in very good favour with one of his urban districts, with the result that at the meeting for his re-appointment, which he was neither asked to attend nor notified of, they rejected his re-appointment for more than one year. One of the greatest difficulties was that at any time one of the districts might, without giving any reason, say they wished to withdraw from the combination, and the probability then was that the combination would go to pieces. He always attended monthly meetings, but several committees held fortnightly meetings, and it was practically impossible for him to attend those.

DR. A. G. R. CAMERON (West Sussex) quite endorsed Dr. O'Connor's views. He was astonished that the paper should fit in so exactly with his district. With regard to parochial committees, he had brought several matters forward which had been thrown out by them or postponed indefinitely. He had five urban districts and fourteen in all. Some were up-to-date and would carry out anything he suggested, providing it was reasonable, but he had a number of rural districts which would do practically as little as possible.

THE HONORARY SECRETARY (DR. HERBERT JONES) said that from what they had been told they gathered that the Bill of the Local Government Board would in all probability be based on the recommendations of Sir J. Dickson Poynder's Committee as to the Housing of the Working Classes. That committee recognized most definitely that there should be enlarged sanitary areas for administrative purposes, and the question would arise as to what those sanitary areas would be. That committee recognized that the area should be that of the County Council, and either the Council itself or a statutory committee very much like the present Education Committees should have the administration of the Public Health Act and the Housing Act. One question they had to consider was what would be the best sanitary area. He could not help thinking that the position had been made very much more difficult by the appointment of county medical officers of health, because if the committee's recommendation was carried out, and the county medical officer of health administered the whole county, what would become of the medical officers of health of combined districts within that county? Surely they were not going to be put on one side altogether. Supposing the county were not the unit, the registration districts might be used as administrative areas. Purely arbitrary areas might be drawn up by officials of the Local Government Board, who might group together districts, and the administration might be put in the hands of a Joint Committee elected by the Sanitary Authorities within that area. He thought that nothing was more striking in reading the reports of the inspectors of the Local Government Board than the fact that invariably within the last year they had recommended that there should be combinations of small districts. That was evidently the policy of the Local Government Board. One complaint he had to make against the inspectors was that at the same

time they recommended a combination of districts, they also said that no doubt a young and active medical officer of health would readily be found to do the work for £500 a year. He would like the inspectors to realise that that really meant a salary of anything between £300 and £400 a year, and they ought to understand it was not a net salary that was paid. Medical officers of health were often required to make analyses, contrary to the wishes of the Local Government Board. He himself was appointed subject to making analyses when requested to do so. The Local Government Board on that ground refused to sanction the appointment, and said it was not his duty to make analytical examinations. He could do so if he liked, but he was to be paid, and no part of the money was to come from the grants of the Local Government Board. He did not entirely agree with the remark that they had no statutory power over the sanitary inspectors. He thought it was laid down that an inspector was to carry out all the instructions of the medical officer of health which referred to his duties. He certainly thought he had power over his inspectors, but at the same time he would like it more definitely laid down.

DR. A. E. PORTER (Reigate), as one who had drawn his experience from small combined districts, said he had heard the paper with surprise and admiration: surprise at the meanness with which local authorities treated their medical officers of health, and admiration at the immense self-sacrifice which the administration of a large district must involve. The districts in which he had experience were rural districts in Essex. He conducted both analytical and bacteriological examinations, and he found his time well occupied. Even in his comparatively small districts he had to work many hours a day, but of course he had his slack times. The point which he would like to emphasize was that the number of districts which should go to form a combination should not be too large to allow of the medical officer of health attending meetings regularly of each authority. He could only get himself thoroughly into touch with all that was going on by regularly attending the meetings, and with a small number he could also get more in touch with his sanitary inspectors. If he attended meetings regularly his influence was more likely to carry weight than if he only attended now and then. He would suggest four as a good number. If the policy of districts of 400 or 500 square miles for one officer to deal with was adopted he should not have to do his own clerical work. It was the rule throughout England that travelling expenses were not allowed, and it was presumed when a man put in for an appointment that he would pay them. But it frequently happened that a medical officer of health had to pay a prompt and urgent visit to an outlying part of his district, say in the depth of winter, and then he thought the local authority should pay part of the expenses. He was glad to say his own authority took that view.

DR. H. BEALE COLLINS (Kingston) said he had never held a combined district, but he had acted as locum tenens. He thought some stress should be laid upon the question of the relationship between the sanitary and medical officers of health. He thought that it should be clearly laid down that the inspectors should be subordinate to the medical officer of health. It was also his opinion that districts should be of a reasonable size. His own experience was that the personal relationship between the medical officer of health and the people of the district was of the greatest importance in carrying out the work. In considering the size of a district they ought to think of the question of the inspection of school

children, which was likely to be made compulsory before long. Personally he thought it was a very important thing that the medical officer of health should be the person to inspect the children. In a very large district it would be quite impossible for him to do so, and he thought that was a very good reason for not having districts too large. He understood there was a rumour about that vaccination was to be given over to the sanitary authority and that the medical officer of health was to carry out the duties. If all those duties were to be thrown upon him, districts must be very much smaller, and they ought to take into account all those questions before the Local Government Board came to any definite decision as to the size of the districts.

DR. O'CONNOR, in replying to the discussion, said, with reference to the advantage or disadvantage of large areas, he might say his own personal experience was that the less he knew of people, say owners of insanitary property, the better. He dealt far more efficiently and effectively with districts far from where he resided than in the parish in which he lived. In his own appointment, analytical work was specified, as evidenced in the initial advertisement, and he analysed from 150 to 200 samples a year. He thought it was scandalous that members should suffer by disintegration of districts and gradual reduction of salary during a course of twenty-five years, as had been told. He sincerely trusted that any legislation which would be introduced, would be based upon much more equitable considerations than at present prevailed. Dr. Stainthorpe had raised an interesting point as to the advisability of combining districts not only for the medical officer of health but for sanitary inspectors and surveyors. He would like to go further, and suggest that districts might also combine for the appointment of clerks, so that they might have solicitors as clerks and solicitors trained in the special branches of the law necessary and essential in the avocations of clerks of rural districts. The same remark applied to surveyors. In many districts the surveyorship and sanitary inspectorship was held by one man, and the principal reason for the appointment by the Council was in order to secure a proportion of the surveyor's salary from the county fund. If they appointed two men they would have to pay their surveyor in toto. By appointing one man they put most of the salary on as sanitary inspector. It was a way of avoiding obligations. With regard to the attendance at meetings of Councils he joined issue with two or three who had spoken. It was very easy and simple in smaller districts, but if they had thirteen or fourteen districts, and the Councils met once a fortnight or once a month, how could they possibly attend all meetings? On almost every day there were meetings of his councils clashing, but he was never asked to attend unless there was some special work on. They were always glad to see him, and he made a point of attending when he had special business. It was rather annoying to have to turn up as a matter of routine when they had nothing to report, and it was an exaction which a medical officer of health had to submit to. His own experience and knowledge was that County Councils had quite enough to do already without administering the Public Health Acts. When a Council election occurred there was nothing put before the public but Education. Dr. Stainthorpe had mentioned that 25 per cent of his salary was absorbed in his official expenditure. It might interest members of the Society to know that during the first year that he was connected with his Leicestershire combination, the proportion of his salary which was absorbed in strictly official expenses amounted to very nearly 50 per cent. With experience he had succeeded materially in reducing them.

EXPERIMENTS MADE TO DETERMINE THE CONDITIONS UNDER WHICH "SPECIFIC" BACTERIA DERIVED FROM SEWAGE MAY BE PRESENT IN THE AIR OF VENTILATING PIPES, DRAINS, INSPECTION CHAMBERS, AND SEWERS.*

BY MAJOR W. H. HORROCKS, R.A.M.C.

MOST sanitarians at the present time believe that when sewage is in a putrefactive condition and gas bubbles rising through it are bursting at the surface, bacteria may be carried into the air of drains and sewers. It is also considered possible that when sewage has dried on the surfaces of pipes, bacteria may be separated as dried particles and carried some distance by currents of air passing through the pipes.

The following experiments were designed to ascertain whether there are any scientific facts on which to base these beliefs, and may be arranged in three groups.

GROUP 1.—*Experiments to determine whether Specific Bacteria are ejected into the Air by the bursting of Bubbles at the surface of Sewage.*

In the first series of experiments, sewage obtained from a main sewer in Gibraltar was inoculated with a rich emulsion of *B. prodigiosus* and then poured into a deep glass jar so as to form a layer at the bottom about two inches deep. At a height of four inches from the surface of the sewage two Petri dishes containing nutrose-agar were fastened, the medium facing upwards, to wire tripods, which were then firmly wedged in the bottom of the dish. A glass cover was then put on the dish and the fluid gently shaken by a horizontal movement, until a layer of bubbles formed on the surface of the sewage. This procedure was followed at intervals for three days, the plates were then taken out and incubated at 22° C. After seven days' incubation no signs of the *B. prodigiosus* appeared. Only one colony composed of cocci derived from the air was seen. This experiment was repeated again and again, but invariably with negative results.

The sewage was next inoculated with a rich emulsion of *B. typhosus*, and litmus-lactose-nutrose-agar plates were fastened to the tripods. The dish was shaken as before, the plates were then removed and incubated at 37° C. No signs of *B. typhosus* or *B. coli* were observed after incubation for one week. Old sewage, smelling strongly of

* A communication to the Royal Society. Received January 11—Read February 7, 1907.

sulphuretted hydrogen gas, was then placed in the dish and the experiments were repeated as before. It was thought that gas bubbles would form more readily in old than in fresh sewage; this proved to be the case, but the special organisms added to the sewage never appeared in the plates.

Soapy water from a lavatory basin was then inoculated with *B. prodigiosus* and freely shaken in a glass bottle until it was permeated with bubbles; the fluid was then transferred to the glass dish, the plates fastened to tripods were rapidly placed *in situ*, and the cover put on. Twenty-four hours elapsed before all the bubbles dispersed; the plates were then taken out and incubated as before, but no signs of the *B. prodigiosus* appeared.

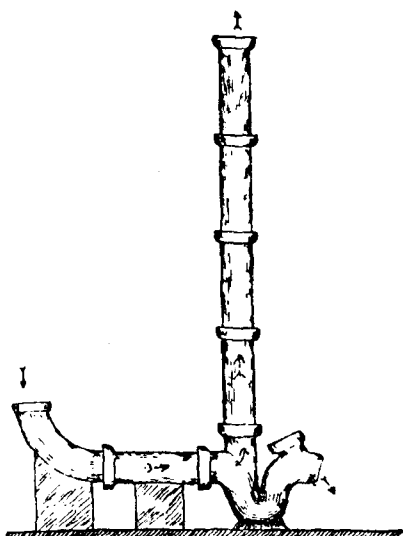


FIG. 1.

In the above experiments there were no air currents circulating above the sewage, and the bacteria could only be ejected by the bursting of bubbles. The results appear to show that independently of air currents, bacteria will not be ejected to a height of four inches by the bursting of infected bubbles.

The next series of experiments were made with the apparatus shown in Fig. 1. Plates of nutrose-agar were suspended by means of wire cages in the vertical pipe, the uppermost plate being nine feet above the water in the trap. Soapy water, inoculated with an emulsion of *B. prodigiosus*, was shaken up in a glass stoppered bottle until the whole fluid was permeated with bubbles; the contents of the bottle were then poured into the trap until it was filled. Under these conditions currents of air passing up the vertical pipe were able to carry

bacteria separated from the fluid by the bursting of bubbles. The plates were removed at the end of two hours and incubated at 22° C. The result was that colonies of *B. prodigiosus* appeared in every plate at the end of seventy-two hours.

The last experiment of this series was made with a catch-pit on the storm-water system of the town. Complaints having been made of foul odours arising from the pit, the hinged cover was thrown back, and it was then seen that bubbles were rising through the water retained in the pit as a result of fermentation processes going on in the mud at the bottom. The pit contained 180 gallons of surface water at the time. An emulsion of *B. prodigiosus* was poured into the water, and plates of nutrose-agar were then suspended as shown in Fig. 2. Twenty-four hours later the plates were removed and incubated at 22° C. for two days, when numerous colonies of

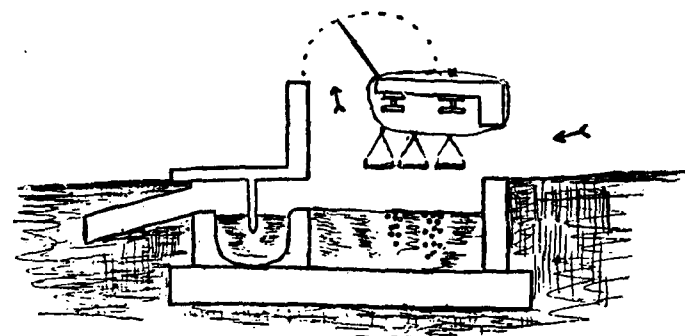


FIG. 2.

B. prodigiosus were found in all the plates. Control plates of nutrose-agar, exposed to the air outside the pit, did not show any signs of the special organism used in the experiment.

These results show that bubbles rising through stagnant water may eject bacteria, which will be carried away by currents of air passing over the surface of the fluid.

GROUP 2.—Experiments to determine whether Bacteria dried on the surfaces of Pipes are likely to be separated and carried by Currents of Air passing through the System.

The apparatus shown in Fig. 3 was employed. Three 2-ft. lengths of 6-inch piping were laid on the ground and a rich emulsion of *B. prodigiosus* was poured inside each of them. The pipes were then rolled backwards and forwards until the fluid was uniformly diffused over the inner surface of each pipe. Twenty-four hours later the pipes, being perfectly dry, were fitted together with clay joints so as

to form the vertical pipe of Fig. 3. Nutrose-agar plates were then suspended in the pipe, and sewage was allowed to flow through the horizontal piping at a rate not exceeding three feet per second for twenty minutes. The plates were then removed and incubated at 22° C.

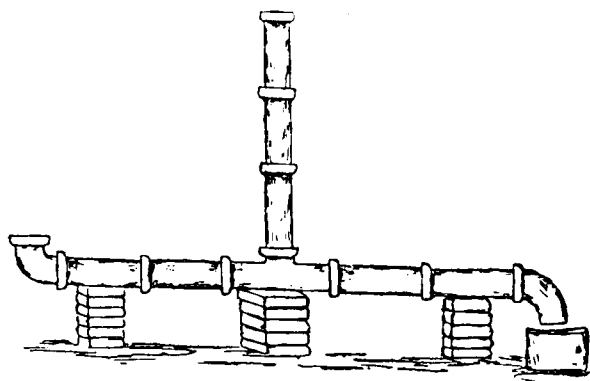


FIG. 3.

At the end of seventy-two hours, all the plates were found studded with colonies of *B. prodigiosus*. The experiment was repeated several times, and on each occasion the same result was obtained. As the sewage passing through the horizontal pipes did not contain *B. prodigiosus*, and control plates exposed to the air were also free from this organism, it is fair to assume that the currents of air produced by the passage of sewage through the horizontal pipes carried up dried particles of *B. prodigiosus* detached from the walls of the vertical pipe.

GROUP 3.—*Experiments to determine whether Specific Bacteria are ejected into the Air of Drains, Sewers, etc., from Sewage flowing under Normal Conditions.*

In the first series of experiments, the trap of a 6-inch disconnecting trap was filled with sewage, and two lengths of 6-inch drain piping, having a junction bend turned upwards, fixed at one end, were fitted horizontally into the house side of the trap. Similar lengths of drain piping, but with the junction bend turned downwards, were also fitted to the sewer side of the trap. The vertical portion above the trap was lengthened by the addition of three 2-ft. lengths of 6-inch drain piping. The apparatus is shown in Fig. 4.

Three litmus-lactose-nutrose-agar plates were next suspended with the media facing upwards in the vertical pipe by means of wire cages, the uppermost plate being about 6 feet 9 inches above the sewage in the trap. Three gallons of sewage, taken from a main sewer in

Gibraltar, were then inoculated with a rich emulsion of the *B. typhosus*, and poured down the bend on the house side of the trap. The sewage passed through the apparatus at a rate not exceeding three feet per second, and was received in a bucket placed under the bend on the sewer side of the trap. The inoculated sewage was passed through

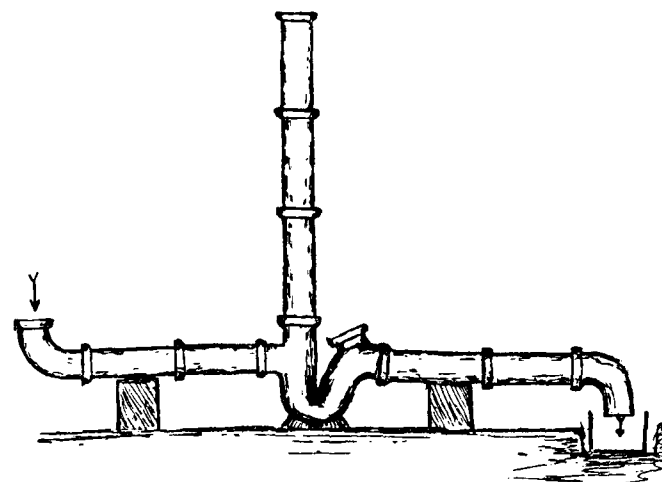


FIG. 4.

the trap in the same manner on two successive days for about half an hour. The plates were then removed and incubated at 37° C. for twenty-four hours, when numerous transparent blue colonies resembling those of the *B. typhosus* were seen in each plate. Several of the colonies were tested with anti-typhoid serum (horse) diluted 1-100 and, agglutination occurring at once, the colonies were planted out on agar slopes. The growths thus obtained were examined as to morphology and Gram staining, and then planted out in the usual media. The following results were obtained:—

Medium.		Result of incubation at 37° C.	
Glucose-peptone	... ..	Acid, no gas.	
Lactose-peptone	... ..	Unchanged.	
Maltose-peptone	... ..	Acid, no gas.	
Cane-sugar peptone	... ..	Unchanged.	
Starch-peptone	... ..	Unchanged.	
Neutral red	... ..	Unchanged.	
Litmus-milk	... ..	Very faint acidity, no clotting.	
Peptone-water	... ..	No nitroso-indol reaction.	
Potato	... ..	Colourless growth.	
Proskauer and Capaldi, No. 1	... ..	No growth.	
Gelatin	... ..	Thin transparent growth, medium not liquefied.	
Nitrate-broth	... ..	Reduced to NO ₂ .	

Morphology, etc.	...	...	Small motile bacillus.
Gram staining ...	...	...	Decolorised.

The bacilli were agglutinated by an anti-typhoid horse serum diluted 1-500.

A portion of the agar growth derived from one colony was then emulsified in water and injected subcutaneously into a guinea-pig. As a control, a similar emulsion of the *B. typhosus* used to inoculate sewage was injected into a second guinea-pig of approximately the same weight. At the end of three weeks the sera of both guinea-pigs agglutinated, in a dilution of 1-100, the stock culture of *B. typhosus*.

It is plain that in this experiment the *B. typhosus* was ejected from the sewage to a height of 6 feet 9 inches.

Further experiments on the same lines were then carried out with the *B. prodigiosus*, an agar growth emulsified in water being added to the sewage. The same apparatus was used as in the previous experiments, the vertical pipe being gradually lengthened by the addition of 2-ft. lengths of 6-inch piping. The *B. prodigiosus* was recovered from the plates suspended 8 feet 9 inches and 11 feet 9 inches above the sewage in the trap.

It was thought that possibly the resistance produced by the passage of the sewage through the trap might have caused the projection of the special bacteria employed into the air contained in the vertical pipe.

Accordingly, in the next series of experiments, the trap was removed and the apparatus fitted up as shown in Fig. 3. Plates of nutrose-agar were suspended in the vertical pipe, and the sewage mixed with *B. prodigiosus* was made to flow at a rate not exceeding three feet per second, through the horizontal pipes, which were never more than half filled with the sewage. The special organism was again recovered from plates suspended 11 feet 9 inches above the sewage in the trap.

As in all the above experiments, a very rich emulsion of the special organism, such as would never be found under natural conditions, was added to the sewage, it was determined to repeat the experiments, employing only 1 cc. of the emulsion, representing one-ninth of the growth on an agar slope after forty-eight hours' incubation at 22° C., to inoculate the sewage. The same results were obtained as when the rich emulsion was used.

It is evident from these experiments that special bacteria can be ejected from flowing sewage independently of the resistance offered to the flow by the disconnecting trap. But as the plates were left in the vertical pipe for more than twenty-four hours, it is possible that the colonies in the plates might have been derived from particles dried

on the surfaces of the pipes. In order to exclude this source of the bacteria, the experiments were repeated again, but the plates were withdrawn immediately the sewage had ceased to flow, each experiment only occupying twenty minutes. As before, colonies of *B. prodigiosus* were found in all the plates, showing that they must have been produced independently of dried particles carried by currents of air. As there were very few bubbles visible to the naked eye in the flowing sewage, it is not very probable that all the microbes found in the plates were ejected into the air by the bursting of bubbles. I think it is possible that many of the colonies were caused by the ejection of minute infected droplets from the flowing sewage. Gross splashing is out of the question, as the sewage was flowing at a comparatively slow rate, and plates were found infected at a height of 11 feet 9 inches above the surface of the fluid.

The next series of experiments were undertaken to test the value of the disconnecting trap as a means of protecting a house drainage system from specific bacteria present in the air of the sewer into which the house drain discharges.

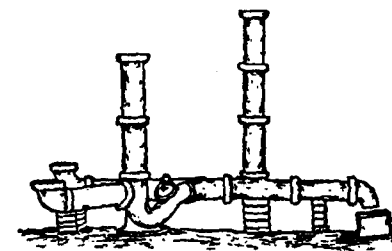


FIG. 5.

The apparatus employed is shown in Fig. 5. It was a combination of the arrangements used in the experiments already described. The straight run of piping, with the vertical pipe attached to it, represents the sewer and an attached ventilating pipe; joining the sewer is the house drain, the air in which is separated from that in the sewer by the usual disconnecting trap. The vertical pipe above the trap represents the air inlet or outlet, as the case may be, of the house drainage system. Plates of nutrose-agar were suspended in both vertical pipes. Sewage inoculated with *B. prodigiosus* was then allowed to flow at a rate not exceeding three feet per second through the pipes representing the sewer. The flow of sewage was continued for half an hour on two successive days; the plates were then withdrawn and incubated at 22° C. Colonies of *B. prodigiosus* were found in the plates placed in the ventilating pipe of the sewer, but none were

present in the plates placed in the ventilating pipe above the disconnecting trap.

The experiment was repeated again, but during the flow of the infected sewage through the sewer the disconnecting trap of the house system was repeatedly flushed with three gallons of sewage. It was thought that during the flushing of the trap, microbes in the sewer air might possibly enter the house drainage system. This never occurred, the plates on the house side of the disconnecting trap never showed any colonies of *B. prodigiosus*.

The vertical trap was then removed and the apparatus arranged as shown in Fig. 6.

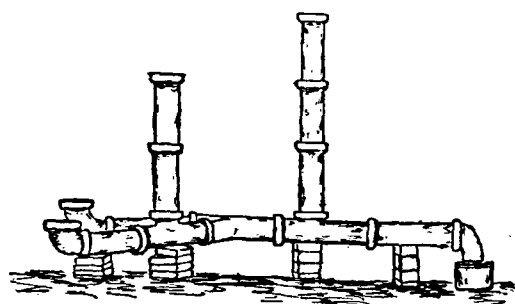


FIG. 6.

Inoculated sewage was made to flow through the sewer as before, and every five minutes a 3-gallon flush was passed through the house drain. Under these conditions colonies of *B. prodigiosus* appeared in the ventilating pipe of the house system as well as in that of the sewer. These results show that a disconnecting trap prevents microbes present in the sewer air from passing into the house drainage system.

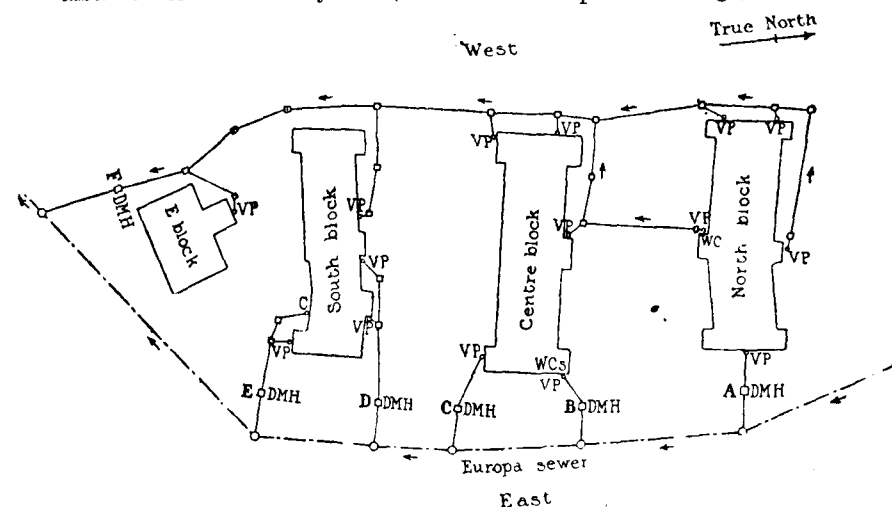
The next series of experiments were made with actual drainage systems.

In the first experiment a newly laid system of a house in the town was tested by suspending plates in the junction and disconnecting chambers. A plate was also fastened in front of the air inlet of the system, the air inlet being provided with a mica valve. An emulsion of *B. prodigiosus* was placed in the pan of the w.c. of the house, which was then flushed out. The plates were removed twenty-four hours later and incubated, with the result that colonies of *B. prodigiosus* were found in every plate. "Air" plates exposed showed no signs of the special organism used in the experiment.

The second experiment was made at the military hospital, plates being suspended in the top of a 6-inch ventilating pipe connected with a w.c. in the basement. The plates were fifty feet above the ground level. A rich emulsion of *B. prodigiosus* was placed in the pan

of the w.c., and the contents were then flushed in the usual manner. At the end of twenty-four hours the plates were removed and incubated for forty-eight hours, when all the plates were found studded with colonies of the special organism.

The third experiment was made in connection with the drainage at the east end of the Centre Block of the military hospital. At the north-east corner of the block there is a ventilating soil pipe, six inches in diameter, receiving the contents of a row of w.c.'s placed in an annexe on the first floor of the hospital. The soil pipe is connected by a 6-inch drain to a disconnecting chamber (B), which is ten feet deep, and discharges its contents by a short drain into a 9-inch sewer, running along the Europa Road. At the south-east corner of the block there is a similar disconnecting chamber (C), which receives the drainage from a w.c. in the basement and is also connected to the Europa sewer. There are six inspection chambers, with ventilating covers at the road level, and a 6-inch ventilating pipe on the Europa sewer, between the Centre Block and the Europa Pass Barracks, a distance of some 200 yards (see Plan of hospital drainage). Plates



were suspended in the top of the hospital soil pipe, at the north-east corner, some thirty feet above the junctions of the w.c.'s, in the disconnecting chambers (A), (B), and (C), in all the inspection chambers connected with the Europa sewer and in the top of the ventilating pipe of the sewer. A rich emulsion of *B. prodigiosus* was then placed in each of the pans of the w.c.'s, which were then flushed. Twenty-four hours later the plates were removed and incubated at 22° C. After forty-eight hours, all the plates, except those in disconnecting chamber (A), were found studded with colonies of the special organism employed. Plates exposed on the ground close to the Centre Block

for twenty-four hours were also incubated, but no signs of the *B. prodigiosus* appeared in them.

Judging by the results obtained with the experimental installations, it was expected that the special organism would be found in the hospital soil pipe, disconnecting chamber (B), and in the chambers and ventilating pipe of the sewer. But as the disconnecting chamber (C) at the south-east corner of the Centre Block is not in any way connected with the w.c.'s receiving the emulsion of the *B. prodigiosus*, and is separated from the Europa sewer by a modern disconnecting trap, the special organism should not have appeared in this chamber. The experiment was repeated again three times, and, in addition to the places already mentioned, plates were also suspended in the disconnecting chambers (D) and (E) connected to the east side of the South Block. The plates were left *in situ* for twenty-four hours, and then incubated as before. Colonies of *B. prodigiosus* appeared in the same places as in the previous experiment, but none were found in the chambers (D) and (E).

It was then evident that there must be some means by which the disconnecting chamber (C) was placed in communication with the Europa sewer. A careful examination of the bottom of the chamber was made, and it was found that there was no plug in the cleaning arm of the disconnecting trap; consequently, the chamber was in direct communication with the air in the sewer. Plugs were found firmly fixed in the cleaning arms of the disconnecting traps in the chambers (D) and (E), and prevented micro-organisms in the sewer air from entering the chambers.

The cleaning arm in the chamber (C) was then firmly plugged and the experiment repeated. The result was that colonies of *B. prodigiosus* appeared in the plates placed in the hospital soil pipe and in the chamber (B), but none appeared in the plates suspended in chamber (C), proving conclusively that the patent cleaning arm had been the channel through which the *B. prodigiosus* entered in the previous experiments.

As a control of the above experiments, plates were next placed in the inspection chambers connected with the west end of Centre and South Blocks. The contents of these chambers are removed by a separate drain, which passes along the west of the hospital into the disconnecting chamber (F), close to the south gate of the hospital. No colonies of *B. prodigiosus* were found in any of the chambers, although the plates were treated precisely as in the previous experiments. A fortnight later the experiment was repeated, but on this occasion the pan of a w.c. connected with the drain on the west side of the hospital was inoculated with *B. prodigiosus*, and the w.c.'s on the

east side were left in their natural condition. The result was that colonies of the special organism appeared in the plates placed on the west of the hospital, but none were found on the east side.

In all the above experiments the plates were left in the chambers and soil pipes for twenty-four hours, consequently the *B. prodigiosus* might have resulted from dried particles of the growth separated from the walls of the pipes and chambers and carried upwards by air currents, as well as from the bursting of bubbles and ejection of droplets from the flowing sewage. In order to determine whether the separation of dried particles was the source from which the bacteria were obtained, the experiments were repeated, but on these occasions the plates were withdrawn as soon as the w.c.'s had been flushed, each experiment only taking twenty minutes. When incubated the plates showed practically as many colonies of the *B. prodigiosus* as in the previous experiments, showing that special bacteria may appear in the air of the chambers and pipes independently of the separation of dried particles.

It might be objected that in the experiments just related the bacteria were suspended in water and had no organic matter adhering to them such as would be the case under natural conditions. When faecal material is flushed down w.c.'s and carried through a drainage system, it is probable that the *B. coli* and *B. typhosus*, in the case of typhoid stools, will have an organic envelope which may materially affect results.

In order to ascertain whether the objection raised had any force, plates of litmus-lactose-nutrose-agar were suspended in the ventilating pipe of the Centre Block for twenty-four hours and then incubated. All colonies having a reddish tint were fished and carefully studied, the result being that typical members of the coli group were readily isolated. Plates were also suspended in large inspection chambers connected with one of the main sewers of the town, about ten feet above the flowing sewage. The plates were removed at the end of four hours and incubated, when typical members of the coli group were again readily isolated. As a final test, the possibility of the *B. typhosus* being ejected from typhoid stools was ascertained by using the apparatus shown in Fig. 7. The trap was filled with sewage and litmus-lactose-nutrose-agar plates, the media facing upwards, were suspended in the vertical pipe, which was afterwards covered with a glass plate. A typical stool, obtained from a case of enteric fever under treatment in the military hospital, was then mixed with two gallons of water placed in the can connected by indiarubber piping, 1.5 inches in diameter, with the house side of the trap. The taps were next opened, and the contents of the can having passed

slowly through the trap, were collected in the can connected to the P outgo of the trap. The taps were then turned off and, the cans having been changed, the infected sewage was passed twelve times through the trap. The plates were then removed and incubated. Next day several transparent blue colonies were observed; these were

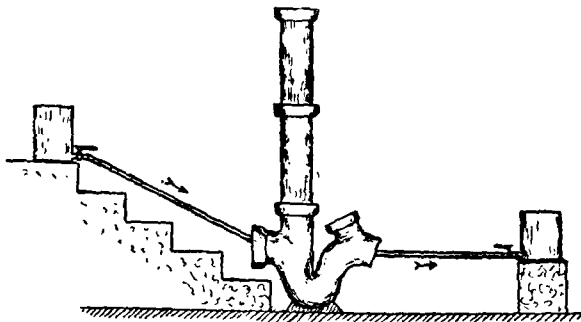


FIG. 7.

fished and planted on agar slopes. The growths resulting were tested with an anti-typhoid horse serum, and one was found to be completely agglutinated by the serum diluted 1-500. The growth was then submitted to the usual tests, which showed that a true *B. typhosus* had been carried up the vertical pipe.

Two days later the experiment was repeated with another stool from the same patient, with the result that three colonies of *B. typhosus* were isolated, one being in a plate two feet above the trap, and the other two in a plate 3 feet 6 inches above the trap. The experiments were so conducted that no splashing could occur, and on looking through the glass plate on the top of the vertical pipe, when sewage was flowing through the trap, a few bubbles were seen bursting at the surface of the fluid. The pipes and trap employed were quite new.

These results show that bacteria existing in sewage under natural conditions can be ejected into the air in the same manner as the naked bacteria used in the experiments already recorded.

The experiments show that :—

(1) Specific bacteria present in sewage may be ejected into the air of ventilation pipes, inspection chambers, drains and sewers by (a) the bursting of bubbles at the surface of the sewage, (b) the separation of dried particles from the walls of pipes, chambers, and sewers, and probably by (c) the ejection of minute droplets from flowing sewage.

(2) A disconnecting trap undoubtedly prevents the passage of bacteria, present in the air of a sewer, into the house drainage system.

(3) An air inlet, even when provided with a mica valve, may be a source of danger when it is placed at or about the ground level.

THE MIDWIVES ACT AND ITS EXTENSION TO SCOTLAND.

By WILLIAM WRIGHT, M.D., D.P.H. (CAMB.),
Senior Assistant Medical Officer of Health, Glasgow.

THE purpose of the Midwives Act of 1902, which came into operation on April 1st, 1905, and at present applies only to England and Wales, is that of securing the better training of midwives and the regulation of their practice. The object of this paper is that of urging the extension of this useful and very necessary measure to Scotland, and the writer hopes that he will have been successful in furnishing sufficient evidence in support of this contention. The provisions of the English Act are shortly these :—

(1) After April 1st, 1905, all women carrying on this business must be certified under the Act.

(2) After April 1st, 1910, they must do so under the direction of a doctor unless certified.

(3) They will not be certified unless they conform to the rules and regulations of the Act.

(4) No uncertified substitutes are allowed.

(5) The Act does not allow her to assume the rôle of doctor, or grant any medical certificate.

The duties of the Central Midwives Board (London) appointed for the purpose are chiefly these :—

(a). Regulation of the issue of certificates.

(b). Conditions of admission to the roll.

(c). To regulate the course of training.

(d). To regulate, supervise, and restrict the practice of midwives.

(e). To regulate supervision or removal from practice for disobedience or misconduct, and to issue and cancel certificates.

(f). To publish annually a roll of certificated midwives.

The Local Authority is the supervising authority for its own area, and its duty is to investigate charges of malpractice, negligence, or misconduct, and report to the Central Midwives Board, and keep a roll for public inspection.

The Local Authority shall appoint a supervising committee from the Council, and every woman certified before practising, and every January, must give notice to this local supervising authority under a penalty. The local supervising authority also has power to prosecute. Those briefly are the purposes of the Act. They are sufficiently

explicit, and should meet with general commendation at the hands of all local authorities in Scotland.

During the month of October, 1906, the writer examined forty-six uncertified and eighty-eight certified midwives. The following information was then obtained, and will serve in indicating the necessity for the existence of such an Act in Glasgow.

At the outset it is necessary to explain that the above figures do not suggest that those comprise the total number of women so employed in Glasgow, but all those that were available at the time of the enquiry. But nevertheless they would appear to furnish sufficient data in support of the writer's plea for the extension of the Act to Scotland.

Uncertified Midwives :—

(1) The fees obtained for conducting the case included, in most instances, attendance for about a week afterwards, and varied from 7s. 6d. downwards to 5s., what was offered, or a drink. Twenty-two stated they usually received money for services rendered, six of those twenty-two gladly accepted what was offered, eight averred they did not ask for money, taking anything in return, and several confessed to having received drink in payment. From information gathered from others, it would appear more are in the habit of taking drink in return for services rendered than stated. Of those who took what was given, one was in practice for forty years, two for twenty years, four for ten years, and others for shorter periods.

(2) Twelve of the forty-six state they never attended a case without the doctor, and eight occasionally attended a case whilst the doctor was calling regularly, but the remainder, i.e., twenty-six, were in the habit of conducting the whole case from start to finish alone, those last mentioned being in practice for periods varying between forty and nine years.

(3) The average number of cases attended by each varied between 150 and three annually.

(4) Only six of the forty-six carried bags containing the necessary antiseptics and other appliances usually required, the remaining forty considering it essential to carry on their persons only a bottle of Condy's fluid, lysol, or other disinfectant. Some carried Higginson's syringes and catheters in the same manner, and another a thermometer, although she was not acquainted with its use. The great danger attending the use of syringes and catheters so carried, exposed in such a manner to all possible infection, cannot be emphasized too strongly, and illustrates to what an extent gross ignorance may act as a factor in the causation of puerperal sepsis and cystitis.

(5) Although six of the forty-six, as above stated, carried a bag with all the necessary appliances, on being questioned, two only of these were able to explain fairly well their uses.

(6) Fourteen confessed to using syringes for the double purpose of washing out the bowel and syringing the uterus, the remainder, with one exception, never using this instrument at all. The grave results which must necessarily follow such a practice as that of inserting an instrument more or less contaminated with fæces within the vaginal and uterine walls, and squirting its highly dangerous contents into those raw tissues, already in a condition most highly susceptible to infection, cannot be exaggerated. There would appear to be little doubt, therefore, that this instrument, useful in the hands of the well-trained obstetrician, is a positive danger in the hands of the careless and ignorant. It is noteworthy that of the forty-six examined, not one of them stated they were ever asked to use the syringe by a medical practitioner. They all without exception, in their ignorance, were bold enough to use it on their own initiative.

(7) One only, as already stated, carried a thermometer, and of the lot (she included) not one could take the temperature either properly or at all, others stating they had never seen the instrument before.

(8) None of them either were able to indicate to my satisfaction on what grounds, or at what stage of the illness, on the occurrence of complications or otherwise, when it would be advisable to send for the doctor.

The following points, which were brought out in the course of the examination, speak for themselves as indicating the condition of affairs which at present exists among this class of women, who to-day are permitted to carry on work which has ever been regarded by the members of the medical profession as the most trying and responsible duties which they are called upon to perform.

One was taught by her mother, another by her mother and aunt, who were alike uncertified, and probably as ignorant as herself. One appeared in nurse's uniform, and informed me that she attended cases so dressed. Many used no disinfectants at all, some not even soap and water, and made no attempt to wash the parts after the birth of the child. Several were quite illiterate, being neither able to read nor write, one of whom was very dirty in person. One came in a very dirty condition, and the worse for liquor. One cleans in the cattle-market, and also attends cases—ten years in practice. Several are in the habit of giving ergot "labour tea." In the hands of such a class of ignorant persons the use of this drug should not

be permitted. Another stated if the pulse was "bating heavy" (which would seem to indicate the onset of grave symptoms), she usually gave castor oil to cool the patient. Two are known to attend their cases wearing shawls, without a covering for their heads or feet and in a generally dirty condition. Both take drink in return for services rendered.

Certified Midwives :—

(1) The dates at the time their certificates were granted were obtained in sixty-nine out of the eighty-eight, and were as follows :—

5, or 7 per cent, hold certificates dated between	1873 and 1877
15, or 22 " " "	1880 " 1890
14, or 20 " " "	1890 " 1900
35, or 51 " " "	1900 " 1906

Twenty-nine per cent, therefore, or almost one-third, have been in practice conducting confinements for periods varying between sixteen and thirty-three years without any return to a training school. That they must be ignorant of most of the recent methods of improved procedure in conducting a case throughout the puerperium cannot be denied, and that they ought to be brought up to date should be generally agreed.

(2) Twenty-one of the eighty-eight (nearly 25 per cent) were not in the habit of carrying bags containing the necessary antiseptics, and other appliances usually required, some considering it essential only to carry on their person Higginson's syringe, catheters, Condy's fluid, lysol, or other disinfectant. Eleven of the remaining sixty-seven who did carry bags, on being questioned as to the various uses of the appliances therein contained, did not satisfy me that they adopted the ordinary necessary precautions in conducting their cases, and were accordingly cautioned. In this respect, therefore, only fifty-six out of the eighty-eight examined were, in my opinion, capable of attending cases with ordinary care and ability.

(3) Fifty-nine out of the eighty-eight stated they regularly carried Higginson's syringe for the purposes of rectal injection only, and twenty-two, or 25 per cent, confessed to using the same instrument for the double purpose of rectal and uterine injection. By so deliberately contravening the most elementary rules of asepsis, those twenty-two certified midwives on this point alone subject themselves to condemnation.

(4) As in the case of the uncertified midwives, all confessed to using this instrument on their own initiative.

Thirty-two were considered as *very careful* and came up to the standard required for due amount of care, cleanliness, and efficiency.

Twenty-four, although considered *careful* in one or other points were advised, and would be all the better for being kept under surveillance. Twelve were considered as *careless*, and should be compelled to undergo another course of training. The remaining fourteen were classed as *really bad*, and six as *very bad*. Those latter, unless much improvement followed upon another course of training, should no longer be allowed to practise.

According to the regulations of the Central Midwives Board, a midwife is compelled to carry "an appliance for giving vaginal injections," and "an appliance for giving enemata." That the Higginson's syringe is occasionally used for the double purpose of bowel and uterus, and also that in the hands of the unskilled and careless it is an instrument capable of doing a considerable amount of mischief, should be generally accepted. Education and supervision are the only possible means of preventing this in the future, and that means the extension of the Act to Scotland.

Training Schools.—There are numerous training schools for midwives in Scotland, more or less satisfactory in regard to their course of training, which at present are furnishing certificates of efficiency. The extension of the Act to Scotland would be the means of serving a good purpose in this respect also, in that only such schools as complied with the requirements of the Board need be recognized by it. England and Wales have seen fit to adopt measures for the supervision and registration of midwives, and much good has already resulted thereby. It is to be hoped that Scotland will follow their lead in this respect, for there would appear to be little doubt that it is urgently needed.

In conclusion I beg to thank Drs. Archibald and McKail for kindly assisting me in the examination of the midwives.

THE ZYMOTIC DEATH RATE.

THE deaths from diarrhœa appear under a score of aliases, according to the fancy of the certifier at the moment, and have to be recorded by the medical officer of health under one of two heads, viz., "Diarrhœa" or "Enteritis." The former is included in the "zymotic" class, the latter is not. And as "diarrhœa" is not unfrequently the largest contributor to the "zymotics," it is evident that the zymotic death-rate as we know it is influenced by personal idiosyncrasies, and is therefore of doubtful value.—*From Dr. Garstang's Ann. Rep.*, 1906.

NOTES ON THE MIDWIVES ACT.

IN the March number our analysis of the revised rules of the Central Midwives Board was carried down to Section *E* (Directions to Midwives) Clause 15 (Duties to Child).

SUB-SECTION.—GENERAL.

16 (formerly 15). “No midwife shall follow any occupation that is in its nature liable to be a source of infection, or shall (*except under the circumstances hereinafter mentioned*) undertake the duty of laying out the dead.

“*A midwife will not transgress this rule if, at the discretion of the Local Supervising Authority, she—(a) Prepares for burial the body of a lying-in woman, a still-born child, or an infant dying within ten days; or (b) Lays out a dead body in a case of non-infectious illness, provided that she is not attending a midwifery case at the time.*

“*After laying out a dead body for burial she must undergo adequate cleansing and disinfection.*

“*In no case must a midwife lay out the body of any patient on whom she has not been in attendance at the time of death, or a body on which a post-mortem examination has been made.*”

This, again, is terribly cumbrous and far too involved for the bona-fide midwife, to whom these directions are especially directed. A plain list of occasions on which the midwife may lay out the dead, with the duty of disinfection included in its proper place elsewhere would be far more effective. As they stand, these rules in practice will require a further commentary. The last prohibition, moreover, is far too sweeping for scattered country districts, where midwives will continue to perform this function, being the only persons available for the purpose. This also should be left to the discretion of the L.S.A. That midwives should be also barred from “dressing of wounds” or the work of a district nurse was also proposed and negatived. The words “At the discretion of the L. S. A.” are surely redundant. They are meaningless to the midwife, and the L. S. A. has its powers of discretion under the Act.

17 (formerly 16). “A midwife must note *in her Register of Cases*,” instead of [a book] every drug given “other than a simple

* *Inverted commas* show quotations from the revised draft.

Italics show new words inserted in the revised draft.

Square brackets show words in the original omitted from the revised draft.

aperient.” A proposal that she should not be allowed to give any drugs except aperients was negatived. Under proper supervision, ergot, for instance, should certainly be allowed. We wonder whether alcohol will be included as such a drug, requiring to be entered in the midwives’ register. We commend this view strongly to local supervising authorities, however imperfectly it may at first be done.

“CONDITIONS IN WHICH MEDICAL HELP MUST BE SENT FOR.”

18 & 19a (formerly 17) are extended.

“18. . . . A midwife must [decline to attend alone and] *explain that the case is one in which she must advise that a registered medical practitioner be sent for, and must hand to the husband or the nearest relative or friend present the form of sending for medical help (see Rule 21 (a)), properly filled up and signed by her, in order that this may be immediately forwarded to the medical practitioner. If for any reason the services of a registered medical practitioner be not available, the midwife must, if the case be one of emergency, remain with the patient and do her best for her until the registered medical practitioner arrives, or until the emergency is over. After having complied with the rules as to the summoning of medical assistance, the midwife will not incur any liability by remaining on duty and doing her best for her patient.*”

This eases the situation in the immediate interests of the patient. But it entirely deprives the midwife of the strong motive she had to insist on medical aid being summoned. Hitherto she was bound to “decline to attend alone” under penalty of being struck off the Roll. Now she must enter into an explanation and fill up the form, after doing which she is free to go on with the case to the end. The idea of the bona-fide midwife explaining the situation in the ordinary confinement-chamber is highly entertaining. The whole clause is undermined.

As elsewhere, the wording is cumbrous. The question of payment of a fee has been omitted. The case is an emergency, and in due course of time will settle itself into common practice like a surgical casualty. We should be glad to see some common ruling or powers on the subject given by the Local Government Board to Guardians or to local supervising authorities; meanwhile the fee is not within the jurisdiction of the Central Midwives Board. In practice, we hold that the Guardians should be approached on the subject. They have the required powers, and are usually willing to exercise them.

“19. The foregoing rule shall apply:—

“(1) *In all cases in which a woman during pregnancy, labour, or lying-in appears to be dying or is dead.*

"PREGNANCY.

"(2) *In the case of a pregnant woman :*

"(a) *If the patient is a dwarf or deformed ;*

"(b) *When there is loss of blood ;*

"(c) *When there is any abnormality or complication, such as—*

"Excessive sickness.

"Puffiness of hands or face.

"Dangerous varicose veins.

"LABOUR.

"(3) *In the case of a woman in labour at or near term, when there is any abnormality or complication, such as—*

"A malpresentation.

"Presentation other than the uncomplicated head or breech.

"Where no presentation can be made out.

"Where there is excessive bleeding.

"Where two hours after the birth of the child the placenta and membranes have not been completely expelled.

"In serious cases of rupture of the perinæum, or other injury of the soft parts.

"LYING-IN.

"(4) *In the case of a lying-in woman, when there is any abnormality or complication, such as—*

"Abdominal swelling and tenderness.

"Offensive lochia, if persistent.

"Rigor, with raised temperature.

"Rise of temperature above 100·4° F., with quickening of the pulse for more than twenty-four hours.

"Unusual swelling of the breasts with local tenderness or pain.

"Secondary post-partum hæmorrhage.

"White leg.

"Hernia."

"THE CHILD.

"(5) *In the case of the child, when there is any abnormality or complication, such as—*

"Injuries received during birth.

"Any malformation or deformity in a child that seems likely to live.

"Dangerous feebleness.

"Inflammation of the eyes, however slight.

"Serious skin eruptions.

"Inflammation about the navel."

This is a much clearer statement than before ; and such as the

midwife may well be instructed to read over and over again and be cross-examined on at each visit of inspection. But there has been an attempt made for an unattainable brevity ; and the list being a list to be studied, and not a rule of thumb to be learnt by heart, suffers from certain omissions, e.g., in Pregnancy, those of rupture, difficult micturition, signs of imminent eclampsia, or fever ; in Labour, of breech-presentation in primiparæ, of convulsions, of palpable tumour ; in the Child, of icterus. A direction that the temperature should be taken periodically ought to have been included early in this Section E.

20. (1) Incorporates the final clause of 17 with the old 18, and simplifies both.

"NOTIFICATION TO THE LOCAL SUPERVISING AUTHORITY.

"20. (1) *The midwife must send notice to the Local Supervising Authority, in accordance with Rule 21, in the following cases :—*

"(a) Medical help.—Whenever she has advised under Rule 18 that a registered medical practitioner should be sent for.

"(b) Deaths.—In all cases in which the death of the mother or of the child occurs before the attendance of a registered medical practitioner.

"(c) Still-births.—In all cases of still-birth where a registered medical practitioner is not in attendance."

"Note.—A child is deemed to be stillborn when it has not breathed or shown any sign of life after being completely born. (See Rule 13.)

Proposals that after (b) and (c) the L.S.A. should notify the Coroner, and that midwives should be warned of their responsibilities and limited powers as to death-certificates and declarations of still-birth were negatived.

"(2) Change of name or address.—The midwife must immediately notify the Local Supervising Authority of any change of her name or address."

This is a necessary step for the administration of the Act. The L. S. A. is bound at once to forward the names thus received to the Central Midwives Board, in order that the necessary alteration may be made in the Roll ; but under the Act, as a fact, the Board has no power to make any such alteration in the Roll, except by the saving clause of sub-section 3, VI. of the Act.

Section 21 details the three forms required for the purposes of Section 20 (1), with clearer instructions as to the use of the first in triplicate. A note "The case is urgent," to be crossed out when not required, has been added, and may be the source of much inconvenience to the medical practitioner. Forms (b) and (c) are new.

(b) Form of Notification of Death.

To the Local Supervising Authority of the *Administrative County of or *the County Borough of.....
or *the Urban or Rural District of.....

I, the undersigned, being a Midwife holding the Certificate No..... of the Central Midwives Board, hereby notify that the following death occurred in my practice on the.....day of....., 19....., before a registered medical practitioner was in attendance.

Name of Midwife.....

Address of Midwife.....

Name of deceased.....

Address of deceased.....

Age.....

Date of Delivery.....

(c) Form of Notification of Still-birth.

To the Local Supervising Authority of the *Administrative County of or *the County Borough of.....
or *the Urban or Rural District of.....

I, the undersigned, being a Midwife holding the Certificate No..... of the Central Midwives Board, hereby notify that, on the..... day of....., 19....., I delivered..... living at.....
of a still-born *male or *female child, no registered medical practitioner being in attendance.

Name of Midwife.....

Address of Midwife.....

In this last surely particulars should have been required as to term of pregnancy, condition of child, and method adopted to attempt resuscitation, if any. A large proportion of still-births are, to our mind, due to negligence.

Section 19 gives the form for the Register of Cases.

"*Date of expected confinement*" has superseded ["*Date of engagement to attend*"]; "*Date and hour of child's birth*" is added; and the note as to administration of drugs includes "*the reason for giving them, and the stage of labour when given.*"

23 (formerly 20). We are still in Section E, Directions to Midwives ;

* Strike out the words not applicable.

and here is a clause directed to the L. S. A., obviously out of place. The L. S. A. is now directed to arrange for a proper inspection "*of every midwife practising in the district of such Authority.*" Does this include those practising under the Poor Law ?

24 (formerly 21) deals with the rules in this section which shall not apply to midwives practising under the Poor Law. As we go to press this vital point, which we discussed last year, is at issue ; and Lord Crewe, as President of the Privy Council, has granted an interview to a deputation from the Association for Promoting the Training and Supply of Midwives, who desire to see preserved intact the complete authority of the Central Midwives Board.

So ends our study of the revised rules. They have introduced much that is good ; but they require re-casting and will need to be supplemented in practice by a paraphrase in simpler language. As they stand they satisfy neither the lawyer, the medical man, the trained nurse nor the bona-fide midwife. That is, perhaps, the highest praise their authors would seek ; and their real value will only prove itself by experience, which will be eagerly required with a view to the next revision.

THE PROPOSED TRANSFER OF PUBLIC HEALTH ADMINISTRATION FROM RURAL COUNCILS TO COUNTY COUNCILS.

THE following resolution passed by the Reigate Rural District Council has been adopted by a number of other rural authorities : That the Reigate Rural District Council having had the report of the Select Committee of the House of Commons on the Housing of the Working Classes Acts (Amendment) Bill under consideration, strongly protest against the transfer of the administration of the Public Health and Housing Acts from the Rural District Councils to the County Councils, for the following reasons : (1) They are of opinion that the evidence before the Select Committee did not justify either the allegations against the local authorities or the conclusions of the report ; (2) That the suggested centralisation of the functions of the local government in County Councils, and the withdrawal of those functions from the local authorities, is a retrograde measure of a very serious character, and entirely subversive to the principles of recent legislation under which Rural District Councils and Parish Councils were brought into existence, and they view with great concern any proposal which tends to destroy or arrest the development of popular local self-government ; (3) That it is impossible for an authority acting over so large an area as the County Council to give adequate attention to the details of the work of local administration, or that such an authority can be cognizant of the special needs and circumstances of the several local areas which would be placed under their control.

REVIEWS.

THE DRINK PROBLEM IN ITS MEDICO-SOCIOLOGICAL ASPECTS. By Fourteen Medical Authorities. Edited by T. N. Kelynack, M.D., M.R.C.P. Methuen & Co., 7s. 6d.

This book is one of the series of the New Library of Medicine, which is devoted to the social problems involved in the medical question with which it deals. Already volumes have appeared on Infant Mortality, the Hygiene of the Mind, the Children of the Nation, and the Control of Cancer. Certainly not less important than these is the great question of alcoholism, upon which Dr. Kelynack has gathered together fourteen admirable papers. It would be invidious to make comparisons, but from the point of view of preventive medicine it may be admitted that the chapters in this volume on the Pathology of Alcoholism by Professor Sims Woodhead, Alcohol and the Public Health by Dr. Newsholme, Alcoholism in relation to Women and Children by Mrs. Scharlieb, Alcoholism and Pauperism by Dr. Ralph Crowley, and the Teaching of Temperance by Dr. Claude Taylor, are those which will most appeal to the medical officer of health. Whatever views we may entertain in regard to total abstinence from alcoholic beverages we cannot doubt that excessive use of such beverages leads to inefficiency, disease, and premature death. It is also one of the chief causes of poverty. And in this way, as well as being a direct factor in the production of disease, the abuse of alcohol is one of the greatest agencies of degeneration with which the medical officer has to contend. Yet up to the present there have been available remarkably few sane and scientific medical statements on the subject. There has been much literature of a sort associated with advocacy of more or less extreme views of repression or control of the liquor traffic, but very little in the way of carefully prepared statistics or facts respecting the actual physical ravages of alcohol. Now, however, we have in reasonable compass a first-rate general view of the drink problem from the medical point of view. In addition to the writers already named Dr. Clave Shaw, Dr. Hyslop, and Dr. Robert Jones write on the mental side, Dr. S. B. Atkinson and Dr. V. H. Rutherford, M.P., on the legal side, Mr. McAdam Eccles deals with life assurance, Dr. W. C. Sullivan with criminology, in a chapter which is all too brief, and Dr. H. Campbell with "The Evolution of the Alcoholic." The editor himself opens and concludes the book with two general chapters of much interest. The book is greatly enriched not only by a good index, but by the exceptional number of references to the literature of the subject. Its only disadvantage indeed is that which is inseparable from a work undertaken by fourteen authors, namely, that there is some slight overlapping, and some inequality both of authority and of value in the statements which are made. But taken as a whole, it is the most satisfactory statement of its kind which has yet appeared, and furnishes unanswerable evidence in the case against alcohol.

FREQUENCY CURVES AND CORRELATION. By W. PALIN ELDERTON. Published for the Institute of Actuaries by C. & E. Layton, London. pp. 172, size 9in. by 6in.

This book is divided into two parts, five appendices being also given. Part I deals with introductory matter, frequency distributions, method of moments, frequency curves, calculation. Part II deals with correlation,

the correlation of characters not quantitatively measurable, probable errors, the test of goodness of fit, the theory of contingencies. The main object of the volume is to give a detailed description of the basis and practical application of the modern statistical methods associated with the name of Karl Pearson. A connected account of Professor Pearson's methods is given, with illustrations derived almost solely from actuarial work. It is important to note, as stated by Mr. Elderton in his preface, that a practical man can use frequency curves and correlation reasonably without higher mathematical knowledge, for "the fact that a curve he has found agrees with the statistics from which the moments were obtained is a proof that in the particular case he has obtained proper values for the constants, even though he has not followed the mathematical reasoning leading to the equations."

The work is extremely technical, one for study rather than for reading. It supplies a good summary of the important new methods available for statistical students, and will therefore be of much use to those engaged in public health problems wishing to employ these more accurate and precise methods.

THE COMPULSORY NOTIFICATION OF PHTHISIS.—On December 8th the Warwick and Leamington Division of the Birmingham Branch of the British Medical Association passed the following resolution:—

"That this meeting of the Warwick and Leamington Division of the Birmingham Branch of the British Medical Association expresses its conviction that phthisis should be included amongst the compulsorily notifiable diseases; and that it should be made compulsory that efficient disinfection of premises where death has occurred from such disease should be undertaken by the Local Health Authorities;" and resolved that a copy of this resolution be forwarded to the Birmingham Branch.

On December 10th the Leamington Town Council passed a resolution from its Health Committee in these terms:—

"Your Committee recommends that a strong representation be made to the President and Secretary of the Local Government Board as to the urgent necessity of powers being conferred on Local Authorities enabling them to require premises in which a death from phthisis has occurred to be disinfected."

The same body had already forwarded to the Local Government Board a resolution urging the compulsory notification of phthisis.

THE SOCIAL ENEMIES OF HEALTH.—Dr. Millard in a recent address to a Leicester "Labour Church" said that "poverty, although a great evil, and one which they must strive to abolish, was not the only factor dragging men down. If all poverty were abolished there would still be much misery, suffering, and degradation. Amongst other causes he would specially mention those national curses—betting, gambling, and drinking. They permeated all classes, from the highest to the lowest, but the lower classes could least afford to handicap themselves. Then there was disease. Much sickness and disease, so far as they knew at present, was unavoidable, and must be looked upon as the natural heritage of man, but they were learning more and more that a great deal of ill-health and disease could to a large extent be prevented by right methods of living."

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

GENERAL MEETING.

A GENERAL MEETING of the Incorporated Society of Medical Officers of Health was held at the Offices of the Society, No. 1, Upper Montague Street, Russell Square, London, W.C., on Friday, April 12th, 1907. Present: Dr. D. S. Davies (in the chair), F. T. Bond, J. A. H. Brincker, R. Dudfield, J. Priestley, J. W. Hembrough, J. Wright Mason, Wm. Butler, R. Ayton Dunn, R. M. Craven, A. Newsholme, A. W. J. MacFadden, Sir Shirley Murphy, Harold Coates, H. Beale Collins, T. Evans, E. W. Hope, H. E. Corbin, R. K. Brown, G. B. Millson, H. Jones.

Minutes.—The minutes of the previous ordinary meeting, held on March 8th, 1907, and printed in the April number of PUBLIC HEALTH, were taken as read, were approved, and duly signed by the Chairman.

Elections.—The following candidates having been duly nominated, were balloted for, and the President declared them to be unanimously elected:—

Bampton, A. H., M.D., Ilkley, Yorks., M.O.H. Ilkley Urban District.

Collins, D. J., M.B., D.P.H., Major R.A.M.C., Cantonments, Roberts Heights, Pretoria, Army Sanitary Officer, Transvaal.

Chesson, Herbert, M.B., D.P.H., Dept. of Public Health, Brisbane, Queensland, Deputy M.O.H. Brisbane.

Dewar, T. F., M.D., D.Sc., County Buildings, Forfar, M.O.H. Forfar County Council.

Nightingale, J., M.D., D.P.H., Horsforth, Leeds, late M.O.H. Horsforth Urban District.

Wilkinson, W. A. H., M.B., Ch.B., Ashcroft Road, Gainsborough, M.O.H. Gainsborough Urban District.

Nominations.—The Hon. Secretary read a list of nominations for membership to the Society.

Presentation by the Metropolitan Branch.—Dr. Millson, in presenting to the Society, on behalf of the Metropolitan Branch, a framed portrait of Dr. T. Orme Dudfield, medical officer of health of the Borough of Kensington, and former President of the Society, said he had no doubt that the admirable portrait would be greatly treasured by the Society. Dr. Dudfield was elected to Kensington in 1871, and joined the Society during the latter part of that year. He served on the Council in 1872-3 for the first time, and was elected President for the Session 1883-4 and again in 1884-5. He was Chairman of the Sanitary Committee of the Kensington Vestry before he held the appointment, and it was interesting to note that Dr. Dudfield's annual reports before the appointment of a county medical officer dealt systematically with the sanitary condition of the Metropolis as a whole, as well as with the Borough of Kensington. He (the speaker) thought that Dr. Dudfield had done more for the cause of public health in the Metropolis than anyone else. He was sure that the Society would join in wishing him every happiness and prosperity, and that he would be spared for a very long time.

THE PRESIDENT said it gave him great pleasure on behalf of the Society to receive the presentation of the very excellent likeness of Dr. T. Orme Dudfield. All present had looked for many years with very great respect and admiration upon the work which Dr. Dudfield had performed in the public health service. They would all be pleased to have the portrait to remind them of one who had very ably served the public health service; and in this connection it was a pleasure to know they also had with them Dr. Dudfield's son, who was doing good work in the same Branch. They as a Society were delighted to have the excellent portrait in their keeping.

ELECTION OF PRESIDENT.

The PRESIDENT (Dr. D. S. DAVIES) in formally proposing for election Dr. George Reid, medical officer of health to the Staffordshire County Council, as President of the Society for the ensuing Session of 1907-8, said that it gave him very great pleasure to propose him as his successor in that chair. His name needed no commendation, for all were aware of his services as a county medical officer of health. He was one of the first medical officers appointed in that capacity, and he had made his name well known in many fields of public health, and he was sure that Dr. Reid's nomination would meet with cordial and general approbation. Dr. Reid had also been nominated by Sir Shirley Murphy, Drs. A. Newsholme, J. Wheatley, W. H. Symons, Joseph Priestley, and Herbert Jones. The nomination was seconded by Dr. W. J. Howarth, and a ballot having been taken, Dr. D. S. Davies declared that Dr. George Reid had been unanimously elected as President for Session 1907-8.

Dr. J. WRIGHT MASON then read a paper upon "Inspection of Food at our Ports,"* and the following members took part in the subsequent discussion: Dr. D. S. Davies, E. W. Hope, R. M. Craven, G. B. Millson, Wm. Butler.

REPORT OF COUNCIL.

Your Council report:—

1. That they have re-elected unanimously the following Officers:—

(a.) The Honorary Treasurer, Dr. G. B. Millson.

(b.) The Honorary Secretaries, Drs. Herbert Jones and Joseph Priestley.

(c.) The Editor, Dr. Arthur Newsholme.

(d.) The Honorary Solicitor, Mr. Robin Hamp.

(e.) The Honorary Librarian, Dr. G. F. McCleary.

2. That they have appointed as the official auditor, Mr. John Hamp, a qualified chartered accountant, of the firm of Messrs. John Hamp & Co., 9 and 10, Pancras Lane, Queen Street, E.C., and have passed a vote of thanks to Dr. Oliver Field and Mr. A. W. Warren for their services as auditors in the past.

3. That they have received a report from the Hon. Treasurer to the effect that there are sixteen Fellows and two Members who are two years in arrear, and that subscriptions for the current Session are due from 216 Fellows, thirty-four Members, and twenty-nine Associates.

That they have received a letter from the Hon. Solicitor dealing with the non-payment by members of their subscriptions and the consequent removal of their names from the Register of Members, as required by Art. 12 (i.e., paragraphs 32 and 33) in the Book of Constitution and By-laws, as published in 1897, and in connection therewith have given instructions

* The Paper will be published in a later issue of PUBLIC HEALTH.

for this routine to be strictly carried out in the future, so that a Register may be kept as required under Section 25 of the Companies Act, 1862.

4. That they have given instructions for the front of the Society's premises to be painted and for repairs to be done as required, at an estimated cost of £9 2s.

5. That they have received a letter from the Earl of Elgin expressing regret that in view of the limited time available and the number of subjects suggested for consideration at the approaching Colonial Conference, it will be impossible to find room for the suggested discussion of the question of co-operation in matters relating to public health, and that in these circumstances it does not appear that the Society's proposed deputation would serve a useful purpose.

6. That they have arranged for members of the Society who are present at any of the following Congresses to be appointed delegates on behalf of the Society, provided that such members communicate with the Hon. Secretaries beforehand :—

(a.) Gouttes de Lait, Brussels.

(b.) Second International Congress of School Hygiene, London.

(c.) International Congress of Hygiene and Demography, Berlin.

(d.) Congress of the Royal Sanitary Institute, Dublin.

7. That they have, in response to a petition sent from the Organizing Committee of the Second International Congress of School Hygiene, voted a sum of £5 5s. towards their Congress funds.

8. That they have received a letter from the Women Sanitary Inspectors Association, enclosing a petition against the Home-Workers Regulation Bill, and in connection therewith have passed the following resolution :—

“While approving the principle of the Bill as to the certification of premises where home work is carried on, the Society are of opinion that the precedent established by Sections 107–110 of the Factory and Workshops Act of 1901 with reference to home work should be followed.”

9. That they have transferred the business of the Journal from the House, Library and Journal Committee to the Finance Committee.

10. That they have arranged for the Annual Dinner to take place after the Annual Meeting to be held on the second Friday in October, and have decided to invite ladies to the dinner as guests.

11. That they are arranging for the provincial meeting to be held at Cambridge at the invitation of the Eastern Counties Branch.

North-Western Branch.—An Ordinary Meeting of the above Branch was held at the Chemical Club, Victoria Hotel, Manchester, on Friday, March 15th, 1907. Present : Dr. A. Greenwood, President (in the Chair) ; Drs. Garstang, Wheatley, Brindley, Hitchon, Buckley, Kerr, Welsh, Sergeant, Hancock, J. A. Harris, Kingsford, Mussen, Wheeldon, Wilkinson, Holt, Coutts, Thomas, Barlow, A. J. Young, Hulbert, Edlin, and Dearden. A letter of apology for absence was read from Dr. Meredith Young.

The minutes of the last meeting were read, confirmed and adopted.

A letter thanking the Branch for their kind message of sympathy was read from Mrs. J. G. Gornall.

Dr. H. L. P. Hulbert was unanimously elected a Member of the Branch.

Dr. A. E. Thomas read a paper on “The Diagnosis of Small-pox,” illustrated by photographs shown by the writer of the paper, and by Drs. M. Young, Mussen, and Buckley.

A discussion followed, in which Drs. Wilkinson, Sergeant, Barlow, Mussen, Greenwood, and Edlin took part.

FALLACIES OF DISINFECTION.

A COMMUNICATION from a correspondent draws our attention to a letter published in a provincial paper from “A Poor Law Guardian” in regard to disinfection by heat. Its purpose is to express the opinion that his authority requires above all “a first-rate disinfecting apparatus,” and that the hot-air chamber used at present by his authority is more efficient than a steam apparatus. His reason is that the hot-air apparatus “has got three elements, fire, air, and water, and the other fire and air alone.” He supports this very interesting proposition by over half a column of argument, leading up to the position that “hot-air is the death of germs, while damp heat is their life.”

This letter would hardly be proper subject-matter for comment in these pages, were it not for the looseness with which standards for disinfection are adopted by even better informed persons and authorities. Even to-day authorities not uncommonly demand disinfectors working with superheated steam, and but seldom is any sufficient precaution, or in most cases any sort of precaution, taken to keep the steam free from air. The practice of disinfection is fraught with many uncertainties; but among the few pieces of positive knowledge at the disposal of the medical officer is the fact that steam loses in efficiency unless it is applied under pressure, and may even become as worthless a disinfectant as is hot air, if it is superheated or mixed with air. A disinfecting station having no provision for insuring that these qualities are present constantly in the steam of its disinfecter is always in danger of permitting a certain amount of the infection which it should destroy to pass unhurt into the body of the community. Owing to the multiplicity of possible sources from which secondary infection may arise cases of this kind can seldom be identified, and the fact that a disinfecter when working at its best efficiency has been shown to give true disinfection is often taken as sufficient reason for believing that it does so in practice. It must be remembered, however, that unless means are provided independent of the attendant to prevent him from allowing the pressure to fall, or from working with a mixture of air and steam, the value of the disinfection will depend on his uncontrolled accuracy. This accuracy is the more difficult to maintain because without special provision it is impossible even for a skilled person to say with certainty when the steam is wholly free from air. Whatever may be the cause of a failure in disinfection, nothing can be farther from the truth than to imagine that a community which sins in this respect gets off with impunity. Epidemics or secondary cases have to be paid for out of the rates none the less because it may be difficult to convict the apparatus or the persons in fault.

STREET SPITTING.—Mr. Frederich, the city health officer of Cleveland, U.S.A., has appointed 1,000 citizens as a special sanitary police force for the purpose of putting down the habit of expectorating on the streets. They are not paid, but have full power to arrest anyone infringing the regulations.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

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ANNUAL AND OTHER REPORTS.

Monthly Bulletin, Mass., U.S.A. City of Aberdeen, February, Dr. M. Hay. Experimental Station Record, Washington, Feb., Mar. Bucklow R.D., and Knutsford R.D., 1906, Dr. T. W. H. Garstang. Tunbridge Wells, 1906, Dr. W. Stamford. Blackburn, 1906, Dr. A. Greenwood. Dr. R. J. Reece's Report to L.G.B., on Sanitary circumstances of Trowbridge U.D. Burgh of Paisley, 1906, Dr. A. Robb. Chelmsford R.D.C., 1906, Dr. J. C. Thresh. Rotherham, 1906, Dr. A. Robinson. Bath, 1906, Dr. W. H. Symons. Registrar-General's Weekly Returns. Bilston, 1906, Dr. T. Ridley Bailey. Glossop-Dale R.D.C., 1906, Dr. D. J. Mackenzie. Glossop Urban S.A., 1906, Dr. D. J. Mackenzie. Special Report on an outbreak of scarlet fever, 1906-7. L.G.B., Dr. D. J. Mackenzie. Hornsey, 1906, Dr. Harold Coates. Final Report on Grain Crops of Province of Saskatchewan, 1906. Borough of Eccles, 1906, Dr. W. M. Hamilton. Blackpool, 1906, Dr. F. H. Coutts. Dr. Reginald Farrar's Report to L.G.B., on lodging and accommodation of Hop-pickers and pickers of fruit and vegetables. Bulletin of State Board of Health of Maine, Mass. West Lancashire R.D.C., 1906, Dr. G. E. Scholefield. Royal Burgh of Rothesay, 1906, Dr. A. J. Hall. West Bromwich, 1906, Dr. H. Manley. Redditch U.D., 1906, Dr. J. Stevenson. Stafford, 1906, Dr. F. M. Blumer. Aston Manor, 1906, Dr. F. H. May. New Windsor, 1906, Dr. Casy. Crewe, 1906, Dr. A. J. Laird. Govan, 1906, Dr. J. Barras. Ealing, 1906, Dr. C. A. Patten. Finsbury, 1906, Dr. G. Newman. Report on Ptomaine Poisoning, Wigan, Dr. Berry. Dr. Theodore Mansfield's Report to L.G.B. on Enteric Fever in Mansfield. Ilford U.D.C., 1906, Dr. C. F. Stovin. Hereford, 1906, Dr. H. C. Moore. Newcastle-upon-Tyne, 1906. Tuberculosis, Dr. H. E. Armstrong. Dr. R. Deane Sweeting's Report on St. Neuts and Eaton Socon R.D.'s. Middleton, 1906, Dr. F. J. Wheelodon. Aberdeen, 1906, Kenneth Cameron, Cert. San. Ins. City and Port of Gloucester, 1906, Dr. W. M. Hope. Report on Isolation Hospitals, 1906, Dr. S. Barwise. Cardiff, 1906, Dr. E. Walford.

JOURNALS.

Journal of Tropical Medicine. Local Government Officer. Australasian Medical Gazette, February. La Technique Sanitaire. All India Hospital Assistant's Journal, January and February. Local Government Journal. British Medico-Chirurgical Journal. Journal Royal Sanitary Institute. Medical Temperance Review. Pacific Medical Journal. Journal of Royal Army Medical Corps. Glasgow Medical Journal. Sanitary Record. American Journal of Medical Sciences. Medical Review of Reviews. Giornale della Reale Societa Italiana D'Igiene. Canadian Practitioner. Journal of the Royal Institute of Public Health. Caledonian Medical Journal. Birmingham Medical Review. Hospital. Water. Yorkshire Daily Observer. Journal of the Royal Statistical Society.

PAMPHLETS.

Note on breaking babies' nipple strings, Dr. John Meredith. Analytical Notes, Evans Sons, Lescher & Webb, Ltd. The Functions of Food in the Body, A. Rabagliati, M.A., M.D. Eliot Stock, London.

THE INFANT, THE PARENT, AND THE STATE.

H. Llewellyn Heath, D.P.H., etc. P. S. King & Son.

FOOD VALUES GRAPHICALLY ILLUSTRATED.

Chart by Eustace Miles, M.A., and Miss M. John. Philip & Son, Ltd.

BUILDERS OF THE BODY.

Eustace Miles, M.A., and Miss M. John. Philip & Son, Ltd.

RECENT PUBLIC HEALTH LITERATURE.

ANTHRAX.

XYLANDER (Dr.). Beiträge zur Desinfektion von milzbrandhalligen Häuten. Arb. aus dem Kais. Gesundheitsb., 1907, xrv, 457.

BERI-BERI.

FALES (J. H.). Beri-beri, its etiology and prevention. Jour. Amer. Med. Assoc., 1907, xlviii, 781.

CENSUS.

RESULTATS statistiques des derniers recensements de la population (in France). Ann. de Hyg. Publique, 1907, 4th ser., vii, 272.

CHILDREN.

MARTIN (H. A.). Child development during school life. Jour. Roy. Inst. Pub. Health, 1907, xv, 193.—RAPPORT sur les memoires et travaux adressés à la commission permanente de l'Hygiène de l'Enfance pendant l'année 1904-1905 (in France). Bull. Acad. de Med., 1907, lviii. Suppl. to No. 15.

CHOLERA.

HEISER (V. G.). The outbreak of cholera in the Philippines in 1905. Jour. Amer. Med. Assoc., 1907, xlviii, 856.

DISINFECTANTS.

HARRIS (C. E.) & C. PRAUSNITZ. The determination of the efficiency of disinfectants. Jour. Roy. Inst. Pub. Health, 1907, xv, 147.—NIETER. Ueber die Verwendung von Para-Lysol einem festen Kresolseifenpräparat, zu Desinfektionszwecken. Hygienische Rundschau, 1907, xvii, 451.

FOOD.

BEZZOLA (C.). Beitrag zur Kenntnis der Ernährung mit Mais. Zeits. für Hyg. und Infectsk., 1907, lvi, 75.

GAS STOVES.

OWENS (J. S.). Abstract of the Report on the tests of Gas Stoves. Jour. Roy. Sanit. Inst., 1907, xxviii, 69.—RIDEAL (S.). Advantages and disadvantages of treating buildings with gas stoves of various types. Jour. Roy. Sanit. Inst., 1907, xxviii, 74.

IMMUNITY AND INFECTION.

CITRON (J.) & R. PUTZ. Ueber die Immunisierung gegen Hühnercholera. Wild- und Schweineseuche mit Bakterienextrakten. Zeit. für Hyg. und Infectsk., 1907, lvi, 145.—FRIESE (H.). Kritische und experimentelle Studien zur Aggressinfrage. Arch. für Hyg., 1907, lx, 261.—HECK (H.). Untersuchungen über das Vorkommen und die Lebensdauer von Typhus-bakterien in den Organen gegen Typhus aktiv immunisierter und nichtimmunisierter Tiere. Zeit. für Hyg. und Infectsk., 1907, lvi, 1.—SAUERBECK (E.). Ueber die Aggressive. Zeit. für Hyg. und Infectsk., 1907, lvi, 81.—SHIPLEY (A.E.). The danger of flies. Science Progress, 1907, i, 723.—WASSERMANN (A.). Die Immunitätswissenschaft und ihre Bedeutung für die Praxis. Deut. Med. Wochens., 1907, xxxiii, 617.

LIGHTING.

AUBERT (L.). Le gaz à l'eau dans l'éclairage de la ville de Paris. Ann. d'Hyg. Publique, 1907, 4me ser., vii, 261.

MALARIA.

NICHOLS (LT. COL. F. P.). The effects of large drainage works on the prevalence of malaria. Jour. Roy. Army Med. Corps, 1907, viii, 344.—SERGENT (E.). Etudes epidemiologiques et prophylactiques du paludisme 5me Campagne, en Algerie 1906. Ann. de l'Inst. Pasteur, 1907, xxi, 81.

MALTA FEVER.

BRUCE (COL. D.). Recent researches into the epidemiology of Malta Fever. Jour. Roy. Army Med. Corps, 1907, viii, 225.

MEAT, INSPECTION OF.

PAYNE (A.). The necessity for the veterinary inspection of Dairy Cattle. Veter. Jour., 1907, lxi, 134.—WATSON (A.). Meat inspection in Dublin. Jour. Roy. Inst. Pub. Health, 1907, xv, 208.—Meat Inspectors and their qualification. Veter. Jour., 1907, lxi, 197.

MENINGITIS, CEREBRO-SPINAL.

FLEXNER (S.). Experimental cerebro-spinal meningitis in Monkeys Jour. Experiment. Med., 1907, ix, 142.—FOWLER (J. S.). Epidemic cerebro-spinal meningitis. Rev. of Neurol. and Psych., 1907, v, 249.

MILK.

HAMILL (S. McC.). The standards and work of the Philadelphia Pediatric Society's Milk Commission. *Amer. Jour. Med. Sci.*, 1907, cxxiii, 608.—HARRINGTON (C.). Milk as a carrier of infection. *N. Y. Med. Jour.*, 1907, lxxxv, 696.—PECK (J. W.). London milk. *Jour. Roy. Inst. Pub. Health*, 1907, xv, 219.

MOSQUITOES.

ROSS (E. H.). Measures against mosquitoes in Port Said, and their results. *Jour. Trop. Med. and Hyg.*, 1907, x, 97.

OCCUPATIONS.

HANSON (W. C.). Effect of Industry on Health. *Bost. Med. and Surg. Jour.*, 1907, clii, 421.—LEWIN (L.). Protection des ouvriers dans les industries toxiques. (Translated from the German.) *Ann. d'Hyg. Publique*, 1907, 4me ser., vii, 289.

PLAGUE.

JALTA (M.) & R. MAGGIORA. Weitere Untersuchungen über die Anwendung der Serum vaccination für die Prophylaxis gegen Bubonenpest. *Zeit. für Hyg. und Infektionsk.*, 1907, lvi, 193.

PUBLIC HEALTH.

DAVIS (Lt. Col. A. M.). Review of the progress of Hygiene. *Jour. Roy. Army Med. Corps*, 1907, viii, 398.—THORP (W. O.). Progress in Works of Public Health in Malvern during recent years. *Jour. Roy. Sanit. Inst.*, 1907, xxvii, 57.

PUERPERAL FEVER.

GONNET (Dr.). Histoire d'une épidémie interieure de fièvre puerpérale a streptocoques. *Lyon Medical*, 1907, cviii, 664.

SANITARY AREAS.

BUND (J. W. WILLIS). The area for Sanitary Administration. *Jour. Roy. Sanit. Inst.*, 1907, xxviii, 49.

SCARLET FEVER.

HEKTOEN (L.). Is scarlet fever a streptococcus disease? *Jour. Amer. Med. Assoc.*, 1907, xlviii, 1158.

SEWAGE.

REID (G.). Discussion on the question to what extent must Authorities purify sewage. *Jour. Roy. Sanit. Inst.*, 1907, xxviii, 97.—Nitrification of sewage. *Jour. Roy. Sanit. Inst.*, 1907, xxviii, 142.—SCOTT-MONCRIEFF (W. D.). The bacterial treatment of sewage, with special reference to the Biolysis of organic nitrogen. *Jour. Roy. Sanit. Inst.*, 1907, xxviii, 117.

SMOKE ABATEMENT.

ASCHER (L.). Coal smoke abatement in England. *Jour. Roy. Sanit. Inst.*, 1907, xxvii, 88.

SWINE FEVER.

PREISZ (H.). Untersuchungen über Schweinesuche. *Zeits. für Tiermed.*, 1907, vi, 161.

TUBERCULOSIS.

CALMETTE (A.). On the etiology and vaccination of tuberculosis. *Jour. Roy. Inst. of Pub. Health*, 1907, xv, 130. CHAVEAU (A.). Sur la tuberculose primitive au poumon et des ganglions bronchiques et mediastinaux, communiqué aux jeunes Bovides par l'ingestion de virus tuberculeux d'origine bovine. *Comp. Rend. Acad. des Sci.*, 1907, cxliv, 777.—HOMAN (G.). The danger of dust as a cause of tuberculosis in domestic households, clubs, hotels, schools and certain other establishments. *Jour. Amer. Med. Assoc.*, 1907, xlviii, 1013.—LIGNIERES (J.). Sur la vaccination des bovidés contre la tuberculose. *Rec. de Méd. Veter.*, 1907, lxxiv, 112.—PEARSON (L.). Review of recent investigations and observations upon the immunisation of cattle against tuberculosis. *Veter. Jour.*, 1907, lxxii, 139.—STANLEY (D.). The selection of cases of phthisis for Sanatorium treatment. *Birmingham Med. Rev.*, 1907, n.s. ix, 117.—TOMARKIN (E.). Ueber die Antibakterielle Wirkung einiger neuer Desinfektionsmittel, speziell über ihre Einwirkung auf Tuberkelbazillen ein tierischen Organismus. *Zeit. für Tuberkul.*, 1907, x, 339.—TRAUTMANN (H.). Wohnungsdesinfektion bei Tuberkulose. *Zeit. für Tuberkul.*, 1907, x, 396.—VAN GORKONS (W. J.). Die Tuberkulosekämpfung in der Niederlanden Ihre, Geschichte und bisherigen Erfolge. *Zeit. für Tuberkul.*, 1907, x, 431.

VETERINARY SCIENCE.

THEILER (A.). Veterinary hygiene principle applicable to Stock in South Africa. *Veter. Jour.*, 1907, lxxii, 152.

LAW REPORTS.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.

December 1st, 3rd, 1906.

BEFORE COLLINS M.R., COZENS-HARDY AND FARWELL, L.JJ.

WOOD GREEN URBAN DISTRICT COUNCIL v. JOSEPH.

A pipe laid in private property and conveying the drainage of several houses belonging to different owners into the public sewer is a sewer repairable by the Local Authority, and not a single private drain within the meaning of the Public Health Acts Amendment Act, 1890, when some of the houses are drained in pairs into this pipe in such a way as to make these connecting pipes into sewers.

This was an appeal by the Urban District Council from a decision of the King's Bench Division, reported in PUBLIC HEALTH, Vol. xviii, p. 394. The Court dismissed the appeal, affirming the decision of the Court below for the same reasons.

January 14th, 1907.

BEFORE COLLINS, M.R., COZENS-HARDY AND FLETCHER MOULTON, L.JJ.

WOOD v. EAST HAM URBAN DISTRICT COUNCIL.

Public Health Act, 1875, Section 189. Matron of Isolation Hospital.—Right of Authority to dismiss.

A person employed by a Local Authority as a matron of an isolation hospital is an officer or servant of the Authority, and in the absence of special provisions in the contract of employment may be dismissed at any time at the pleasure of the Local Authority and without notice.

This was an appeal from a judgment of ALVERSTONE, L.C.J., in an action tried by him and a special jury, and a new trial was asked for. The action was brought by the plaintiff for damages in lieu of notice to terminate her employment as matron of an isolation hospital which had been established by and belonged to the defendant Council. It appeared that she had been engaged by their medical officer in 1895, on their instructions. Her salary was £1 a week, with board and washing. The appointment was made by the medical officer and confirmed by the Council, but he had no power to make any provision as to terminating the contract. There was no written contract entered into between the parties. In 1900 the plaintiff's salary was increased to £60. In January, 1904, in consequence of some complaints about the management of the hospital, a Committee recommended that she be requested to resign, but this she refused to do. The defendant Council thereupon gave her one month's notice to leave. She left at the end of the month, but claimed that she was entitled to three months' notice. The jury thought that a three months' notice was reasonable, and assessed the damages at £25. ALVERSTONE, L.C.J., gave judgment for the defendants on the ground that the contract ought to have been in writing.

C. Jones appeared for the plaintiff. Macmorran, K.C., and L. M. Richards for the defendants. The appeal was dismissed.

COLLINS, M.R., said it was unnecessary to determine whether or not the contract ought to have been in writing, because Section 189 of the Public Health Act, 1875, afforded a complete answer to the plaintiff's claim. By that section it was provided that "every urban authority shall also appoint or employ such assistants, collectors, and other officers and servants as may be necessary and proper for the efficient execution of this Act, and may make regulations with respect to the duties and conduct of the officers and servants so appointed or employed. Subject, in the case of officers any portion of whose salary is paid out of moneys voted by Parliament, to the powers of the Local Government Board under this Act, the urban authority may pay to the officers and servants so appointed or employed such reasonable salaries, wages, or allowances as the urban authority may think proper; and, subject as aforesaid, every such officer and servant appointed under this Act shall be removable by the urban authority at their pleasure." These words completely covered the case of this lady who was employed as a matron, and the authority had therefore power to dismiss her without a reason assigned, and at pleasure at any time.

Cozens-Hardy and Fletcher Moulton, L.JJ., concurred.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.

March 26th, 1907.

BEFORE LORD ALVERSTONE, L.C.J., DARLING AND A. T. LAWRENCE, JJ.

EVANS v. WEATHERITT.

Sale of Food and Drugs Act, 1875, Sections 9 and 25—Milk—Warranty—Evidence connecting Consignment with Contract.

In order to prove a warranty as a defence to proceedings for selling milk from which fat has been abstracted it will be sufficient to prove a contract containing a warranty and a delivery note from which it can be inferred that the delivery was made under the contract, and it is not necessary that such delivery note should expressly refer to the contract.

Watts v. Stevens (1906, 2 K.B. 323) distinguished.

This was a case stated by a metropolitan magistrate on the hearing of a summons against the appellant Evans charging him under Section 9 of the Sale of Food and Drugs Act, 1875, with selling milk from which 28 per cent of milk fat had been abstracted, so as to affect injuriously its quality, substance, and nature, without making disclosure of the alteration. The sale of the milk and the analyst's certificate were not disputed, and it was proved that the appellant sold the milk in the condition he received it. The defence was a warranty, and the sole question raised in the case was whether the documents hereinafter mentioned sufficiently complied with Section 25 of the above Act. One document was an agreement of October 23rd, 1905, made between the Great Western and Metropolitan Dairies, Ltd., as vendors, and the appellant as purchaser, by which agreement the appellant agreed to take all his milk from the vendors for twelve months, and the vendors warranted the milk. The particular consignment in question was delivered on June 27th, 1906. It was accompanied by a delivery note, which was the other document in the case. The delivery note contained no reference to the contract or any warranty, but showed

that the milk came from the Great Western and Metropolitan Dairies, Ltd. The Magistrate convicted, as he was of opinion that there was not a sufficient connection in writing between the consignment and the contract, as had been laid down in the case of *Watts v. Stevens* (1906 2 K.B. 323., PUBLIC HEALTH, vol. xviii, p. 633).

Avory, K.C., and *Bailhache* appeared for the appellant; *S. G. Turner* for the respondent. The Court allowed the appeal.

LORD ALVERSTONE, in giving judgment, said that the Magistrate had thought that the case of *Watts v. Stevens* (*supra*) had laid down that there must be a written connection between the warranty and the particular consignment, which must be found in the delivery note. There must be evidence in writing identifying the consignment with the contract, but this connection need not necessarily be in the delivery note. In the present case it was not suggested that the appellant obtained milk from any other people. He produced delivery notes from the Great Western and Metropolitan Dairies, Ltd. The contract showed that all the milk that the appellant sold came from them, that he was to take the milk during twelve months, and that the milk in question was delivered during one of those months. In his judgment, the document of October 2nd was sufficient on the face of it to show that there was a connection between the warranty in the contract and the particular consignment of milk in this case, and that the magistrate fell into an error in thinking that this connection could only be proved in one way.

DARLING and A. T. LAWRENCE, JJ., concurred.

HIGH COURT OF JUSTICIARY (SCOTLAND).

November 20th, 1906.

BEFORE THE LORD JUSTICE CLERK, LORDS STORMONTH DARLING AND LOW.

CRAWFORD v. HARDING.

Sale of Food and Drugs Act, 1879, Section 3—Milk—Taking Sample in course of Delivery—Fair Sample.

When a consignment of milk was delivered in three separate vessels, and on receipt the contents of two of the vessels and part of the contents of the third were poured into one vessel, and the remainder of the contents of the third vessel poured into another, it was held that a sample taken from the remainder of the third vessel was not a fair sample of the contents of that vessel, as the fat may have risen to the top and been poured off with the other part of the contents.

This was an appeal by way of case stated from a conviction by a Sheriff-Substitute upon a complaint charging the appellant Crawford, a farmer, with offences against the Sale of Food and Drugs Act, 1875, Section 6, and Sale of Food and Drugs Act, 1879, Section 3. The latter section enables an inspector to procure samples of milk at the place of delivery to the purchaser or consignee and to have the same analysed and to take proceedings in the same way as if he had purchased the sample from the consignor.

The appellant had sent a consignment of twenty-two gallons of milk to Glasgow under a contract to supply sweet milk. They were sent in three cans, two of which contained eight gallons, and the third contained six gallons. On receipt the consignee poured the contents of the two cans which contained the eight gallons each into a vessel holding twenty

gallons, and he filled this up from the can containing the six gallons, and the remaining two gallons were poured into another vessel. There was no evidence as to whether or not the six-gallon can had been allowed to rest before this operation. The inspector, the respondent, took samples from both vessels and had them analysed. The sample from the twenty-gallon vessel had a percentage of fat of 3.05, and that in the small vessel of 2.8 per cent, or 6 per cent below the regulation amount. Proceedings were taken in respect of the six-gallon vessel.

McRobert appeared for the appellant, *McLennan*, K.C., and *Haldane* for the respondent. The Court sustained the appeal and quashed the conviction.

LORD LOW, after stating the facts, said that what was found was, that after four gallons of the six gallons contained in the can had been removed, the remaining two gallons only contained 2.8 per cent of milk fat. But no one knew the percentage of fat in the four gallons which had been poured out. That would not have been material if the milk at the bottom of the can was necessarily the same as at the top. But that was not so, as the fat had a tendency to rise, and it had not been found that the can had not been at rest so as to allow it to rise. He came to the conclusion that the sample taken from the two gallons was not therefore a fair sample of the whole contents of the six gallons which the can contained.

LORD JUSTICE CLERK and LORD STORMONTH DARLING concurred.
[See 44 Scottish Law Reporter, 84.]

COURT OF SESSION, SCOTLAND.

SECOND DIVISION.

January 12th, 1907.

BEFORE THE LORD JUSTICE CLERK, LORDS STORMONTH DARLING AND LOW.

BURGH OF LEITH v. IRONS.

Burgh Police (Scotland) Act, 1892, Sections 4, 117, and 339—White-washing Common Stair—Owner—Appeal.

A sanitary inspector of a burgh who makes a requisition while acting within the scope of his authority makes it as representing the Town Council, and there is, therefore, a right of appeal from such requisition under Section 339 of the Burgh Police (Scotland) Act, 1892, as amended by the Burgh Police (Scotland) Act, 1903.

The owner of the ground storey of a tenement is not the owner of the common passage giving access only to the upper flats, although his walls may form the boundaries thereof, and he cannot be required to whitewash the same under Section 117 of the Burgh Police (Scotland) Act, 1892.

This was an appeal from an interlocutor made by Sheriff MACONOCHE on a case stated by him. The respondent, Irons, had received a notice from the sanitary inspector of the Burgh of Leith requiring him to white-wash or paint the common stair and common passage of a certain tenement within fourteen days, in terms of the Burgh Police (Scotland) Act, 1892, as amended by the Burgh Police (Scotland) Act, 1903. The notice was served upon him as owner of the common stair or passage, and stated that the other owners had been notified. He was the proprietor of shops in the ground storey of the tenement, but the upper flats belonged to others. The walls of the passage and stair up to the height of the ground storey formed the walls of the shops, but there was no access from the

shops to the passage. He had a right to use the passage for various necessary purposes, such as for sweeping the chimneys of the shops. The owners of the flats above had joint rights in common to the common passage and stair. He brought an action against the Council of Leith. The Sheriff Substitute and the Sheriff decided in his favour. Two points were raised: (1) Whether the notice and requisition of the inspector were the notice and requisition of the Burgh of Leith, so as to make an appeal competent within the meaning of Section 339 of the Burgh Police (Scotland) Act, 1892, as amended by the Act of 1903; and (2) Whether the respondent was an owner of the common stair or passage.

Clyde, K.C., and *Constable* appeared for the appellants, *Dickson*, K.C., and *Munro* for the respondent.

The Court held that the Sheriff was right in regard to both questions.

LORD JUSTICE CLERK said on the first point that, where an official is appointed to do duties under a public body set up by Act of Parliament, his acts, unless he goes outside the scope of the Act, are the acts of those under whom he serves and from whom he gets any authority which he exercises. In this case the orders of the inspector were therefore the orders of the Burgh Council. On the question of ownership, it appeared from the titles that his title to the stair and passage was quite different from those of the owners of the flats above, and that he could not be considered to have any rights of ownership in the passage or stair. The other Lords concurred.

[See 44 Scottish Law Reporter, 287.]

COURT OF SESSION, SCOTLAND.

FIRST DIVISION.

January 26th, 1907.

BEFORE LORDS McLAREN, KINNEAR, AND PEARSON.

CAMERONS v. YOUNGS.

Landlord and Tenant—Insanitary House—Infectious Disease—Defects known to Tenants—Promise of Landlord to Repair—Right of Tenant and Family to Recover Damages for Illness.

A tenant of a house, who knows of its insanitary state and complains to the landlord, who promises to repair the defects, can recover damages from the landlord for the loss sustained through illness occasioned by such insanitary state, and the fact that he knew of the defects and did not leave the house at once is not a sufficient defence. The wife and children cannot recover damages for similar loss, because they are not parties to the contract of letting.

This was an appeal from a Sheriff in an action brought by Robert Cameron, his wife and family, against James and Alexander Young to recover damages for loss sustained through the insanitary state of a house occupied by the Camerons and rented from the defenders by Robert Cameron. It was alleged that he and his wife had frequently complained of the bad smells to the factor of the landlords, and stated that they were sure they came from the drains, and that the factor had promised to see to them. He had also stated that he would remove at once to another house unless the house was put right, and he had looked for one, but before he had found one he was taken ill with typhoid fever and removed to the infirmary. Soon after his wife and some other members of the family were also taken ill and removed to the infirmary. The other members of the family

removed to another house. The drains were then inspected and found to be in a bad state.

The defenders objected to the relevancy of the claim made by the pursuer, Robert Cameron, and also that the other pursuers had no title to sue. The Sheriff decided that Robert Cameron could only sue for the costs of removal to another house, and that the other defenders had no title to sue. The Court affirmed the latter part of the judgment, but held that Robert Cameron had a right to proceed to trial to recover damages on the averments made.

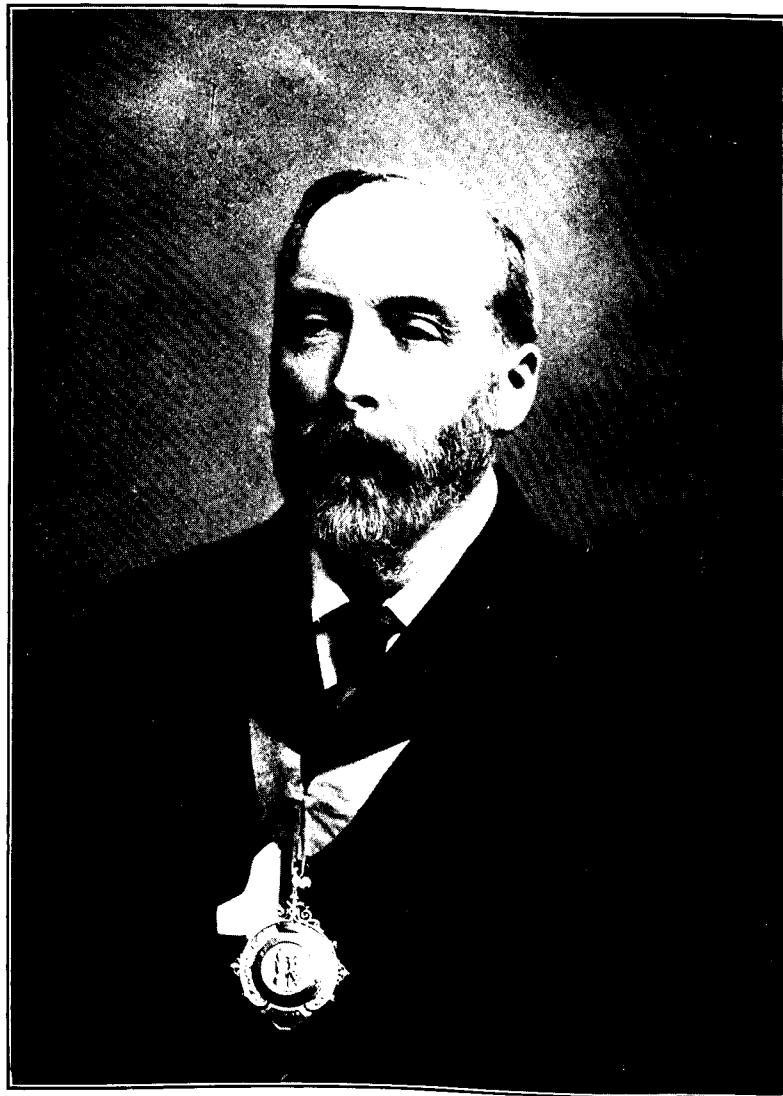
LORD McLAREN, in the course of his judgment said: By the law of Scotland it is an implied term of the contract of location that the subject let is to be maintained in tenantable condition, and it follows that where a house occupied by a tenant becomes insanitary or otherwise dangerous and unfit for occupation, the tenant may treat the contract as broken, and will be entitled to compensation for the expense to which he has been put in finding another residence. He will not in the ordinary case be entitled to compensation for suffering from disease or accident attributable to the faulty condition of the house, if he remains in it with the knowledge that the house is insanitary or insecure. But there may be cases where removal is not necessary as a protective measure. In the case of an insanitary house which the tenant is entitled to quit, if the landlord offers to have the faulty pipe or drain instantly repaired and the tenant agrees to remain in the house, and does remain and contracts disease in consequence, it may be that the landlord induced the tenant to stay on by taking the risk on himself and waiving the objection that the tenant must act as necessary for his own protection. He therefore thought that the case should go to trial. As regards the other pursuers, the claim was founded on contract, and they were no parties to the contract and had no title to sue.

LORDS KINNEAR and PEARSON concurred.
[See 44 Scottish Law Reporter, 344.]

STARCH IN BUTTER.—A provision dealer was summoned at Bow Street on January 14th, by the Westminster City Council, for selling on December 3rd, butter containing 17·48 per cent of water and 0·53 per cent of starch. The defendant said he purchased the butter in rolls from another firm on November 13th, and produced an invoice and a paper marked "pure butter," in which he said one of the rolls of butter was wrapped. He claimed that this amounted to a warranty. The manager of the firm alluded to gave evidence that fresh butter would not keep good many days, and did not think the butter sampled by the inspector was purchased from his firm. Mr. Marsham held that no warranty had been proved, and fined the defendant 40s. and 12s. 6d. costs.

It was stated that the Belgian Government require the addition of 0·2 per cent of starch to margarine, together with 5 per cent of sesame oil.

TINNED MILK.—At Thames Police Court, on April 5th, during the hearing of a charge of selling unsound condensed milk as human food, Dr. L. D. Thomas, medical officer of health for Stepney, informed the Court that 75 per cent of tinned goods when imported into this country from America were unlabelled. The English firms afterwards put their own labels on the tins, and retailed them to the public in that way. Some five years ago he acquainted the Local Government Board with the practice.



Russell & Sons photo.

THE LATE DR. JOSEPH GROVES,
*President of the Incorporated Society of Medical Officers of Health,
Session, 1903-4.*

PUBLIC HEALTH

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THE LATE DR. JOSEPH GROVES.

DR. GROVES, a former President of our Society, died on the 21st of May at his home in Carisbrooke, Isle of Wight, in his 68th year. During the past year his numerous friends on the Councils of the Society of Medical Officers of Health and of the British Medical Association had been noticing with apprehension his failing health, and it is to them a lasting sorrow that they will see no more his fine and commanding presence, nor share again in his wise and conscientious counsels.

It was a privilege to be associated with such a man, whose entire life evidently was controlled by unselfish motives and the highest ideals of conduct. Although it must frequently have involved the gravest inconvenience, he was assiduous in attendance not only at Council meetings, but at all Committee meetings of which he was a member, never sparing time or pains in his efforts for the public health. The keynote of his character was unselfishness, and this was shown both in his relations with his confrères and in the difficult and oft-times obstructed work of medical officer of health of a large number of rural and small urban districts in the Isle of Wight. He was indeed a worthy forerunner of the times when—

“ . . . None shall work for money, and none shall work for fame;
But each for the love of the working, and each in his separate star
Shall draw the Thing as he sees It for the God of Things as they are.”

The single-minded unselfishness of Dr. Groves's character was associated with a strenuousness and fearlessness which never failed him. However unpopular a cause, if convinced of its justice he advocated it, without haste but without rest, at every available opportunity. His annual reports were from this standpoint, as well as from many others, always worth reading; and any medical officer of health having to deal with non-progressive authorities may study them with profit, noting the mingled courage and courtesy with which

they were penned. At the moment of writing the only report of his which is available for quoting is the one for 1897, but the following extracts from it speak for themselves :—

I would point out to you that your rateable value is increasing, and that the most certain mode of hastening its increase is to obtain for your district a good sanitary reputation, which you will not do until you have made provision for the isolation of infectious disease. After the expenditure of infinite labour and time through a long series of years, you have declined as a sanitary authority solemnly charged with serious obligations, to advance in this matter along the path of progress upon which you had entered.....

In a district like the Isle of Wight—with its thirty-seven sanitary "authorities"—dominated by sectional interest, and in which the "personal" enters so largely into all questions, I admit it is very difficult for the best disposed to take broad views of the common welfare.....

A prudent man in his private capacity insures his premises, and if any member of a sanitary authority were known not to be insured against fire, his sanity would be questioned. As a trustee in his private capacity he would be compelled to insure; it is only as a trustee in his corporate capacity, and running no direct personal risk, that he refuses the community their right to the protection of insurance (against disease).....

I have endeavoured, and shall continue to strive, so long as I have the honour to serve you, to guard you against the reproach and scandal of bad engineering work. It may be a delicate subject, but it ought not to be. There should be no choice. The very highest skill necessary should be obtained . . . What is cheapness? It does not consist of all sorts of petty economies, and the shirking that kind of expenditure which should be generous, not to say lavish, if security can be obtained.....

Your three years of service will have left their permanent mark upon your district. I am unable to say you have not halted when you should have gone forward, or that the interests of the individual have never prevailed over the general good; but when all that may appear unworthy, and the resulting evils are forgotten, there will remain enduring monuments of your administration in the independent supply of pure water.....

It would be easy to multiply further quotations with a similar ring of earnest, outspoken advice and warning, which never became discourteous. We cannot refrain from quoting the last sentence of his report for 1897. In it he says :—

"The work you have done, while you were opposed and discouraged by those from whom you had a right to expect sympathy and help, will make for the prosperity of this Island, and will have an enduring effect for generations to come upon the health and happiness of its people."

These were the appreciative words written by Dr. Groves to the local authorities whom he faithfully served; and they may be claimed with even greater appropriateness as a fitting testimony to the life and work of one whose memory to those who were privileged to be his friends will always be a precious possession. A. N.

SINCE the preceding appreciation was written, Dr. Hugh Stott, who represented the Society and the Southern Branch at the funeral, has furnished

the following particulars. Dr. J. Groves was interred at Newport Cemetery on Friday, the 24th of May. Every house and shop in Newport had blinds drawn and shutters up; the pavements were lined with crowds of poor persons, chiefly men, with bared heads. The church of St. Thomas, Newport, where the full choral service was held, was filled with members of the Bench, the Guardians, and Local Authorities with which Dr. Groves was associated. "It was a wonderful sight to see the signs of simple affection to him. . . . He was simply worshipped by the poor, attending many for years without fees."

Dr. Groves was a bachelor of medicine and of arts in the University of London. He was a magistrate, and in many other ways made his influence and character tell on the life of the island, including the encouragement of horticulture and sports. He was never married. He lived in a small cottage at Carisbrooke, filling it and several empty houses near it, which belonged to him, with a collection of old china, paintings, ivories, antique silver, and furniture. His collection of antiques is said to be extremely valuable, and it is believed that he had intended to found a museum for the Isle of Wight.

In the resolutions of local authorities which have so far come to hand, tribute is paid to "his remarkable independence, treating the squire exactly as he did the peasant"; and to his "useful and able public work, his marked independence, and his love and kindness for the poor, which would be a lasting monument to his name."

EFFICIENCY AND EXPENSE.

DR. O'CONNOR'S paper and the discussion arising out of it reported in the last issue of PUBLIC HEALTH gave much insight into the difficulties impeding efficient sanitary administration in large combined sanitary districts. One of the chief of these difficulties consists in the expense of journeying to and fro. The time involved in such journeyings cannot with equal reason be stated to be a serious difficulty; for even when train services are not available, the motorist is now able to cover great distances in a short time. The real and only difficulty, therefore, which prevents the medical officer of health from making systematic and frequent visits to the most distant parts of extensive sanitary areas is the expense of efficient locomotion. A painful instance of this is recorded in a recent report by Dr. Deane Sweeting on the general sanitary circumstances and administration in part of one of the eastern counties of England. The medical officer of the one urban and three rural districts referred to receives a total salary of £272 per annum. He is appointed yearly to each of the above four districts separately. He is allowed nothing for travelling expenses and is debarred from private practice. Dr. Sweeting has found it necessary to pass certain strictures on the work of the medical officer

of health in question. Although his entries in his journals as to infectious diseases are fairly full, there is no record of "action taken" on matters referred to in previous reports, and seldom any on "directions of council on matters reported." The report goes on to state that "... had the candour to acknowledge to me that he could not afford to go round his districts regularly in view of his meagre salary, since it cost him a considerable sum for horse hire every time he took a journey of inspection. . . . As it is . . . says that he spends some £40, out of the total £272, on horse hire. The area of the two districts is over 100 square miles."

This particular instance brings out very strikingly the evils of the present arrangements for paying medical officers of health. It obviously puts a premium on inefficiency to mulct an officer each time that he has to make a distant visit. Dr. Sweeting in his list of recommendations says: "The medical officer of health should give more time to the regular and systematic inspection of both districts. The councils should consider the question of making an allowance towards the travelling expenses of this officer." It is unfortunate that the Local Government Board apparently cannot go further than the expression of opinion embodied in the last quoted sentence. It would greatly increase the efficiency of administration of combined sanitary districts if the Local Government Board had power to regulate the size of such combinations, to prevent their arbitrary separation, and to insist on reasonable travelling and other expenses being paid apart from salaries. Is it too much to hope that this may be given, by new legal enactments if necessary?

EFFICIENT DEMOCRACY.*

UNDER the above title a recently published book has been sent to us, which from many social standpoints is an eloquent plea for the installation of efficient methods of check on the various branches of work for the betterment of the people. Mr. W. H. Allen, the author of this book, starts out with the dictum that to be efficient is more difficult than to be good, and that the average citizen honestly in favour of "good government" fails to appreciate that intelligence and efficiency are as far beyond the reach of mere goodness as is business efficiency beyond the reach of mere good intention. Hence the general necessity for "efficiency tests." Such tests cannot be

* *Efficient Democracy*. By Wm. H. Allen, General Agent, New York Association for improving the Condition of the Poor; Secretary, Committee on Physical Welfare of School Children. (New York: Dood, Mead & Co., 1907, 346 pp., 8in. by 5in.).

applied without accurate knowledge, and knowledge of details of government cannot be made common property without statistics. Mr. Allen lays down the bold rule that an "honest man who is inefficient can do more to defeat the purpose for which he is employed than a dishonest man compelled by intelligent supervision to render efficient service." Hence efficiency tests are more important than, and must to a large extent be substituted for, goodness tests. The value and the justification of these dicta lies in their application, and the sixteen chapters of Mr. Allen's book bear out his premises. The contents of the first chapter, dealing with "The Goodness Fallacy," may be summarised in the words "No man is good, unless good for something. Goodness is subjective. Goodness for something is objective, and may be counted, weighed, tested." We do not, for instance, require hospital managers, because they are men of undoubted worth, or eminent in some particular, but on account of their business capacity.

THE STATISTICAL KEY TO EFFICIENT GOODNESS.

To avoid corruption in any branch of government, the statistical method intelligently applied ensures a prompt record of work accomplished, and of needs disclosed. Notwithstanding the ancient criticism as to the hierarchy of liars—plain liars, expert liars, and statistics—statistics are universally employed, and indeed indispensable. They are often dull, still oftener untrustworthy, and frequently overloaded with unnecessary detail, but efficiency in any department cannot be tested without them, and the remedy for their defects is to employ competent men as statisticians, and for business men to insist on such dissection of data by these statisticians as is required for administrative insight, to enable them to gauge efficiency.

THE STATE AS DOCTOR.

No better instance of the statistical test of efficiency could be given than the inauguration of public health measures. In England they owed their initiation in large measure to our national system of death returns; and their efficiency can similarly be measured by death and sickness returns. The weekly and quarterly comparisons contained in the reports of the Registrar-General are a constant stimulus to the laggards in sanitary administration: and we are only at the beginning of the utility of this means of efficiency. The districts with a high infant mortality, and with a high death-rate from phthisis will, as time goes on, have the search-light of public attention directed to them, and will be compelled to alleviate, and as far as is practicable remove the evil conditions, making them conspicuous by high death-rates.

HOSPITAL EFFICIENCY.

MR. ALLEN's remarks as to hospital efficiency may be applied with advantage to the management of isolation hospitals. He points out the necessity of hospital authorities not only themselves knowing what each item of service costs, but also of showing the public that they know, and of enabling the public also to know. The attention now being drawn to efficient hospital administration, both in this country and in America, must do great good. "No hospital is rich enough to afford an incompetent book-keeper. No hospital is too poor to afford proof that it is run on an economical basis consistent with efficiency in treatment." The following remarks are of special value, in view of the enormous waste of time of skilled officers in filling up schedules. "Men whose affairs are organised on the principle that a \$100 clerk should never be permitted to do the work of a \$30 messenger will go into a hospital and spend their time on routine inspection,

making estimates, and counting details." An efficient business man converted into a hospital governor does not "analyze his own and his colleagues' experience; accepts from a hospital treasurer a summary of the year's work that does not show where the hospital stood at the beginning of the year, how far it has travelled, in what direction it is going, what needs it has met, and what needs it has failed to meet." The above deficiencies of hospital accounts obviously militate against public support, for "an uninformed public is a fickle friend." In the preceding paragraphs only a few of the valuable suggestions contained in Mr. Allen's interesting book have been mentioned: but the whole book is instructive, and should lead to the more general introduction of business methods into the public life of communities.

ACCOUNT KEEPING IN ISOLATION HOSPITALS.

As an important branch of administrative efficiency, we draw attention to a valuable report on the Isolation Hospitals of Derbyshire, recently issued by Dr. Barwise, in which the subject of account keeping in isolation hospitals is fully considered. By Section 17 of the Isolation Hospitals Act, it is enacted that the expenses incurred in respect of any isolation hospital shall be classified under the headings of structural, establishment, and patients' expenses. The schedule form drawn up by the Local Government Board, Dr. Barwise states, does not give sufficient details to enable full and accurate comparisons of the expenses of different hospitals to be made. One of the chief difficulties in allocating expenses occurs in regard to provisions for patients and staffs respectively. It is obviously very difficult to keep separate accounts for the food of staff and patients, and Dr. Barwise suggests that in order to insure uniformity in accounts, the simplest plan would be to charge for the staff 7s. 6d. per head per week under this heading, and to transfer the balance of the costs of provisions to the patients' expenses account. The system appears to be preferable to charging for the patients and transferring the balance to the staff, because the amount of food consumed by the patients is more variable than that consumed by the staff. It would be a most useful reform were a detailed schedule of expenses made out and all isolation hospitals instructed to adhere to this schedule.

THE CONTROL OF TUBERCULOSIS.

DR. H. ARMSTRONG in a recent exhaustive report to the City Council of Newcastle-upon-Tyne makes valuable suggestions on the control of tuberculosis. He criticises adversely the model milk clauses of various Corporations. No power is given to deal with any form of tuberculosis among cows, however extensive, other than disease of the udder; although, as shown by many bacteriologists, the milk of cows without visible sign of tuberculosis of the udder may be infectious. Dr. Armstrong recommends that every Sanitary Authority should have power to apply the tuberculin test, and to prevent the sale of the milk of any cow reacting to this test.

Attention is also drawn in this report to the objectionable practice of sweeping the footways with ordinary brooms. He adds: "This process is carried out by shop-keepers in all main thoroughfares at the time when they are crowded with foot passengers on their way to business; and the dust, especially in windy weather, is both disgusting and a serious source of disease. The invention of an apparatus after the style of the household carpet sweeper for taking the dust from footways without creating a nuisance, would be a public boon. Sanitary Authorities would insist on its adoption, and it would rapidly gain favour with shopkeepers." Dr.

Armstrong's remarks in this report on the establishment of a National Sanitary Authority are given on this and following pages.

WOMEN'S WORK IN PUBLIC HEALTH.

IN a recent paper on the aim and scope of women's work in relation to public health, Dr. Meredith Richards draws attention to the importance in allotting women's work in public health administration, of paying due regard to the fundamental differences between the two sexes, not only in training, but also in their physical and mental capabilities. Evidently, as he points out, we are not making the best of the human material unless we recognise these aptitudes, and assign to each the task which each can do most efficiently with the greatest ease to themselves and advantage to the community. This is not a question of superiority, or inferiority, but one of recognising differences. Women's minds, as was observed by Buckle many years ago, are not only more deductive than men's, but quicker of apprehension; and these qualities make them specially valuable for the educational side of public health work, as in the instruction of mothers, the care of children, and personal hygiene generally. Their work, Dr. Richards added, would undoubtedly be greatly increased when the compulsory medical inspection of school children was begun; for much of the preliminary work of medical inspection could be entrusted to a trained nurse.

A NATIONAL SANITARY AUTHORITY.

By H. A. ARMSTRONG, D.Hyg., M.R.C.S.,
Medical Officer of Health of Newcastle-upon-Tyne.*

THE treatment of tuberculosis as a serious national menace is one of the highest imaginable, and one to the promotion of which any man may be glad to devote the best energies of his life. Such a work to succeed must be carefully planned and energetically executed. Its scope extends far beyond the selfish aims of party politics or the restricted sphere of an incorporeal Local Government Board; it requires for its conception, initiation and direction, a governing body freed from narrow interests and local prejudices, and having in view only the good of the State; a body so constituted as to represent the hygienic interests of all classes of the community alike; and prepared to give to the public health service that continuity of attention and breadth of treatment which the subject demands. An Authority, constituted of representatives of County Councils, Metropolitan and Provincial, and the large Sanitary Authorities, Urban and Rural, of the kingdom would form a truly representative and popular

SUPREME NATIONAL HEALTH AUTHORITY

to consider and deal with all questions of purely public hygiene, including, *inter alia*

Tuberculosis in man and animals;

* From a special report to the Newcastle City Council

Milk and meat supplies ;
 Infant mortality ;
 Occupational diseases ;
 Water supply ;
 Vagrancy ;
 Vaccination ;
 Physical degeneration ;
 The disposal of sewage ;
 The pollution of rivers ;
 The prevention of disease through shell-fish in polluted waters ;
 The promotion and encouragement of the use of bacteriology as a preventive measure in relation to disease ;
 The prevention of syphilis as a national evil ;
 The housing question in all its phases ;
 The stimulation of lax local authorities and the assistance of others in the carrying out of necessary sanitary reforms in their respective districts, &c., &c.

The securing of the necessary powers and funds to carry out the requirements in respect of the foregoing matters ; and

Any other questions relating to public health.

In the contemplation of an original scheme of the nature and extent above indicated, among the first questions likely to arise are those as to the necessity for it. It may be asked "Are not the means already available for promoting the physical health of the population sufficient for the purpose ? If not, in what respect do they fall short, and what are the advantages of the innovation proposed over those of existing institutions ?"

The answers to the foregoing queries are as follow :—

The consideration and carrying out of all matters relative to the maintenance and improvement of the public health at present rest with

1. Parliament.
2. The Local Government Board.
3. Occasional Royal Commissions and Departmental Committees.
4. Local Sanitary Authorities.

With respect to the first of these, it has been truly said that Parliament has neither time, opportunity, nor inclination for the study of public health questions, each political party being too much absorbed in its own immediate concerns to be able to attend to matters of mere general sanitary interest, unless these are forced into notice, for example, by the dread of some impending epidemic. If it be advanced that the above drawback is met by the establishment of the Local Government Board, the reply is that that Board has already as much

work to do as, *from its singular constitution*, it can manage.* Moreover, its organisation and the character of its existing duties unsuit it for the consideration and treatment of questions such as those at issue. Of strictly orthodox views, it perceives from the outside only, and fails to appreciate the difficulties which Sanitary Authorities see and feel from within. Accustomed to stereotyped methods of procedure and averse to new departures, instead of leading, it discreetly sails in the wake of public opinion.

Royal Commissions and Departmental Committees do unquestionably excellent service in collecting and analyzing information on matters of public importance. But their function is advisory, not administrative ; their investigations are merely special in character and limited in scope ; and their work usually ends with the issue of their report.

Local Sanitary Authorities, as at present constituted, being isolated from each other and entirely self-centred, have no common bond of union, such as the health of the population at large, for which to work. That they are quite able and willing to combine in the promotion of such objects is proved by their readiness to meet in conferences for the consideration of questions of public health, and by the unanimity of their conclusions on these occasions. Here again the efforts of a large assembly of Authorities are apt to fail in effect through want of continuity of action and permanent cohesion on the part of its members.†

State medicine demands fuller and more special attention than under existing circumstances it either receives or can be expected to receive. The remedy for this is the establishment of a permanent *Supreme National Health Authority*, representative of the whole of the Sanitary Authorities of the kingdom, and entrusted with the sole object of safe-guarding and improving the bodily health of the race. Such an Authority will find ample scope for its deliberations and ever-increasing demands on its energies.

* See Annual Reports of the Local Government Board.

† This was only too plainly demonstrated at the Conferences convened by the London County Council on Small-pox in relation to Vagrancy in 1894 and 1904. The resolutions passed at the first of these Conferences were forwarded to the Local Government Board, and were heard of no more. At the second Conference a Committee was appointed to wait on the President of the Local Government Board, but the then President declined to receive the deputation. Shortly afterwards, on this gentleman leaving office, his successor was induced to receive the deputation, and did so, but almost immediately had to relinquish office on a change of Government. Since then, so far as is known to the writer of the present report, no further steps have been taken in the matter.

THE METROPOLITAN MAIN DRAINAGE AND ITS EFFECT ON THE MORTALITY, 1857 TO 1907.

By P. CALDWELL SMITH, M.D.,
President of the Metropolitan Branch.*

THE subject of my Address differs in some respects from that of my predecessors, as it deals with that which at first sight appears to belong to another profession—that of sanitary engineering.

My reason for choosing the subject was chiefly the fact that in January, 1857, the first paper read before this Society was one by my immediate predecessor in Wandsworth, Dr. Nicholas, on "The Drainage of the Metropolis by a Continuous Water Flow."† For this knowledge I am indebted to the Jubilee Number of PUBLIC HEALTH, recently published under the able supervision of Dr. R. Dudfield.

Medical officers of health in 1857 had to deal with very different conditions in regard to drainage than those which exist in 1907, and a perusal of the local reports of fifty years ago shows that our predecessors were quite alive to the necessity for improvement in this subject, and that the representations made by them to their respective Authorities had a very good effect on the Central Authority.

In reading these reports of the medical officer of health for this district for 1856 and 1857, one is struck by the ability which characterized the work, and by the fact that in many cases the measures recommended for preventing disease were far in advance of the time. This is to a large extent shown in the paper read by Dr. Nicholas fifty years ago, and one must remember that this was before the main drainage scheme of the Metropolis was matured.

I do not think that the public are always sufficiently grateful to those who have preceded them, nor do they give them sufficient credit for their labours, and very specially is this true of preventive medicine. Sir John Simon in his *English Sanitary Institutions* says very truly, "It is a favourite reflection among philosophers, that if departed great benefactors of our race could now and then look down on the harvest fields where mankind age after age is gladdened by the fruits of their labours, they would in general find themselves less remembered than perhaps their terrestrial ambitions had desired. Doubtless this is so, but let the noble compensation be noted that often the thoroughness of a reformer's victory is that which most makes silence of a

* Presidential Address delivered before the Metropolitan Branch.

† *Sanitary Review and Journal of Public Health*, vol. III, page 65.

reformer's fame. For how can men be adequately thankful for redemptions when they have no present easy standard, no contrast between yesterday and to-day by which to measure the greatness of them? Dr. Nicholas begins by stating that the delay in draining the Metropolis was due to an absence of a proper knowledge of sanitary science, and a consequent absence of data. He also stated that the question was a purely sanitary one, and that the engineering difficulties could easily be overcome. "The initiative consideration of the subject," he says, "particularly belongs to the province of the medical officer of health. I trust I need no excuse therefore in soliciting earnest attention to the subject, inasmuch as it would appear inconsistent with the objects of this Association that its members, the elected guardians of the public health, should remain inactive in a matter which so deeply concerns their public duties."

After giving some historical references to the subject of drainage, he stated that Rome was superior to London in many ways, as in the sewerage system of the former a continuous supply of water existed. The sanitary conditions with regard to removal of effete matter were at that time very bad, and we have only to refer to the reports of our predecessors, where numerous examples are given of the serious nuisances which resulted. Dr. Nicholas says that this removal was effected by horse and cart, and partly by drains, that cesspools were universal, and that this system was not only insufficient but was the cause of serious mischief. I have no doubt that similar remarks may be found in the reports of other medical officers of health.

The most important point in this paper is, however, the statement that the flow of water in sewers should be constant, independent of rain-fall and slop water, and for this purpose he advised that reservoirs should be constructed or that sea water should be used, the latter being also advised for street watering and public and private baths. We must recollect that at this time the water supply of the Metropolis was not constant, that it was supplied to cisterns only for a few hours a day, and frequently every second or third day, and that a considerable number of inhabited houses had for their only water supply that derived from surface wells, and in some instances from streams and even the Thames itself. The rain-water pipes also were in many instances not connected to the drains, and consequently the amount of water in the sewers was very small, and not sufficient to carry off the solid matter. The drains that were in existence were badly laid, were mostly constructed of bricks, and were not self-cleansing. These discharged into cesspools, and the overflow from these discharged into the nearest ditch, and thence into the Thames.

In the report of the Royal Commission on Sewage Discharge it was said that the state of the Thames was at that time alarming, and that since 1848, when the first Consolidated Commission put its powers into force for the abolition of cesspools, the river had become very foul, and that the noxious smell was intensified by large deposits of sewage matter on the flat banks, which were left dry at low water. A year after the reading of Dr. Nicholas' paper, viz., in 1858, it was stated in the House of Commons that members were unable to sit in the Committee Rooms in consequence of the stench from the river, and similar statements were made in the House of Lords.

With regard to the outfalls Dr. Nicholas made three suggestions: either that the sewage should be utilized for manure after deodorization, or that it should be used for direct irrigation, or that it should be discharged direct into the sea. The two former he did not think were desirable; but the discharge into the sea, although wasteful, was the method that ought to be adopted. Dr. Nicholas humorously adds that this system is not so wasteful as it would appear, as "the fishermen say that it is returned to the aldermanic table in the form of fat, wholesome fish." In conclusion he says that, "an abundant and continuous water flow for the dilution and removal of all sewerage is the only available means to prevent loss of life, and as to the loss of sewerage, until chemistry steps in it is evident that either the sewerage must be economized at the cost of health, or health and life must be preserved at the expense of sewerage." I have purposely quoted the above remarks of Dr. Nicholas to show that medical officers of health at that time were, as they are now, in advance of the times, for if we carefully enquire into what has been done since we will find that it has all proceeded on the lines of obtaining, as far as possible, a continuous water flow.

At the time the above paper was read the question of the main drainage of London was still under consideration, and if we refer to the various and numerous reports made on the subject we shall see that there were diverse opinions expressed as to the methods which should be adopted to gain the desired end. Time will not permit me even to mention the earlier schemes which were advanced previous to the plan submitted by Mr. Bazalgette in 1856, but it is interesting to note that the principle of interception put forward by that famous engineer was in reality an idea originated in 1834 by John Martin, the celebrated painter.

After many vexatious delays—as is nearly always the case with any legislation which deals with public health matters—the principal Act was passed in 1858. One very extraordinary feature of this Act was

that the Board of Works were to be the sole arbiters of the method of construction, and that the Legislature was to have no control except that no nuisance was to be caused. This was due to three reasons:—

- (1) The river was in a very foul state and the matter was urgent.
- (2) The general principle of interception was agreed upon.
- (3) The only divergence of opinion was with reference to disposal of sewage and to the position of the outfalls, and these points could be left for future decision.

Shortly after this the necessary works were commenced, but it was not until the year 1865 that the system was formally opened. Even then portions of the Bazalgette scheme were incomplete, and it was not until the year 1875 that the low level sewer and some of the pumping stations were completed. The principle adopted by Mr. Bazalgette may be best stated by quoting from the original paper on the subject read before the Institute of Civil Engineers in March, 1865. In that paper, after giving a short historical resumé of the subject, he says, "The objects sought to be attained in the execution of the main drainage works were the interception as far as practicable by gravitation of the sewage, together with so much of the rain-fall mixed with it as could be reasonably dealt with, so as to divert it from the river near London; the substitution of a constant instead of an intermittent flow in the sewers; the abolition of stagnant and tide-locked sewers, with their consequent accumulations of deposit; and the provision of deep and improved outfalls for the extension of sewerage into districts previously, for want of such outfalls, imperfectly drained." After briefly stating a few of the considerations and general principles upon which his scheme is based, Mr. Bazalgette gives a detailed description of the works. It is not necessary for my purpose to enter into these details, as I have no doubt all of you are well acquainted with them, but I shall briefly refer to the principal works proposed and carried out. On the north side of the river three main sewers were constructed, respectively called the High Level, the Middle Level, and the Low Level Sewers.

The High Level sewer begins by a junction with the Fleet Sewer at the foot of Hampstead Hill and passes through Tufnell Park Road, Holloway Road, Stoke Newington, Church Street, Hackney, and then through Victoria Park to a junction with the Middle Level Sewer at Old Ford. This sewer is about seven miles long, is mostly circular, and varies in size from 4ft. in diameter to 12ft. by 9ft. 6in. It has a very good fall, especially at the upper end. The whole of this sewer has been in operation since May, 1861.

The Middle Level Sewer begins at Kensal Green near Harrow Road,

thence under the Canal to Uxbridge Road, along Oxford Street to Clerkenwell Green, then by Old Street to High Street, Shoreditch, along Bethnal Green Road, under the Regent's Canal and Railway to Old Ford, where it joins with the High Level Sewer. A branch of this sewer is carried along Piccadilly, through Leicester Square to King's Road. The length is about $9\frac{1}{2}$ miles, and of the Piccadilly branch 2 miles. The size varies from 4ft. 6in. by 3ft. to 10ft. 6in. in diameter. This sewer is at some parts 60ft. deep, and is formed mostly in the London clay. It was completed about the end of 1864.

The Low Level Sewer begins at Grosvenor Road, and passes along Lupus Street to the river, then along river side and Thames Embankment, then past the Tower of London to Limehouse, along Devons Road, under the Lea to Abbey Mills, where the sewage is raised 36ft. by pumping to the outfall sewer. This sewer also receives the drainage of the low-lying land about Hackney and the Isle of Dogs at a point between Bow and Bromley. The length of the sewer is about $8\frac{1}{4}$ miles, and its branches about 4 miles. Its size varies from 6ft. 9in. to 10ft. 3in. in diameter. The western branch of this sewer drains Fulham, Chelsea, Kensington, Hammersmith, and part of Acton, and it was originally intended to treat the sewage from this sewer with chemicals and discharge it direct into the river near Pimlico. Strong objections were raised to this, and it was necessary to construct a pumping station at Grosvenor Road, where it is pumped into the main Low Level Sewer. The extension sewer from Acton is about 6 miles long and varies much in size in the different districts it passes through.

The outfall sewers, constructed of two wrought iron culverts, from Old Ford to Abbey Mills, each 9ft. by 9ft., are built on a concrete embankment. At Abbey Mills the low level intercepting sewer is pumped 36 feet into another sewer 9ft. by 9ft., and the three are continued to Barking Creek. These sewers have been in use since March, 1864. The reservoir at Barking covered $9\frac{1}{2}$ acres with a capacity of about 35,000,000 gallons, but Bazalgette intended the sewage to be stored in this reservoir till high water, when it was to be discharged into the river.

On the south side of the Thames the main line of the High Level Sewer began at Clapham, and the branch line at Dulwich. These drain an area of about twenty square miles, including Tooting, Streatham, Clapham, Brixton, Dulwich, Camberwell, Peckham, Norwood, Sydenham, and part of Greenwich. The main line varies in size from 4ft. 6in. by 9ft. to 10ft. 6in. by 10ft. 6in., and the branch from 7ft. diameter to 10ft. 6in. by 10ft. 6in. These two branches unite in New Cross Road near New Cross Station, and from thence run to Deptford.

The Southern Low Level Sewer does not follow the course of the river as on the north side. Beginning near Putney Bridge, it passes through Wandsworth, Battersea, Nine Elms, Lambeth, Newington, Southwark, Bermondsey, Rotherhithe, and Deptford, where at Deptford Creek the sewage is pumped 18 feet into the outfall sewers. With reference to this sewer Mr. Bazalgette says, "The sewers throughout this district have but little fall, and except at the period of low water were tide-locked and stagnant, consequently after long continued rain they became overcharged and were unable to empty themselves during the short period of low water." He also says further on, "The want of flow also caused large accumulations of deposit in the sewers, the removal of which was difficult and costly. These defects, added to the malaria arising from the stagnant sewage, contributed to render the district unhealthy." This sewer is about 10 miles long and varies in size from 4ft. barrel at Putney, to 7ft. at the lower end.

The southern outfall sewer from Deptford to Crossness is about $7\frac{3}{4}$ miles long, and is entirely underground. It is 11ft. 6in. in diameter and has a fall of two feet per mile. The construction of this sewer was very costly and difficult on account of the quantity of water in Plumstead Marshes. In spite of these difficulties the sewer was completed in June, 1862. At Crossness the sewage is pumped from the outfall sewer into the reservoir, although it was intended to discharge the crude sewage at or near low water without pumping if necessary. The reservoir is $6\frac{1}{2}$ acres in extent and is similar in construction to that at Barking.

In connection with the intercepting sewers there are several pumping stations, two on the north side, the western, where the sewage is raised 18 feet, the Abbey Mills, where it is raised 36 feet, and two on the south, one at Deptford, where the sewage is raised 18 feet, and the other at Crossness, where the lift raises from 10 to 30 feet according to the level of the water in the sewer and in the reservoir into which it is lifted. The total length of these intercepting sewers is 82 miles, and the cost of construction was about £4,100,000.

In 1865 Mr. Bazalgette stated that the sewage on the north side amounted to 10 million cubic feet per day, and on the south side to 4 million cubic feet, but provision was made for an anticipated increase up to $11\frac{1}{2}$ millions on the north side and $5\frac{3}{4}$ millions on the south side, in addition to $28\frac{1}{2}$ million cubic feet of rain-fall per day on the north and $17\frac{1}{4}$ million cubic feet per day on the south side; a total of 63 million cubic feet. One question which was the source of much anxiety and enquiry by the engineer was how to dispose of the rain-fall. He put aside the idea of having a separate system in London as

being most impracticable, and decided to deal with the rain-fall when excessive by means of storm overflows at various parts of the system. Overflow weirs were constructed at the junction of the intercepting sewers with the main valley lines, and these were intended to act as safety valves in time of storm. There are in all 48 of these storm overflows, 35 on the north and 13 on the south side. These discharge direct into the Thames with two exceptions, one on the banks of the Effra at Nine Elms, and the other at the Falcon Creek. In 1878 the Board of Works erected a pumping station at the Effra outlet to relieve the southern Low Level Sewer when surcharged with rain water. The lift is 17 feet and the storm water can be discharged into the Effra Creek at any state of the tide. At Falcon Creek also a similar station was erected, but here the lift is only 11 feet.

This short and necessarily imperfect account of the work carried out under the supervision of Mr. Bazalgette is, however, sufficient to show the magnitude and importance of the work, and I am sure medical officers of health will agree with the statement of Messrs. Worth and Crump in a paper read before the Institute of Civil Engineers in 1896, that the designers of the scheme have left behind them an enduring monument to their perseverance and ability.

Up to the year 1882 no addition to the main intercepting sewers was constructed, but in that year an important extension of the southern High Level Sewer was carried out. This begins at Roehampton Lane, and after passing through Putney, Wandsworth, Battersea, and Clapham Common, joins the original system near Clapham Road Station. The works for the discharge of sewage into the Thames at Barking and Crossness were not completed till 1865, but it was not till 1868 that complaints were made as to the pollution of the Thames. In that year the inhabitants of Barking presented a memorial to the Home Secretary, and an enquiry was ordered. This enquiry was held in June, 1869, and the conclusions were, *inter alia*, that the allegations were only partially proven, and also that deodorization and disinfection of the sewage by chemicals would be very costly and the results imperfect. From 1867 to 1880 the Thames Conservators had been watching the condition of the river, and after the above report was made they, in 1870, approached Parliament with a view of preventing the discharge of sewage without previous treatment. The Bill was passed in an altered form, and the Board of Works were prohibited from causing any deposit or obstruction from the sewage. In 1877 a report was made to the Conservators, in which it was stated that offensive accumulations had formed in the Thames channel, but the officials of the Board of Works denied this. In consequence it

was arranged, in view of the 1870 Act, that the matter should be settled by arbitration. The arbitrators met in 1879, and in 1880 reported that the banks in question were not caused by the sewage but by the dredging operations. Serious complaints continued to be made, and the nuisance became so grave that a Royal Commission was appointed in 1882 to report on the following points :—

- (1) "The system under which sewage is discharged into the Thames by the Metropolitan Board of Works."
- (2) "Whether any evil results therefrom"; and
- (3) "In that case what measures can be applied for remedying and preventing the same."

After holding 59 meetings and examining 126 witnesses, the Commissioners, in January, 1884, issued their first report, and the conclusions they arrived at were, that a nuisance was caused by such discharge, and that the evils and dangers were likely to increase with the increase of population. In their final report in November, 1884, they recommended that some process of deposition or precipitation should be used, and that this could be carried out at the two present outfalls. They also recommended further purification, after precipitation, by the application of the effluent to land by intermittent filtration. Another recommendation was, that if land could not be conveniently obtained at the present outfalls, the sewage should be conveyed farther down the river. We shall see, however, that it has not been found necessary either to adopt intermittent filtration or to remove the outfalls, as the methods adopted so far have been found most efficacious in preventing any nuisance. As far as the precipitation of the solids is concerned this has been carried out at Barking since the year 1889, and at Crossness since 1892.

Experiments were made by Mr. Dibdin, the chemist to the Board, and the results, after having been submitted to and approved by a Committee of experts, were adopted and the necessary works put in hand. The sewage arriving by the three main sewers at Barking was at first screened to remove any floating solids, but this screening has been done away with for some considerable time; then the proper quantity of lime is added, this quantity varying with the strength and rate of flow of the sewage. Usually, however, the amount is about 4 grains to one gallon of sewage. The lime is added in solution as milk of lime, the crude sewage being used to make this solution. At Crossness, however, this solution of lime is made with river water. The iron salt is then added in solution to the limed sewage which flows into the thirteen precipitation channels. These channels are from 1,000 to 1,300 feet in length, and in them the sludge falls to the bottom,

and the supernatant liquid falls over a weir and then into the river. The sludge is then swept by hand labour from these precipitation channels through culverts to a receiving chamber, from which it is pumped into the sludge settling tanks. Before pumping, however, the sludge is screened and a considerable amount of heavy solid matter removed. The amount of solid matter collected at these screens is about 100 tons per week, and this is removed by barges to low-lying land farther down the river. After settling, the supernatant liquid is drawn off by syphons and the sludge is discharged into storage tanks, from which it is pumped into the sludge vessels. Occasionally, however, in times of fog or very stormy weather, it is necessary to pump the sludge into high level reservoirs, of which there are three, each capable of containing 1,000 tons, sufficient to load one vessel, and this can be done by gravitation. With some modification the same system is used at Crossness, but Mr. Dibdin stated in 1896 that, "in consequence of the more effective arrangements for making lime water at Crossness, the results have been more satisfactory than at Barking Creek."

By the above process the condition of the River Thames has been much improved, and an inspection of the works made by me about three weeks ago showed that there was no offensive deposit at the outfalls, and that the sewage entering the Thames differed little if any in colour from the river water above the outfalls. Mr. Dibdin, however, in 1896 stated that while the addition of chemicals was evident, the action of the bacteria in the sewage was not so evident, although the latter were far more potent in destroying the organic matters remaining. The sludge is conveyed by the ships to that part of the estuary beyond Southend or Shoeburyness, where it is distributed over a length of about ten miles of open sea.

Although on the whole the main drainage acted more efficaciously in removing the sewage, yet it was found that in some localities occasional flooding occurred. As early as 1885 a new pumping station was provided at the Isle of Dogs to relieve the flooding there, and another station was also erected at King's Scholars' pond, Westminster, at the point where it formerly discharged into the Thames.

In December, 1889, soon after the London County Council took up the duties of the Metropolitan Board of Works, the Council instructed the Engineer to report on the subject of the main drainage system, and for this purpose to secure the services of another Engineer to co-operate with him. In accordance with this resolution, Sir Benjamin Baker and Sir A. Binnie, the Engineer to the Council, after a careful enquiry, presented in February, 1891, an elaborate and able report to

the Council. This report deals with (1) The condition of the main drainage system; (2) The treatment of the sewage at the outfalls; (3) The condition of the Thames; (4) The new works necessary to prevent flooding, and to provide for future increase; and (5) The question of new outfalls farther down the river.

They found that the flow in the intercepting sewers on the north side was, in ordinary dry weather, 18 to 23 per cent of the maximum in the high and middle level sewers, and 70 per cent in the low level, and in the sewers on the south side there it was stated that the pipes at Deptford Creek could only pass 9,000 cubic feet per minute, while the maximum discharging power of the high and Effra branch sewers was 34,000 cubic feet per minute. They also stated that the works as originally designed had become over-taxed on account of the increase of population, and that the storm outlets into the Thames were brought into operation whenever the rain-fall amounted to one tenth of an inch.

They therefore recommended the construction on the north side of a new outfall sewer from Old Ford to Barking, a new intercepting sewer from Paddington to Old Ford, and the separation of the Isle of Dogs and Hackney Wick branches, including pumping engines, while on the south side they recommended a new outfall sewer from Deptford to Crossness, a new high level intercepting sewer from Dulwich to Crossness, and new engines and buildings at Crossness. In 1891 the Main Drainage Committee reported that the proposed works were urgent, and plans were prepared, but it was not until 1895 that the Committee recommended the Council to—

(1) Construct one additional outfall sewer from Old Ford to Barking.

(2) Construct a new intercepting sewer from Paddington to Old Ford.

(3) Erect pumping stations at Lots Road, Chelsea, and Imperial Road, Fulham, and construct a new sewer from Hackney Wick to Abbey Mills pumping station.

The Council did not agree to the two first recommendations, but adopted the third. In the meantime, however, a very important sewer had been constructed from the Isle of Dogs to prevent flooding in Limehouse, Poplar, and the Isle of Dogs, the original sewer being much too small and quite incapable of dealing with the storm water from these districts. At the same time a new pumping station was erected at Abbey Mills. This resulted in largely increasing the pumping power at this station, so that not only were the districts above mentioned relieved, but more power was available for the sewage

from the northern low level sewer. Storm relief sewers were also constructed in certain localities to prevent flooding, and the Main Drainage Committee reported that these had the effect of relieving the affected districts to some extent, but they did not think that the full benefit would be felt until the construction of the new intercepting sewers.

Strong representations continued to be made to the Council by various Local Authorities, and the majority of these urged the construction of the new intercepting sewers recommended by Sir B. Baker and Sir A. Binnie in 1891. The Engineer to the Council presented a report to the Council in April, 1899, and the Main Drainage Committee stated that, owing to the great increase in population, and to the future increase, they were of opinion that all the sewers recommended by the Engineer must ultimately be carried out, and that it was absolutely necessary that the capacity of the outfall sewers should be increased without delay. They, therefore, recommended :—

- (a) That two additional outfall sewers be constructed between Abbey Mills and Barking Creek, each 9ft. in diameter.
- (b) That an additional outfall sewer 11ft. 6in. in diameter be constructed between the Deptford pumping station and the Crossness outfall works.
- (c) That a portion of the suggested new sewer from Crossness outfall to Catford be constructed.

These recommendations were adopted by the Council. In December, 1899, works were recommended and passed by the Council, including a new sewer between the high level and middle level sewers on the north side, and a new sewer from Deptford to Battersea on the south side; and they reported, in February, 1904, that considerable progress had been made with the works. At the same time they were also of opinion that other remedial measures should be taken for the disposal of storm waters in certain localities; and they, therefore, proposed the construction of relief sewers to communicate directly with the sewer or with other sewers connected therewith. Some of these have been put in hand; but it will be a considerable time before all the works recommended and passed by the Council can be carried out.

Of the works recommended in 1904 I have been able, through the kindness of the officials of the Engineering Department of the London County Council, to ascertain the following :—The enlargement of the northern outfall sewers from Old Ford to Barking is practically completed and in operation. The northern Low Level Sewer from Hammersmith to Bow is in progress. The storm relief sewer at

North Kensington and the Hornsey and Stroud Green relief sewers have been completed. On the south side, the new outfall sewer between Deptford and Crossness is nearly completed, and the new High Level between Catford and Crossness is well advanced. The storm relief sewer from Wandsworth to Battersea is completed, and the new Falcon Creek pumping station will shortly be in working order. The Bermondsey and Southwark storm relief sewer is in progress; and the new pumping station for storm water at Shad Thames is about to be commenced.

I have purposely refrained from even mentioning all the relief sewers which have been constructed at various times; and I have not mentioned at all the lines of main drainage other than the intercepting lines, as such a work would not only be unnecessary, but would overburden this paper with complicated details. The total cost of these works from 1856 up to March, 1905, was over nine million pounds (£9,000,000), and it will require further two millions to complete the schemes now in hand and projected. The total amount of sewage discharged in 1904 was about 92,000 million gallons, 54,000 millions at Barking, and 38,000 millions at Crossness. This means a discharge of about 250,000,000 gallons per day at both outfalls.

The result of the above drainage works has been most beneficial, and has conduced largely to the health and well-being of the inhabitants of the Metropolis. We know from contemporary literature that the condition of things in London as regards drainage was very bad in the seventeenth and eighteenth centuries. Swift in his "City Shower" portrays vividly the effect of a heavy fall of rain at Holborn Bridge; and describes, in another passage, the Fleet Ditch as "surrounded with a hundred stinks." The Registrar-General in his Report for 1872 states that London, with impure wells and without sewers, was a city of plagues up to the seventeenth century; and was called in the eighteenth century one of the graves of the nation. Dr. Farr, in the Supplement to the thirty-fifth Annual Report, remarks, "The mortality of the City of London was at the rate of 90 per 1,000 in the latter half of the seventeenth century, 50 in the eighteenth, against 24 in the present day."

The great reduction in the general death-rate has not been due to the better drainage of London alone, although it has been a most powerful factor in producing such reduction. Reference to statistics, however, shows that the (we hope) permanent reduction began shortly after the drainage was completed, and that it has continued. Even Farr never dreamed of the reduction in the London mortality to 16 per 1,000. In the same report he says, "It will not be pitching the

standard of health too high to assert that any excess of mortality in English districts over 17 annual deaths to every 1,000 living is an excess not due to the mortality incident to human nature, but to foreign causes to be repelled, and by hygienic expedients conquered." In his thirty-seventh Annual Report he mentions several districts where a very great reduction in the death-rate had resulted from sanitary improvements, and notably re-drainage.

The putrid and pestilential fevers which prevailed in London in the seventeenth and eighteenth centuries were to a large extent due to the accumulations of filth indoors and out-of-doors, concerning which references were frequently made in the medical and other literature of these periods. The writer in Knight's *London* (vol. i., page 230), says, "It is not easy to form an adequate conception of the inconvenience and annoyance which the inhabitants of London must have experienced before the formation of underground communications for carrying off the drainage of private houses. Soil had to be carried from the houses to places appointed by the City Authorities. In 1670 the public laystalls and dung-hills were at Mile End, Dowgate Dock, and Whitefriars. The consequence was that pestilence and disease marked the City as their own." Sir Wm. Petty, at the close of the seventeenth century, said that "one time with another a plague happeneth in London every twenty years."

In the eighteenth century epidemic fevers were very prevalent, especially in 1726-1729, 1740-1742, and 1772-1773. These epidemics being also largely due to pollution of the air by excremental matter. I have found it difficult to ascertain the actual death-rate of this period, as, in the first place, the population of London was not accurately known. The first accurate census taken in 1801 shows that the population was about one million, and in 1741 was estimated to be about 700,000. In the second place, the deaths, as given in the London Bills of Mortality, although fairly accurate up to the end of the eighteenth century, did not include the whole of the Metropolis comprised in the 1801 census. The parishes of St. Pancras, Marylebone, Kensington, and Chelsea were not included, and, consequently, the rates shown on the chart are only very approximately correct. Taking these facts into consideration, the decennial rate 1741-1750, viz., 35.28, is a very high one; but the rate 1791-1800, viz., 21.14, is no doubt the minimum rate, and is, for the reason above given, much under the actual rate. Turning now to the period 1857-1907 we see a very different condition of things, as, with the exception of the years 1864 and 1866, we have a gradually decreasing rate of mortality.

We have already stated that the main drainage works were not

wholly completed till 1874, although the outfalls had been in operation since 1865, and in 1875 Dr. Farr said, "The Metropolitan Board had done their duty, and much responsibility rested on the medical officers of health of the District Boards to bring to the notice of their Authorities the defects in the branch sewers and drains, which deprive the Metropolis of the full fruits of the most stupendous hydraulic works ever created in any country." In the decennium 1841-1850 the mortality was 24.8 per 1,000; in 1851-1860, 23.7; in 1861-1870 it had, owing to cholera epidemics of 1866, risen to 24.4; in 1871-1880 the rate fell to 22.5; in 1881-1890 to 20.5; in 1891-1900 to 19.6; while in the quinquennium 1901-1905 the rate was only 16.7 per 1,000 living. If this reduction of the mortality is any criterion, the medical officers of health have done their duty, and I think we may say that, as a whole, London is the best drained large city in the world. In most of the areas under our control there are some spots where more efficient drainage is necessary, but these are, in comparison with former days, few and far between. It is never safe to prophesy, but I think we may say that London never will again be the most unhealthy city in the Kingdom.

We have only to look at the chart of fever mortality in London from 1851-1905 to see that some powerful factor or factors have been in active operation to produce such a great reduction. In the decennium 1851-1860 the mortality was 880 per million, rising in the decennium 1861-1870 to a little over 900 per million, then falling to only 360 per million in 1871-1880, 212 per million in 1881-1890, and 145 per million in 1891-1900. If the present low mortality continues there is no doubt that in the next decennium the rate will be considerably under 100 per million. There is no need for me, in addressing the medical officers of health, to enter into further details of these rates, but I think you will agree that the reconstruction of the London Main Drainage System has been the cause of a considerable reduction in the mortality from all causes, and particularly from certain causes, and a corresponding increase in the comfort and well-being of the inhabitants of the Metropolis.

THE CITY COUNCIL of Liverpool has increased the salary of Dr. Hope, medical officer of health, from £1,150 to £1,250. Dr. Hope also receives £150 per annum as port medical officer.

DR. GREENWOOD's salary as medical officer of health of Blackburn has been increased from £550 to £650 a year.

ISOLATION HOSPITALS AND SCARLET FEVER.*

By SIDNEY BARWISE, M.D., B.Sc.,
County Medical Officer of Health of Derbyshire.

RECENTLY doubts have been raised as to the value of Isolation Hospitals in dealing with scarlet fever. It should be understood, however, that no attempt has been made to question their utility in dealing with small-pox, enteric fever, and diphtheria.

The case against the isolation of scarlet fever is based upon statistics which have failed to comply with the essential condition of *cæteris paribus*. The charges have obtained a wide hearing; the public have been told that "the infective sick are herded like dumb cattle in pest houses, miscalled Isolation Hospitals." It is advisable to examine the grounds for these charges, to seek the truth that is in them and the remedial steps that can be taken, so that we can avail ourselves of such benefits as isolation conveys without incurring its drawbacks. The case against the isolation of scarlet fever is that "statistics show that scarlet fever is, speaking generally, just as prevalent and causes as many deaths in towns and districts which have built hospitals and spent large sums of money in maintaining them as in those towns and districts which have spent little or nothing on hospitals. Statistics also show that scarlet fever is just as prevalent in towns since they have practised hospital isolation as it was before the practice was begun." The reply to this statement is, in the words of Sir Shirley Murphy, that "the statistical method is inapplicable," for the reason that other conditions bearing on the question are not the same in the groups compared.†

To explain why the statistical method is inapplicable we must bear in mind, as Dr. Fremantle points out, that "the more precise statistics show that the curves of this disease (scarlet fever) undergo a 30-yearly swell, a 5-yearly wave and a seasonal ripple."

A reference to the curve of monthly incidence of cases of scarlet fever in Derbyshire 1894-1906 shows the waves and ripples, and makes it obvious that any result can be obtained by making comparisons of districts in the trough period with districts in the crest period, that no statistics can be reliable until they have been obtained over a sufficiently long period to minimise the effect of waves, and

* From a Special Report to the Derbyshire County Council.

† Although the statistical argument is fallacious, if to minimise this difficulty the groups compared are made to include all available information, the figures taken relating to ninety-three towns with a total population over 10,000,000 show that the attack rate diminishes as the percentage isolated increases.—KAYE.

then only when the districts compared have experienced the same number of waves, and in other respects are comparable.*

There are other facts bearing on the prevalence of scarlet fever which are incapable of statistical presentment, such as social conditions, the general keenness of the medical officer of health and his committee, the efficiency of methods of disinfection, etc.

Then again, in these days of cheap transit the amount of infectious disease in a district does not depend alone on its own sanitary arrangements. In a neighbouring county borough, in which there is an isolation hospital, there was a wide-spread outbreak of enteric fever, traced to a single case in a Derbyshire district in which there was no isolation hospital ("the wrong cloth had been used to wipe a milk can"). Again, some 280 cases of scarlet fever in a London district, in which there is an isolation hospital, were traced to a case in the family of a milker in a Derbyshire rural district in which there was no isolation hospital. These are not isolated examples: the argument in favour of the isolation of the first cases in the rural districts is obvious—but if the statistics were available, although they might point the moral, "don't isolate," it is clear they would be misleading.

With regard to the comparison of the same towns before and after practising isolation, here again the comparisons must be over longer periods than are yet available, and the periods compared must have the same number of wave crests and troughs. The figures ought also to be expressed in rates per 1,000 children under 15. It must also be borne in mind that the density of population, the proportion of children attending elementary schools, are increasing, and would thereby tend to discount the beneficial effects of isolation.

If an attempt is to be made to express in figures the effect of the isolation of scarlet fever, the investigation should be made on the recognized lines of small-pox enquiries, and the attack rate should not be expressed in terms of the entire population, the bulk of whom

* As examples of these other conditions which invalidate the comparisons made, Dr. Kaye gives the following data relating to two towns (Preston and Warrington) which have been used to show the failure of the isolation hospital in the latter.

	Preston.	Warrington.
No. of persons per house ...	4'8	5'5
Proportion (per 1000) of houses with one or two rooms only ...	32	88
Proportion (per 1000) of population living in ditto ...	19	58
Proportion (per 1000) of children under 10 ...	239	270
Number of seats in schools per 100 scholars on register ...	150	107

might, as far as the infection is concerned, be living a hundred miles away, but *in terms of the population exposed to infection*.* Working on these lines Dr. Malet, of Wolverhampton, has collected the facts relating to 4,864 cases of infectable children living in 1,758 houses. He found that after removal to hospital 4·8 per cent of the remaining children contracted the disease, but that when the cases were left at home 28·2 per cent of the other children were infected.

But from the nature of infection no statistics are required to prove that secondary cases must be reduced in houses from which the first case is promptly removed to hospital. We shall not have the full benefit of the system until the whole country is isolating those cases which, if left at home, are a danger to the public health.

There are dangers in connection with isolation hospitals which must be clearly faced—and until we know more of the pathology of scarlet fever the steps to be taken to prevent “return cases” must err on the side of over-caution.

SEDIMENTATION IN THE PURIFICATION OF WATER.

TWO new reservoirs for the storage of water for supplying London were recently opened, one having a storage capacity of 480 million gallons, and the other of 718 million gallons. The provision of these two reservoirs increases the total capacity of the storage reservoirs for unfiltered water possessed by the Metropolitan Water Board to 8,884 million gallons. The Chairman of the Board quoted the following remarks of Dr. Houston, the Board's Water Examiner, on the influence of storage on pathogenic bacteria.

“The chief importance of storage lies in the fact that the micro-organisms of water-borne disease gradually die where they have to contend against the ordinary water bacteria in the struggle for existence. All the available evidence points not only to the practical inability of pathogenic bacteria to multiply in water, but also to the fact that their loss of vitality is only a question of time. If water is stored for weeks or months, the probability of any harmful bacteria surviving becomes excessively remote. Water stored sufficiently long (even if turbid or unpalatable) is in the light of present knowledge a water incapable of giving rise to epidemic disease. The aim of the Water Board is to render it practicable for every gallon of water to pass through a sedimentary stage before it is passed on to the filter beds, thus ensuring the safety of the water-drinkers.”

* Failure to recognize this is at the bottom of the statistical arguments of the opponents of vaccination.

THE AMENDMENT OF THE BIRTHS AND DEATHS REGISTRATION ACT.*

By EDMUND M. SMITH, M.D. Edin.; D.P.H. Camb.;
Medical Officer of Health, City of York;
President of the Yorkshire Branch.

IT is evident that we shall have to be persistent in order to obtain the long and much-desired amendment of this Act. A Select Committee of the House of Commons considered and reported upon the subject so long ago as 1893, and the Physical Deterioration Committee made important recommendations in 1904. And yet nothing has been done.

I need not dilate upon the need for amendment. Fairly exhaustive papers upon the subject by Dr. Kaye, Dr. Snell of Coventry, and Dr. Walford of Cardiff, have recently appeared in our Journal, PUBLIC HEALTH.

I will, therefore, only summarize a few of the chief suggestions in order to propose a resolution.

The following were some of the more important conclusions of the Select Committee of the House of Commons on the subject in 1893:—

1. That in no case should a death be registered unless on certificate of a registered medical practitioner or of the coroner after inquest.
2. That in each sanitary district a public medical certifier should be appointed to investigate all deaths uncertified.
3. That the fact of death should be verified by the medical attendant, but if that be impracticable, on the ground of distance or other sufficient reason, then a certificate should be signed by two persons verifying the death.
4. That medical practitioners should be required to send certificates of the cause of death *direct* to the Registrar.
5. That a compulsory form of certificate should be prescribed.
6. That still-births which have reached the stage of development of seven months should require registration upon the certificate of a registered medical practitioner.
7. That burial should take place only on the certificate of a registrar.

The Inter-departmental Committee on Physical Deterioration were emphatically of opinion that still-births should be registered,—

* Read before the meeting of the Yorkshire Branch at Huddersfield, December 14th, 1906, and discussed at the meeting at Doncaster, April 19th, 1907.

"As, apart from the advantages a system of registration would have in making it easier to bring home instances of malpractice, a knowledge of the facts as to the frequency of still-births would be of great value towards elucidating the causes of infant mortality, by throwing light on the antenatal conditions prejudicial to the survival of the foetus.

"By the system under which deaths are registered, a medical certificate as to the cause of death is not absolutely essential to the registration of a death, or the burial of a dead body, although the certificate is always asked for by the Registrar. Having regard to the heavy mortality affecting children of tender years, the Committee were of opinion that the death of no child should be registered in the absence of a medical certificate as to the cause of death. Every witness who touched the subject was strongly in favour of this amendment of the law as the best means of bringing home to the careless parent the consequences of culpable neglect."

The Committee, therefore, recommended that "still-births should be registered," and that:—

"A medical certificate as to the cause of death should invariably be required before the death of any child, or, indeed, of any other person, is registered. Moreover, the medical certificate should be regarded as confidential, and its contents should never be divulged by the Registrar, as is permissible at present, to the friends of the deceased. It should be sent by the local Registrar direct to the Registrar-General."

These opinions have been strongly emphasized by the Infantile Mortality Conference of last June.

The chief stated causes of "uncertified" deaths are as follows: premature birth, congenital defects, convulsions and dentition, atrophy and debility, diarrhoeal diseases, tubercular diseases, measles, apoplexy, heart diseases and other diseases of the circulatory system, bronchitis, pneumonia, and old age.

Happily, the percentage of deaths "uncertified" has been declining for some years past (e.g., from 4·85 per cent in 1878 to 1·62 in 1904). But the proportion of such deaths under the age of twelve months still remains unsatisfactorily high, as the following statement indicates:—

UNCERTIFIED DEATHS UNDER ONE YEAR OF AGE.

Year.	Total.	Percentage of total "uncertified" at all ages.	Percentage of above under age of three months.	Percentage of latter not referred to Coroner.
1898	4940	47	68	40
1904	3736	42	68	40

In 1898 the Registrar-General said, in his Annual Report, that "the 2,500 deaths which had neither been certified nor referred to coroners included the following:—

(a) Cases attended by qualified though unregistered medical practitioners; (b) Cases informally attested;* (c) Cases attended by midwives; and (d) Cases that had received no skilled attendance in their last illness."

There is abundant demand, then, for the amendment of the present system of the registration of both births and deaths, and upon this matter we ought not to let the Government rest until amendment has been achieved.

I venture briefly to state the chief suggestions which have been made regarding the amendments required:

1. In order to carry out the education of mothers as early as necessary, and in order to secure the maximum of breast feeding, we require to have much earlier notification or registration of births. We congratulate our colleague, Dr. Moore, and the Mayor and town of Huddersfield, upon having obtained Parliamentary powers for securing the notification of every birth within forty-eight hours. But, notwithstanding all that has been said to the contrary, I fail to see why we should not be able to have the legal registration of births within at most three days. The present limit of forty-two days is absurdly extended. Surely it would be as easy for the father (or some person present at birth) to register immediately after birth, and registration would then be much less likely to be forgotten or overlooked. If the father requires half a day's absence from work in order to do it, then he should take it; he frequently takes half a day "off" for much less important business.

2. There is no necessity here to re-state the several undeniable arguments in favour of the compulsory registration of all still-births. They should be registered both as births and as deaths, otherwise statistical difficulties would ensue. They are registered as one or both in nearly every other civilized country but ours, and the necessity for their registration in this country has become seriously intensified by the Midwives Act of 1902.

3. But this amendment would be covered by another one, even more important and satisfactory, viz.: No body of a child which was born, living or dead, after the seventh month of pregnancy, should be buried without the duly registered certificate of a qualified medical practitioner, or of a coroner. Further, there should be no such thing as what are termed to-day "uncertified deaths." All cases of death

* "In some of these cases an informal statement of the probable cause of death was made by a registered medical practitioner, who had either attended the deceased in a previous illness, or had been called in only when the patient was moribund. In other cases the practitioner in attendance was unqualified."

medically uncertified should, under compulsion, be referred by the local Registrar to the Coroner, who should order a post-mortem and hold an inquest, if not in every case, at least in those in which there is the slightest room for doubt. This would do much to put a stop to the neglect of sick children and of aged relatives, to carelessness during pregnancy, to the deliberate permission of the death of illegitimates and other "undesirable" children, and to that new form of insanity called "Christian science"; for there is a most wholesome dread of coroners' inquests amongst the mass of the people.

4. All certificates of the cause of death, required by law to be sent to the Registrar, should be delivered or posted to him by the certifying medical practitioner, *direct, and under sealed cover*. There is much reason to believe that the present method of delivery to the informant or relatives seriously vitiates the correctness of certification, and, consequently, we obtain no correct statistics of deaths due to such causes as alcoholism or venereal disease.

5. *The certifying medical practitioner should be paid a fee by the National Exchequer for each certificate of the cause of death required to be sent by him to the Registrar, only one fee being paid in respect of each death; the certificate to state that he had seen the body after death, and to give the cause of death fully, and as truthfully as possible, according to clear directions stated on the form of certificate; there should be only one legal form of certificate, the use of which by practitioners should be compulsory. Incomplete or apparently inaccurate certificates should be returned to the certifier by the Registrar-General (through the Superintendent Registrar) for correction.*

6. If the District Registrars of deaths be not medical men, at any rate *the Superintendent Registrar of Births and Deaths should be a qualified medical man, and it should be his duty to forward the weekly and quarterly returns of the district statistics to the Registrar-General. I am loath to suggest the addition of any more duties to those of the Medical Officer of Health, but I think there would be decided advantage in his being the Superintendent Registrar (with special stipend of course), for then the deaths returned to the Registrar-General would be more properly, and could be more fully classified, and there would be more accurate handling of the deaths of residents and non-residents. Then we could surely arrange for a much more complete interchange of the facts concerning the latter, between one district and another, than at present exists.*

In conclusion, I beg to propose that we should recommend the Central Society to urge the Government to promote early legislation

embodying the following amendments (*as amended after Discussion*), viz:—

1. The compulsory registration of births within three days after birth.
2. The compulsory registration of still-births.
3. That there should be no registration or burial without a certificate stating the cause of death, from either a qualified medical practitioner, or a coroner, after inquest.
4. That a compulsory form of death certificate be prescribed, that death be verified before certification, that the medical certificate of cause of death be sent *direct* to the Registrar, under cover, and that such certificate should be paid for out of national funds.
5. That the Certificate for burial given by the Registrars of Deaths be retained by the official of the cemetery and returned to the Registrars of Deaths after the interment.
6. That the Local Government Board's definition of "Residents" and "Non-Residents" be extended so as to comprise the deaths of all persons dying or found dead in a district in which they were not permanently resident: e.g. (a) Visitors to watering places, etc.; (b) Bodies washed ashore from shipwreck or from boat accidents; (c) Sudden deaths in railway stations or carriages, etc., in addition to those occurring in public institutions, or in institutions for the reception of paupers or the mentally or bodily sick.

SALARIES OF LADY ASSISTANT MEDICAL OFFICER OF HEALTH.—MISS M. H. WILLIAMS, M.B., writes to the *British Medical Journal* to protest against the salary of £105 per annum, which it is proposed to give for whole-time lady assistant medical officers of health in a provincial town. In her opinion, "for qualified medical practitioners to accept this salary is to admit that, from a financial point of view, their whole expenditure on education was wasted; and from another point of view is to encourage the rankest sweating, and to further reduce the remuneration in a profession that is already underpaid." The proposed salary is about equal to that paid to lady health visitors in many districts. It is about half or a third of what is paid in West End drapers' shops to the female heads of departments in the ladies' showrooms.

NOVEL SLAUGHTER-HOUSE BY-LAWS.—RECENT by-laws for slaughter-houses adopted by the Stockport Town Council include the following very useful powers:—

1. It is forbidden to keep animals in any pound, pen, or lair, unless the following space is provided: for each ox, 24 square feet; for each calf, 8 square feet; and for each sheep, lamb, or pig, 6 square feet of floor space.
2. No animal is allowed to be slaughtered until it has first been effectually stunned; as this includes pigs, it may be assumed that the argument that the money-value of pigs' heads is seriously reduced by stunning, has little if any foundation in fact. Much of the public nuisance from pig-slaughtering will be removed by such preliminary stunning.
3. It is forbidden to slaughter any animal in the view of another animal.

TRADE MORTALITY STATISTICS, WITH SPECIAL REFERENCE TO RAILWAY EMPLOYEES.*

By ANDREW J. LAIRD, M.D.,
Medical Officer of Health of the Borough of Crewe.

THE influence of occupation has long been recognized as one of the most important factors in mortality statistics, and the importance and utility of studying the influence and effect of local industries upon the health of those engaged in them has frequently been pointed out. In the majority of annual reports of medical officers of health the subject receives comparatively little attention, and the reasons for this I soon discovered when I began to make the attempt myself. The one which causes probably most trouble is the matter of classification. The classification of trades in the census reports is doubtless the best possible that could be adopted under the circumstances, but it is one which makes it extremely difficult to utilize the figures for local purposes, and still it is impossible to set them aside, as they are the only source of information as to age distribution of the workmen. This is illustrated in the present case by the great differences in the classification of the Registrar-General and the manager of the locomotive works at Crewe. The former groups under one heading, guards, porters, and pointsmen. If these had represented stages of advancement among the same men at different ages, it might be considered a perfectly natural grouping, such as is seen among engine cleaners, firemen, and drivers. These are the steps in the ladder of advancement in this group of men. Then again, such well-defined groups of railway employees as signalmen, brakesmen, furnacemen, hammermen, forgers, rollers, and moulders are not mentioned at all in the census classification, but are classed under the heading of "Other or undefined engine and machine makers."

Some difficulty also arises (especially in the Registrar's returns of deaths) from different names being given to the same occupation, and also from different occupations being given the same name, e.g., smith may include such trades as that of a blacksmith, whitesmith, copper or tin smith, angle iron smith. A man whose occupation is returned as labourer may be a general, agricultural, or railway labourer, and so on in other trades. This want of accuracy in local death returns results from the absence of any guidance in the

* A Paper read before the meeting of the North-Western Branch at Manchester, April 19th, 1907.

description of occupations. It would be well if some definite and authoritative rules could be laid down, so that local and other returns might be made more readily comparable in this respect. There are several other important points in this connection, but the two above give most trouble.

Probably few towns in this country have their history and growth so closely associated with their chief industry as that of Crewe with the London and North Western Railway Company. That the town, in fact, owes its very existence to the establishment of the railway works is clearly shown in the following historical outline.

The enumerated population of Crewe at the census in 1841 was 203. The township was then composed of only a few farms and cottages, almost the entire population being engaged in purely agricultural pursuits. It was only in 1843, when the Grand Junction Railway works were transferred from Edgehill, Liverpool, to Crewe, that the growth of the town began. This arose from the necessity of housing the railway workmen, and the rate of increase was so rapid that the population had increased to 4,491 in 1851. The works then covered an area of less than three acres, the number of men employed being only 161. After this the history of the town is one of extraordinarily rapid growth, increasing with the development of the engineering works. In 1853 a department for the manufacture of rails was established, and four years later Crewe became the centre of the locomotive and carriage departments of the northern division of the line. Almost every succeeding year saw still further additions to the works, until at the present time we find them covering an area of 138 acres, 39 of which are entirely covered with buildings.

The town contains very few old buildings, practically the whole of it being less than sixty years old. The property is almost entirely of the usual brick two-storey cottage class. 95 per cent of the houses are under £20 rateable value, and there are no slums. Generally speaking, therefore, as regards housing and sanitation, the whole of the population is subjected to precisely similar conditions. What differences arise otherwise have resulted either from factors which are purely personal or from their varying occupations.

The total number of men employed both in the locomotive works and in the running department is about 10,000. Of these, according to the census figures (kindly supplied by Dr. Tatham), 7,386 were living within the borough of Crewe, the number employed in the locomotive works being 4,736, and in the running department 2,656.

The following tables show the number of men employed in the various trades, and age distribution, based upon the census return:—

AGE DISTRIBUTION OF EMPLOYEES IN CREWE LOCOMOTIVE WORKS.

	Under 15.		15-25.		25-35.		35-45.		45-55.		55-65.		65 and over.		Total.
	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	
GROUP I. Fitters, Erectors, Turners, Machinists, Millwrights	62	3	814	37	486	22'3	373	17'1	208	9'5	166	7'6	58	2'6	2177
GROUP II. Smiths, Strikers, Bolt- makers, Spring & Chain- makers, Angle Iron Smiths	10	2	141	27	124	23'6	105	20	73	13'9	56	10'6	16	3'04	525
GROUP III. Boilermakers	20	3	214	32	163	24'1	127	18'8	81	12'01	53	7'8	16	2'3	674
GROUP IV. Furnace & Hammermen, Rollers, Forgemmen, Casters	5	1'5	108	30	112	31'1	75	20'8	42	3'3	12	3'3	5	1'3	359
GROUP V. All other Trades	17	2	301	31	252	30'1	183	21'9	143	17'1	72	8'6	27	3'2	835

AGE DISTRIBUTION OF EMPLOYEES IN THE RUNNING DEPARTMENT.

	Under 15.		15-25.		25-35.		35-45.		45-55.		55-65.		65 and over.		Total.
	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	No.	Percentage.	
GROUP I. Engine Drivers & Firemen	3	0'4	308	34	271	30	163	18'05	122	13'5	31	3'4	5	0'5	903
GROUP II. Porters & Shunters	5	2	106	34	82	26'9	42	13'8	44	14'4	19	6'2	6	1'9	304
GROUP III. Signalmen	0	0	11	17	17	26'1	21	32'3	11	16'9	5	7'6	—	—	65
GROUP IV. Foremen, Timekeepers, Clerks	8	1'5	164	30'7	169	31'6	105	19'6	65	12'1	19	3'5	4	0'7	534
GROUP V. Pointsmen, Platelayers, Labourers	3	0'4	169	24'3	238	34'2	141	20'2	78	12'6	46	6'6	19	2'7	695
GROUP VI. Guards, Brakesmen	—	—	8	5'2	67	43'2	41	26'4	24	15'4	14	9'0	1	0'6	155

From this table it is seen that group I (engine fitters, etc.) has the largest proportion of men under 25, viz., 40 per cent; porters and shunters have 36 per cent; engine drivers have 34'4 per cent; and boilermakers 34 per cent under 25 years of age. The occupations with the smallest proportion of men under 25 are signalmen with 17 per cent, and guards and brakesmen with only 5'2 per cent.

Between 25 and 45 the proportions in each group are: guards and brakesmen 69'6 per cent; signalmen 58'4 per cent; pointsmen, platelayers, and labourers 54'4 per cent; furnacemen, etc. 51'9 per cent; foremen, timekeepers, and clerks 51'2 per cent; engine drivers and firemen 48'05 per cent; blacksmiths, etc. 42'9 per cent; porters and shunters 40'7 per cent; and fitters, etc. 39'4 per cent. Between 45 and 65 years blacksmiths and signalmen have each 24'5 per cent; guards 24'4 per cent; porters and shunters 20'6 per cent; boilermakers 19'8 per cent; pointsmen, etc. 19'2 per cent; fitters, etc. 17'1 per cent; drivers 16'9 per cent; foremen, etc. 15'6 per cent; and furnacemen, etc. 14'9 per cent. At the age period 65 and over, there were no signalmen employed at the time of the census, and there were less than 1 per cent of engine drivers, foremen, and guards at this age. The occupations with the largest proportions of old men were blacksmiths, strikers, etc., with 3'04 per cent; pointsmen, etc. 2'7 per cent; fitters, etc. 2'6 per cent; boilermakers 2'3 per cent; porters 1'9 per cent; and furnacemen, etc., with 1'3 per cent.

To summarize this it may be said that in the running department there are the fewest number of employees under 15 and over 65; that in this department there are no signalmen under 15 or over 65, and that the numbers at these ages among guards, pointsmen, etc., and engine drivers, is very low. The men in this department are, probably from the exacting character of their employment, at the best working period of their lives.

In the locomotive department the fitters and erectors, furnacemen and hammermen are the youngest men, while the smiths, etc., are the oldest men.

The men employed by the railway company are all medically examined before being engaged, and physically, therefore, they are a specially selected class. The earliest age for admission to the company's service is fourteen years.

The workshops in the locomotive works are for the most part lofty, well lighted, and have ample cubic space per head. The sanitary conveniences are modern and kept strictly clean. The workshops are entirely satisfactory in respect of cleanliness, while

with regard to ventilation the different shops vary considerably. Where there are furnaces or forges, or in the rolling mills, one entire side of the shed is open, and the men work practically in the open air, but the engine fitting and erecting shop is a distinct contrast. The windows there are seldom or never opened. With this exception the workshops are all in good sanitary condition.

The following notes upon the mortality of railway employees are based upon the figures contained in the supplement to the Registrar-General's 55th annual report, and upon the reports of the L. & N. W. Railway Co.'s Works Mutual Insurance Society and the insurance society of the running department and the Registrar's weekly returns of deaths.

LOCOMOTIVE WORKS DEPARTMENT.

Group I.—Erectors, fitters, turners, machinists, millwrights. Total number of men, 2,177. This forms the largest group of tradesmen in the railway company's service. They include a larger number of young men than any other group of employees. Their work exposes them to no special or exceptional conditions. It is carried on, however, in a somewhat dusty atmosphere, and although the workshop has windows made to open, the men always keep them shut, and object to them being opened at all.

In the supplement to the Registrar-General's report for 1897 they are shown to have a mortality above that of occupied males from diseases of the nervous, circulatory, and respiratory systems, phthisis, and malignant disease, in this order, while from alcoholism and accident their mortality is below the standard. Their greatest mortality is from gout and rheumatic fever. From my own figures the mortality is high from diseases of the circulatory and respiratory systems and from phthisis, while from malignant disease and apoplexy their mortality is above the average of the locomotive department, although not so high as the other causes mentioned. Their mortality from alcoholism is higher than that of any other group. This, with the dusty, ill-ventilated workshop, probably accounts for the excess of their deaths from phthisis; although it must also be remembered that their age also favours this. Their mortality from old age is exceeded only by that of group II, although the latter includes the largest percentage of men above twenty-five, and the former the smallest. This is probably due to the grouping of millwrights in this class, these being an older class of men on the whole than fitters.

Group II includes blacksmiths, strikers, boltmakers, spring and chainmakers, and angle iron smiths. The total number of men

employed in these trades is 525. The Registrar-General gives the figures for smiths separately, and with chainmakers he groups nail, anchor, and other iron and steel manufacturers. I have grouped them as one class, the conditions and work being in many respects similar, and the chainmakers are too small a group to treat by themselves.

According to the Registrar-General, in order of their importance blacksmiths exceed the standard in their mortality from disease of the circulatory, respiratory, and nervous systems, and cancer. The only disease which exceeds these is rheumatic fever. The causes of death which are below the standard are phthisis, alcoholism, and accident. Among nail and chainmakers the mortality from all causes is considerably higher than that of smiths, among individual causes which are especially high being diseases of the respiratory, nervous, and circulatory systems, and cancer, and diseases which, while below the standard, are still higher than smiths, are alcoholism and accident.

In the local figures, circulatory diseases stand out prominently as the greatest factor in the mortality of this group of men, while next in importance come diseases of the respiratory system and phthisis.

Among locomotive works employees this group contains the smallest percentage of men under twenty-five. Old age is returned as a cause of death more frequently among this than any other class, and from the ages at death this in many instances was apparently premature. The majority work practically in the open air, but they are subjected to great physical strain and to great heat and variations in temperature. This accounts, no doubt, for the high mortality from respiratory and circulatory diseases among them.

Group III consists of 674 boilermakers. This is the most clearly defined group of workers, and there is less ambiguity about the men to be grouped under this heading than any other. There is, however, this source of error, that not infrequently a boilermaker's labourer may have his occupation returned as a boilermaker. For statistical purposes, however, the error is not great.

In the Registrar-General's report diseases of the respiratory system far exceed any other as the cause of death; next come diseases of the digestive system, then accident and diseases of the circulatory system. These are above the standard, while below the standard come phthisis and alcoholism. In the local figures diseases of the respiratory system show the same prominence, and next, although 50 per cent less, come phthisis and apoplexy. Accident among the Crewe boiler-makers is a less frequent cause of death than in any other group in the locomotive department.

Their mortality from old age is very low as compared with smiths and fitters and millwrights. It is, however, higher than that of the next group of workmen. During the ten years 1896-1905 there were no deaths registered as directly due to alcoholism in this group. According to the Registrar-General, their mortality from this cause is low, and is the same as that of smiths, and less than that of fitters and millwrights.

Group IV includes 359 men employed as furnace and hammermen, rollers, forgemen, and casters. None of the trades in this group are specially mentioned by the Registrar-General, but are grouped in the census report under the heading "Other or undefined engine and machine makers." They form, however, quite a well-defined class. The nature of the work is such that only physically strong men are engaged in it. It is extremely heavy, the work entailing a considerable strain upon the muscular and circulatory system, and the men are subjected to great heat. It is scarcely surprising, therefore, that the mortality from diseases of the respiratory and circulatory systems should be excessive, from the former the death-rate being nearly double that of any other class in the works.

Deaths from diseases of the nervous system are low, and especially low from apoplexy. In the ten years 1896-1905 there were no deaths from phthisis or alcoholism among the men in this group. The mortality from old age is the lowest in the locomotive works department. The rate of mortality from accident is slightly higher than that of fitters and millwrights, is double that of boilermakers, but is considerably less than that of smiths and chainmakers. The number of deaths from suicide is higher among this class of men than any other in the company's service.

RUNNING DEPARTMENT.

Group I includes 903 engine drivers and firemen. This also is a very well defined group. It includes a very small percentage of men of 65 and over. The work demands physical strength, endurance, and steadiness. It entails, especially in long-distance fast trains, an enormous strain upon the strength and nervous system. It is stated that in the journey from Crewe to London (a distance of 150 miles) coal is shovelled into the firebox at the rate of nearly two tons an hour, and in the double journey from Crewe to London and back, the fireman feeds the engine with from 10 to 13 tons of coal, no inconsiderable feat. This enormous strain, coupled with long hours and irregular meals, we might expect to see reflected in the mortality figures.

From the Registrar-General's report it is seen that their mortality is, however, very low, being 15 per cent below that of "occupied males." Of the causes of death diabetes heads the list, being exactly double that of the standard, next in order come diseases of the nervous system and accident, and next diseases of the digestive and circulatory systems and cancer. Below the standard is their mortality from diseases of the respiratory system and liver, and deaths from phthisis, while their mortality from alcoholism is extremely low, 85 per cent below the standard, and exactly the same as that among the clergy and ministers.

In the local statistics diseases of the circulatory system are high, next in order come the nervous system and apoplexy, and then diseases of the respiratory system. Their mortality from accidents is much lower than any other group of employees in the running department, and their mortality from alcoholism is low, and much below that of the locomotive works employees.

Group II includes 304 porters and shunters. These are classed by the Registrar-General along with guards and pointsmen, although in the census return they are kept apart. They therefore correspond to groups II, V and VI in the Crewe figures. Taking the Registrar-General's figures first, the outstanding feature of these is the enormous mortality among guards, porters, etc., from accidents, a fact which is also a striking one in the local statistics. From various other causes the mortality is below the standard, lowest of all being that from alcoholism. In groups II, V and VI of the local figures, there were no deaths from alcoholism in the ten years 1896-1905. It is evident, therefore, that the men employed in the running department are amongst the most temperate in the country.

In groups V and VI the number of men employed was in each 695 and 155. The chief causes of death in both are diseases of the respiratory and circulatory systems.

Group III is a very small one, including only 65 signalmen. In the ten years 1896-1905 there were no deaths among them from any of the following causes: diseases of the nervous and respiratory systems, accident, apoplexy, cancer, alcoholism, or old age. The chief causes of death were diseases of the circulatory system and phthisis. This group, although mentioned in the census return, is not mentioned separately in the Registrar-General's report. The fact that none of the men in this class are under 15 and none over 65 accounts to a great extent for the extremely low mortality among them. The employment apparently requires men who are in the best physical condition, and causes which in other classes of work would only

lessen the working capacity, without altogether excluding them from work, in this case would seem to render the men unfit for the occupation.

There are several other groups of railway workmen whose occupations do not fall conveniently within any of those I have already mentioned. One of these is the labourer, who in the Registrar-General's report is grouped along with platelayers. I have placed him in a somewhat similar group, but have also distributed in the following table the deaths of 538 railway labourers extracted from Insurance Societies' reports according to their causes. From this it seems that by far the most frequent cause of death among them is disease of the respiratory system. Next, but a long way behind, come diseases of the circulatory system, and then phthisis. Deaths from accident and alcoholism far exceed those in any other group of railway workers.

Another large group is formed by those engaged in sedentary or indoor work, and includes clerks and draughtsmen. Out of 61 deaths among them 15 were from phthisis, 9 from disease of the nervous system, and 8 from disease of the respiratory system. No other cause of death contributed more than 5 deaths in this group.

Any statistics of railway employees would be incomplete in which special mention was not made of accidents. In the table shown below, both fatal and non-fatal accidents met with while on duty in the Company's service are given for a period of twenty years. These relate to men employed in the running department only, among whom the liability to accident is undoubtedly greatest.

STATISTICS RELATING TO ACCIDENTS AMONG MEMBERS OF
L. & N.W.RLY. CO.'S INSURANCE SOCIETY (RUNNING DEPARTMENT).

(From the 37th Annual Report of the Society.)

Year.	Number of Members.	Fatal.	Non-fatal.	Year.	Number of Members.	Fatal.	Non-fatal.
1885	8,212	6	5	1895	10,463	6	6
1886	8,256	5	4	1896	10,817	9	1
1887	8,419	5	4	1897	11,466	6	6
1888	8,582	8	6	1898	11,199	12	4
1889	9,092	14	7	1899	11,531	11	6
1890	9,435	9	3	1900	11,503	4	0
1891	10,054	6	4	1901	11,305	7	1
1892	10,453	11	1	1902	11,698	11	9
1893	10,387	6	8	1903	11,490	5	10
1894	10,388	5	10	1904	11,496	5	11

In the Registrar-General's report the railway employees whose mortality from accident is above the average of occupied males are (beginning with the highest) labourers, guards, porters, engine-drivers, and boilermakers.

The death-rate among the general public (including railwaymen) from railway accidents in England and Wales during the year 1905 was '04 per 1,000 males. In the twenty years 1885-1904 (given above) the average rate per 1,000 men employed was '73, the lowest being '35 per 1,000 and the highest 1'5 per 1,000. Porters and shunters, guards and brakemen both had a rate of 0'64 from this cause, next come smiths and chainmakers with a rate of 0'38, and then pointsmen, platelayers, and labourers, with a rate of 0'29 per 1,000. The only men among whom no fatal accidents were registered were signalmen, while those with the lowest rates from this cause were engine-drivers, boilermakers and foremen and time-keepers.

In conclusion I may say that I am aware of the limits of usefulness of such figures as I have placed before you and of the danger of basing too broad deductions upon them.

The fallacies to which such statistics are subject are well known, and there is only one which I would specially mention here. It is in connection with the recorded mortality from alcoholism. The opinion is sometimes expressed by those who have been associated with them for many years, that this or that particular class of workmen are heavy drinkers. And such opinions, although not founded upon anything which is reducible to demonstrable proof, are not infrequently in accordance with fact. The extremely low mortality from alcoholism among men employed in some of the more skilled kinds of work may quite well be due to the fact that a workman addicted to the excessive use of alcohol becomes by that reason incapacitated, and so is discharged, and when death occurs his occupation is registered in some lower grade of employment, where the possible consequences of intemperance would be trifling or at least less serious.

The figures, nevertheless, have a distinct interest, and serve to illustrate some interesting points in connection with trade mortality. They also incidentally illustrate the difficulty of obtaining reliable local statistics and point to the need, if anything is to be done in such an important matter, for some improvements in the registration of sickness and death.

There is an immense amount of valuable information regarding sickness among certain classes of men in the possession of Friendly and Insurance Societies. In 1894 a system of voluntary notification of sickness among their members, by the Secretaries of Friendly Societies, was inaugurated in Crewe by my predecessor, Dr. Herbert Jones. The anticipations which were formed of its value were unfortunately never realized, as the returns were very incomplete, and even the payment of the same fee as that for the Registrar's returns

of deaths failed to produce more than a tenth of the total. After a final effort to obtain more complete returns had failed, the scheme, which had promised so well, was reluctantly abandoned in 1902.

There can be little doubt that this is a source of extremely valuable information which ought to be placed at the command of all health authorities. Our experience in Crewe of voluntary notification, even when paid, extending over a trial of eight years, is that it is practically useless. There seems no reason why such returns should not be made compulsory.

In his Presidential Address to this Branch of the Society in 1903, Dr. Wheatley made a suggestion on the subject of trade mortality statistics, which, if carried out, would be of immense value. It was, that when the Registrar-General had obtained all the information he wanted, the census enumeration books should be returned to the local authorities.

The issue to local registrars of instructions as to the entry under the heading of occupations would also be of great service. In the meantime it is possible for each medical officer, by getting into touch with the local registrar, to remedy some of the errors which are most likely to detract from the value of the death returns. Other points which might be mentioned are not all of equal importance to every district; e.g., the absence of any trade statistics for females in the Registrar-General's decennial supplements has no special interest for a place like Crewe, where the amount of female labour is very small, but will have a very special bearing upon the health of the community in places like Blackburn or other places where female employment is common.

There is little doubt that if the suggestions I have mentioned were carried into effect, the subject of the influence of trades upon the health of those engaged in them would receive much greater attention from medical officers of health than it does at present. The local knowledge possessed by them would be of the greatest value in the interpretation of the statistics which could then be compiled, and would lead to the application, when the need for such was indicated, of measures to remedy any condition operating unfavourably upon health.

MEAN ANNUAL MORTALITY AT SUCCESSIVE PERIODS OF LIFE IN 1890, 91, 92.
(From R. G. Supp. to 55th Annual Report.)

	Ages	15-	20-	25-	35-	45-	55-	65 upwards.
Occupied Males	...	2'55	5'07	7'29	12'43	20'66	36'66	102'32
" (Industrial Districts)	...	3'05	5'53	8'65	15'91	27'82	50'15	120'44
Engine Driver and Fireman	...	4'45	4'91	5'44	7'21	16'09	42'46	152'96
Guard, Porter, Pointsmen	...	5'15	5'43	6'45	9'19	17'28	35'52	89'07
Railway Official, Clerk	...	3'33	6'75	7'76	9'48	16'41	27'63	94'73
Engine, Machine Maker, Fitter, and Millwright	...	3'01	5'44	7'23	12'56	24'27	47'10	146'38
Boilermaker	...	2'40	4'48	6'62	11'97	21'99	43'81	125'00
Blacksmith, Whitesmith	...	1'77	4'27	5'80	10'81	20'74	39'45	120'55
Nail, Chain Makers, and other Iron and Steel Manufacturers	...	3'21	6'12	8'81	15'81	28'50	55'30	157'04
Railway Platelayer, Labourer, &c.	...	6'03	6'19	8'33	13'04	22'76	41'70	98'76
DITTO AMONG CREWE WORKMEN, 1898-1905.								
GROUP I.—Engine Fitters, Erectors, Millwrights	2	5	8	14	32	153		
II.—Smiths, Strikers, &c.	0'7	2	7	2	28	168		
" III.—Boilermakers	1	5	2	9	7	81		
" IV.—Hammermen, Furnacemen, &c.	3	6	4	30	91	240		
" V.—All other trades in Loco. Dept.	2	9	8	17	29	133		
Engine Driver and Fireman	1	1	4	4	38	440		
Porter, Shunter, Cleaner	2	1	2	9	—	33		
Signalman	—	—	—	—	—	—		
Foreman, Inspector, &c.	0'6	—	0'9	4	36	175		
Guard, Brakesman	—	4	4	8	21	400		

REVIEWS.

THE ARCHIVES OF NEUROLOGY—Vol. III. London: Published for the Asylums Committee of the L.C.C. by Macmillan & Co.

The papers comprised in this volume constitute the third volume of the *Archives of Neurology* (Ed., Dr. Mott) from the pathological laboratory of the London County Asylums, Claybury, Essex. The papers throughout reach a high standard of excellence, and both the London County Council and Dr. Mott are to be congratulated on the result.

Although the range covered is extensive, from pure histological and physiological research to the description of clinical cases, they all have direct or indirect connection with the central nervous system. For the purposes of this review only those papers which have a more immediate relation to public health are especially noticed.

The article on Alcohol and Insanity by Dr. Mott, which is an abstract of a paper read before the Medico-Psychological Society and published in the *Journal of Mental Science*, 1906, is interesting for the support it gives to the theory that although alcohol may frequently be a contributory cause of insanity it is comparatively rarely the efficient cause. "It may perhaps be worth mentioning as an interesting illustration of the danger of *post hoc ergo propter hoc* reasoning in regard to pseudo-alcoholic cases, that in both these inquiries (i.e., L.C. asylums . . . 'Alcohol as a Cause of Insanity') total abstinence was found to be much more frequent than intemperance as an antecedent of insanity." Dr. Branthwaite is quoted in support. "I am satisfied that the majority of our insane inebriates have become alcoholic because of congenital defects or tendency to insanity, not insane as the result of alcoholism." Again, Dr. Mott says: ". . . I am of opinion that there is no proof that insanity would diminish to anything like the extent that is believed by some enthusiasts if alcohol were abolished. The results of the valuable enquiry into the incidence of cirrhosis of the liver at Charing Cross Hospital and at Claybury Asylum by Dr. Candler are very important, and are included in this article. Dr. Mott had previously come to the conclusion that as a rule only people with an inherently stable nervous system could drink long enough to acquire advanced alcoholic cirrhosis of the liver, and Dr. Candler's enquiry entirely supports that view. In the hospital 8 per cent of the cases at autopsy showed alcoholic livers, while at the asylum only 2 per cent were found. A large part of the article deals with the symptoms of alcoholic insanity.

A paper is contributed by Dr. Ascherson "On Some Aspects of the Mental State in Alcoholism, with special reference to Korsakow's disease." Although no text-book of medicine which did not refer to this disease could be considered up to date, still probably few doctors know the group of symptoms constituting the disease and still less its name. The paper is a long one, 98 pages, but well repays the reading. Any advance in the knowledge of mental diseases is specially important from a public health point of view. Dr. Ascherson is therefore to be congratulated on his very able monograph, which will probably be referred to as the standard English description of the disease for some time to come.

The practical enquiry into the diphtheroid organisms in the throats of the insane by Drs. Eyre and Flashman was mainly undertaken with a

view of throwing further light on the work of Dr. Ford Robertson, who in several recent papers has suggested that a diphtheroid organism may play an important part in the production of general paralysis of the insane. Should this theory be true the discovery would of course be of overwhelming importance. Hence the great value of any practical work bearing on the subject. The number of cases examined was not large, material being obtained from 138 living cases and from 33 autopsies. The authors were unable to trace any causal connection between the *Bacillus diphtherie* and general paralysis of the insane.

Dr. Candler contributes a very valuable criticism on Dysentery in the London County Asylums. The identity or otherwise of dysentery and ulcerative colitis is unfortunately not yet settled. Osler (6th ed.) says simple ulcerative colitis . . . "is often regarded wrongly as a form of dysentery." Dr. Candler says (p. 299) that so far he has not ascertained any evidence as to their etiological relationship justifying Osler's conclusion. The difference of opinion may be explained by the fact that Professor Osler is basing his conclusion on a wide experience of sane people, while Dr. Candler is referring more especially to asylum cases. The evidence as to the direct infectivity of dysentery or ulcerative colitis here collected from the various London asylums, lends great weight to the infective theory, and the summary of the evidence against "dysentery" being a trophic nerve change is very complete. The conclusions at which Dr. Candler arrives supporting those of Drs. Mott and Durham (1900), are those which it is the undoubted duty of every asylum superintendent to follow in his endeavour to check this disease.

Drs. Mott and Halliburton undertook a research to see whether there was any constant relationship between wasting of the suprarenals and diseases of the nervous system. This had suggested itself to Dr. Mott as a result of a long experience of autopsies, performed chiefly at the L.C. asylums, in which he had noticed that the suprarenals were frequently atrophied. The number of cases examined was 71, and the examination being of a particularly complete character full reliance may be placed on the result. The deductions were, however, mainly of a negative character, for although degenerative changes were frequently found in the suprarenals, these changes did not appear to be related to the kind of disease for which the patients were admitted to the asylums. Dr. Bodington has given the results of a lengthy enquiry into the condition of the blood in general paralysis of the insane, with special reference to the white cells. The figures and results are published in full.

Of the remaining eighteen articles eleven come from the pen of Dr. Mott. Several of the latter are the records of interesting clinical cases, mostly under Dr. Mott's care, which have come to autopsy and in which he has made elaborate microscopical investigations of the brain or other organs especially affected. It is impossible to refer to these in detail here. Drs. Watson, Harper, Koch, Jones, and Eisath also contribute painstaking and valuable papers.

THE PROGNOSIS AND TREATMENT OF DIPHTHERIA. By F. G. Crookshank, M.D. London. (Reprinted from the *West London Medical Journal*, April, 1907). . .

For general practitioners and residents at fever hospitals there are

numerous points of practical importance in this useful paper by Dr. Crookshank. For example, it cannot be too forcibly or too frequently impressed on the former that antitoxin should be given as soon as a suspicion of diphtheria is aroused, and that to wait for the result of a swab may mean the difference between tracheotomy or even death, and a comparatively speedy recovery. The question of dosage of antitoxin is of interest to doctors at fever hospitals and is of some economical importance to those Local Authorities who distribute antitoxin gratis. Dr. Crookshank uses 6,000 units for the mild faucial cases; 24 to 30 thousand units are used in the more severe cases, and if within six or twelve hours no improvement is noted, the large doses are repeated. That some doctors appear to get as good results with very much smaller doses (e.g., 10,000 units maximum) cannot be denied, and there is now evidence suggesting that the smaller doses of antitoxin may be as efficacious as the massive ones. The cost of the serum varies with its concentration, e.g., 6,000 units cost about 9/-, but about 15/- in the more concentrated variety. When, therefore, doses of twenty-four and thirty thousand are not infrequently given and repeated, the cost may be between £2 and £8. Dr. Crookshank refers to a causative relation between the administration of strychnine and irregularity of the pulse. This is certainly a very important point when considering the treatment of the convalescent cases, and as it is satisfactory to hear of the success obtained with adrenalin chloride in and tracheotomy seems very fair, and few will quarrel with his conclusion that "Whatever may be the right thing to do in hospitals, in private practice tracheotomy is the operation of election."

HEALTH READER, WITH CHAPTERS ON ELEMENTARY SCHOOL HYGIENE. Southern Cross Series. By J. S. C. Elkington, M.D., Chief Health Officer of Tasmania. Whitcombe & Tombs, Ltd. Pp. 139. 1/6, size 7 in. by 5 in.

This admirable school reader may fairly claim to have some unique features, especially in the way of illustrations. The memories of children are largely visual, and the original and artistic illustrations by Mr. Norman Lindsay are alone worth much more than the price of this book.

The reader itself is clearly written in words suitable for intelligent boys and girls, and gives an admirable review of its subject. Dr. Elkington's preface is an eloquent plea for the teaching of hygiene in schools.

BURDETT'S HOSPITALS AND CHARITIES, 1907: The Year Book of Philanthropy and Hospital Annual. The Scientific Press. Pp. 889, size 7½ in. by 4½ in.

The main part of this useful annual volume forms a directory of institutions in the United Kingdom. The first 204 pages are occupied by a useful review of the problems of hospitals. Chap. I deals with the misuse of hospitals, Chap. II with the King's Fund and the League of Mercy, Chap. III with hospitals in the United States, Chap. IV with nursing departments and their cost, Chap. V with hospital management, Chap. VI with Hospital Sunday, Chap. VII with Hospital Saturday, and so on. The volume is indispensable for all those who are interested in the administration of hospitals.

THE FUNCTIONS OF FOOD IN THE BODY. By A. Rabagliati, M.A., M.D. Publishers: Elliot Stock (London); H. C. Derwent (Bradford). 12mo, pp. 46.

This brochure, in many ways most interesting, shows at any rate that Dr. Rabagliati has the courage of his convictions. Most physiologists would maintain that the functions of food in the body are to balance waste by replacing lost tissue, and, either directly by the destruction of food itself, or indirectly through the breaking down of the tissues, to supply energy requisite for the work and for the maintenance of temperature of the body. Dr. Rabagliati, however, is quite opposed to this view. The only function of food, says he, is to repair waste—it has nothing whatever to do with the work or the heat of the body. His hypothesis seems to be that during sleep the body is charged in inexplicable fashion with vital energy, which then by its transformation into other forms, such as kinetic energy and heat, performs the work and maintains the temperature of the body. The body is simply the machine through which the energy manifests itself, and, like all machines, is subject to wear and tear. It is to mend this that food is needed. Such is Dr. Rabagliati's hypothesis. It labours under the serious disadvantages, first, that it is no explanation, merely a re-statement in unknown terms; second, that it has apparently no evidence to support it.

At the same time, Dr. Rabagliati very properly attempts to overthrow the current views on the question. His data are derived chiefly from starvation experiments. It is difficult to judge of these, since they are given in insufficient detail, but so far as can be seen, they are but flimsy weapons with which to unseat his opponents.

To this degree, however, Dr. Rabagliati is right, that over-eating is too frequent in occurrence, and that less food may in many cases be beneficial. But his denial that food is utilized in the work of the body is quite unjustified.

DIARRHOEA OUTBREAK ASSOCIATED WITH CONTAMINATED WATER.

THE President of the Board of Health of Warren, Pa., reports (*Journ. Am. Med. Assoc.*, March 2, 1907) that on December 8th, 1906, nearly 3,000 persons—approximately one-third of the population of Warren—were attacked within a short time by severe vomiting, profuse watery bowel discharges and some prostration. There was no fever, and most of the symptoms disappeared within 12 hours. Warning was at once given to boil the water used for drinking, and those who obeyed had no further symptoms. Others continued to suffer from attacks of diarrhoea for a period of two weeks. In no case did any typhoid fever develop.

The water supply of the town is derived from wells 60 feet deep, situated near a river which frequently overflows, and with numerous out-houses and outlets of sewers in the vicinity. Analyses made at irregular intervals in the last few years have shown the water to be of good quality as a rule, but on this occasion evidence of sewage contamination was found, and from the date of the outbreak to January 18th of this year, the *B. coli* was present. It is believed that the wells were contaminated with surface washings. Only users of water from these wells were affected.

This outbreak appears to be somewhat similar to that recorded by Dr. Thresh (*Brit. Med. Jour.*, Sept. 26, 1903), which occurred at Chelmsford, when about 1,400 cases occurred.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

Northern Branch.—A Meeting of the above branch was held on February 22nd, 1907. The following members were present, viz.: Dr. Armstrong (Chairman), Drs. Mostyn, Milburn, Renney, Hibbert and Taylor; Visitors, Mr. Burgess, Borough Surveyor of South Shields, and Alderman Robinson, Chairman of the Slaughter-house Sub-committee of the Borough Council. Dr. Mostyn read a paper entitled "The Effect of the Closure of Schools on Measles in South Shields during the last quarter of 1906*." Dr. Mostyn's conclusion was that the closing of the schools had a real effect in lessening the incidence of measles.

Mr. Burgess, Borough Surveyor, then gave the Branch a full description of a new public slaughter-house erected by the Corporation of South Shields from his plans. The slaughter-house occupies an area of 4,500 sq. yards in close proximity to the goods and cattle sidings of the N. E. Railway, from which it is reached by a subway, thus obviating the driving of cattle in a crowded street.

At the main entrance is a Superintendent's lodge, from which can be overlooked the greater part of the buildings.

The slaughter-house provides separate lairages for 100 beasts and 700 sheep and pigs. The slaughter hall is 146 feet long by 27 feet wide, and is separated from the cooling hall, 107 feet long by 27 feet wide, by an avenue 24 feet wide, which is partly uncovered. The cooling hall is capable of hanging 500 carcasses of dead meat, of sheep, cattle, and pigs. Separate rooms are provided for pig slaughtering, for tripery business, gut scraping, and for the storage of hides. In addition there are a post-mortem room, a separate slaughter-house for animals suspected of being diseased, and cold storage in which meat can be kept at a minimum of 35° F.

Men's quarters, sanitary conveniences for both sexes, and an excellent system of drainage complete this most necessary adjunct to a modern system of sanitary administration.

After the reading of the description, the members were very kindly shown over the buildings, which were fully explained by Mr. Burgess.

Yorkshire Branch.—A Meeting of the Yorkshire Branch was held in the Mansion House, Doncaster, on April 19th, 1907.

There were present Drs. E. M. Smith (York, the President), Angus (Bingley), Anderson (Doncaster), Banham (Worsborough), Cameron (Leeds), English (Swinton), Gibson (Wakefield), Halliwell (Dewsbury), Huey (Mexborough), MacSwiney (Monk Bretton), Milne (Mirfield), Porter (Leeds), Robinson (Rotherham), Richardson (Ravensthorpe), Robinson (Wakefield), Sisam (Wakefield), Stedman (Selby), Williams (York), Mitchell Wilson (Beverley), and J. R. Kaye (Wakefield, Hon. Sec.).

Five new Members were elected.

Dr. Smith then dealt with the subject of "The Amendment of the Birth and Death Registration Act,†" and several resolutions arising out of his paper were adopted for the consideration of the Central Council.

A microscopical exhibition of the *Diplococcus intracellularis*, and other

* The paper will be published in a later issue of PUBLIC HEALTH.

† Published in the present issue.

specimens, was given by Dr. Robinson and Dr. Sisam, of the Health Department, County Hall, Wakefield.

A vote of thanks was proposed to the Mayor, who kindly welcomed the members at the opening of the meeting, and afterwards provided light refreshments.

A very interesting time was spent at the Yorkshire Institute for the Deaf and Dumb, the visit being kindly arranged for by Dr. D. Lechmere Anderson.

The Mayor, together with County Alderman J. F. Clark and Councillor Theobald, were present during part of the proceedings, also Dr. Reginald Farrar, of the Local Government Board.

North-Western Branch.—An Ordinary Meeting of this Branch was held in the Chemical Club room, Victoria Hotel, Manchester, on Friday April 19th, 1907. Present: Dr. Alfred Greenwood, President (in the Chair); Drs. Garstang, Wheatley, Laird, Buckley, Kerr, Wheeldon, J. A. Harris, T. Holt, Wilkinson, and Sergeant. Letters of apology for absence were read from Drs. M. Young, A. E. Brindley, Peck, and Coutts.

The minutes of the last meeting were read, confirmed, and adopted.

Dr. Daley, Bootle, was duly elected a Member of the Branch.

Resolved, that the meeting of the Branch be held at Blackpool on Saturday, June 22nd, and that the Secretary send out reply postcards to ascertain who will be present, and who might wish to stay over the week-end.

Resolved, that it be suggested to Dr. Coutts that he should read a paper giving a description of the places to be visited on this date.

Dr. Laird then read a paper on Trade Mortality Statistics, with Special Reference to Railway Employees.* Drs. Greenwood and Wheatley took part in the discussion which followed, and Dr. Laird suitably replied.

Southern Branch.—A Meeting was held at the George Hotel, Winchester, on May 3rd, 1907. Present: Drs. Stott (President), Nunn, Willoughby, Sandilands, and Griffith.

Dr. McGlashan (Newhaven) and Dr. Sandilands (Winchester) were nominated as Members of the Branch.

The letter referred by the Society respecting the registration of plumbers was considered, but it was not thought wise to take any action in the direction proposed.

The advisability of the Society drawing up a memorandum on the management and feeding of infants was again mentioned, and it was resolved to re-assert the resolution passed by the Branch in April, 1906, viz., "That the Southern Branch considers that the distribution of a general circular on feeding of infants by Registrars is undesirable."

The Hon. Sec. called attention to the insurance of hospital nurses under the Workmen's Compensation Act; the other members present were able to state that their Councils proposed to do this.

The President read a paper on the best methods of setting out the expenses of isolation hospitals, so that those of different districts might be compared. He pleaded for the adoption of some definite and uniform method in all hospitals, and produced a scheme based upon the requirements of the Isolation Hospitals Act. This was discussed by the members, and it was left to the Hon. Sec. to draw up a scheme including the suggestions made, and to send this to those present.

After lunch the members visited the Cathedral, St. Cross, and Godbejot house.

* Published in the present issue.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

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ANNUAL AND OTHER REPORTS.

Burgh of Ayr, 1906, Dr. W. F. Brown. Wigan, 1906, Dr. W. Berry. Report on Match Factory, Gloucester, H. H. S. Cunyngame, C.B., and B. A. Whitelegge, C.B., M.D. Salford, Quarterly, Dr. C. H. Tattersall. Registrar-General's Weekly Returns. Minutes of Metropolitan Asylums Board. South Shields, 1906, Dr. S. G. Mostyn. Worcester, 1906, Dr. Mabyu Read. Sanitary Commissioner with the Government of India, 1905. Registrar-General's Weekly Returns. Festiniog U.D.C., 1906, Dr. R. Jones. Reports of Conference of Representatives of Cotton and Allied Trades re Weights and Measures (Metric System) Bill. Edmonton U.D., 1906, Dr. S. C. Lawrence. Trowbridge U. San. D., 1906, Dr. J. Pearse. Dr. R. Farrar's Report to L.G.B., on Ebbw Vale U.D., 1907. Dr. J. S. Low's Report to L.G.B. on Mitford and Launditch R. Ds., 1907. Stoke Newington, 1906, Prof. Henry Kenwood. Kensington, Monthly, Dr. T. Orme Dudfield. Derby Borough Asylum, 1906. East Ham, 1906, Dr. G. Sowden. Exeter, 1906, Dr. E. A. Brash. Dr. Theodore Thomson's Report to L.G.B., on Hambledon R.D., 1907. City of Providence, U.S.A., 1906, Dr. C. V. Chapin. Coventry, 1906, Dr. E. H. Snell. Report on the Isolation Hospitals of Derbyshire, 1906, Dr. S. Barwise. Renfrew, 1906, Dr. A. C. Munro. Registrar-General's Quarterly Returns and Annual Summary. Monthly Bulletin, State Board of Health of Massachusetts. Bridgend U.D., 1906, Dr. W. Randall. Penybont, 1906, Dr. W. Randall. Surrey County Council, 1906, Dr. E. C. Seaton. Hampstead, 1906, Dr. G. F. McCleary. Fremantle, Western Australia, 1906, Dr. J. W. Hope. Dr. J. S. Low's Report to L.G.B., on Aberdare Urban District. Gorton, 1906, Dr. A. W. Martin. Metropolitan Asylums Board, 1906. Acton, 1906, Dr. D. J. Thomas. Dr. E. P. Manby's Report to L.G.B., on Brecknock R.D. Experiment Station Record, Washington, U.S.A., April. Home Office *re* Regulations for loading and handling goods in Dock, also Regulations for use of horse-hair.

JOURNALS.

Wigan Examiner. La Technique Sanitaire. Transactions of the Cremation Society. The Hospital. Sanitary Record. Medical Temperance Review. Journal Royal Sanitary Institute. Sanitary Journal. Australasian Medical Gazette. The Psychological Clinic. Pacific Medical Journal. Giornale della Reale Societa Italiana D'Igiene. Yorkshire Herald. Local Government Officer. American Journal of Medical Sciences. Asylum News. Journal of Tropical Medicine. Glasgow Medical Journal. All India Hospital Assistant's Journal. Local Government Journal. Journal of Royal Army Medical Corps. Transvaal Medical Journal. Water. Canadian Practitioner. Birmingham Medical Review. Medical Review of Reviews. The Englishman.

SANITARY EVOLUTION OF LONDON.

Henry Jephson, L.C.C. Fisher Unwin.

SANITATION OF ARMIES ON ACTIVE SERVICE.

T. F. Dewar, M.D., D.Sc. T. Buncle & Co., Arbroath. Second Edition.

CAUSE AND PREVENTION OF BERI-BERI.

W. L. Braddon, M.B., B.Sc., F.R.C.S. Rebman, Ltd.

DEUTSCHES BADERBUCH.

Bearbeitet unter Mitwirkung des Kaiserlichen Gesundheitsamtes. J. J. Weber, Leipzig.

HAY FEVER, HAY ASTHMA.

William Lloyd, Surgeon-in-Charge of the Nose, Ear, and Throat Dept., Kensington General Hospital. Henry J. Glaisher.

RECENT PUBLIC HEALTH LITERATURE.

BACTERIA.

CANTACUZÈNE (J.) et P. RIEGLER. De la maladie toxique provoquée par l'injection intrastomacale de Bacilles morveau tués. *Ann. de l'Inst. Pasteur*, 1907, *xxi*, 194.—GUILLIERMOND (A.). La cytologie des bactéries. *Bull. de l'Inst. Pasteur*, 1907, *v*, 273, 321.—HORROCKS (Maj. W. H.). Experiments with specific bacteria derived from sewage present in the air of ventilating pipes, drains, etc. *Jour. Roy. San. Inst.*, 1907, *xxviii*, 176.—MUCHA (V.). Ein Beitrag zur Kenntniss der Bakterienflora der Mundhöhle. *Zeit. für klin. Med.*, 1907, *lxvii*, 347.—SABRAZES (J.) et A. MARCANDIER. Action du vin sur le bacille d'Eberth. *Ann. de l'Inst. Pasteur*, 1907, *xxi*, 312.

BLASTOMYCOSIS.

HAMBURGER (W. W.). Comparative study of four strains of organisms isolated from four cases of generalized blastomycosis. 2 plates. *Jour. of Infec. Dis.*, 1907, *iv*, 201.—LE COUNT (E. R.) and J. MYERS. Systemic blastomycosis. *Jour. of Infec. Dis.*, 1907, *iv*, 187.

CHILDREN.

BRENNEMANN (J.). Nutritional disturbances in infancy due to overfeeding. *Jour. Amer. Med. Assoc.*, 1907, *xlvi*, 1338.—CARPENTER (G.). The rearing of children. *Brit. Jour. of Child. Dis.*, 1907, *iv*, 190.

DIPHTHERIA.

ALBERT (H.). Diphtheria: a statistical study of certain laboratory and clinical observations. *Jour. of Infec. Dis.*, 1907, *iv*, 210.

DYSENTERY.

VAILLARD et C. DOPFER. La sérothérapie dans le traitement de la dysenterie bacillaire. *Ann. de l'Inst. Pasteur*, 1907, *xxi*, 241.

FILTERS.

MIGUEL (P.) and V. MOUCHET. Sur les filtres à sable non submergés. *Arch. de Med. Navale*, 1907, *lxxvii*, 265.

FOOD.

BEHRE (A.). Die Verwendung von Bindemitteln bei der Wurstfabrikation. *Zeit. für Unters. der Nahrungsmitt.* 1907, *xiii*, 525.—KERMORGANT. L'alimentation en Indo-Chine. *Am. d. Hyg. Publique*, 1907, 4th ser., *vii*, 411.—KICKTON (A.). Wirkung von Konservierungsmitteln auf Hackfleisch. *Zeit. für Unters. der Nahrungsmitt.*, 1907, *xiii*, 534.—SIEGFELD (M.). Einfluss der Fütterung auf das Butterfett. *Zeit. für Unters. der Nahrungsmitt.*, 1907, *xiii*, 513.

HEMATOZOA.

SERGEANT (E. & E.). Études sur les hématozoaires d'oiseaux. *Ann. de l'Inst. Pasteur*, 1907, *xxi*, 251.

HYGIENE, MUNICIPAL, PUBLIC, AND TROPICAL.

HIBBERT (J. C.) and W. H. WELLS. Sketch of the sanitary history of Newcastle-upon-Tyne. *Jour. Roy. Sanit. Inst.*, 1907, *xxviii*, 161.—THOMPSON (W. G.). Street dirt and public health. *New York Med. Jour.*, 1907, *lxxv*, 732.—ROSS (R.). Points of interest connected with tropical sanitation. *Jour. Roy. Sanit. Inst.*, 1907, *xxviii*, 153.

IMMUNITY AND INFECTION.

TRAUTMANN (H.). Über infektion von Büchern und Schriftwerken und ein Aussichtsvolles Verfahren zu ihrer Desinfektion. *Zeit. für Tuberkul.*, 1907, *x*, 497.—WRIGHT (J.). The physical processes of immunity and infection. *New York Med. Jour.*, 1907, *lxxv*, 769.

MENINGITIS, CEREBRO-SPINAL.

WEIDAUZ (O.). Ueber das Wesen, die Verhütung und Bekämpfung der epidemischen Genickstarre. *Viertelj. für Gerichtl. Med.*, 1907, *xxviii*, 376.

MILK.

PIFFARD (H. G.). The milk problem. *New York Med. Jour.*, 1907, *lxxv*, 773.—WALLS (F. X.). The digestion of the proteins of cows' milk in infancy. *Jour. Amer. Med. Assoc.*, 1907, *xlvi*, 1389.

MORTUARIES.

HABERSTOLZ. Erwagungen bei der Erbauung und Einrichtung von Leichenhausen. *Hygienische Rundschau*, 1907, xvii, 507.

NICOTINE.

WEIDANZ (O.). Ueber die Vergiftung mit Nikotin vom gerichtsarztlichen Standpunkte. *Viertelj. Gerichtl. Med.*, 1907, xxviii, 253.

OCCUPATIONS.

GINESTONS (É.). Les accidents oculaires des ouvriers agricoles. *Ann. d'Hyg. Publique*, 1907, 4th ser., vii, 445.—REPARTITION des Industries en France d'après les résultats statistiques du recensement de 1901. *Jour. de la Soc. Statist. de Paris*, 1907, xlviii, 137.

OPHTHALMIA.

BUTLER (T. H.). Clinical features, bacteriology and treatment of acute ophthalmia in the East, analyses of 5700 cases. *Roy. Lond. Ophth. Hosp. Rep.*, 1907, xvii, 115.

PIROPLASMA.

THEILER (A.). Further notes on piroplasm mutans—a new specific of piroplasma in South African cattle. *Jour. of Comp. Pathol.*, 1907, xx, 1.

SCHOOLS.

LANDRETH (O. H.). Sanitation in schools. *Pediatrics*, 1907, xix, 273.

SPIROCHETE.

GAYLORD (H. R.). Spirochete in primary and transplanted carcinoma of the breast. *Jour. of Infec. Dis.*, 1907, iv, 155.

SWEATING SICKNESS.

HAURY. L'épidémie de suette miliaire des Charentes, 1906. *Rev. de Méd.* 1907, xxvii, 209.—WEICHSELBAUM (A.). Ueber Schweissfriesel vom anatomischen ätiologischen und epidemiologischen Standpunkte. *Zeit. für klin. Med.*, 1907, lvi, 21.

TICK-FEVER.

LEVADITI et MANONÉLIAN. Recherches sur l'infection provoquée par le spirille de la tick-fever. *Ann. de l'Inst. Pasteur*, 1907, xxi, 225.

TRYPANOSOMIASIS.

NOVY (F. G.), J. W. MACNEAL, and H. N. TORREY. Trypanosomes of mosquitoes and other insects. 7 plates. *Jour. of Infec. Dis.*, 1907, iv, 223.—THIROUX et TEPPEY. Les trypanosomiasis animales du Sénégal. *Ann. de l'Inst. Pasteur*, 1907, xxi, 211.

TUBERCULOSIS.

CLAPP (H. C.). Pulmonary tuberculosis; some of the details of its modern hygienic treatment which can be employed in treating the patient in his own home. *Med. Rec. N. Y.*, 1907, lxxi, 717. VAN GORKOM (W. J.). Die Tuberkulosebekämpfung in den Niederlanden. Ihre Geschichte und bisherigen Erfolge. *Zeit. für Tuberkul.*, 1907, x, 515.—MARMOREK (A.). Weitere Berl. klin. Woch., 1907, xlii, 621.—MORGENROTH (J.) and L. RABINOWITSCH. Die Immunitäts reactionen tuberculösen Gewebes und deren Zusammenhang mit der Theorie der Tuberculinwirkung. *Deut. med. Woch.*, 1907, xxxiii, 705.—MORITZ (S.). On the diagnosis of early pulmonary tuberculosis. *Med. Chron., Manchester*, 1907, xvi, 73.

TYPHOID.

HARRISON (Maj. W. S.). Reports on the results of experiments in connection with anti-typhoid vaccine. *Jour. Roy. Army Med. Corps.*, 1907, viii, 472.—QUILL (Sur-Gen. R. H.). Enteric fever: Is it invariably a water-borne disease? *Jour. Roy. Army Med. Corps.*, 1907, viii, 515.

WATER, BACTERIOLOGY OF.

BAHR. Trinkwasserbeurteilung und Trinkwasserversorgung bei der Feldarmee. *Zeit. für Hyg. und Infektsk.*, 1907, lvi, 113.—FAICHME (Maj. N.). The bacteriology of water-bottles, with the description of one of B. Coli communis "the presumptive test" and the sewage streptococci in drinking water. *Jour. of Med. Research*, 1907, xvi, 85.

LAW REPORTS.

HIGH COURT OF JUSTICE.

KING'S BENCH DIVISION.

March 26th, 1907.

BEFORE LORD ALVERSTONE, L.C.J., DARLING AND LAWRENCE, JJ.

FIELD AND SONS v. SOUTHWARK BOROUGH COUNCIL.

Public Health (London) Act, 1891, Sections 4, 48, 141. Nuisance—Insufficient Water Supply—House sublet in floors—Owner.

When the owner of a house leases it to a tenant with a condition against his subletting it, and the tenant in breach of the condition sublets the different floors to separate tenants, the owner cannot be ordered to abate a nuisance arising from the fact that one floor has not a separate water supply, because he is neither "the owner" within the Act, nor does the nuisance arise by his act or default.

This was a case stated by a metropolitan police magistrate on the hearing of a complaint under the Public Health (London) Act, 1891. It was made by the sanitary inspector of the Southwark Borough Council against the appellants for failure to obey an order to abate a nuisance, namely that the water supply to a house belonging to them was insufficient, there being none on the top floor, and it was said that it was caused by their act, default, or sufferance.

The house in question consisted of three floors, and the water supply consisted of three taps, one on the ground floor, one in the yard, and one on the first floor. There were w.c.'s in the yard and on the ground floor. The appellants had let the house to one John Brown at a yearly rent, and he had agreed not to assign or underlet without the written consent of the appellants. He had in fact without such consent sublet each floor to a separate tenant. The only water supply available for the tenant of the top floor was that provided by the tap in the yard. The magistrate decided that the water supply would have been sufficient if the house had been in the occupation of one tenant only, but as the top floor was let separately the supply of water was not proper and sufficient. He also held that the appellants were the owners of the house, and that the defect was of a structural character, and he ordered the appellants to abate the nuisance and pay 5s. costs.

Herbert and Chester Jones appeared for the appellants, *Arory*, K.C., and *Courthope Munroe* for the respondents. The Court allowed the appeal.

Section 48 (1) of the Public Health (London) Act, 1891, provides that "an occupied house without a proper and sufficient supply of water shall be a nuisance liable to be dealt with summarily under this Act," and Section 141 provides that "the expression 'owner' means the person for the time being receiving the rack rent of the premises in connection with which the word is used, whether on his own account or as agent or trustee for any other person, or who would so receive the same if such premises were let at a rack rent."

LORD ALVERSTONE, in the course of his judgment, said that the magistrate's decision could not possibly be supported. There was no

evidence or finding that the appellants had agreed to the subletting, and if the top floor was to be treated as separate premises the appellants were not in receipt of the rack rent, and were not therefore the owners of that floor within the meaning of the Act. One could not deal with this top floor as a house for the purpose of the section as to nuisance. It was straining technicalities to say that if a tenant sublet one of the floors without the owner's consent the owner could be called upon to put in a pipe, although the floor might the next day cease to be occupied. An occupied house as used in the section meant a structure as let, and the magistrate ought to have held that he could not call upon these owners to undertake an increased burden due to an act for which they were not responsible.

Darling and Lawrence, J.J., concurred.
[See 71 J.P. 239.]

THE FEEDING OF INFANTS.

DR. J. F. J. SYKES, in a communication to a recent number of the *Municipal Journal*, expresses the opinion that the Bill now before Parliament authorising Milk Depôts will be "a strong encouragement to hand-feeding." He believes that human nature will tempt some mothers to apply for the municipal milk because it is cheap, and abandon breast-feeding. The only form of help possible under the Bill is by providing milk, whereas "an underfed mother can be fed at less cost than the baby can be fed, so that both mother and child, or two persons, can be fed by this means at less cost than one, and breast-feeding can be maintained and the infantile mortality diminished. On the other hand, Dr. E. W. Hope, in the same paper, states that he considers that the Bill constitutes an important step towards the removal of difficulties in the way of saving infant life. The two views, we think, constitute two aspects of truth, for milk depôts can be so administered as to favour breast-feeding when they form part of a general system of health-visitation of babies.

GOOD LUNCHEONS FOR RURAL SCHOOLS WITHOUT A KITCHEN, Ellen H. Richards (*Boston: Whitcomb & Burrows*, 1906, pp. 12).

As the author points out, satisfactory lunches for school children may be prepared with the simplest apparatus by co-operation on the part of pupils and teachers. Such an enterprise should include instruction in home economics, and suggestions are made for carrying on the work in schools without interfering with the regular curriculum. Data are quoted showing the satisfactory results which have attended such efforts.

PUBLIC HEALTH

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VOL. XIX. No. 10.

JULY, 1907.

ENTERIC FEVER IN SURREY, 1895-1906.

DR. SEATON'S reports always contain matter deserving careful study, and his report for 1906, which contains a detailed study of enteric fever in the County of Surrey during the last twelve years, is no exception to the rule. He draws attention to the important fact that the great water-borne epidemics of enteric fever are liable, owing to their dramatic suddenness and their magnitude, to bulk excessively in the public mind; and, as a natural corollary, a pure water is supposed to be the only measure needed for the prevention of this disease. It is a remarkable fact, in view of such a general impression, that although during the last twelve years 2,098 cases of enteric fever have been notified in the administrative County of Surrey, there has not been in the county a single epidemic of water-borne enteric fever.

A series of diagrams illustrating the report show no evidence of such a relationship between heavy rainfalls causing floods and enteric fever excess as has been evident on several occasions in London. Nor, again, do the facts in the report offer any support to the contention of some experts that "a quickening of the passage of polluting matters through the earth when the springs rise rapidly after periods of heavy rainfall, adds to the chances of pollution" of chalk water supplies. At the same time, Dr. Seaton expresses the wise opinion that "when wells are made in a populous area in the chalk formation, it is not only an advisable, but a necessary, precaution to adopt the softening process."

Polluted water not having been the source of the relatively small amount of enteric fever occurring in Surrey, Dr. Seaton does not fall back on vague generalities as to insanitary local conditions, though there can be no question that if these are so gross as to take the form of privy-middens, etc., they form a ready source from which may be spread any specific infective material accidentally deposited in them.

His main conclusion is that "polluted and infected foods are a much more frequent source of typhoid illness than is even now generally supposed." In this connection he notes the pollution of milk, of shell-fish, and watercress, and other foods.

A number of interesting cases "occurring in isolated country dwellings, or under conditions where chances of infection could be definitely excluded," are next mentioned, and in this connection attention is drawn to "the possibility of new origin (i.e., apart from human infection) through bacilli other than those which are regarded as the invariable specific causes of typhoid." Several points need to be worked out, it need hardly be said, in connection with such cases. In the first place, a bacteriological investigation is needed to show whether the cases are typhoid or paratyphoid. Secondly, the possibilities of human infection need to be indefinitely extended. It is now well established that an abscess developing fifteen months after an attack of enteric fever may contain the *B. typhosus*; that a bone sinus may continue to discharge much bacilli three years after an attack of enteric fever; and that they persist for long periods in the gall-bladder, and may thence be discharged in the dejecta. The importance of personal infection is not overlooked in the report, and the whole study of the subject should be carefully read.

THE NOTIFICATION OF BIRTHS BY MIDWIVES.*

THE consideration of infantile mortality would not be complete without a reference to the frequent occurrence of the registration of birth after or at the same time as the registration of the child's death. During the past year this happened 89 times. The ages of the deceased children ranged from a few hours to something under 2 months. The bulk of such deaths were practically inevitable, some perhaps even desirable. On the other hand there can be little doubt that approximately a quarter of such deaths were due to preventable causes, and that had registration been effected at an earlier date something might have been done in that direction. The system inaugurated by the medical officer of health of the county whereby midwives, or some of them, report to him each week the names and addresses of women attended by them, is a step in the right direction, and will, it is hoped, be a prelude to the regular "notification" of births. The returns received by the county medical officer of health are distributed to the medical officers of health of the boroughs where the parturient women reside. It is thus possible to get into communication with the mothers within a fortnight of the birth of the child.

METROPOLITAN CONFERENCE ON TUBERCULOSIS.

THE Paddington Council recently convened a Conference of the City and Metropolitan Boroughs Councils to consider steps for limiting the spread of consumption. Twenty-eight out of twenty-nine Councils were represented

* From Dr. R. Dudfield's Ann. Rep., Paddington, 1906.

at the Conference. Resolutions were passed in favour of the compulsory notification of consumption, in favour of the public inspection and control of the sources of milk supply, in favour of a sanatorium for the open-air treatment of poor persons suffering from consumption in the early stages of the disease, and in favour of the extension of various powers relating to infectious diseases, to consumption. It is difficult to understand why the sanatorium should be restricted to cases in the early stage, in the ordinarily understood meaning of the words "early stage." Beds thus restricted would remain chiefly empty, as it is only exceptionally that cases of phthisis in the "early stages" are diagnosed among the poor. The fact is that in a considerable proportion of cases of phthisis with extensive consolidation and even caritation, obsolescence of active disease is secured by suitable treatment, and even when this is impossible, the sanatorium treatment has more than justified its expense because of its educational value. But why should the most urgent need of all—the most urgent both for the patient and the public—be overlooked, namely, the provision of comfortable hospital treatment for advanced patients living under unfavourable home conditions, but who do not come within the scope of the Poor Law restrictions?

THE PROPOSED UTILISATION OF THE "SOUTHERN HOSPITAL" AT CARSHALTON FOR CONSUMPTIVES.

DR. ORME DUDFIELD in a recent report draws attention to the fact that the managers of the Metropolitan Asylums Board have "going-a-begging" a new hospital at Carshalton which would make an admirable sanatorium for consumptives. This hospital, he states, was built for convalescent fever and diphtheria patients. It was handed over to the Board by the builders last autumn, and in November a special committee was appointed to decide the best use to which it can be put, as there appears to be no immediate prospect—if ever—of its being needed for the purpose for which it was built. The hospital, which has cost nearly a quarter of a million sterling, is admirably situated on the Surrey hills. It consists of double cottages, each half of which will accommodate fifteen patients. There are 24 of these double cottages arranged *en échelon* in three groups, all fully exposed to sunlight. There is accommodation for 800 patients and a staff of 213 persons.

Dr. Dudfield suggests that possibly the hospital might be made self-supporting, the Friendly Societies paying 30/- a week for each bed; or, in the alternative the suggestion of the special committee to allocate beds to each of the metropolitan unions and parishes should be considered. The metropolitan local authorities might maintain beds under the provisions of section 75 Public Health (London Act, 1891); or, as the hospital is particularly adapted for children, it might be utilised for tuberculosis in children. Any of these courses obviously is better than allowing the institution to remain idle.

HOSPITAL PROVISION FOR CONSUMPTIVES IN AND NEAR LONDON.

DR. D. J. THOMAS reports that in July, 1905, the Urban District Council of Acton entered into an arrangement for maintaining three beds at the Northwood Sanatorium. Only twelve persons applied for admission during 1906, and of these four were in too advanced a state to benefit from the treatment. Very rarely the three beds were occupied during the year, and two beds would more than have sufficed for the demand. The object here aimed at was the treatment and cure of early cases. It would be interesting to know whether, if for this ideal were substituted that of temporary segregation

become "sewers." The defects of the existing law relating to combined drainage have been pointed out again and again, and it is remarkable that no steps are taken to remedy what is undoubtedly a gross injustice to London ratepayers. During 1906, however, only one successful claim was made in Hampstead, and this was settled by the payment by the Council of £18.

EPIDEMIC DIARRHOEA AND REFUSE HEAPS. *

DR. FRASER, of Portsmouth, in his Annual Report, associated an epidemic of diarrhoea with accumulations of refuse and the usual litter of rubbish associated with the making of bricks in the town. The heat of the refuse and the brickmaking had afforded a breeding ground for millions of flies, that had been passing backwards and forwards from the refuse to the houses, and he attributed the epidemic in a certain district of Portsmouth entirely to the infection of the food in the houses by these insects. This particular epidemic occurred during a period when there had been no deficiency of rain, nor had the heat been excessive. The families that suffered were by no means of the lowest classes, being composed of respectable working and middle classes; their houses were new, clean, and, as a rule, well kept. Curiously, in Acton, the district in the vicinity of the refuse tip and the brick works was the area least affected by diarrhoea. Although the figures are admittedly limited, it is curious that so few deaths occurred from diarrhoeal diseases to the north of the Great Western Railway, as undoubtedly this constitutes the fly-infected area of the district.

THE CAUSATION OF RICKETS.

ANYTHING throwing light on the causation and means of prevention of such a disabling disease as rickets is to be welcomed; and the article on the subject in a recent issue of the *Hospital* (June 8th) is therefore well worth reading. The usual view taken is that a deficiency of fat in a child's diet is the essential cause of rickets. Dr. Branson quotes experimental observations on pigs fed on milk from which practically all fat had been removed, showing that they became very thin but not rickety. His view is that rickets is due, not to absolute deficiency in any element of diet, but to an excess of carbohydrate, and that its correct treatment lies therefore in the proper adjustment of the carbohydrate supply. This can be achieved either by levelling up the fats and proteids to correspond with the high carbohydrate intake of rickety children, or by levelling down the carbohydrates; the latter method involving less risk of overtaxing the digestion than the former. For medical officers of health these views are of value, for one may with advantage advise reduction in the amount of starchy food as well as increase in fatty food, as a means of preventing rickets.

THE REMOTE CONSEQUENCES OF GONORRHOEA.

THE remote dangers of gonorrhoea to the innocent are strikingly illustrated in some recent figures (*Munch. med. Woch.*) given by Erb. He found that about 49 per cent out of 2,000 male patients questioned by him had had one or more attacks of gonorrhoea, nearly 85 per cent of these patients having acquired gonorrhoea between the ages of sixteen and twenty-five. He also investigated the condition of 400 wives of men who had had gonorrhoea some time before marriage, and found that 4·3 per cent were suffering from diseases either very probably or certainly due to gonorrhoea. Such statistics are difficult to obtain; but the part played in the production of pelvic inflammations and of sterility by gonorrhoeal infection is a fact of grave public health importance.

* From Dr. D. J. Thomas's Ann. Rep., Acton, 1906.

RESIGNATION OF DR. WYNTER BLYTH.

THE announcement of the impending retirement of Dr. Wynter Blyth from the post of medical officer of health of Marylebone will be received with regret by his confrères. Dr. Blyth has done distinguished work in many departments of public health, and his writings on analytical and allied subjects have become standard works. But it is particularly as the first editor of *Public Health* that he earned the gratitude of every member of the Society of Medical Officers of Health. He initiated the journal on sound and safe lines, secured it a special place in the literature of preventive medicine, and as its editor, for many years did gratuitous work on behalf of the Society, which has left its impress on its history, and will always leave the Society under a debt of gratitude to him.

MILKING RECORDS.

THE *Times* of June 11th gives the milking record of the herd of cows kept at the Dairy School, Kilmarnock, recently published by the West of Scotland Agricultural College, Glasgow. The record shows the value of properly kept records of dairy herds. The figures show the extent to which, in a herd numbering 42 head, the individual yields may vary, and emphasize the conclusion that the value of animals cannot be definitely ascertained unless accurate records are kept of the returns they give. Presumably the animals were all of the Ayrshire breed. The average for the 42 head for a period of 26 weeks is 441 gallons, equivalent to an average daily yield of 26·2 lb., or rather more than 2½ gallons. As most of the animals were spring calvers, the period covered by the investigation no doubt shows them to the best advantage, as their yields would be considerably diminished as the lactation period advanced; still, the individual records are on the whole satisfactory. But the fact that the individual performances vary from 620 gallons down to 250, or from between 30 lb. and 40 lb. per day to from 14 lb. to 20 lb. indicates that there is in the Ayrshire, as in other breeds, ample room for the exercise of judicious skill in the selection and building up of a herd. The results are even more notable in respect to the average percentage of butter fat in the milk. Owners of Ayrshire herds have been among the most persistent critics of the action of the Board of Agriculture in fixing the *minimum* standard at 3 per cent. According to the Kilmarnock figures, not a single animal failed to reach the official standard, although in four instances the average was exactly 3 per cent. The milk of one cow contained as much as 4 per cent butter fat, and the average throughout was 3·4 per cent, thus showing a considerable margin to the good if the milk of the whole had been mixed, as in ordinary farming would be the case.

THE PAIL CLOSET SYSTEM IN ROCHDALE.—During the last three years it appears from a statement made at a recent meeting of the Rochdale Council, that only 89 pails have been converted. As there are 16,383 pails in the borough, it will at this rate of progress be about 540 years before all the pails have been converted into water-closets.

INSPECTION OF FOOD AT OUR PORTS.*

By J. WRIGHT MASON, M.B., C.M., D.P.H., M.R.C.S.E.,
Medical Officer of Health, City and Port of Kingston-upon-Hull.

THERE is no universal method for examining imported cargoes of food stuffs, only some two Authorities having powers vested in them for this purpose. By an Order of the Local Government Board issued in 1892, certain sections of the Public Health (London) Act, 1891, were made applicable to the Port of London, and further powers were obtained in 1898. Under these powers the examination of food stuffs in London is conducted by the Port of London Sanitary Authority immediately on arrival and before being deposited or exposed for sale. By a recent Order (1906) obtained by the Manchester Port Sanitary Authority, similar powers have been conferred. At our other ports food stuffs are only examined after being landed and deposited or exposed for sale, as at present we possess no powers to interfere at an earlier stage, and the duties are then carried out by the Local Sanitary Authority.

The Bill recently introduced into Parliament by the President of the Local Government Board provides as follows:—

“The power of making regulations under the Public Health Act, 1896, and the enactments mentioned in that Act, shall include the power of making regulations authorising measures to be taken for the prevention of danger arising to public health from the importation, preparation, storage, and distribution of articles of food or drink (other than drugs or water) intended for human consumption, and without prejudice to the generality of the powers so conferred.”

This Bill, if passed into law, will no doubt confer a necessary and long-desired power upon Port Sanitary Authorities, as under existing arrangements large consignments of food arrive and are despatched to various centres throughout the country without any inspection whatever taking place, thus leaving it open for inferior, innutritious, and often unwholesome food, to be improperly distributed.

An inspection before being landed or before leaving the docks would not only be beneficial from a public health point of view, but would also be some guarantee to the consignee, retailer, and the public generally, that they are being more fully protected.

* Paper read before the Incorporated Society of Medical Officers of Health, on April 12th, 1907.

As H.M. Customs enforce the powers vested in them for excise and other purposes, including the taking of samples of butter and margarine for analysis, so should Port Sanitary Authorities be empowered to board vessels and examine food stuffs before they are allowed to be distributed.

According to the Board of Trade returns, the total value of imported foods arriving at thirteen of the principal ports in this country in 1905 was nearly £202,000,000, whilst the value of imports of all kinds amounted to some £484,000,000. It will, therefore, be seen that nearly half the value of imports refers to food. During the last quinquennial period, the total imports at the thirteen ports alluded to shows an increase of £33,000,000 over those for 1901, and £25,000,000 of this increase is credited to food stuffs. Our principal supplies come from the United States, Russia, Canada, British India, Denmark, Australia and New Zealand, Germany, Netherlands, France, and Belgium.

As an illustration of the importance and necessity for inspection by Port Sanitary Authorities, I would mention the importation of very young calves from Holland and elsewhere. These arrive in large numbers weekly, especially during the months of February, March, April, and May. Some are immature, but being consigned inland, they escape inspection at the port of entry. At Hull at one time it was customary to notify the medical officers of health of the districts to which these carcasses were consigned, with the result that they were shipped by another route. If, however, the powers possessed by the ports of London and Manchester were extended to all ports, this evasion could not be resorted to.

Very large quantities of frozen meat are now imported into this country. Frozen carcasses of sheep and lamb were first sent from Australia in 1880, from New Zealand in 1882, and from the Argentine in 1883. New Zealand now sends yearly to this country four million carcasses, and the River Plate region three million carcasses.

Some consignments of food may be old, damaged, or otherwise of a questionable character, and in the case of tinned goods the tins may have become blown or bulged.

The inspection advocated would prevent articles of a doubtful character when landed being distributed, which if once allowed to come into the hands of some dealers could be so manipulated and treated as practically to prevent anyone knowing they were unsound.

The power to inspect a ship's cargo consisting of food stuffs before or when being landed would enable an inspector to satisfy himself whether the cargo had been stowed in a proper manner so as to avoid

damage to the same, also whether injury had arisen to such food stuffs by being stowed with other cargo not intended for food, thereby rendering all or some probably unfit for human consumption. The continual supervision of articles landed at the docks and quays within a port would also enable an Authority to intercept goods damaged subsequent to their being landed.

Regulations requiring that meat intended for export should bear a label indicating that it has been subjected to official inspection are in force in Holland, Denmark, New Zealand, and Belgium, and in June, 1906, the United States Government passed similar regulations providing for a thorough inspection and marking of all food stuffs before being exported. These are important regulations, and should do much to give confidence to the public that efforts are being made to ensure a purer and better food supply. Nevertheless, it is all-important that a thorough and efficient inspection by qualified officers should be made of all foods arriving at our ports.

The American regulations also provide that no meat food products intended for foreign commerce shall contain any substance which lessens its wholesomeness, nor any drug, chemical, or dye or preservative other than common salt, sugar, wood smoke, vinegar, pure spices, and, pending further inquiries, saltpetre.

Inspection and sampling of prepared meats and meat food products by Department employes shall be conducted in such a manner and at such times as may be necessary to secure a rigid enforcement of this regulation. It is, however, provided that in accordance with the direction of the foreign purchaser or his agent, meats and meat food products prepared for export may contain preservatives in proportions which do not conflict with the laws of the foreign country to which they are to be exported. When such meats or meat food products are prepared for export under this regulation they must be prepared in compartments of the establishment separate and apart from those in which meats and meat food products are prepared according to the regulations, and such products must be kept separate and be labelled with special trade labels, approved by the Secretary of Agriculture, and indicating that such products are for export only. Special export certificates will be issued for meats and meat food products of this character, and, if the products are not exported, under no circumstances will they be allowed to enter domestic trade.

In my opinion, any future regulations should require that all imported tinned foods should bear the name and address of the manufacturer, and also the date when packed.

In 1905 the following food stuffs were seized and condemned by

the Port of London Sanitary Authority: 3,517 quarters and 1,463 pieces of beef; 15,070 carcasses and 784 pieces of mutton; 437 cases of veal, pork, etc.; 524 crates of rabbits; five cases and 1,121 tins of canned meat, and 1,666,860 eggs. To these may be added large quantities of fruit, jam, marmalade, cocoa, tea, coffee, nuts, etc., etc. This illustrates the necessity and advantages of powers of inspection being vested in Port Sanitary Authorities. It would have been interesting to show the results of such an examination at other ports had the Authorities been empowered to make a similar inspection.

The inspection should be carried out without undue delay and interference with commerce, and should be conducted in conjunction with the Customs inspection. The inspector or inspectors appointed to carry out the work should be competent men and possess the special certificate for the examination in meat and other foods granted by the Royal Sanitary Institute, and they should act directly under the direction and supervision of the medical officer of health.

The Authorities of many of our large cities and ports recognize the necessity of attaching a veterinary surgeon to their foods inspection department, as, from their knowledge and training, he is the better qualified to undertake this work. It would be advantageous to have such a qualified person attached to the Port Sanitary Staff.

It is also important where large cargoes of food of a doubtful and perishable character have to be dealt with, that suitable warehouse accommodation should be provided for the purpose of examining and sorting the same, and in order that there may be no unnecessary delay caused in the discharge of a ship's cargo. The goods which are passed after being sorted should bear an official label or stamp certifying that they have been examined.

An inspection of this kind, I may say, is at present carried out at Hull by the Local Sanitary Authority, but only in respect of perishable fruit cargoes, and then not until being landed and deposited for sale. On the arrival of such cargoes, some of which may be in a faulty or unsatisfactory condition, notice is given to the auctioneer that the goods may be sold only subject to being conveyed to a warehouse provided by the Corporation, and the good separated from the bad under official inspection before the former is allowed to be retailed to the public. This inspection, however, does not include tinned meats and the many other imported meats and foods, which arrive in large quantities.

As a further argument in support of the inspection of food before being landed or leaving the docks, I would mention that in Hull on the auctioneers' bills of sale the following condition appears:—

"If any of the contents of any package are spoilt, damaged, unsound, or otherwise defective, so as to be unfit for human consumption, such defective goods are not intended by the brokers or purchased by the buyers for the food of man, and buyers shall separate such defective goods from the bulk, and shall not use or sell any such for the food of man."

This clause has been held in law to free the wholesale dealer from liability, but the small dealer found selling the goods which he has purchased, often in an unwholesome condition, is liable to prosecution.

On inspection at the port of entry, all carcasses that have been stripped, and tinned goods or pieces of boned meat contained in packages, if of a suspicious or doubtful character, should be seized and condemned.

Whilst strongly advocating the provisions of the Public Health Acts and Food and Drugs Acts being extended to Port Sanitary Authorities with regard to the inspection of food supplies, it should not in any way relieve Local Sanitary Authorities from their duty and responsibility, and their efforts in this direction should not in any way be relaxed. Owing to their geographical position, ports of entry should be regarded as the first line of defence for the proper inspection of our food supplies before they are allowed to be distributed to our great commercial and industrial centres. Upon the Authorities of such ports should devolve the responsibility to arrest, if possible, not only the importation of infectious disease, but also that which has a far reaching effect upon the country generally, namely, our food supplies, upon which the population is so much dependent, and whose health and welfare is the strength of our Nation and Empire.

DISCUSSION.

THE PRESIDENT said they must all agree that the point of view which Dr. Mason had raised was one of considerable importance, and that if adequate inspection of food at the ports of entry could be obtained it was very desirable. The first point—that any such inspection must be uniform at all the possible ports of entry—was a very important one. At present it was very probable that any one particular port using certain powers would find that importers would divert their supplies to a port where less stringent regulations were enforced. It certainly seemed curious to him that only two ports, London and Manchester, had special powers for dealing with food. Personally he was of opinion that it would be an excellent thing if uniform powers were given to all port authorities where food could possibly enter into the country. They must not forget, however, that if such powers were given it would involve certain expenditure

by the local port authorities. First there would be the necessary expenditure for warehousing, and secondly it was worthless having powers unless an adequate staff was provided for carrying out the inspection.

DR. E. W. HOPE (Liverpool) said there could be no two opinions as to the desirability of possessing powers for the inspection of food stuffs at the ports of entry. The advantages were obvious—so obvious, in fact, as almost to run the risk, one might say, of being over-estimated. Such examination would not in any degree absolve local sanitary authorities from any of the obligations which rested upon them. It was quite plain that certain food stuffs, fruit for example, might with great advantage be subjected to a preliminary sorting. The practice in Liverpool—and he believed it was a fairly widespread practice amongst the fruit traders—was to have a preliminary sampling of cases, and on that preliminary sampling the various cases of fruit were classified. Some of them were assumed to contain 50 per cent of damaged or useless fruit, oranges for instance, and others more or less. In that way the cases appeared upon the auctioneers' bills or catalogues, and they were sold with the knowledge that a certain proportion must be given over for destruction. They were purchased with that knowledge, and when they were purchased a further sorting took place. He had listened to what Dr. Mason had said as to whether the sorting should take place before the sale or after it. Personally he did not think it was of very much consequence, but he did think it was desirable that the sorting, whether before or after sale, should take place on some part of the Port Sanitary Authority's area, or somewhere within the jurisdiction of that authority. That, he thought, was much better than sending the fruit to the wholesale markets and having the sorting taking place there. In the Port Sanitary Authority's area there was greater privacy. There would be fewer trespassers and fewer children hunting around for damaged fruit. Therefore the risk of tainted fruit being eaten by children and people would be very much lessened. Another point referred to was the need for dispatch. Delay would be extremely harmful in the case of perishable goods such as fruit. With regard to the question of labelling cases to show that the fruit had been inspected, he saw no harm in it, but he was bound to say he saw very little good. With such a perishable thing as fruit the fact of its being labelled might lead local sanitary authorities to think they need not be so particular, because it had already been passed by the Port Sanitary Authority. That might be a very wrong impression. The fact of labelling would show that the inspectors of the port sanitary authorities had done their part of the business, but cases had been known in which food-stuffs had been labelled and stamped or dispatched from abroad, which nevertheless on arrival had been seized and condemned. Although it was a very good thing to have that first line of defence, it must be remembered that it was merely a first line, and nothing must be done to throw local sanitary authorities off their guard. Of course some expenses would necessarily be incurred, but, after all, that was a necessary incident of a port. If they wished to attract traders they would have to incur expenses in the same way in which a seaside resort incurred expenses in advertising its attractions. But the question had vexed all Port Sanitary Authorities for a

very long time. Some had become weary of waiting and had obtained special powers of their own. The best way of meeting the difficulty which had come to his notice was the Bill introduced by Mr. Burns. It seemed to him to be one of the most ingenious ways of overcoming a very great difficulty that could possibly be devised. The principle of it was based upon the Act of 1896, which dealt with the importation of disease. It was an Act which brought into play all existing legislation designed with a view to check the importation of infectious disease, and would bring into play all existing legislation relating to the inspection and examination of food. He was very disappointed that the Bill did not proceed in the last Session, but he hoped it would go through at no distant date. In conclusion he expressed entire appreciation of the views put forward by Dr. Mason, and he hoped that all Port Sanitary Authorities would at an early date have the power which they desired.

DR. R. M. CRAVEN (Westmoreland) thought that if food was going to be examined, such examination would have to take place in a warehouse. Every railway company dispatched an invoice with goods sent to the station of delivery. That invoice stated to whom those goods were to be delivered. He did not see why they could not notify the medical officers of health of such consignments, and let them know what time the goods would arrive at the station consigned to.

DR. G. B. MILLSON (Southwark), dealing with the work at the Port of London, said that of course some cargoes arrived which without examination were palpably damaged. Those were sent off to the dock or warehouse and sorted there. With regard to fruit it would be impossible for it to be sorted before it arrived at the market. The quantities which arrived were so enormous that the great thing was to get the stuff into market and sold. If there was any question about its being good or bad, it was sold to be sorted. He had always held that they ought to have a warehouse where it could be sorted. At present the buyer took the stuff away, and they did not know whether or not it went for human consumption. The great difficulty was the immense volume of the stuff they had to deal with. With regard to meat it was very rarely there was a bad carcass, and only when there was a breakdown in the freezing machine. He had not observed any desire to pass such meat for human consumption. It was a great thing to have plenty of inspectors to wait for the stuff when it was landed and to examine it, and it must be dealt with in the warehouses. At the present time they were under the difficulty of having no power of entry to warehouses, although wharfingers had given them every facility, and had destroyed stuff which ought not to be sold. But lying behind, there was the feeling that there were certain wharfingers—he knew one or two—who dealt in unwholesome food. They bought such food—food which had deteriorated in its nature after it had come, say from Africa. Two or three years ago, unfortunately, he was led to allow some to go away for chicken food. He had no doubt it went for potted food or something of that kind. What they wanted were regulations, giving the power of entry into warehouses, and the power of sampling within a reasonable measure. Above all, authorities should be made alive to the necessity of employing an adequate staff at the business.

DR. R. M. CRAVEN pointed out that whilst a medical officer of health might take very good care that no diseased meat was allowed to be eaten in his district, yet a railway might run through the district which might convey such stuff to other districts.

DR. BUTLER (Willesden) said that port medical officers might tell them that inspectors at ports of entry were possible and desirable, and they

would all agree that that was so. At a port of entry there was much inspectorial work to be done which would in a large measure protect their food supplies, but it was quite obvious that the practical considerations would limit that inspection, so that it would not be possible to prevent unsound food coming in, in spite of any such system of inspection as might be organized at the ports. Dr. Craven had suggested a system of notification to the local medical officers of health, and it would be desirable if practicable. The inspection of food in the retail shops—which was all local medical officers of health could do—was certainly inadequate, and it was desirable that the food supplies should be inspected in bulk. They had endeavoured to secure a system of food inspection by which carcasses should be inspected at the place where they were slaughtered. Central abattoirs had been advocated, where all animals should be slaughtered, and inspection made at such points. To have anything like a system that should be comprehensive it seemed desirable that in addition to the methods suggested by Dr. Mason, they should also have what Dr. Craven suggested, namely, notification to the local medical officers of health. That it would be costly there could be no doubt. Furthermore, it would be to the interest of any port authority not to have a too rigid inspection and not to have too many rejections. Such a port would obtain a reputation amongst shippers, who would go to a port whose regulations were not so severely enforced. It was really a question of national importance, and the gain would be to the people of the country to whom the food was consigned. Therefore he thought the expenses should come out of the Imperial exchequer. The port medical officer should be the man to carry out the work, but as the question was a national and not a local one, the cost should be borne by the nation itself.

DR. J. WRIGHT MASON in replying to the discussion thanked the various speakers for their criticisms. All ports, he said, were exceedingly anxious for local self-government; and desired the power of inspection, not only as a first line of defence, but knowing the dangers attending importation of food. The food supply, like infectious disease, should be dealt with at the port of its entry. On the question of sorting, and whether it should take place before or after the auction, he thought it should be after. Notice should be given and the food should be sold subject to inspection. It was only now and again that they were called upon to deal with enormous quantities, and they were dealt with as the emergency occurred. If they got proper regulations then he thought the first thing they ought to do was to follow the lines of experience. For instance, when they saw articles of a suspicious character, the ship should not be detained or the discharge of the cargo delayed, but the goods should be detained for inspection. He thought that if the Port Sanitary Authority undertook the first inspection, they should take the entire responsibility. There should be no such thing as giving a certificate; it should simply be said in the case of a good cargo that it had been examined. The question resolved itself into one great problem. They did not assume that they should inspect the food for the country, but as they received the disease of the country so they received the food; and he thought that in their various ports their staffs should have the inspection of all food supplies arriving in the country.

"CARRIER CASES" OF ENTERIC FEVER.*

THE results of the campaign against endemic typhoid on the south-west frontier of Germany not only go far in support of the correctness of Koch's methods of suppressing this disease, but throw a flood of light on its etiology. One epidemiologically important fact brought out by these measures and investigations is that the healthy, or at least non-specifically sick, can harbour typhoid bacilli and excrete them—to the danger of the public. These bacilli-carriers (*Bazillenträger*), according to Klinger,¹ may be of either sex and of any age between eighteen months and sixty years; they have no specific symptoms of typhoid, and are apparently in perfect health. The bacilli are excreted in the faeces and can be demonstrated by the ordinary methods. For demonstrating *B. typhosus* we have not yet got a method with anything like the same certainty and simplicity as the peptone enrichment method for the isolation of the cholera vibrio. The bacilli are sometimes found in the urine, especially of women (seven out of eight cases), but never in great numbers, and so may possibly have been accidentally carried into the urine, where they multiply. "Carriers" are of two classes: (1) "acute carriers" (*akute Bazillenträger*), who have never before or after the demonstration of the bacillus in their faeces shown any symptoms of sickness, have been in direct contact with the sick and, as in the case of the majority of sick after recovery from the disease, excrete the bacillus for a short time only and in small numbers, being thus, in comparison with the second class, of little significance; (2) "chronic carriers" (*chronische Bazillenträger*), who have, a short or long time before, gone through a regular attack of typhoid, and may excrete for months pure cultures of typhoid bacilli. Of twenty-three "carriers" detected by Klinger, from among 1,700 individuals examined during a period of 1½ years, 11 (6 men and 5 women) belonged to the first class and 12 (3 men and 9 women) to the second. To get some idea of the number of convalescents who become chronic "carriers," 482 cases of typhoid fever were kept under bacteriological observation during recovery, with the result that 63 (i.e., 13.1 per cent) were found to excrete the bacillus during convalescence, but only 8 (i.e., 1.7 per cent) for longer periods than six weeks after the disappearance of fever; and of these 8 chronic "carriers," one was still excreting the bacillus a year after the attack of typhoid, and the other seven excreted for periods of eleven, eight, five, and three

* Taken from the Annual Report of the Sanitary Commissioner with the Government of India for 1905.

months. When examining persons who had been in contact with typhoid patients, Klinger discovered four chronic "carriers," one having had typhoid thirty years, and another ten years before. These four cases, as they were in contact with the sick, may have ingested the bacilli shortly before observation, or they may have been reinfecting themselves again and again from the outer world, or from their own dejecta, ever since their illness, but Klinger thinks it likely, from other observations and investigations, that typhoid bacilli under certain not yet fully understood conditions can live a saprophytic existence in the gall-bladder of a person who has recovered from an attack. This persistence of typhoid bacilli in the gall-bladder seems to predispose to the formation of gall-stones; and, in fact, two of Klinger's chronic "carriers" had, after their attack of typhoid, suffered from gall-stones. That these chronic "carriers" may become bacilli-free was only proved with any degree of certainty in one case, where the bacilli could not be detected after three months from the date of disappearance of fever; Klinger states that the others, to avoid trouble and inconvenience, probably sent in for examination the stools of other persons. Particularly in those cases where the bacilli were being excreted for eleven months was this form of deception likely, for one such woman was persuaded, on the occurrence of a fresh case of typhoid in her house, to come to hospital for a short stay, and in her faeces typhoid bacilli were found almost in pure culture.

Theoretically, as with cholera, diphtheria and cerebro-spinal meningitis, typhoid bacilli from these "carriers" may infect other individuals and cause typhoid, but experimentally this cannot be proved, for although cultures from "carriers" have been shown relatively virulent for guinea-pigs, this does not demonstrate their pathogenicity for man. We have, therefore, to fall back on epidemiological observations, and these, although few, and from their nature affording no absolute proof, are yet fairly convincing. Kayser², in relating his own experience in Strasburg of the danger which these "carriers" are to the public, gives a number of instances of which the following is an example. At a certain bakery a journeyman fell ill of typhoid and died in hospital; and at the same time the fact was elicited that for the past few years every apprentice in this bakery, shortly after his arrival, suffered from intestinal catarrh and indigestion. A few days after the journeyman, suffering from typhoid, had been taken to hospital, the proprietrix of the bakery, who had had typhoid ten years before, was found by the Bacteriological Institute to be a "carrier." About two months afterwards this

woman temporarily refused to send her stools for examination, and the stools subsequently sent in, for three consecutive examinations at weekly intervals, were found free from bacilli. Under the circumstances, Kayser suspected that in order to escape the inconvenience of being under bacteriological observation, this woman had sent for examination the stools of another person. The following month, however, her tenant, who used the same privy, got a severe attack of typhoid, and, although brought at once to hospital, died. As Kayser was unable to discover any source of infection other than this chronic "carrier," and as it was of great importance to obtain for examination material the source of which was beyond question or doubt, the proprietrix, under pressure of the police authorities, was brought to hospital, and her faeces, obtained from the hospital, were invariably found extremely rich in typhoid bacilli. Her blood serum, in a dilution of 1 in 100, gave a prompt positive agglutination reaction with *B. typhosus*. There was no fever; and no bacilli, even by using "enrichment" methods, could be isolated from her blood. There were thus, within the space of one year, two fatal cases of typhoid in the household of this chronic "carrier." It is possible, therefore, that these chronic carriers, especially if they are unaware of the potential danger of their dejecta, and are not cleanly in their habits, may disseminate the disease; and in outbreaks where a definite cause cannot be found, and where, in spite of immediate isolation and thorough disinfection, fresh cases still occur, we should bear in mind the possible presence of undetected carriers.

The search for carriers has been chiefly amongst those who have been in contact with typhoid patients. Minelli,³ however, made an attempt to discover them away from the vicinity of the sick. He examined the stools of 250 inmates of Strasburg prison, and found one carrier, who, from all the evidence that could be gathered, had not been in contact with any typhoid patient. The blood of this carrier, in a dilution of 1 in 1000, agglutinated the laboratory strain of *B. typhosus*. According to Forster and Kayser, the serum of those who merely harbour the bacillus as a saprophyte in the intestine, without having actually suffered from typhoid ("acute carriers"), has generally no agglutinative power; so this inmate of Strasburg prison had probably had a slight attack of typhoid, and was a chronic carrier.

To add to our difficulties in the campaign against this disease, we are unable, in the present state of our knowledge, to free from bacilli those carriers that have been detected; and measures suggested to minimize the risks of infection, e.g., thorough cleaning and disinfection

of hands and anus after defæcation, continuous disinfection of dejecta and their proper and careful disposal, are expensive and cause inconvenience to the carrier, and are therefore impracticable. In connection with the (at least apparent) natural immunity of acute "carriers," reference may be made to an article by Wassermann and Citron⁴ on the local immunity of tissues and the place of origin of typhoid-immune bodies. These authors maintain that a local immunity of tissues may exist spontaneously (e.g., the intestinal mucous membrane of acute "carriers") as well as after having undergone an attack of typhoid, the bacillus in such individuals living in the intestine without producing any symptoms and without causing any increase of agglutinating bodies in the blood.

¹ Klinger in *Arbeiten aus dem Kaiserl. Gesundheitsamten*, Bd. 24, H. 1, 1906, p. 91.

² Kayser in *Arbeiten aus dem Kaiserl. Gesundheitsamten*, Bd. 24, H. 1, 1906, p. 176.

³ Minelli in *Centralbl. für Bakteriologie*, Bd. 41, 1906, p. 406.

⁴ Wassermann and Citron in *Zeitsch. für Hygiene*, Bd. 50, 1905, p. 331.

SOME DIFFICULTIES IN PREVENTING PERSONAL INFECTION IN ENTERIC FEVER.*

LEAVING aside occasional abortive and incorrectly diagnosed cases of infection, there are two classes of the public, viz., children and typhoid bacilli-carriers, that, owing to certain peculiarities in their reaction to the typhoid bacillus, are specially dangerous to the community. Children suffer from this disease usually in a mild form, incorrect diagnoses being very frequent, and both from their habits and from their being together in school or at play for a great part of the day, are particularly liable to become infected themselves and to infect others: the incidence of the disease is greater among children than among adults. The greater liability of infection from children than from adults has been pointed out by Baginsky, who has studied the course of the disease, as it affects children between one and fourteen years of age, in eighty-eight cases. Frequently the disease, appearing as a feverish dyspepsia, was not recognized. This fact, together with the greater liability of children to soil their surroundings, make it obvious that children are very apt to spread infection by contact. In this connection the account given by Conradi of the part played by children in endemic typhoid in Metz (Lothringen) is particularly interesting. In Metz during the past

* Taken from the Annual Report of the Sanitary Commissioner with the Government of India for 1905.

twenty-five years there have died from typhoid forty-five natives (i.e., residents from birth) and 382 aliens or in-comers, and yet, up to fifteen years of age, natives and aliens die in about equal numbers. As regards the age incidence amongst residents from birth, over two-thirds of all the cases of typhoid were among children under fifteen years of age. Conradi states that the great incidence of typhoid among children is chiefly responsible for the dissemination of the disease amongst the inhabitants of Metz, and that on this latent contact epidemic amongst children (the disease as it affects them often not calling for medical aid) rests essentially the endemicity of typhoid in the city. Further, this contact epidemic amongst the children of Metz going on uninterruptedly from generation to generation explains (1) the adult native's immunity, which is acquired in youth and not inherited, and (2) the high incidence among the newly arrived non-immune alien adults who contract the severe adult type of the disease, the alien children with their native companions being equally liable to the disease in its mild form. It is obvious, therefore, that whenever the floating alien population is increased in such an endemic focus, e.g., for public works or military operations, formidable epidemics are almost certain to occur.

Wright and Archibald have reported from Glasgow some instances of typhoid in children under ten years of age, where personal infection seems to have taken place during play. For a detailed description of sixty-three cases of typhoid fever in children, the reader is referred to the original paper by Pater and Halbron. The peculiarities which make carriers specially dangerous to the public are the difficulty of detecting them, the length of time during which, unknown to themselves or others, they may be disseminating a virulent specific virus, our inability in the present state of our knowledge to free them from the specific virus, and the practical difficulty, almost impossibility, of getting such carriers as are detected to remain under surveillance and bacteriological control and to carry out continuous and efficient disinfectant measures in order to prevent infection being conveyed to others.

From the researches of Klinger, the proportion of typhoid fever patients that may become chronic carriers is 1.7 per cent, but according to Lentz the proportion may be as high as 4 per cent: reference has already been made to the instances brought forward by Kayser of the possible danger which these carriers may be to the public.

Finally, before leaving this subject, attention may be drawn to a suggestion made by Friedel, that the existence of "typhoid houses"

may be largely, if not entirely, due to the presence in them of the carrier, rather than on the presence in dust or crevices of typhoid bacilli, and consequently that in such houses a systematic examination of fæces and urine is a desideratum.

PARATYPHOID AND MEAT-POISONING.*

THE first clear diagnosis of a case of paratyphoid fever, that is, of a bacterial septicæmia clinically like typhoid but associated with a bacillus quite distinct from Eberth's, was that of Gwyn in 1898, where a "paracolony" bacillus was cultivated from the blood of a patient with all the clinical features of typhoid fever. Cushny (1900) in America, and Schottmüller (1900-1) in Germany, by a systematic application of the method of blood-culture in cases of "typhoid," showed that paratyphoid was not an uncommon disease in these countries. During the past five years cases have been reported from many parts of the world—including India and Japan. Recently Boycott¹ has published an account of three fully established cases of infection with *B. paratyphosus B.*, which were met with in England during 1905 while examining a series of 176 specimens of blood sent in for Widal's test in suspected cases of typhoid. For a detailed description of these cases, together with a useful bibliography on paratyphoid infections, the original paper should be consulted. Bacteriologists are by no means in agreement with regard to the systematic grouping of the organisms concerned in the production of these fevers; but the following classification appears to be the one which reflects the most recent views of authorities on this subject: (1) *B. paratyphosus A.*, (2) Gärtner's meat-poisoning bacillus, (3) Hog-cholera group, including *B. typhimurium*, etc., (4) *B. paratyphosus B.* The A type of paratyphoid bacillus is easily distinguished from the other three groups by cultural methods, is more nearly related (especially culturally) to Eberth's bacillus, and according to universal experience is much less frequently met with than *B. paratyphosus B.* Gärtner's bacillus is differentiated from *B. paratyphosus B.* and the hog-cholera group by the agglutination reaction with sera prepared from known cultures. The differences, however, in agglutinability between *B. paratyphosus B.* and the hog-cholera group are so slender that at times it is impossible to distinguish them, yet many authorities who merge them in one group acknowledge that there is a certain amount of contrast between the two. Schmidt² is of the opinion that

* Taken from the Annual Report of the Sanitary Commissioner with the Government of India for 1905.

hog-cholera, mouse-typhoid, and *B. paratyphosus* B cannot be differentiated, morphologically, culturally, experimentally, or by agglutination, and places them together under the hog-cholera group. Bock³ has demonstrated the close relationship between hog-cholera, mouse-typhoid, and the Kaen type of meat-poisoning bacillus, and although he places the B type of paratyphoid bacillus along with these as showing "no essential differences" culturally or in pathogenicity for animals, he admits that there is a certain amount of "contrast," and that the relationship between the first three mentioned is much more intimate than between these three and *B. paratyphosus* B. Boycott considers the distinction between the B type of paratyphoid bacillus and the hog-cholera group, although slight, is real. In the classification of Böhme⁴ not only is *B. paratyphosus* B, but also the Aertryck type of meat-poisoning bacillus and *B. psittacosis* found along with *B. typhimurium* in the hog-cholera group, which is differentiated from Gärtner's bacillus by the immune-serum reactions. In contradiction of Bonhoff's statement, Bock also reports that Gärtner's bacillus is easily differentiated from the others by the agglutination test.

In Germany and America it is estimated that about 10 per cent of cases clinically diagnosed as "typhoid" are in reality paratyphoid. In England, Boycott, from the past year's experience, puts the proportion at 3 per cent, but admits that this is probably too low. In paratyphoid, intestinal ulceration is more frequently absent, and the prognosis is much more favourable, the case-mortality of paratyphoid being 1 to 4 per cent as compared with 17 per cent for typhoid (London). It is therefore desirable for the patient's, as well as the bacteriologist's, satisfaction that an accurate diagnosis should be made. Although for diagnostic purposes a bacteriological examination of the blood is preferable, and occasionally absolutely necessary, for differentiation and identification a diagnosis of paratyphoid can generally be made from the agglutination reactions of the serum with known cultures of the various organisms (Boycott). Basing their observations on forty cases of true typhoid, Grünberg and Rolly⁵ report that 70 per cent of all cases gave the group agglutination reaction with paratyphoid bacilli in a dilution of 1 in 30 or higher, and in 33 per cent the paratyphoid bacilli were agglutinated in a higher dilution than the typhoid bacilli. They therefore maintain that a bacteriological blood examination alone under certain circumstances can show the true nature of an illness. In reply to Grünberg and Rolly, Korte and Steinberg, having investigated the group agglutination reaction in seventy cases

of true typhoid (for a positive result a dilution limit of 1 in 40 being required), state that in all cases the typhoid bacillus gave the reaction in higher dilution than the paratyphoid bacillus, and explain the results of Grünberg and Rolly by (1) their not having estimated the exact agglutination limits, (2) their having used the macroscopic test, which is not so exact as the microscopic, especially at the limits of agglutinability, and (3) the occurrence of "zones of inhibited agglutination," which are more marked in the macroscopic test. Similarly, Manteufel⁶ says that in his experience paratyphoid bacilli seldom gave the group reaction in dilutions over 1 in 50; in all cases higher limits were got with the typhoid bacilli, and in no case did agglutination occur with paratyphoid bacilli when absent with typhoid bacilli. Korte and Steinberg observed that occasionally the typhoid bacillus failed to agglutinate with serum in low dilutions (zones of inhibited agglutination), while if the serum were more diluted, agglutination appeared; and the same authors also noted that this phenomenon was materially misleading only in the macroscopic method.

According to Falta and Noeggerath⁷, the agglutination-preventing bodies (*Hemmungskörper*) which cause these zones of inhibited agglutination, appear generally towards the end of illness, and to prevent error it is advisable to use a dense emulsion of bacilli and test the serum to its agglutination limits. Although anomalous results are occasionally obtained, irregularities in agglutination results can generally be attributed to one or other of the following: (1) errors in technique and judgment of results, (2) a tendency to spontaneous agglutination of some strains (therefore use a strain of known agglutinable capacity), (3) the ultimate limits of agglutinability, especially by the microscopic test, of the different organisms not having been attempted, (4) zones of inhibited agglutination, (5) mixed infection. For the diagnosis of mixed infections, Castellani's test of absorption or exhaustion of agglutinins is necessary. Castellani found that an excess of typhoid bacilli would remove not only primary or homologous (i.e., typhoid), but also secondary or heterologous (e.g., coli) agglutinins from the serum of a rabbit inoculated with typhoid bacilli; while from a serum elaborated in response to inoculation with both *B. typhosus* and *B. coli*, neither typhoid nor coli bacilli alone, but only both together—simultaneously or successively—would remove all agglutinins. An instance of mixed infection by typhoid and paratyphoid, established by Widal's, Pfeiffer's, and Castellani's tests, has been recorded by Gaetgens.⁸ Ficker's paratyphoid diagnostica are two new bacterial suspensions—

substitutes for living bacterial cultures, of *B. paratyphosus A* (Brion-Kayser) and *B. paratyphosus B* (Schottmüller), respectively, specially designed to be of service for the agglutination test to practising physicians. Minelli⁹ reports favourably on these proprietary preparations. Stühlinger¹⁰ by killing paratyphoid bacilli with chloroform, or better still by aseptic autolysis (in normal saline at 37° for two months), has obtained very good paratyphoid diagnostica.

A case of infection by *B. paratyphosus A* (Brion-Kayser), where the bacillus was isolated from the blood, urine, and faeces, has been recorded by Kayser¹¹; and Brion¹² lays stress on the fact that paratyphoid, like typhoid, is a bacillæmia rather than an intestinal disease.

Meat-poisoning bacilli, which, it will be observed, find a place in almost all groups in the above classification, have been divided by Levy and Fernet¹³ into two broad classes—(1) those like *B. botulinus* (sausage poisoning), that produce nervous symptoms, and (2) those that have an accentuated action on the gastro-intestinal tract. They give an account of a family of seven that was infected with *B. paratyphosus B*, the symptoms being very like those of typhoid: the bacillus was isolated from the excreta of all seven, and was agglutinated by the serum of the patients in dilutions of 1 in 200 to 1 in 10,000. An instance of sausage poisoning, caused by *B. paratyphosus B*, has been reported by Krehl¹⁴. The fever ran a course like that of a moderately severe case of typhoid; the bacilli were found in great numbers in the stools from the beginning of the illness, and agglutination (1 in 1,000) appeared on the eleventh day of illness and only with *B. paratyphosus B*. Curschmann¹⁵ recognizes the gastro-intestinal and nervous forms of meat-poisoning, and regards *B. botulinus*, outside man, as a pure saprophyte. Gärtner's bacillus, on the other hand, generally occurs in the flesh of cattle that have been sick during life. Schmidt,² Pottevin,¹⁶ and Klimenko,¹⁷ all draw attention to the significance of sickness among domestic animals at a time when meat-poisoning and typhoid-like illnesses of man occur.

Pottevin isolated a bacillus very like Gärtner's from a ham which had infected four members of a family of seven. The blood of the four patients agglutinated this bacillus in dilutions of 1 in 50 to 1 in 500, while tests with the serum of other persons, even in a dilution of 1 in 25, were negative. The bacillus was pathogenic for young cats, producing, after ingestion with milk, a diarrhoea which persisted for about three weeks. Klimenko isolated *B. paratyphosus B* from a perfectly healthy adult dog, and believes that this

may throw some light on the occurrence of sporadic cases or even epidemics of paratyphoid fever. The bacillus was pathogenic for mice, rats, guinea-pigs, rabbits and young dogs, causing fever and diarrhoea, and retained its vitality in milk for a long period, being still alive and virulent after one year and four months.

¹ Boycott in *Journal of Hygiene*, Jan., 1906, p. 33.

² Schmidt in *Centralbl. für Bakteriologie Originale*, Bd. 38, 1905, p. 14.

³ Bock in *Arbeiten aus dem Kais. Gesundheitsamten*, Bd. 24, H. 2, 1906, p. 238.

⁴ Böhme in *Zeitschr. für Hyg.* Bd. 52, 1906, p. 97.

⁵ Grünberg and Rolly in *Münch. med. Wochenschrift*, No. 3, 1905, p. 105.

⁶ Manteufel in *Hyg. Rundschau*, June 1, 1906, p. 592.

⁷ Falta and Noeggerath, *Hyg. Rundschau*, June 1, 1906, p. 595.

⁸ Gaechtens in *Centralbl. für Bakt.*, Bd. 40, 1906, p. 621.

⁹ Minelli in *Centralbl. für Bakt.*, Bd. 41, 1906, p. 583.

¹⁰ Stühlinger in *Arbeiten aus dem Kais. Gesundheitsamten*, Bd. 24, H. 1, p. 54.

¹¹ Kayser, reported in *Journ. de Physiol. et de Path. Gen.*, May 15, 1906, p. 560.

¹² Brion, reported in *Centralbl. für Bakteriologie Referate*, Bd. 37, 1906, p. 548.

¹³ Levy and Fernet in *Centralbl. für Bakteriologie Referate*, Bd. 41, 1906, p. 161.

¹⁴ Krehl in *Deutsche med. Wochenschrift*, Feb. 22, 1906, p. 326.

¹⁵ Curschmann in *Deutsch. med. Wochenschrift*, June 7, 1906, p. 940.

¹⁶ Pottevin in *Hyg. Rundschau*, July 15, 1906, p. 751.

¹⁷ Spencer in *Indian Med. Gaz.*, April 1900, p. 122.

THE " FAKING " OF BUTTER.

THE remarks made by Sir E. Strachey in introducing the Butter and Margarine Bill into the House of Commons indicate the necessity for further legislative powers. The evidence before the Select Committee had shown how it paid to adulterate butter. One witness stated that overtures had been made to his company offering a process of adulteration which should not be open to detection, but which would increase their present profits by £5,000 a year. In a case taken against the Bridgwater Creamery Company only recently, it was said that the profits made by adding lardine to butter were £5,650 in fifteen months, so that there was a very real need for this Bill, which aimed at stopping the adulteration of butter at its source. Previous Bills were aimed at the seller or retailer; this measure went to the source.

SOME LESSONS LEARNT FROM RECENT OBSERVATIONS OF AIR IN RELATION TO HEALTH AND COMFORT.*

BY M. H. GORDON, M.D.

IN attempting to assign a relative value to the various external factors governing that maximum condition of vitality which we, as medical men, strive for on behalf of those who seek our advice—whether these be individuals or communities—we cannot fail to be impressed by the supreme importance of the quality of the air environment. For while the quality of water or of food supply is confessedly of immense moment, the action of these factors is to some extent intermittent; the operation of the air environment, on the other hand, is continuous.

It is becoming realized that health is something more than mere absence of disease. Perfect health implies a balance on the credit side—a capacity for resisting fatigue and disease that may be termed aggressive. It will probably be undisputed that this condition of “fitness”—a condition that largely determines the quality of work that the human machine can produce, especially mental work—is, under ordinary conditions, very intimately dependent upon the quality of the air environment. The term “bracing” or “relaxing,” applied by the public to describe the positive or negative effect of the atmosphere of various places upon their vigour, is witness to this, and the speed with which fatigue is engendered by the air of a closed room is familiar to us all.

The intimate relation between quality of the air environment and bodily condition and health is no modern discovery. It may be of interest, however, to recall that Francis Bacon, in his fable “The New Atlantis,”† prophesied amongst other discoveries to result from systematic investigation of Nature, the following:—

“We have also certain chambers which we call Chambers of Health, where we qualifie the Air as we think good and proper for the cure of divers Diseases and Preservation of Health.”

Although I do not propose to deal with climate in the present paper, I would venture to call the attention of those interested in this matter to a valuable address on Climate and Health, delivered at the Congress

* A paper read before the Midland Branch of the Incorporated Society of Medical Officers of Health, April 11th, 1907.
† *Sylva Sylvarum*. London, 1664.

of the Royal Sanitary Institute at Bristol, last year, by Dr. W. N. Shaw, F.R.S., Director of the Meteorological Office. After describing the meteorological records available for study of the relation between climate and health in this country, Dr. Shaw selects three particular localities, viz., London, Oxford, and Cambridge, and compares the physical quality of their atmospheres, with a view to elucidating a subjective difference he has observed between their effects. This difference he describes by saying that it is easier to go on working in London than at Oxford and Cambridge, and he believes that the variation is not due solely to altered social circumstances and habit. On comparing the three atmospheres with regard to temperature, sunshine, rainfall, and humidity, however, he was unable to extract from the figures much information of a kind to directly elucidate the difference in their physiological action. The most conspicuous feature was the relative smallness of the London sunshine—which was hardly to the advantage of London. Leaving that out of account, he found a persistent elevation of minimum temperature in London, and he suggested that this might be connected with a corresponding increase in the effective dryness of the atmosphere. “But,” he goes on to say, “if that be the whole explanation, the human organism must be regarded as a much more sensitive instrument than the thermometer, and great hygienic effects must be attributed to small meteorological causes.”

As my present object is to describe the outcome of some recent observations of air in enclosed spaces, I shall not concern myself with the qualities of open air, interesting and of first-rate importance though I believe that matter to be in relation to human comfort, vigour, and health. In the present paper I propose to deal mainly with the impairment in quality that air in occupied rooms is liable to undergo from the presence of human beings; and more especially I propose to lay before you some considerations that arose in course of a recent investigation of the ventilation of the Debating Chamber of the House of Commons. That investigation, which was of a very detailed character, and took over two years to complete, was planned and carried out on behalf of H.M. Office of Works for the purpose of defining the conditions of the Debating Chamber system—a necessary antecedent to obtaining the best results out of that system, and thus improving the quality of the air in the Debating Chamber when in use. Full details of this investigation have been published*, and also some recommendations based on its results; but as the points that

* House of Commons (Ventilation) Reports and Recommendations, 1905, 1906—Wyman.

arose in course of it apply to the artificial supply of air to persons in enclosed air spaces generally, I shall refer to them in some detail.

While the air in which we live has a continual influence upon us, and we are provided with a special and highly delicate sensation whereby we are warned of fluctuations in its quality, sensitiveness to the condition of the air environment, like all other subjective phenomena, is not a constant value, but varies considerably in different individuals, and even in the same individual at different times. This variation constitutes one of the chief difficulties which are encountered in practice when attempting to supply a room full of human beings with the quantity and quality of air best suited to their temperament and health. As an extreme instance, the case may be cited in which the same quality of air has been found to cause one man to complain of its heat, and another of its coldness. On the whole, however, such extreme divergences of subjective response are, I believe, exceptional, and, other conditions being equal, the majority of normal people would seem to react fairly equally to the same quality of air.

I. Standard of Purity desirable for the Air of an Occupied Room.

The first point to be determined with regard to ventilation may be put in form of a question: What standard of purity should the air of a room be made to conform to in order that it may satisfy requirements as to health and comfort of the occupants?

Now, in this matter, whatever standard be desirable theoretically, there is only one to be aimed at in practice: the air of the room must be free of objectionable smell or property. In other words, it must be free of impurity when judged by the subjective senses.

In estimating the purity of an atmosphere by the subjective test, the sense of smell is, of course, one of the chief guides; and the standard which is generally accepted as desirable is that when the room is entered from the fresh outer air its atmosphere should not be found to smell differently from the fresh air. It is very necessary to realize in this connection the enormous delicacy of the human sense of smell. This sense has been computed by Berthelot to be a million times more delicate as a test for the presence of musk than the spectroscope is for the presence of sodium. As the latter test exceeds in delicacy the ordinary chemical test for carbonic acid by about the same degree, it is clear that the atmosphere of an occupied room may be irreproachable as regards exhaled carbonic acid, and yet abominable to the olfactory sense. The sense of smell, moreover, is a constant test which, unlike standards of carbonic acid, systems of ventilation needs must satisfy. Its extreme delicacy—providing

as it does an enormous margin over the chemical test for pollution—compensates to some extent for the two chief drawbacks attached to its use, viz.: (1) the rapidity with which it becomes fatigued; and (2) possibly the result of (1), the variation which this subjective faculty exhibits in different persons, and in the same person at different times. For this reason it is essential that when applying the sense of smell to estimate the purity of the atmosphere in an enclosed and inhabited air-space, the sensation observed directly on entering the room should alone be recorded.

Personally I believe that when properly used, the sense of smell is the most valuable of all our guides to the purity of air, and I look forward to the time when this most vital question of the purity of the air supply shall have received the attention it deserves from our legislature, and even to a time pictured by Mr. Hudson,* when air inspectors (with standardized sense of smell) shall enforce the doctrine of the open window.

Another subjective sense of great moment in regard to ventilation is the thermal sense. As a means of detecting deficient ventilation, the sensation of heat, stuffiness, or closeness, is of no less importance than the sense of smell.

A third subjective effect produced by the atmosphere of a room in which ventilation is at fault is seen in cases in which the deficiency is only of moderate degree. It was this quality of the air that was complained of in case of the atmosphere of the Debating Chamber of the House of Commons. The Committee of Members that was appointed to look into the ventilation in 1903 did not complain in their report that the air of the Debating Chamber smelt badly, nor did they say that it was too hot: what they said was this:—

“It is the common experience of many Members that the air of the Chamber lacks freshness, that there are some qualities possessed by it which lead to a stay for a length of time in the Chamber causing in Members a lassitude and feeling of heaviness which tends to interfere with the due performance of their duties.”

In answer to the question previously stated, therefore, we may lay down the following standard of purity. In a properly ventilated room the air must possess no objectionable odour; it must not be hot or oppressive; it must not engender fatigue or “lack freshness”; and unless the atmosphere of an occupied room passes these three subjective tests, the ventilation is imperfect. To this I hope the further condition may some day be added that the air shall not convey infection, even though an infectious person be present.

* Transaction of the Surveyors' Institute, Vol. xxxix, Part 6.

II. Factors of Pollution.

1. *The Causation of Stuffiness.*—The arduous and classical work of De Chaumont, whereby he correlated the amount of respiratory impurity expressed as carbonic acid with the corresponding degree of stuffiness, is well known, and likewise the four qualities of air which he distinguished by this means. His observations led him to infer that in order to keep the respiratory impurity below two parts of carbonic acid per 10,000 of air, the amount of fresh air required per head was 3,000 cubic feet per hour, or 50 cubic feet per minute. De Chaumont's observations were mostly made in barrack-room dormitories during the night, and in hospital wards. In the latter case—either because the wards were in continuous occupation, or because of the more offensive quality of air vitiated by the sick—he found that 4,000 cubic feet were required per head per hour, or about 66 per minute, to keep the air fresh and pure to the subjective senses.

The observations of De Chaumont went to show that in his own words, “the sense of smell carefully employed gives a very fair idea of the amount of respiratory impurity in an inhabited air space.” The chief criticism of his results lies in the fact that his observations were limited to barrack-room dormitories and hospital wards. The atmospheres which he examined do not appear to have been overcrowded, and they were relatively cool. His object was to correlate the amount of respiratory impurity expressed as carbonic acid with the degree of pollution observed by the sense of smell, and to define the quantity of air necessary to keep the atmosphere of a room free of objectionable odour arising from the exhalations of its inmates; and in these points he succeeded admirably.

On the other hand, the more recent and elaborate observations of Flügge, Heyman, Paul, and Erklentz were made with the object of defining the causation of the injurious effect that air acquires in places such as schools, theatres, and churches, when crowded, and these experiments go far to prove that the bad effect in question is due entirely to physical vitiation of the air. Their experiments included a number of tests made in a specially constructed glass chamber in which the physical and chemical qualities of the air could be rigorously controlled. They found that with a respiratory impurity of carbonic acid exceeding any recorded up to that time as having been found in the air of a crowded room (e.g., from 10 to 15 or even 17 per mille), absolutely no injurious property of the air could be demonstrated so long as the temperature and humidity were kept low; and that under these circumstances the absence of any disturbance was so complete that the power of co-ordination remained intact, as was proved by the

ease and normal manner in which certain arithmetical calculations given by way of test were carried out. Parallel results were obtained in case of a schoolroom crowded with children, but in which the temperature was kept low.

On the other hand, as soon as the temperature and humidity were increased to beyond a certain point, there appeared, both in normal and in diseased persons who were submitted to experiment, the usual symptoms that occur when people are crowded together in one room, i.e., feeling of inconvenience, oppression, lassitude, giddiness, nausea, etc. These symptoms, however, could be relieved at once by reducing the temperature and humidity of the air to normal.

The temperature of the air at onset of unpleasant feeling in these experiments appears to have varied from 70–86° F., and the humidity from 45–86 per cent; the unpleasant effect becoming manifest at a lower relative humidity at the higher temperature.

Following on these observations, Dr. J. S. Haldane, F.R.S., has carried out a series of experiments to determine the actual point at which a rise in the temperature and humidity of the air environment produces a definite rise in the body temperature. He found the all-important factor in this matter to be the wet bulb temperature of the air. In still air the “critical” temperature was 88° F., wet bulb, though, in case of moving air, a wet-bulb temperature up to 93° F. could be borne without abnormal rise of body temperature, provided the body was at rest. If muscular work was being performed the critical temperature of air was 78° F.

2. *Air in Relation to Infection.*—Before proceeding further, I must say a few words about recent observations of air in relation to infection. Morbific virus may conceivably be given off from an infected person in the expectoration, in the excreta, in discharge from a mucous cavity, or in particles shed from the surface of the skin; and of such particulate products, those which have hitherto been found to be especially liable to convey infection to others are the materials derived from mouth and intestine respectively.

It is hardly necessary to observe that from the point of view of Preventive Medicine, the importance of being able to identify the presence of particulate material derived from mouth or intestine is great. For where environment is such that particulate pollution derived from the human mouth or intestine has continual access to the alimentary or respiratory system of others, it is only a matter of time and opportunity for infection to be successfully transmitted by the same route. Tests, therefore, by which particulate material derived from mouth or intestine can be identified, and the frequency

and extent of such pollution measured, are tests by which the danger of the access of morbid virus may be discerned, and the efficiency of measures adopted with view to preventing such access gauged and controlled.

1. *Particulate Matter derived from the Mouth and Upper Respiratory Passages.*

In the case of influenza, diphtheria, scarlet fever, small-pox, and a number of other infections, including epidemic cerebro-spinal meningitis, the bulk of evidence tends to show that their virus is mainly transmitted through air: in other words, that air is the medium through which particulate matter containing the disease germ passes from one person to another. The large proportion of cases of such air-borne diseases to the total number of cases of infectious disease of all kinds in this country would seem to point to air as the most active of operating vehicles of infection at the present day.

The work of Flüge and his pupils has thrown considerable light upon the mechanism of the process whereby infective material present in the upper respiratory passages is transmitted through air. By artificially infecting the mouth with *B. prodigiosus*, and then performing certain acts such as coughing, sneezing, and loud speaking, in a room in which agar plates had been exposed at various levels and distances from the person performing the acts referred to, Flüge and his pupils have shown that minute particles or droplets of mucus are expelled from the upper respiratory passages into the air in these acts, and that they are wafted by air currents such as exist in ordinary rooms to all levels, and to distances as far as 40ft. away. In some cases patients suffering from phthisis were experimented with, and *B. tuberculosis* expelled by them in the act of coughing was actually demonstrated to penetrate through the air to a distance of one metre or so from the mouth of the patient. Another observer showed that the leprosy bacillus was emitted to much the same distance by lepers under similar conditions.

Having repeated some of the experiments of Flüge with *B. prodigiosus*, and confirmed them, I proceeded to enquire whether there was not constantly present in the normal human mouth some micro-organism which might be utilized as a bacterial test or index for detecting particulate matter derived from the mouth in the same fashion that *B. coli* is used for identifying material derived from the intestine. As a result of quantitative bacteriological examination of a number of samples of normal human saliva, I found that streptococci were present in every case, and far exceeded other bacteria in

abundance. In each sample of normal saliva examined streptococci exceeded 10,000,000 per cc., so that they serve as a test whereby 0.000,000,1 cc. of saliva can be detected. On examining the character of these streptococci, I found that though several varieties are present in saliva, one streptococcus in particular, *Streptococcus salivarius*, is present with far greater constancy and abundance than the others. This streptococcus, therefore, promised to provide the index for which I was seeking.

Streptococci develop in broth far more readily than on solid media. It was by inoculating the highest dilution of saliva directly into broth that I succeeded in proving the enormous abundance of streptococci in normal saliva. Hence, in testing for the presence of salivary streptococci in air I used broth, and exposed this medium in suitable receptacles to the air. Moreover, salivary streptococci grow as well anaerobically as aerobically, whereas many of the commonest bacteria in air, such as *B. subtilis*, *mesentericus*, etc., are inhibited by anaerobic conditions. After exposing the broth to the air, therefore, I incubated it anaerobically at 37° C.

I need not enter into further details of these experiments, as they have already been fully described elsewhere.* Suffice it to say that by this streptococcus test I succeeded in proving the spread of particulate matter from the mouth through the air of the room to the same extent and distance as in previous experiments carried out with *B. prodigiosus*. The advantage of using a microbe normally present in the secretion of the mouth, however, for this purpose, is obvious: for by this means one obtains a test whereby the degree of particulate contamination which the air of a given room undergoes in actual practice can be determined, and, further, the influence of various systems of ventilation on the spread of particulate matter sprayed into the air in the acts referred to can be tested under actual working conditions.

Before proceeding to develop this streptococcus test for particulate material emanating from the upper respiratory passages, it became necessary to see if it were possible to distinguish between streptococci of saliva and streptococci of other origin. By examination of a number of streptococci in a variety of media, I succeeded in showing that this differentiation could be readily effected by observing, in addition to their ordinary morphological and cultural characters, their bio-chemical behaviour in the presence of certain sugars, alcohols, and glucosides, in regard to their action on which these streptococci differed *inter se*. It is now as necessary in case of a given streptococcus

* Reports Medical Officer Local Government Board, 1902-3; 1b, 1903-4.

to examine its characters by a series of tests of a proved differential value before drawing inferences as to its significance as it is in the case of coli-like micro-organisms.

2. *Particulate Matter derived from the Intestine.*

Identification of the presence of minute traces of excremental contamination by means of *B. coli* and the spores of *B. enteriditis sporogenes* is too well known to need description here.

The use of streptococci as an index of the presence of faecal matter is due to Dr. Houston. Dr. Houston has classified streptococci of faecal origin on similar lines to those used by me in reference to salivary streptococci; and his results show that although the variety of these microbes in faecal matter is as great as in the case of saliva, the frequency of some kinds is greater than that of others, and one streptococcus in particular, which, amongst other things, changes mannite with acid reaction, would seem to be particularly characteristic of faecal matter.

In course of the experiments described above, a streptococcus that differed morphologically, and also in cultural respects, from salivary streptococci, was frequently obtained from the air of rooms, and also from the open air. Later on, when tested against various sugars, etc., this streptococcus was also found to differ markedly from streptococci of saliva in bio-chemical action. At first I called this micro-organism "the air streptococcus," because I came across it so frequently in air. On ten occasions fifty litres of the air of London, E.C., were sampled, and the air streptococcus was recovered in this quantity of City air eight times. On the other hand, the air of Blackheath only yielded this streptococcus in three out of eleven parallel tests, although, in the aggregate, double the quantity of air was examined in these Blackheath tests. The air streptococcus, therefore, was much more abundant in the air of the City of London than in air on Blackheath.

When I subsequently examined the air of the House of Commons, I came across this air streptococcus frequently, and found that it was the most frequent streptococcus in air directly contaminated by material brought in from the streets by Members upon their boots. Dr. Houston found it to be frequent in faeces, and Dr. Andrewes has found it in great abundance in horse manure, and has called it *Streptococcus equinus*.

This micro-organism, therefore, would appear to serve as an index of the presence of particles of horse manure in air. I may add that I recovered it from air at the level of the lantern on the Clock Tower at Westminster.

3. *Particulate Matter derived from the Skin.*

Working on similar lines to those adopted when developing the bacterial test for particles of saliva, I have shown that a certain staphylococcus, possessed of constant and definite characters whereby it can be identified, is uniformly and abundantly present in particles detached from the human skin or scalp, and that this micro-organism serves as an index whereby the presence of such material can be identified. The skin staphylococcus in question grows well anaerobically, and is best detected in air by exposing broth and then incubating it anaerobically at 37° C. This micro-organism, which is identical with *Staphylococcus epidermidis albus* of Welch, differs from *Staphylococcus pyogenes albus* in a number of points, notably by reason of the fact that it fails to decompose mannite with an acid reaction whereas *Staphylococcus pyogenes albus* rapidly decomposes that alcohol with a strongly acid reaction.

I have recovered this skin staphylococcus from the air of rooms in which people were moving about, though I failed to obtain it from the air of such rooms when empty. No doubt its demonstration would be possible in the air of a theatre after much clapping of hands. I have found it in abundance in bath water.

4. *Special Factors of Pollution.*

Although identification in air of particulate material derived directly from a human being is limited at present to the tests described above, it is well, before proceeding further, to touch upon a few other factors of pollution to which air in occupied rooms is liable. The first of these calling for attention is sewer air.

(a) *Sewer Air*.—When a few litres of sewer air are aspirated through a plug of sterile wool, it has been found that the bacteria thus obtained (Gel. 22° C.) are fewer than in case of a similar sample of air drawn at the same time from the air of the street above the sewer. This result cannot be gainsaid, as the experiments of independent observers have placed it beyond dispute. But in spite of its freedom from bacteria when judged by this method, sewer air would appear to have a bad effect on health when it makes its way into a house; and the explanation of this pernicious attribute has for long puzzled us.

A recent investigation by Drs. Andrewes and Hurlley of air in the sewers at Hampstead* has considerably added to our knowledge of the properties of sewer air, and suggests a possible clue.

Dr. Andrewes, by exposing plates to the air of the sewer, obtained evidence of their infection by micro-organisms present in the sewage.

* Report to the Hampstead Sanitary Authority, 1905.

On one occasion he obtained *B. coli*, and on several occasions streptococci were obtained, the characters of which were found to differ from those of streptococci recovered from air in the street above, and were similar to those exhibited by streptococci isolated from the sewage itself. The question of occasional particulate contamination of the air of the sewer by the sewage itself is as yet, therefore, by no means settled in the negative.*

Dr. Hurtley's results are hardly less interesting. He noticed that the air of the sewers was always either saturated, or very nearly so, with water vapour, hence, even if only a small diminution of temperature occurs, condensation takes place, and moisture settles on any particulate matter floating in the air, and this becomes deposited. At night, such condensation occurs regularly, and the air of the sewer is thus automatically cleansed of any suspended matter.

Furthermore, carbonic acid is only slightly soluble in water, and hence this humidity of the sewer's atmosphere does not materially affect the prevalence of that gas. But ammonia is 200 times as soluble as carbonic acid, and hydrogen sulphide is four times as soluble as carbonic acid; hence these two gases of decomposition tend to be diminished very considerably by the humidity of the sewer's atmosphere.

(b) *Fumes and Dust*.—About other special conditions of pollution of air, such as arise in manufacturing processes from the presence of fumes or dust, I do not propose to speak more than to say that it is obvious that special impurities require special measures for their removal. It is of importance that the efficiency of such removal should be proved by the actual test of experiment. Nothing less than this should be accepted; the arrow diagram and routine formula threaten to become actual impediments to progress in practical improvement of the art of ventilation, because they tend to detract attention from the all-importance of proving, by actual experiment upon the spot, the efficiency or otherwise of systems of ventilation.

III. The Limit of Ventilation.

As the best test of the purity of the atmosphere of an inhabited room is the subjective test, so also the maximum quantity of air that can be supplied is limited by the subjective sensation of discomfort or draught.

The relation between movement of air and sensation of draught

* The remarkable experiments of Major Horrocks, published in a recent issue of PUBLIC HEALTH, have confirmed and considerably amplified these observations with reference to particulate contamination of sewer air.

has been experimentally defined, and it has been found that the velocity of air at a temperature of 55° to 65° F.—

- (1) At 1½ ft. per second is felt by none.
- (2) At 2 to 2½ ft. per second is felt by only a few very sensitive persons.
- (3) At 3 ft. per second is felt by most.

Since a velocity of 1½ ft. per second is felt by none, the quantity of air that can be supplied per head per minute without provoking draught is limited chiefly by the sectional area of available inlet. With an inlet area of 1 sq. foot per head, 90 cubic feet of air can be supplied per head per minute without draught, and 120 to 180 cubic feet without movement of the air being perceptible to more than a few very sensitive persons. The sensation of draught is dependent to a considerable extent on the temperament of the occupants, their habits, and the time of day. In the early hours of the morning, during an all-night sitting, the velocity of the air at the House of Commons has to be considerably reduced. The influence of relative humidity of the air has still to be defined in relation to draught.

IV. Observations made during a recent Investigation of the Ventilation of the Debating Chamber of the House of Commons.

Complaints of Members about the quality of the atmosphere of the Debating Chamber led to the appointment of a Select Committee of Members, whose report and recommendations, published in 1903, have been already referred to. One of the chief causes of the appointment of this Committee was an outbreak of influenza, which disease had attacked Members with particular frequency.

The Committee examined a lot of witnesses, and caused a chemical and bacteriological examination to be made of the air of the Debating Chamber. The result of the chemical examination, which was made by Mr. Butterfield, was satisfactory—the respiratory impurity, in the form of carbonic acid, being found to vary from 1.0 to 1.86 per 10,000 of air in one test, and from 0.19 to 2.15 in another. The bacteriological examination of the air made by Dr. Graham Smith at the same time with Frankland's method, showed a mean of 5.8 micro-organisms per litre of air in the Debating Chamber. The Committee remarked that though less exact and less satisfactory than the chemical results, the bacteriological results could not be regarded as other than satisfactory.

In contrast to the results of these objective tests, the Committee pointed out the unsatisfactory nature of the air from the subjective standpoint, and instanced its lack of freshness and its tendency to produce lassitude and fatigue. After suggesting many improvements, including better cleansing of the Debating Chamber, the substitution

of a suitable extract fan for the old coke-fire exhaust, and the replacement of the in-put fan by one of more powerful type, the Committee made a final recommendation that enquiry should be instituted into problems of ventilation still unsolved, with the view of introducing further improvements into the present system.

The recommendations of the Committee were acted upon, and I received instructions from H.M. Office of Works to make an investigation. The matter which was determined in the first place was the degree to which the air of the Debating Chamber was liable to pollution from particulate matter derived from various sources, and subsequently it became necessary to go into other aspects of the ventilation of no less importance. The inquiry which has been made owes a great deal to the late Sir Michael Foster, who throughout its course spared no trouble to make the investigation as far-reaching and thorough as possible. As a physiologist, and as Chairman of the Committee of Members who had reported on the ventilation, his interest had been keenly aroused in the problem of improving the atmosphere of the Debating Chamber, and throughout its course he continually imparted encouragement, and even enthusiasm, to the enquiry.

After my preliminary examination of the system, the First Commissioner of Works appointed a committee consisting of Sir Michael Foster, Chairman, Dr. J. S. Haldane, F.R.S., Dr. W. N. Shaw, F.R.S., together with Mr. Patey, of the Engineering Department of H.M. Office of Works, and myself, to continue and complete the investigation. Important help was also rendered by Dr. W. H. Hurtley, who made a further chemical investigation of the air, and by Mr. R. G. K. Lempfert, of the Meteorological Office, who carried out an investigation of the physical quality of the air in regard to temperature and humidity. Dr. John Aitken, F.R.S., also rendered valuable advice and assistance in course of the enquiry.

The investigation which was made of the ventilation comprised enquiry under the following three heads:—

1. The quality of the air at the inlet, and before and after passing through the Debating Chamber respectively.
2. The quantity of air supplied and withdrawn.
3. The distribution of fresh air within the Debating Chamber.

(a) *Quality of the Air.*—Subjectively the air on the Terrace of the Houses of Parliament is remarkably pure and fresh, and when in 1904 I began to investigate the system as it was under the old conditions (the improvements recommended by the Select Committee not having then been carried out), I was forcibly struck by the subjective difference between the air of the Terrace and that of the Debating Chamber

on the same occasions. Furthermore I, by painful experience, confirmed the tiring effect of the air delivered at the Debating Chamber at that time. The bacteriological and chemical results failed to furnish any explanation of this difference, but a striking objective difference was nevertheless detected by the dry and wet bulb hygrometer, for it was found that the temperature of the incoming air was being raised at the expense of its relative humidity. The observations were made during the months of May, June, and July, 1904, and a number of tests of the air at the inlet, and as delivered at the Debating Chamber respectively, showed that the air entering the system had a mean humidity of 71 per cent, whereas by the time this air reached the Debating Chamber its humidity was reduced to 63 per cent. In other words, the air, on arrival at the Debating Chamber, possessed a capacity of absorbing moisture 50 per cent over that exercised by fresh air on the Terrace at the same time. Now, although expired air is saturated with moisture, it is clear that dry air will primarily tend to saturate itself at the expense of moisture present in the upper respiratory passages, and this "thirstiness" of the air—which would, of course, be far greater in the winter months, when the temperature of the fresh air would require to be still more raised—is a factor that deserves more attention than it has yet received in reference to "want of freshness" and liability of air to encourage catarrhal conditions.

At a subsequent stage of the enquiry Mr. Lempfert, of the Meteorological Office, carried out a number of observations of the temperature and humidity of the air for the Committee, and his report is well worth the perusal of those who may be called upon to keep these most important qualities of air under observation. A number of the thermographs and hygrographs used by Mr. Lempfert have since remained in constant use at the Debating Chamber, and provide a continuous record of these qualities of the air. Such instruments should be in use in all systems of ventilation of any importance.

Dr. John Aitken also rendered valuable assistance to the investigation, and by means of the ingenious and accurate instrument which he has invented for counting the number of minute dust-particles in air of various sorts, succeeded in measuring the value of two filtering processes for removing these particles from the air. In these experiments I had the honour to assist him, and on both occasions when we tested it we found that the air on the Terrace contained about 40,000 of these minute particles per cc.—a number by no means large for London air, and suggestive of the comparative freedom of the Terrace air from smoke. On testing the

air before and after its passage through the water screen at the inlet we found no diminution to be effected in the number of these particles, though observations of the bacteria contained by the air before and after passage through that screen showed that they were reduced by 60 per cent. But while the water screen failed to remove these minute particles of dust, we found that the cotton-wool screen (which is used only in time of fog) reduced them by about 80 per cent.

The chemical investigations made by Dr. Hurtley proved a valuable supplement to the carbonic acid observations of Mr. Butterfield, previously mentioned. Dr. Hurtley examined the air at the inlet quantitatively for oxygen, ozone, nitrous acid, nitric acid, and sulphuretted hydrogen. His results are fully described in the Appendix to the Committee's report. He made some particularly valuable observations in connection with the water spray then in use at the inlet for moistening the air when the break between dry and wet bulb was over 5° F. Dr. Hurtley tested the value of this spray for removing free and albuminoid ammonia from the incoming air. His observations showed that a very material decrease in these two constituents was effected by the spray in question, and he determined the quantity of water necessary to obtain the best results. These observations of Dr. Hurtley cannot fail to be of interest to all concerned in the problem of purifying air.

Dr. Hurtley also applied lithium for the purpose of ascertaining the extent to which air in the Debating Chamber is liable to contamination by dirt brought in by Members on their boots. In these experiments I applied *B. prodigiosus* for the same object. By the spectroscope Dr. Hurtley showed the presence of lithium in dust falling down through the floor of the Debating Chamber at the same time that I obtained *B. prodigiosus*.

The air at the inlet showed no evidence of contamination by particulate material derived from the mouth or intestine, except in the case of a side inlet which was under a grating on which people walked, and at that point the air was found to be liable to contain excremental bacteria on such occasions from minute particles of street dust detached from the boots of persons passing over the grating in question. This inlet has now been abolished. Although I tested the air at the inlet on several occasions for a number of hours at low tide, I failed to find any of the bacteria which I had ascertained to be most abundant in the mud of the river by the Terrace.

The air enters the Debating Chamber throughout the whole, or almost the whole, of its floor, which is one vast metal register. I found that there were two areas where the up-going air was especially

liable to contamination from material brought in from the streets by Members on their boots—these spots being the places where traffic is most active during debates, i.e., between the Bar and the door under the clock, and at the opposite end of the Debating Chamber behind the Speaker's chair.

The air in the Debating Chamber itself could not be examined during debates by the methods I was using, but on one occasion I tested it as soon as possible after the House had adjourned. Only three salivary streptococci were recovered; but it is significant that one of these was recovered from air over the Treasury Bench, and another from air over a bench where one of the Members, who had taken an active part in the debate, had been speaking. As some ten minutes elapsed before I could spread the broth plates, etc., about for this test, no doubt many of the particles contained by the air had time to gravitate to the floor before the plates were exposed.

A large number of bacteriological observations were made of air leaving the Debating Chamber during debates, and the chief particulate contamination contained by it under these conditions was found to be material derived from the upper respiratory passages. When the House was empty, on the other hand, no such contamination was found present. *Streptococcus salivarius* and other salivary streptococci were present in the air leaving the Debating Chamber during debates, and occasionally *Staphylococcus aureus* was obtained. I regret that at this time I had not yet developed my test for the presence of particulate material shed from the skin, as it would have been interesting to have seen the degree to which *Staphylococcus epidermidis albus* was present in the air leaving the Debating Chamber during use.

B. mycoides was occasionally found in air leaving the Debating Chamber during debates, and as this micro-organism was also recovered from air under parts of the floor where contamination from particles brought in on the boots of Members was most active, the presence of *B. mycoides* in air leaving the Debating Chamber was regarded as indicating the presence therein of particulate contamination derived from Members' boots. Further evidence to the same end was provided by certain streptococci of unusual type recovered in the same tests from air below the Bar, and from air leaving the Debating Chamber. *B. coli* was never found in air leaving the Debating Chamber; though I got it on rare occasions from air under the Bar. In the experiments previously referred to, in which earth infected with *B. prodigiosus* was laid down at a point outside the Debating Chamber, that organism was recovered from air in the

Equalising Chamber below the floor of the Debating Chamber, but was not found in air passing out of the Debating Chamber. Though that air was tested continuously over a period of many hours in these experiments, *B. prodigiosus* was only found once in the air passing out; and this single observation may have been accidental.

During these observations of air passing out of the Debating Chamber, the opportunity was taken of determining the distance to which particulate matter given off from the respiratory passages could be traced though air by means of the streptococcus test. The farthest distance to which it was traced was to a point 150 ft. from the person who spoke.

Quantitative Observations of the Air-flow.

Coming now to the second division of the enquiry, namely, the all-important question of the quantity of air supplied and withdrawn, I may say that this and the subsequent stage of the investigation were carried out conjointly with Mr. Patey, at that time resident Engineer at the Houses of Parliament. The instrument used throughout this part of the enquiry was the anemometer. We made, in the first place, a number of comparative trials with various anemometers, and decided upon Casella's instrument.

This we then had tested at Kew, and its error determined for velocities of air between 50 and 1000 ft. per minute. We next determined by experiment the distance at which this instrument should be held from the body in taking observations in the airway, and various other points were examined with a view to obtaining comparative results of reasonable accuracy. These points have been described at length in the report previously mentioned. Two of them merit attention, as they are bound to occur in similar enquiries. The first difficulty which we had to solve was the question as to whether the velocity reading given by an anemometer when passed about an inch above the face of a thickly barred grating should be multiplied by the sectional area of the whole grating, or only by the sectional area of that part of it which was actually patent. Mr. Patey had a "cuff" fixed round one of the gratings in the floor of the Equalising Chamber, and by measuring the air at the face of this grating, in the ordinary way, and by then repeating the observation near the top of the cuff (about 2½ ft. above the grating), where the currents had all merged, we proved that the velocity reading given by the anemometer held at about one inch above the face of the grating should only be multiplied by the sectional area of the part of the grating which was actually patent.

A second difficulty met us when measuring quantitatively the air

issuing at the bench inlets on the floor of the Debating Chamber. One of the inlets through which air issues into the Debating Chamber is furnished by a space 1½ in. in height, and extending between the extremity of the valance which hangs down between the seat and the floor. The extremity of the valance is fringed, and this added to the difficulty. The diameter of the wheel of the anemometer was 3 ins., and the problem was to determine the extra correction necessary when only exposing part of its surface to the air current at the spot mentioned. Mr. Patey, by an ingenious experiment which is fully described in the report, proved that it was necessary to add about 37 per cent to the reading given by the instrument at this point, besides adding the correction needed for velocity.

By means of the anemometer we measured the quantity of air passing through the system as a whole, and through each part separately, under various conditions, and we determined the actual quantity of air issuing at each bench per Member per minute. Some of the major points discovered were that the extract fan was exhausting the Debating Chamber in excess of the supply at that time, and that the ventilation of the Division Lobbies was very deficient. By joining the extract fan to the Division Lobbies these two difficulties were met by the same remedy.

The experience acquired in this part of the investigation has convinced me of the enormous practical value of the anemometer; and, indeed, to me its accuracy was as surprising as welcome. By putting the fans at the same speed as on a previous occasion—even though the previous test was made perhaps three months before—we obtained the same air flows. On taking a reading at the inlet airway at a point where the sectional area was 45 sq. feet, and then repeating it at a point 200 ft. farther along, where the air was more diffused, the sectional area being now 270 sq. feet—we again and again obtained results that showed us the accuracy of the method. On one occasion we missed a few thousand cubic feet of air at this second site, and on investigation found that a shaft from the airway, which was supposed to be closed, had remained open. A further point which we ascertained was the wonderful extent to which the Equalising Chamber under the floor of the Debating Chamber fulfils the intention of its designer, Dr. Reid, and equalises the air currents. So delicate is the balance of the air at that part of the system that the uplifting of the valances in the Debating Chamber was sufficient to divert a considerable quantity of air from the Division Lobbies into the Debating Chamber. The following tests show the accuracy of the anemometer method in this connection. In an

experiment made on August 14th, 1904, the valances which had been lifted up were lowered in the Debating Chamber, and as a result 2,640 cubic feet more air were found to pass into the Division Lobbies. On making the reverse test three months later, and raising these valances, 2,502 cubic feet less air were found to flow into the Division Lobbies.

An interesting result arising out of the anemometer investigation was that we were able to measure the percentage of Terrace air in the atmosphere of the Debating Chamber under various circumstances, by deducting the air flow at the floor from the quantity of air found issuing at the outlet over the ceiling near the extract fan.

Distribution.

The distribution of fresh air within the Debating Chamber was determined by making a series of anemometer observations all over the floor, and also over the ceiling at the points where the air issues between the panels, which are all raised from their supports. We also used smoke for this purpose. The smoke tests were particularly valuable for confirming our anemometer results, and for demonstrating the extent to which the galleries were supplied with Terrace air.

These, then, are the chief results that I wished to bring to your notice. Objective tests of air do not compare with the subjective senses in delicacy, and preferably purity of air should be judged by the latter standard. As air at a temperature of 55-65° F. moving at a velocity of 1½ ft. per second can be borne by all without sensation of draught, the question of air supply is limited largely by the sectional area of the available inlet and its distribution. Humidity of air is as important to observe as temperature, and both should be rigidly controlled in all public systems of ventilation. In inspecting systems of ventilation, the subjective test and a suitable form of dry and wet bulb hygrometer, which rapidly picks up the temperature of the air, are of more value than the carbonic acid test; though the latter has its uses, particularly where insufficiency of ventilation is gross.

Our knowledge of air-borne infection is only in its infancy; but as the spread of infection through air is mechanical, it is possible that in time this may be controlled by mechanical means.

Although I have dealt with the relation between air and infection solely from the point of view of the transit of virus, there is another aspect of this universal problem that merits equal attention, namely, the question of individual susceptibility. At present we know exceedingly little of this matter, but from what we do know, there can be little doubt that resistance to disease is very intimately related to purity of the air environment.

UNITED STATES ALIEN INSPECTION.

A VISIT TO ELLIS ISLAND.

By H. RATCLIFF KIDNER, M.B., B.Sc., D.P.H.

WHILE on a recent visit to the United States I had the opportunity, through the kind help of Dr. Beaumont of s.s. *Celtic*, to inspect the method by which the undesirable alien is prevented from effecting an entry into that country.

In the main the actual examination is identical with that pursued in England, the same stress being laid on certain conditions tending to render the alien objectionable as a future citizen on either moral or physical grounds. The method of carrying out the examination is, however, more efficient, especially in regard to administrative details.

THE IMMIGRANT STATION.

Ellis Island lies just within New York Harbour, and is easily reached by a ferry from the south side of the city. This easiness of access only refers to time, for it is very difficult to set foot on the island unless the visitor has legitimate business there or is introduced by an official. The main buildings are two in number, viz., the general building in which the examination and subsequent forwarding or rejection of the aliens is carried out, and the hospital for their temporary detention if necessary. These practically occupy the whole island, much of which is artificial in character, being land reclaimed from surrounding shallows.

Statistics showing the extent of the work also impress one with the importance of rapidity and smoothness in the methods used, without which it would be impossible to grapple with the problem. The average number of aliens entering New York Harbour annually is 1,200,000. The record number dealt with on one day is 7,500. The maximum hourly rate for comfort and efficiency is 600. Not only are these people medically examined, but full particulars are taken of their occupations, financial conditions, their places of origin and destination, and any details about their domestic affairs which have bearing on their proposed residence in the country.

The medical staff consists of sixteen qualified men under a lay commissioner, who is the chief official on the island. Besides these there is a large staff of attendants, clerks, and others to attend to the different administrative details.

THE MEDICAL INSPECTION.

This is the first process through which the alien immigrants pass. They are landed on the island by tenders from incoming vessels, not being allowed to leave the vessel by any other method. They pass

directly into the main building, which is an imposing, handsome structure, standing out apparently almost from the water, and is one of the features of the harbour entrance. Ascending a flight of stairs, the immigrants enter a large central hall, in which most of the work of inspection is carried out. This hall is spacious, lofty, and well lighted, and is provided with a surrounding gallery. It is rectangular, and the floor space is divided into sections and gangways by partitions formed of metal rods and wire meshwork. These sub-divisions are set apart for various branches of the examination. On entry the alien first passes along one of the gangways, in which he is subjected to the primary, rapid general inspection. Here each person is examined by two medical officers, one placed in the centre of the run and another at the far end. The officer in the centre rapidly sizes up general condition, and by long experience can estimate the likelihood of the presence of mental or physical defects such as imbecility, senility, morbis cordis, or phthisis, and can even very frequently diagnose the probability of hernia or defective sexual development without local examination. He makes no attempt at a detailed diagnosis. Any cases which he thinks require further inspection, or are in the least degree doubtful, he marks at once on the coat with blue chalk, using distinguishing letters, such as H for heart lesion, K for hernia, C for conjunctivitis, and so on.

Next the candidates must pass the second medical officer at the end of the gangway. At this point the upper eyelids of every person are everted and examined rapidly for trachoma; nothing else receives any attention here, the officer devoting himself solely to the upper lids. He can by long practice work very quickly, barely stopping the person if the conjunctiva is normal. If there is inflammation present closer attention is paid to the condition, and more complete eversion is aided by means of a metal spatula. Any case appearing in the slightest degree doubtful receives the blue chalk mark on the coat, and is passed on for a more detailed examination.

Attendants stand at the end of the gangways and separate the passed from the temporarily rejected immigrants. Those with no blue chalk mark are directed to the main body of the hall, where they wait their turn for the verification of their personal history. Those marked are shown into rooms opening from the main hall, where the more detailed inspection is in progress.

Each case is here examined with great care by a second body of medical officers. The rooms resemble the out-patient department of a general hospital. Lungs and heart are examined, eye conditions more closely looked into, consultations held over doubtful cases, and all the

various aids to diagnosis requisitioned. Here the case is finally passed or rejected, as far as the strictly medical part is concerned. If passed, the immigrant receives a card with the letters "O.K." printed upon it, and rejoins his fellows in the main hall; if rejected, a card is filled up with the particulars on which his rejection is based, and he is conducted by an attendant to the portion of the building devoted to the accommodation of "rejects."

The examination is very fair, and is as thorough as it can be. The question which the inspecting officer has in his mind is—Will the person make a healthy, useful citizen, and will he be able to maintain himself?

VERIFICATION OF HISTORY.

When the immigrant has passed the medical inspection, he has to take his position on a form in one of a series of gangways, each having a desk at the far end. An official sits at each desk and, with the assistance of an interpreter, enquires closely into the particulars regarding the place from whence the person comes, his destination, financial state, and in the case of a minor, a young female, or an old person, whether there are any relatives or friends at their destination who will be responsible for them. Those waiting their turn can do so now in comfort, there being seating accommodation provided. In the old arrangement of the gangways only standing room was allowed for; this has lately been altered by the present Commissioner, who has also introduced and is introducing many modifications which increase the comfort of the immigrant.

Should the examinee not satisfy the necessary conditions at the second test, he will be rejected, but he may appeal.

THE APPEAL COURT.

At Ellis Island the court is in the same building as the inspecting rooms. Three judges are always sitting while the immigrant inspection is in progress, and the decision given is that of the majority.

The candidate is sworn after the manner of his or her country or creed, there being interpreters present. Witnesses may be called, being usually relatives or friends resident in the States. Friends are allowed to visit an alien while still on the island, of course under strict supervision.

A candidate may appeal against either the medical or the lay examination; successful appeals necessarily coming chiefly from the latter, and have reference to financial state or to the adequacy of the surety for future maintenance. For instance, on our visit a case was in progress in which a widowed mother with young children wished to reside with her son and daughter, who were already domiciled in the

country. The Court had to decide whether the position of these elder children warranted their taking over such responsibility, the witnesses producing as evidence a considerable amount of money and bank books for a further large amount. The accommodation at their house was also inquired into closely. The Court decided in favour of their admittance. An appeal had also been made the same day against a medical rejection. One young female among a large family coming from Russia was rejected for epilepsy; the family refused to let her go back alone, and were willing to undertake entire responsibility for her maintenance. The decision was an adverse one, and the whole family, after an unsuccessful appeal to the Commissioner, decided to return to their native land. Necessarily many decisions appear harsh, but the authorities are determined to keep up the standard required.

An appeal may always be made from the decision of the Court to the Commissioner himself, but he seldom reverses the verdict, which is always arrived at after very careful and impartial consideration.

OTHER DEPARTMENTS.

The alien after passing the examinations is provided, if required, with a cheap railway ticket for his journey. He buys this at a special booking office in another department. Cheap rations are put up in cardboard boxes, each sufficient for one day, and are sold very cheaply to those unprovided with provisions. Different boxes are made up for Jews. These boxes have inscribed upon them in different languages the price and a list of the contents.

There are many other departments which in a brief description can only be touched upon. Immigrants who are delayed either in proceeding onwards or in deportation are housed and fed in the building. Friends of "rejects" are allowed to visit them finally before they leave, in a special room with a wire meshwork partition.

Lastly, there is the Record department, the marvel of the administrative section, where particulars can be at once turned up of any alien who has been either passed or rejected during the previous seven years. His course can be traced from his original home to his destination, and if rejected the stage at which this occurred and the reason for it can be seen at a glance.

Taken as a whole, the system in operation at Ellis Island can hardly be improved upon; the present Commissioner intends to make it ideal, and as he is intensely keen on his work, and pays as much attention to the comfort of the immigrant as he does to the perfection of the routine, it is highly probable that he will do so. My best thanks are due to the Commissioner, Mr. Robert Watchorn, and his staff for their courtesy in allowing and helping in every way the inspection of their methods.

REVIEWS.

THE CONTROL OF A SCOURGE. By CHARLES P. CHILDE, B.A., F.R.C.S. (The New Library of Medicine. Methuen & Co. 7/6 net, pp. 299 size 9 in. by 6 in.)

To contrive to write a book for reading by the public dealing with the treatment of cancer, and yet to avoid the danger of quackery and the indignation of the medical profession, is a difficult task; but Mr. Childe has succeeded in this task admirably. He has written a book which it would be well if every person at the age of forty could be persuaded to read. If this could be secured there would, we believe, be an appreciable reduction in the present appalling death-toll from cancer. Two considerations cover the main position of the writer. Four-fifths of all cancers occur in regions of the body readily accessible to surgical intervention; and cancer, if operated on at a sufficiently early stage, usually does not recur. These considerations bring cancer even now within the range of preventive medicine; for to prevent the more serious and ultimately fatal symptoms of cancer by removing early disease, is preventive medicine just as much as ensuring efficient ventilation or a pure milk supply. Behind the two propositions just stated lies the doctrine that cancer in the first instance is a local disease, a now well-established fact. That it was not earlier established is owing to the imperfect nature of former operations for the removal of cancer, recurrence being ascribed to the "general" character of cancer instead of to the imperfection of the operation or the delay in its performance. In actual experience it is commonly true that cancer is not curable. About 90 per cent of the cases of cancer of the uterus are inoperable when they first come under the notice of the surgeon. Of the operable cases seen by the surgeon, about one in three is curable. If all the cases came under treatment at an operable stage, the lives saved would roughly be thirty-three instead of three in every hundred. And so in other instances given by Mr. Childe disastrous delay is almost the sole obstacle to the successful treatment of cancer at the present time. An important chapter deals with danger-signals not to be neglected if operation is to succeed—a lump in the breast after 35 or 40, in all probability cancer; slight bleedings at irregular times, probably uterine cancer; sores on the lower lip, on the tongue, etc., which do not heal, etc. Treatment by operation prevents the later symptoms. Preventive treatment should also be directed to the removal of local irritation, which predisposes to cancer.

We cannot deal here with the educational policy advocated by the author, nor with his wholesome warnings against the numerous remedies for cancer that are so commonly exploited. The book is an admirable contribution to a difficult but most important problem.

SCHOOL DENTISTS' SOCIETY'S DENTAL HYGIENE CHARTS. Lith. in colours, 34½ in. by 53 in. Three Charts, No. 1 Elementary, No. 2 Newer and Dental Caries, No. 3 Teeth of a child.

These excellent charts have been issued by the School Dentists' Society for use in school-teaching, at a price of 12s. each, or 30s. for the set. A reduced set, with explanatory letterpress, is issued at a price of 1s. 6d.

We can speak in very high terms of these charts. They make an excellent basis for the teaching of the hygiene of the mouth. The charts are well drawn and coloured, and illustrate the necessary points of normal and abnormal growth very clearly.

THE CAUSE AND PREVENTION OF BERI-BERI. By W. Leonard Braddon, M.B., etc., Staff Surgeon, Negri Sembilan, Federated Malay States. Rebman, Ltd. Pp. 544, size 10 in. by 6 in. Price 21s. net.

This work consists chiefly of a report presented to the Colonial Office, in May, 1904, to which have been added further facts and observations. As it now stands it is a very full account of the disease, especially in British Malaya. The work is divided into nine sections, to which two appendices are added. Fourteen pages are occupied with a very useful bibliography. The first section deals with general considerations, including clinical characteristics, prevalence, mortality, and economic loss from the disease. In the second section the theory of grain intoxication as the cause of beri-beri is developed. The third section deals with the latent period of the disease. In the fourth section the theory of grain intoxication in the case of rice is proved by the epidemicity of beri-beri; in the fifth section the periodic movements of beri-beri are discussed. In the sixth section beri-beri in animals; and in the seventh section the nature of the toxic agent in rice which produces beri-beri is debated. Section eight deals with objections to previous rice theories, and section nine with the prevention of beri-beri.

Every aspect of this important disease is considered with ample detail. Different views are clearly summarized, and from this point of view, as well as from others, the book is very valuable, by focussing the work of so many epidemiologists.

Thus Takaki's work is fully summarized, although strong reasons are given for regarding his view that beri-beri is caused by nitrogen starvation as erroneous, the real factor being that giving more nitrogenous food diminishes the amount of toxic rice. In a later chapter the epidemic of arsenical poisoning in Lancashire is described: and it is boldly suggested that the cause of this epidemic may not, after all, have been the arsenic in the beer, but some other toxic agent contained in the glucose.

We have indicated only a few interesting points. The whole book deserves careful study, and will be indispensable for reference by those practising wherever beri-beri prevails.

HAY FEVER, HAY ASTHMA: ITS CAUSES, DIAGNOSIS, AND TREATMENT. By Wm. Lloyd, F.R.C.S. H. J. Glaisher. 1907. Pp. 95, size 9 in. by 5½ in. Price 3s. 6d. net.

This book, which its author describes as more or less sketchy, has been written chiefly to record his opinions upon the cause and effective treatment of hay fever. As regards the main element in causation, the pollen of grasses, the author accepts the established explanation of the disease; and he lays stress, in addition, on the hypersensitive condition of the nasal mucosa; this condition being in patches; and where there is also asthma there are similar patches in the pharynx. These all, according to the author, need to be destroyed to stop or prevent hay fever. A number of cases are quoted in favour of the views of the author.

ON THE SANITATION OF ARMIES ON ACTIVE SERVICE IN THE FIELD. By Thos. F. Dewar, M.D. 2nd edition, pamphlet, pp. 83.

Dr. Dewar speaks in this interesting booklet not only as a surgeon-major of the Imperial Yeomanry and Army Medical Service, but with the weight attaching to his position as medical officer of health of the County of Forfar and Burghs of Alyth and Monifieth. The work is based on personal experience during the South African war, and Dr. Dewar is thus able to temper his counsels with a full appreciation of what is practicable under the conditions of warfare. In seven chapters he reviews all the main medical and sanitary needs of warfare, and the work may be recommended as most useful both for army surgeons and for officers in the Army generally.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

Yorkshire Branch.—The Annual Meeting of the above Branch was held on Friday, the 14th day of June, at the Guildhall, York. Dr. E. M. Smith (the President) occupied the Chair, and there were present the following members of the Branch: Drs. A. Anderson (Wortley), H. W. Arbuckle (Thorne), A. H. Bampton (Ilkley), W. J. Buchanan (Thirsk), J. H. Coates (Hull), E. E. English (Doncaster), T. O. Halliwell (Dewsbury), E. B. Hicks (Wasingwold), J. R. Lambert (Farsley), F. W. Martin (Brighouse), S. G. Moore (Huddersfield), R. Muschamp (Guiselley), J. T. Neech (Halifax), A. Raimes (York), H. Ramsden (Saddleworth), A. Robinson (Rotherham), F. Robinson (Wakefield), B. Stedman (Selby), and J. R. Kaye, Hon. Sec. (Wakefield).

It was arranged that the Annual Report should be presented in type at the next Meeting, at which a paper was also promised by Dr. Moore, on scarlet fever.

The election of Officers for the Session 1907-8 resulted as follows: *President*, Dr. F. J. Burman (Wath); *Vice-Presidents*, Drs. Neech, Martin, Moore, Arbuckle, and Wade; *Council*, Drs. A. Anderson, D. L. Anderson, H. Angus, H. W. Arbuckle, J. Buck, J. S. Cameron, A. M. Erskine, W. A. Evans, R. Forsyth, T. Gibson, H. O. Halliwell, E. B. Hicks, W. L. Hunter, T. Johnstone, J. Knight, J. A. Lambert, C. J. R. McLean, R. Muschamp, A. Robinson, W. Scatterty, H. Scurfield, E. M. Smith, T. B. Stedman, A. C. J. Wilson, J. M. Wilson; *Representatives on Central Council*, F. J. Burman, J. R. Kaye, J. Mitchell Wilson; *Honorary Secretary and Treasurer*, J. R. Kaye.

A vote of condolence was passed in connection with the lamented decease of Dr. G. E. Coleman, of Hemsworth, for many years a Member of the Branch.

After the transaction of formal business, the members were joined by their lady friends, and journeyed by steamboat some six miles down the River Ouse, to the tidal locks at Naburn, thus affording an inspection of the city's magnificent waterway. On the return journey a halt was made for a visit to the York Corporation Sewage Works, where, under the guidance of the City Engineer, the bacterial filters were examined and explained. Further up the river another landing was made near Fulford, and the party arrived at the new Asylum of the York Corporation. Here the Lord Mayor (Alderman S. Border, J. P.) acted as host, accompanied by the Lady Mayoress.

After being entertained with tea and music, an inspection was made of the Asylum arrangements, the buildings being shown by the designer, Mr. Creer.

Before returning to the boat a hearty vote of thanks was accorded to the Lord Mayor, and Asylum officials, on the motion of Dr. Moore, seconded by Dr. Neech. Speeches were also made by Dr. Muschamp and Dr. Kaye, and by Mr. Creer and Dr. Hopkins, the Medical Superintendent at the Asylum.

The sail back to York was accomplished under excellent weather conditions, and after a glimpse at some of the interesting sights of this delightful old city, the party broke up well satisfied with the afternoon's mixture of business and pleasure, and deeply indebted to Dr. E. M. Smith (the President of the Branch) for the excellent arrangements which had been made for the Meeting.

North-Western Branch.—An Ordinary Meeting of the above Branch was held at the Chemical Club, Victoria Hotel, Manchester, on Friday, May 17th, 1907. *Present:* Dr. A. Greenwood, President (in the chair); Drs. Wheatley, Buckley, Wilkinson, Wheeldon, R. Young, Henry, Peck, Hitchon, Welsh, Martin, Berry, Coutts, Garstang, Chadwick, Buchan, and M. Young.

The minutes of the last meeting were read, confirmed, and adopted.

Letters of apology for absence were read from Drs. Barlow, Laird, and A. E. Thomas.

Dr. F. G. Haworth, Medical Officer of Health, Darwen, was unanimously elected a Member of the Branch.

The report of the Librarian (Dr. A. J. Laird) was read; and it was resolved that the Hon. Sec. forward a circular to each member of the Branch, asking him to return any books belonging to the Library which he may have in his possession.

Dr. A. W. Martin then read a paper on "The Elimination of the Unfit by the State, the Evolution of a Higher Race, and a Third Sex."

Drs. Peck, Wheatley, Coutts, Meredith Young, Chadwick, Berry, and Greenwood took part in the discussion, and Dr. Martin replied thereon.

UNWHOLESOME TINNED MILK.—At the Mansion House, on June 3rd, Messrs. Field & Co., Limited, were summoned before Alderman Sir W. Vaughan Morgan, by the Stepney Borough Council, for selling 1,290 tins of condensed milk which were unfit for human food. Mr. Thomas Palmer, manager of their tinned food department, was charged with aiding in that offence. They pleaded "Not guilty." Mr. G. H. Young, for the prosecution, said that on March 7 a Mr. Wear, of Stepney, purchased, through Palmer, 69 cases of condensed tinned milk of the "Flora" brand, containing in all 1,290 tins, at 2s. 9d. per case. He subsequently sold a number of tins to grocers: in one instance 130 tins out of 192 tins were unfit for food. Further investigation of the remainder showed that in twenty cases only twenty-seven tins were good. Wear had been proceeded against in respect of the same milk, and fined. He gave evidence that he bought the milk for human consumption. The defence was that the milk was sold as pigs' food. It had come from a milk factory in Belgium, and was bought at 5s. per case. The early samples were good, but the later ones were unsatisfactory and were sold as bad milk. The Company, however, supplied labels to put on the tins, describing the contents as "machine skimmed milk." The Alderman convicted, and fined the Company and Palmer each £25 and £5 5s. costs.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

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ANNUAL AND OTHER REPORTS.

Registrar-General's Weekly Returns. Kimberley, 1906, Dr. A. W. Reid. Gateshead, 1906, Dr. T. M. Clayton. Port of Manchester, 1906, Dr. Dearden. Sunderland, 1906, Dr. H. Renney. Birmingham, 1st Quarter, 1907, Dr. John Robertson. Bristol Port, 1906, Dr. D. S. Davies. L.G.B. Report for Scotland, 1906. Hunslet R.D., 1906, Dr. J. Buck. Wandsworth, 1906, Dr. P. C. Smith. Newcastle-upon-Tyne, 1906, Dr. H. E. Armstrong. Port of Liverpool, 1906, Dr. E. W. Hope. Portsmouth, 1906, Dr. A. M. Fraser. Edinburgh, 1906, Sir Henry D. Littlejohn, M.D. Holborn, 1906, Dr. W. A. Bond. Minutes, Metropolitan Asylums Board. State Board of Health, Massachusetts, U.S.A., April, 1906, Dr. E. Walford. Croydon, 1906, Dr. H. Meredith Richards. Report of Commission to Investigate Measures for Relief of Consumptives, Illustrated. Boston, U.S.A., 1907. Blackburn Education Committee, 1906, Dr. Alfred Greenwood. Newport Port S.A., 1906, Dr. J. Howard-Jones. Ipswich, C.B., 1906, Dr. A. M. N. Pringle. Minutes of Metropolitan Asylums Board. Women Sanitary Inspectors' Association, A.R., 1906-7. Carnarvonshire C.S.D., 1906, Dr. P. Fraser.

JOURNALS.

Royal Army Medical Corps. All India Hospital Assistants'. Reale Societa Italiana d'Igiene. Australasian Medical Gazette. Local Government Officer. Royal Sanitary Institute. Sanitary Record. La Technique Sanitaire. Glasgow Medical Journal. Birmingham Medical Review. The Veterinary Journal. Journal of Tropical Medicine. The Hospital. Transvaal Medical Journal. Medical Review of Reviews. American Journal of Medical Sciences. Transvaal Medical. Journal of Tropical Medicine. Australasian Medical Gazette. Bristol Medico-Chirurgical. Canadian Practitioner.

STATUTORY RULES AND ORDERS.

(407) Workmen's Compensation Act, Extension of Provisions to other Diseases. (408) Home Work Order of 23rd May, 1907, List of Out-workers and prohibition list where infectious disease. (409 & 410) Particulars of Work and Wages, Order of 23rd May, 1907, applying provisions of Section 116 of the Factory and Workshop Act, 1901, with modifications to certain industries. (149, 329) Home Office Draft Regulations for casting brass.

BRITISH SANATORIA ANNUAL, 1907-08.

John Bale, Sons & Danielsson, London.

METABOLISM AND PRACTICAL MEDICINE.

Adolf Magnus-Levy, Berlin. Vols. I. & II. Edited by I. Walker Hall, Professor of Pathology, University College, Bristol, etc. William Heinemann, London.

THE CONTROL OF A SCOURGE.

Charles P. Childe, B.A., F.R.C.S. Methuen & Co., 36, Essex Street, Strand, W.C.

MANUALE DELL'IGIENISTA.

Prof. Angelo Celli. 2 Vols. Illustrated. Unione Tipografico-Editrice Torinese, Turin.

THE LICENSED TRADE.

Edwin A. Pratt. John Murray, London.

PAMPHLETS.

Trickling Sewage Filters at the Lawrence Experiment Station.

THE NURSING.

The Feeding and Hygiene of Premature Infants and Full Term Infants. By Prof. Pierre Budin, of the University of Paris, etc., etc., translated by Wm. J. Maloney, M.B., Ch.B.; with an Introduction by Sir Alexander R. Simpson, M.D., LL.D., D.Sc. 111 Diagrams in colour and other illustrations. Caxton Publishing Co., London.

RECENT PUBLIC HEALTH LITERATURE.

AGGLUTINATION.

FISHER (J. W.). A Study of Agglutination. *Jour. of Med. Research*, 1907, xvi, 203.

BACTERIA.

BAIL (O.). Fortschritte in der Erforschung der Bakterienaggressivität. *Berl. klin. Wochens.*, 1907, liv, 745.—EKELOFF (E.). Studien über den Bakteriengehalt der Luft und des Erdbodens der Aurbarkischen Gegenden, Ausgeführt während der schwedischen Südpolar-Expedition, 1901-1904. *Zeits. f. Hygiene*, 1907, lvi, 344.—GRAF (H.) and W. WITTNEBEN. Zwei durch anaërobes Wachstum ausgezeichnete Streptokokken. *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 97.—HESS (L.). Zur Frage des latenten Mikrobismus. *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 1.—LEWIS (C. J.). The influence of meteorological and other conditions upon the distribution of bacteria in Urban atmospheres. *Scott. Med. and Surg. Jour.*, 1907, xx, 487.—WEINZIRE (J.). The action of sunlight upon bacteria, with special reference to B. tuberculosis. 2 plates. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3.), 128.

CHILDREN.

GRIFFITH (J. P. C.) and J. E. GITTINGS. The weight of breast-fed infants during the first two weeks of life. *Arch. of Pediatrics*, 1907, xxiv, 321.

DIARRHŒA.

DESSAU (H.). Management and treatment of summer diarrhœa in infants. *Pediatrics*, 1907, xix, 327.

DISINFECTANTS.

HAMMERL (H.). Autan ein neues Raumdesinfektionsmittel. *Münch. Med. Wochens.*, 1907, liv, 1113.—HUBIS (E.). Ueber desinfizierende Wandanstriche mit besonderer Berücksichtigung des Vitralin. *Zeit. für Hygiene*, 1907, lvi, 329.

DYSENTERY.

KLEIN (B.). Ueber die löslichen Giftstoffe der Ruhrbacillen. *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 144.

EXCREMENT.

FISHER (J. W.). Study of normal and diarrhœal stools for the detection of dysentery or allied organisms, with description of a new bacillus. *Jour. of Med. Research*, 1907, xvi, 181.

GLANDERS.

MOORE (V. A.) and W. J. TAYLOR. The agglutination method of diagnosis in the control of glanders. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3), 85.

HYGIENE, PUBLIC.

FORMAN (Col. R. H.). The difficulties of sanitation in India. *Jour. Roy. Army Med. Corps*, 1907, viii, 609.—GORGAS (Col. W. C.). Sanitary work in the Isthmus of Panama during the last three years. *Med. Rec. N. Y.*, 1907, lxxi, 801.—WYMAN (W.). The march of sanitation. *Jour. Amer. Med. Assoc.*, 1907, xlviii, 1830.

IMMUNITY AND INFECTION.

CROWDER (T. R.). Problems of bar sanitation. *Jour. Amer. Med. Assoc.*, 1907, xlviii, 1580.—FAMULENER (J. W.). Report of immunization curves derived from goats treated with certain hæmolytic bacterial toxins (Vibriolysin and Staphylolysin). *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 58.—FRIEDBERGER (E.). Die Bedeutung der Bakterizidie für die Immunität gegen über Typhus und Cholera. *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 32.—JAROTZKY (A.). Lokale Erschensungen bei passiver Immunität gegen Schweinerotlauf und Infektion. *Centralb. für Bakteriöl.*, 1907, xlv, (1te Abth.) 76.—SMITH (T.). The degree and duration of passive immunity to diphtheria toxin transmitted by immunized female guinea-pigs to their immediate offspring. *Jour. of Med. Research*, 1907, xvi, 359.—WEIL (E.). Kritik der Immunisierungsversuche gegen Hühnercholera mit Bakterienextraktion. *Zeit. für Hygiene*, 1907, lvi, 509.

INSECTS.

BERGEY (D. H.). Relation of insects to the dissemination of disease. *New York Med. Jour.*, 1907, lxxxv, 1120.

LEAD-POISONING.

WILSON (S. A. K.). The amyotrophy of chronic lead-poisoning. amyotrophic lateral sclerosis of toxic origin. *Rev. of Neurol. and Psych.*, 1907, v, 441.

MILK.

AUCHÉ (A.). Lait et allaitement. *Arch. de Med. Navale*, 1907, lxxvii, 350.—HARRIS (N. M.). Relative importance of streptococci and leucocytes in Milk. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3), 50.—REVIS (C.) and G. A. PAYNE. Acid coagulation of milk. *Jour. of Hygiene*, 1907, vii, 216.—RUSSELL (H. D.) and C. HOFFMANN. Leucocyte standards and the leucocyte content of milks from apparently healthy cows. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3), 63.—VOORHEES (E. B.). State regulation of the milk supply. *Med. Rec., New York*, 1907, lxxi, 934.

PLAGUE.

GALLI-VALERIO (B.). L'état actuel de nos connaissances sur le rôle des puces dans la transmission de la peste bubonique. *Centralb. für Bakteriöl.*, 1907, xxix (1st Abth.), 721.

RHEUMATISM.

GREENWOOD (M., Junr.) and T. THOMPSON. On meteorological factors in the etiology of acute rheumatism. *Jour. of Hygiene*, 1907, vii, 171.

SCARLET FEVER.

SCHICK (B.). Die Nachkrankheiten des Scharlach. *Jahrb. f. Kinderheilk.*, 1907, lrv, 132.

SEWAGE.

PHELPS (E. B.) and C. E. A. WINSLOW. On the use of methylene blue in testing sewage effluents. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3) 1.

STATISTICS.

YULE (G. U.). On the influence of bias and of personal equation in statistics of ill-defined qualities. *Jour. of Anthropol. Inst.*, 1906-7, xxxvi, 325.

TETANUS.

NOGUCHI (H.). Nature of the antitetanic action of eosin, also, local immunity to tetanus in inoculated rats treated with eosin. *Jour. of Experiment., Med.*, 1907, ix, 281, 291.

TUBERCULOSIS.

HUTYRA (F.). Zur Frage der Schutzimpfung von Rindern gegen Tuberculose. *Zeit. für Tuberkul.*, 1907, xi, 67.—TRUDEAU (E. L.). Tuberculin immunization in the treatment of pulmonary tuberculosis. *Amer. Jour. of Med. Sci.*, 1907, cxxxiv, 813.

TYPHOID FEVER.

COLEMAN (W.) and B. N. BUXTON. The bacteriology of the blood in typhoid fever. *Amer. Jour. of Med. Sci.*, 1907, cxxviii, 869.

TYPHUS.

BRUMMUND (J.). Erfahrungen bei einer grosseren Typhusepidemie. *Zeit. für Hygiene*, 1907, lvi, 425.—STUHLERN (V. R.). Ueber Typhusbakteriämie und agglutinationsvermögen im Verlaufe des Typhus abdominalis. *Centralb. f. Bakteriöl.*, 1907, xlv, (1te Abth.), 178. VIAL (F.). Ueber Verwendbarkeit chemisch reiner Malachitgrünpräparate als Nährbodenzusatz bei der Untersuchung von Typhusstühlen. *Hygienische Rundschau*, 1907, xvii, 707.

WATER.

MCCRAE (J.) and P. G. STOCK. Some experiments with fluorescein as an agent for the detection of pollution of wells. *Map. Jour. of Hygiene*, 1907, vii, 182.—SAWIN (L. R.). Experience with lactose-bile medium for the detection of B. coli in water. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3), 33.—SELIGMANN (E.). Über die Prüfung gereinigter abwässer auf ihre Zersetzungsfähigkeit. *Zeit. für Hygiene*, 1907, lvi, 371.—SELLARDS (A. W.). Sanitary chemical examination of water bacteria. *Jour. of Infec. Dis.*, 1907, May (Suppl. No. 3), 41.

WATER SUPPLY.

JORDAN (E. O.). Water supply and public health. *Jour. Amer. Med. Assoc.*, 1907. xlviii, 1668, 1755, 1860.

LAW REPORTS.

HIGH COURT OF JUSTICIARY (SCOTLAND).

March 9th, 1907.

BEFORE LORDS ARDWALL, DUNDAS, AND MACKENZIE.

WILSON v. McLAUGHLIN.

Sale of Food and Drugs Acts—Margarine Act, 1887—Analyst's Certificate—Form of Complaint.

It is not necessary in a complaint under the Sale of Food and Drugs Act, 1875, to set out the analyst's certificate, and the use of the word margarine in the complaint does not make it bad, although it is not used in the certificate.

An inspector under the Sale of Food and Drugs Acts may conduct proceedings by means of a duly qualified law agent.

McLaughlin was charged in a sheriff court with selling, to the prejudice of the purchaser, as butter an article which was not of the nature, substance, and quality of butter, but was margarine. An offence under the Margarine Act was also charged. The analyst's certificate said nothing about the article being margarine, but stated that the fat contained 95 per cent or thereby of fatty matter not derived from milk, and the analyst stated as his opinion that the sample was not of the nature, substance, and quality of butter.

Two objections *inter alia* were taken, namely (1) "That the contents of the analyst's certificate were insufficiently labelled, and that the complaint affirms that the certificate bears what in point of fact it does not bear," and (2) "That the prosecutor was not personally present in court but was represented by a solicitor." The Sheriff Substitute sustained the objections and dismissed the complaint.

This was an appeal by way of case stated. The Court allowed the appeal.

LORD ARDWALL said with regard to the first of these objections it contained two distinct branches. With regard to the first he knew of no authority which made it obligatory for the complainer to set forth the analyst's certificate in the complaint. With regard to the second the insertion of the word margarine in the complaint, which does not appear in the analyst's certificate, was surplusage and did no harm. This objection should have been repelled.

With regard to the other objection, this may be read to mean that the prosecutor ought to have conducted the case personally. There were two classes of prosecutors, public and private. The public prosecutors were the Lord Advocates and their deputies, and the Procurators Fiscal and their deputies, and other persons specially appointed to prosecute. Every other prosecutor must be regarded as a private prosecutor, and every private prosecutor could employ a law agent to conduct the prosecution. An inspector under the Sale of Food and Drugs Acts appeared to him to be a private prosecutor, and therefore the second objection was bad.

Lord Dundas agreed as to both points. Lord Mackenzie agreed on the first, but doubted as to the second, although he did not dissent.

[For full report see 44 Sc. L. R. 469.]

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THE INTERNATIONAL CONGRESS ON SCHOOL HYGIENE.

AS medical officers of health, whose life-work is concerned with all that tends to uplift the well-being of the community, we welcome the distinguished hygienists of many nationalities who will, almost as soon as this number of PUBLIC HEALTH is in the hands of our readers, assemble in London, under the presidency of Sir Lauder Brunton. This Congress is an event of great importance, not only intrinsically, because the hygiene of school-life is one of the most important and far-reaching parts of the life-work of the medical officer of health; but also in the opportuneness of its meeting, as within a few months every medical officer of health will find it necessary to consider the new public health work of medical inspection of scholars which will be organised throughout the land, and in most instances, we trust, under his immediate direction. The contributions to and discussions at the Congress will doubtless prove of the greatest value in indicating the most important lines of work in school hygiene, and in giving the advantages to be reaped by comparisons of experience.

THE INTER-RELATIONS OF SCHOLASTIC AND DOMESTIC WORK
IN HYGIENE.

The work of medical officers of health is limited only by the total environment of the communities which they serve. They are bound by their official regulations to report on all conditions affecting injuriously the health of the community. Their time is thus chiefly occupied in three classes of investigation and in devising means for combating three sets of evils, relating respectively to the domestic, the scholastic, and the industrial circumstances of life. This classification, although not exhaustive, covers the greater part of the work of the medical officer of health. Putting aside for the present the industrial aspect of hygiene, it is well to bear in mind

the intimate inter-relations between scholastic and domestic hygiene. School hygiene is simply general hygiene in its application to the special circumstances of school-life. It embraces no principles not comprised in the groundwork of physiology and pathology, on which general hygiene is based. It merely applies these principles to the special circumstances of congregation in school. In applying these principles, furthermore, much of the work of school hygiene must be done at the children's homes, whether in the investigation of actual disease, or in the prevention or removal of those conditions of overcrowding and uncleanness which so commonly lead to disease.

SCHOOL HYGIENE NOT A TRUE SPECIALITY.

School hygiene cannot, any more than the total work of the medical officer of health, be described as a speciality in the true sense of the word. It involves a knowledge of ordinary sanitation, of the problems of construction, ventilation, warming, and lighting of rooms. It comprises investigations based on the laws governing the physiological and psychological development of children; the problems of fatigue and rest. It includes the medical investigation of disease, of defective teeth, of eyesight and hearing; the removal of sources of contagion and infection, of conditions of uncleanness, and so on. A physician who is a specialist in one of these numerous lines of enquiry and work cannot be equally proficient in all the others; and it is evident, therefore, that except in large centres of population, where a number of "specialists" may be appointed under one co-ordinating head, the plea for specialists in daily scholastic medical work is out of touch with the real facts. Any competent doctor who has had a public health training will be able efficiently to carry out the work of school doctor, referring special cases, such as defects of eyesight, to specialists for further testing.

THE NECESSITY FOR AND ADVISABILITY OF ECONOMY.

It must not be assumed, furthermore, that all the work of investigation in the medical inspection of schools will be done by doctors. It will be the duty of medical officers of health in advising Education Committees to advise them as to the methods which are most economical, having due regard to efficiency. Very few communities could afford the expense involved in having every measurement of a child, or even every preliminary test of eyesight, etc., carried out by a doctor, if this is to be carried out to the extent demanded by the needs of the case. Medical control and supervision will be needed at every step; but much of the work can, and will be, efficiently and economically carried out under such

supervision by school-nurses and by teachers. Thus, school-nurses will carry out the detailed inspections necessary for the control of pediculosis, and other contagious conditions of the skin. They, or teachers, or special clerks, will be able to carry out the weighings and measurings of children. Even the *preliminary* testing of eyesight may, as seen in the interesting experience of Salford, given on another page of this number, be undertaken by the teacher, the medical officer then investigating in accurate detail the children found to be defective. The school doctor will, of course, need to make the first complete examination of every scholar on admission to school, and to make periodical examinations, especially of children who from any cause are failing in health. But unless in advising Education Committees we have regard to considerations of expenditure, and unless we take up reforms in the order of their urgency, it is likely that these Committees in a large number of instances will postpone altogether the commencement of medical inspection of schools on efficient lines.

In the organisation of such work, especial care will need to be taken to avoid overlapping on the one hand or hiatus on the other hand of scholastic and domestic public health work, a point which is more fully dealt with in the next paragraph.

THE EVILS OF INCO-ORDINATION OF PUBLIC HEALTH WORK.*

The medical inspection of schools by doctors unrelated to the medical officer of health illustrates well the evils of inco-ordination. Such doctors have many duties: First, they are concerned with the prevention of the spread of infectious diseases in school and among the scholars; and second, aided by school nurses, they are concerned with the prevention of the spread of such diseases as pediculosis, ringworm, and scabies. Thirdly, they must supervise and regulate the sanitary conditions of schools, including their means for ventilation, cleansing and warming. Additional duties will be undertaken by them, including the supervision of anthropometrical records, the medico-psychological problems of school-life, of rest and play, and of school curricula, the detection of defects of eyesight and hearing, of adenoids, and of conditions like under-feeding and consequent malnutrition, which render children unfit to profit from their school-work. The first three of these duties already come within the scope of the medical officer of health's work, and cannot be efficiently carried out without his special information and his co-operation in the school, and still more in the homes of the children. Paradoxical as it may

* Extracted from an Address given by the President of the Section of State Medicine, at the Exeter Meeting of the British Medical Association, July 30th, 1907, in introducing a discussion on "The Prevention of Disease through the Co-ordination of Medical Services."

appear, much of the medical inspection of school and scholars, if it is to be efficient, must take place in the homes of the children. A doctor has no magical power of diagnosing whooping cough and scarlet fever in a class-room of 40 to 70 scholars, much less in an entire school. Successful action must proceed from the known to the unknown, from cases notified to the medical officer of health to "contacts" with these; and a large share of this work must be done in the children's homes. So likewise with the chronic contagious diseases, and with the control of children who come dirty to school. The home is the point at which these conditions must be primarily controlled, and parents cannot be expected to tolerate a dual system of medical inspection. Neither the medical officer of health nor the school doctor, nor both of them together, whether both posts be held by one official or by two officials, in active daily relationship to each other, suffice for the needs of the case, which will only be met when the doctors in every district are co-ordinated with the mechanism of preventive medicine, and thus secure the early diagnosis and treatment of all disease, and by this means prevent its introduction into the school. The school doctor under present and under frequently proposed arrangements, is apparently expected to detect all such cases in school. Even given occasional success on his part, he only discovers the enemy within the gates instead of before he has gained an entrance. If the principle of co-ordination of the entire medical service be realised in practice, evidently many of the other functions of the school doctor enumerated above will merge in those of the district doctors, aided by skilled consultants for all difficult cases. In large districts the need for special school doctors will doubtless remain; but their possibilities of utility will be realised only very partially unless and until they are merged in a general co-ordinated system of preventive medicine.

THE VIEW OF A GOVERNMENT COMMITTEE ON THE METHOD OF CARRYING OUT THE MEDICAL INSPECTION OF SCHOOLS.

The present is an opportune occasion for reproducing the remarks made in the Report of the Inter-Departmental Committee on the Medical Inspection and Feeding of Children attending Elementary Schools. They are as follows:—

"There are distinct advantages in the school medical officer being also medical officer of health. The duties of the two offices naturally overlap, or may do so. The inspection of children for the prevention of the spread of infectious disease, and the sanitary inspection of the premises, are examples of this. The union of the two offices tends to prevent duplication of work. It has the additional advantage that

the staff of the authority's sanitary department is thus made easily accessible for any special work. They are employed for disinfecting schools, and for following up cases of dirty, verminous children, and for obtaining attention to the condition of the homes as well as of the children. At the same time, the medical officer of health finds that his position as educational medical officer greatly facilitates his work in preventing the spread of infectious disease. The chief danger of the arrangement is that the work for the prevention of infectious disease may tend to swamp the work in other directions. In saying this we must not be understood to be in any way under-estimating the value of this work, we merely desire to point to the possible danger of other important branches of medical inspection not receiving due consideration. . . .

"Dr. Kerr has given it as his opinion in his memorandum that the irregular calls made upon, and duties demanded from a general practitioner, who has to be at everybody's beck and call, will always make the combination of general practice and the duties of a school doctor incompatible.

"We express no opinion upon this view, but there is no doubt that in large places, where the educational duties are considerable, a due attention to them has made attention to private practice very difficult. In small places, where the number of schools and of children to be examined is limited, and the duties of the medical officer in consequence are slight, this difficulty is very largely diminished, even if it does not altogether disappear; but the matter becomes serious when the time required for educational duties amounts to, perhaps, two or three half-days in the week, or even more.

"Danger may also arise in another direction unless great tact is exercised. If the medical officer (*i.e.*, of the School Authority) is in private practice, the other medical practitioners may be jealous of him, and may, rightly or wrongly, accuse him of using his position to remove their patients from them. It is true that only one case of this difficulty was mentioned, and that this was almost certainly due to a misunderstanding, but the danger was evidently very much in the minds of the witnesses whom we examined, and clearly needs to be guarded against. The importance of this, it is true, is somewhat diminished by the fact that the duty of the medical officer is confined to the examination of the children and to the discovery of any ailments from which they may be suffering, and does not extend to their treatment. His work, on the other hand, is not popular, and the unpopularity of his official duties may lead to a loss of private practice. Again, as Dr. Martin and others have pointed out, the

private practitioner and the medical officer have different points of view—'The one aiming at curing diseases, and the other at hunting for disease.'"

THE TRAINING OF TEACHERS FOR THE TEACHING OF HYGIENE.

The new "Regulations for the Training of Teachers . . . in Training Colleges" recently issued by the Board of Education contain matter of much interest to hygienists, especially the prefatory memorandum written by Sir Robert Morant. This memorandum first states the concern of the Board at the increasing difficulty of securing for students who take University courses, adequate instruction in the main business of their profession. "It is impossible at present to impose upon them the instruction in hygiene, which should form an essential part of the equipment of a teacher, and more especially for service in a public elementary school." The following further remarks are then made :—

The Board have under careful consideration the need for requiring the special instruction of all students, in whatever type of college, in the principles of hygiene, so that they may be able to deal profitably with this most important subject in the schools.

The Board are well aware that the mere addition of this subject to the list of those which are part of the students' compulsory course would increase a burden already serious, but they hope that the considerable diminution of academical work made possible by the shortened courses in English and in history and geography set forth for the first time in the Regulations of this year may provide some room, as a temporary expedient, for the more adequate treatment of hygiene, by making it a part of the ordinary course in science. It is intended that further steps shall be taken in the same direction as soon as possible, with a view of securing for hygiene its proper place in the education and training of all persons intending to become teachers in public elementary schools.

The Board would have preferred, if it had been possible, to place hygiene at once in its proper position, by making it compulsory on all students, at least to the extent of the ground covered by the syllabus in the present Regulations for its study as an optional subject. But for the reasons given above, they are not prepared to go further at present than to recommend that in the drawing up of schemes of work careful consideration should be given to the paramount claims of this subject.

If hygiene is taken as an optional subject, it will not, of course, be necessary to treat it as part of the ordinary science course.

Although it is disappointing to find that hygiene cannot immediately to the necessary extent be made a compulsory subject in training colleges, it is fair to state that Sir R. Morant's memorandum shows that he has a clear appreciation of the needs as well as of the difficulties of the case, and that progress will certainly be made, which, though it may be slower than the enthusiast would wish, will probably be the safer and more solid because of this fact. The accuracy of this forecast is indicated by the emphasis laid on the fact that "the teacher's work, whether he intends it or not, has its relation to the child's whole

being, and that all the powers of the teacher's nature, and not merely his intellectual powers, have their part to play in the education of the child."

It is further emphasized in the following words :—

Lastly, the students ought to have an adequate knowledge of school hygiene. They should understand the general conditions necessary for making a building or a room healthy and for keeping it so, and they should be well acquainted with the rules of personal health, and so far as possible with the physiological principles upon which these rules are based. In the case of women students the nutritive value of food-stuffs, in connection with their cost in the market and in relation to the needs of young children, should be known in outline, even though the student may not be specially qualified in domestic economy. Only thus will they know how to conduct the school as a whole with the greatest profit to the health and bodily development of the scholars, and how to adapt the instruction to limitations which are imposed in some cases by the feeble health of the children or by the poverty or neglect of their parents.

The following extracts from the Regulations show to what extent hygiene is being at present pressed forward in training colleges :—

A scheme for a course of instruction in Science (including *Hygiene*) in accordance with Appendix C, and schemes for courses of instruction in Physical Training and Manual Instruction must be submitted by the College for the approval of the Board.

Shortened Courses in English Language and Literature, and in History and Geography are also set out in Appendix C. These may be offered, with the approval of the Board, by the Two-Year Students of a College as a whole, on the condition that, if a shortened course is taken in any subject, the time gained is devoted to the study of Hygiene, and so far as possible to practice in class teaching.

HOW TO PREVENT THE EVILS DISCOVERED TOO LATE BY THE MEDICAL INSPECTION OF SCHOLARS.*

It is evident that between 1 and 5 years of age, as in infancy, child mortality is capable of a great reduction. But we must also go a step further, and consider not only the deaths during infantile life, but the effects of sickness and improper care on the health and physique of those that survive, and this is hardly a less important aspect of the question. For every infant that dies, a number are attacked by sickness, or are subjected to improper care, and only survive to grow up with their physical, and often their mental constitution more or less seriously impaired. My work of inspecting school children during the past year has brought this aspect of the question most forcibly before me, and made me realise, as I never did before, what an immense amount of ill-health and physical defect exists amongst children of the school age, and attributable to ignorance, want of proper care or unhygienic surroundings during the first few years of life. On each visit to a school I have a number of children brought before me on account of some malady or defect. Some can be treated with a likelihood of cure, others with a chance of improvement, but not a few are quite beyond any form of treatment. And the pity of it all is, that a large proportion of these children need never have

* Dr. Gibson's Annual Report, 1906.

suffered at all, if only they had had the care and the surroundings that every child ought to have. As an instance, take rickets. Rickets is an insignificant item in our bills of mortality—only one death from this disease was registered in 1906—yet rickets, essentially a preventable disease, is one of the commonest diseases amongst children in Wakefield, and is the cause of much physical deformity and chronic ill-health. Every time I enter a school I see children with bandy legs or knock-knees, with distorted arms, with narrow chests and feeble breathing, with general low vitality and mental backwardness, and I am asked if anything can be done for these poor rickety children. Some go to the surgeon to get their limbs straightened, some may improve under medical treatment, but the majority of these cases are left alone to struggle through life handicapped and as best they can. And yet, with proper feeding and proper care during early life, practically every one of these children would have escaped the blight of rickets.

And so it is with many other maladies that come under one's observation during school inspection, and I am bound to confess that, while I regard medical inspection of school children as an important and useful branch of public health work, I find it, to a certain extent, disappointing, and disappointing inasmuch as one is so often forced to simply note some malady or defect, now beyond hope of cure, but one that assuredly could have been prevented. Prevention must always be our watchword, and medical inspection during school years will at best prove a poor substitute for lack of care and proper treatment during the years of infancy.

PARLIAMENTARY GRANTS FOR SCHOOL ABSENTEES.

ON Tuesday, May 28th, Mr. Whitehead asked the President of the Board of Education whether his attention had been drawn to the fact that when individual children were kept away from an elementary school by order of the medical officer of health their absence, by reducing the average attendance, reduced the Parliamentary grant; whether he was aware that reduction in such circumstances operated hardly upon poor districts and discouraged proper precautions against the spreading of disease; and whether steps could be taken to assimilate the administration of elementary schools in this particular to that prevailing in secondary schools, where no loss of Parliamentary grant was sustained through absence caused by illness.—Mr. McKenna answered: The absence of individual children, whatever be the cause, necessarily reduces the average attendance of the school, but I do not think any serious loss of grant results from exclusion under medical authority—for example, the exclusion of 40 children for a week would only involve a loss of about £2 to the local education authority. The method of computing average attendance will, of course, be one of the questions demanding careful consideration in connection with any scheme for reorganising the system of grants, but I have grave doubts whether the system at present in force in secondary schools could be applied without very considerable modifications to elementary schools.

The subject of the above question and answer is one of great public importance. The present arrangements are profoundly unsatisfactory. The abolition of the "Epidemic Grant" has done much to diminish and to make belated the voluntary notification of suspected cases of infectious disease to the medical officer of health; and has increased and rendered more difficult both educational and public health work. It is very desirable that representations should be made to the Board of Education which would meet the requirements as to communicable diseases. A valuable step in this direction would be to refrain from including in the statement of average attendance the attendance of children under five years of age.

THE OBJECTION TO CENTRAL HALLS IN SCHOOLS.*

I DO not think that the last word has been said as to the best type of building which is most appropriate for the requirements of a school. Dr.

* From Dr. Snell's Ann. Rep., Coventry, 1906.

Reid, the county medical officer of health for Staffordshire, in his Annual Report for 1904, says, "In the designing of schools hitherto, more attention seems to have been devoted to educational administrative requirements than to health conditions, especially as regards ventilation, the result being that by a gradual process of development on such lines, a type of building has been evolved, in which adequate ventilation by natural means is impossible. The chief cause of this has been the introduction of the central hall principle, which has greatly interfered with the cross window ventilation of the classrooms." On this account the County Council of Staffordshire has adopted some plans of schools, which have since been sanctioned by the Board of Education, in which the modern pavilion system of hospitals has been followed; by this plan the maximum of light and ventilation can be secured to each class-room. One school built on these lines has recently been erected at Darlaston.

HOME VISITS AS PART OF THE MEDICAL INSPECTION OF SCHOOLS.*

HOSPITAL experience convinces me that diphtheria patients treated on the first or second day of the disease can almost invariably be cured. It is therefore of the greatest importance to secure treatment at the earliest possible moment, and to effect this, medical aid should be summoned as soon as the slightest spec of membrane appears on a child's throat or a croupy cough develops. This may be a counsel of perfection, but I believe we shall be able to make considerable progress towards this end when our methods of supervising school children are more completely organized, especially when additional health visitors have been appointed, so that children suffering from sore throat and absentees from classes where diphtheria is notified may be visited without any delay and medical advice recommended if there is any suspicion of diphtheria. I am also strongly of opinion that greater facilities should be available for obtaining free medical advice. This is specially true in the case of diphtheria and "sore throat." In these diseases prompt treatment is not only essential to the safety of the patient but would be economical from the purely financial standpoint. Not only does a missed case of diphtheria frequently infect others, but delay in treatment involves our giving huge doses of antitoxin when the patient arrives at hospital, though much smaller quantities of this expensive remedy would have been sufficient on the first day of the disease.

THE DETECTION OF "MISSED CASES" IN SCHOOL.

THE fact that occasionally undetected infectious disease can be picked out by medical inspection is illustrated by the following case. This would only be likely to happen where special attention had already been attracted to the class in question, and the instance illustrates the value of such investigation being based on the official information of the medical officer of health. The instance is taken from a report by Dr. Richards of Croydon.

In the small outbreak at this particular school all the cases occurred in one class, and on examining the children on November 26th, I found that one boy, A. W., aged 9 years and apparently in good health, had a very small patch of membrane on his left turbinate bone, *i.e.*, within the left nostril. He was promptly excluded from school and isolated at home, a swab from his nose being in the meantime examined at the laboratory and found to contain diphtheria bacilli. On December 7th, his brother, J. W., aged 4, the only other child in the house and not attending any school, developed a moderately severe attack of faucial diphtheria. This is an interesting observation, as it illustrates the fact that diphtheria of the nose is not infrequently marked by almost complete absence of symptoms. It also demonstrates the danger to others of these nasal cases, a clinical fact of the greatest practical importance, as has so long been urged by Dr. Davies, of Bristol, though still not fully recognized by those who have not had experience of epidemic diphtheria.

* From a Report by Dr. Meredith Richards, Croydon.

THE MEDICAL INSPECTION OF SCHOOLS IN RELATION TO PUBLIC HEALTH WORK IN SALFORD.

By C. H. TATTERSALL, M.R.C.S., &c.,

Medical Officer of Health of Salford;
Medical Officer to its Education Committee, and Examiner in Public Health
to the University of Victoria.

THE Salford School Board was one of the first to realise the importance of medical inspection, and in 1898 appointed a medical officer.

The necessity for advice in connection with the examination of children reported to be defective and feeble-minded was the immediate cause which led to this appointment, but the general advantages were clearly recognised, and are well indicated by the statement of duties which was issued when the appointment was advertised. These were :—

1. To visit each department of the Council schools once a year, and report in writing as to the sanitary condition of the premises, and to attend, when requested, any meetings of the Committee.
2. To examine any children in the borough reported to the Committee to be defective or feeble-minded, and to decide whether they shall be instructed at a special centre.
3. To advise the Committee as to the course of study, etc., of the children in attendance at the centre for defective children.
4. To examine blind and deaf children, to decide whether they are suitable cases to be dealt with under the Blind and Deaf Children Act, and to give the necessary certificates.
5. To make arrangements for the periodical examination of the eyesight and hearing (and, if thought desirable, of the teeth) of the children in the schools.
6. To supervise the taking of anthropometric records of the children in the schools.
7. To examine, if required, any plans for new buildings or alterations of existing buildings, and to report as to their sanitary arrangements, ventilation, lighting, etc.
8. To examine all candidates selected for appointment under the Committee, or employes, when required by the Committee, and to make out certificates.
9. To examine candidates for pupil teachership, and pupil teachers at the end of the second year, and to make out the certificates required in each case by the Board of Education.

10. To visit, when required by the Committee, any employé who is absent from duty on account of illness, and report in writing.

11. To examine, when required by the Committee, any child who is stated to be physically unfit to attend school, and to make out a certificate.

12. To give the Committee the benefit of his advice on special occasions, when required.

The duties of the medical officer were confined to those schools which were under the control of the School Board, and on the transference of the authority to the Borough Council the duties were extended to cover all the schools in the borough.

The choice of the Committee fell upon Dr. Ray, who at once commenced most valuable work, including an anthropometric survey, which has since been developed and carried on by Dr. Butterworth.

When the Council took over the schools Dr. Ray retired, as he was unable to continue to give the necessary time. The medical officer of health was then appointed medical officer to the Education Committee, together with an assistant, Dr. J. J. Butterworth, who has devoted most of his time to the development of the work of school inspection, and to whom is mainly due the credit for what has been accomplished.

Taking the work in the order in which it is set out in the list of duties, I will endeavour to describe what has been done.

1. *Sanitary Supervision.*—The whole of the schools in the borough have been thoroughly inspected, and written reports on their sanitary condition have been submitted to the Education Committee. The modern schools erected by the School Board are excellent in every way, but the earlier Board schools and almost the whole of the Voluntary schools presented defects, varying from somewhat deficient ventilation, lighting, and warming, to a general condition that made them quite unsuitable for school purposes; almost everywhere class-rooms were much too small. Classes of fifty were found at work in rooms which contained accommodation for less than thirty, even with the moderate allowance of space insisted upon by the Board of Education in these Voluntary schools, viz., eight square feet per head. One class-room was found so dark that even on a bright day the gas had to be kept alight. The general standard of cleanliness was also very low.

As a result of this examination many representations were made to school managers, and in those schools which were capable of improvement much has been done. The small class-rooms, however, still remain, and appear likely to do so, and it seems little short of ridiculous that while insisting on a certain amount of space per head in the

school as a whole, the Board of Education allow children to be crowded together in small class-rooms during most of the time they are in school.

I am quite aware of the great difficulty in teaching the children except in class-rooms, and the great expense of providing sufficient teachers to reduce the number of children in a class to what the class-room might properly accommodate; still, I think great efforts should be made to increase the size of the class-rooms.

The general standard of cleanliness has gone up in a marked degree, and this is assisted by the visits made to each school by the staff of sanitary inspectors attached to the Public Health Department. Each school is visited by them at least once each week, and it has been interesting to observe that their complaints as to insanitary conditions in the schools have been reduced almost to zero.

The greatest difficulty in regard to cleanliness has been experienced in the Voluntary schools, which suffer from a special disadvantage owing to their being used on the evenings of the week and on Sundays for Church and Sunday-school purposes, so that while they are far more used than the Council schools, there is actually much less opportunity for cleaning.

2 and 3. *Examination of Defective Children, etc.*—The School Board had established a school for defective children, accommodating about thirty, which was carried on in a building rented by them for the purpose. It was the intention of the Board to have built satisfactory new premises, but the Council, after the transference of authority, thought the scheme too expensive, and although various modifications have been suggested by the Education Committee, nothing has yet been done. In the meantime the building in which the school was held has been very justly condemned by the Board of Education as being unfit for its purpose, and the school is, for the time being, discontinued.

While it was in existence the Medical Staff visited it regularly, consulting with the teachers as to the education given, and watching the results of the instruction. Defective children were examined before admission to the school, and I formed the opinion that there exists a class of children who, while not being imbeciles, are quite incapable of receiving sufficient benefit from instruction in such a school to justify the expenditure of large sums of money upon them; and when our new school is erected, it is our intention to select children for tuition therein who may be best described as "slow and dull in intellect" rather than those verging towards the line of imbecility.

All the known cripples in the borough have been examined and a

special report presented to the Education Committee, which I trust may result in the establishment of a residential school.

4. *Examination of Blind and Deaf Children.*—It has been our duty to examine blind and deaf children for admission into the special schools. During the course of our visits to the schools a number of children were found whose sight was so defective that the education they were then receiving was rapidly making the eyesight worse, and threatened ultimately to cause complete blindness. These children have been drafted into the special schools for blind children, and this has been a really valuable part of our work. In examining these cases we could not help being struck by the large proportion of them in which the disease might have been cured at an early stage if proper attention could have been given to them in their own homes, and I hope to see, before long, some arrangement made by which children attending the eye hospitals may be visited at their homes and the detailed treatment of their ailments receive proper attention.

Invaluable as is the work done in our eye hospitals, some arrangement of this kind would enormously increase their utility to the community, and it would probably save the Education Department money to make some provision of this kind. This would also refer to children who had not yet reached school age.

5. *Eyesight.*—The vision of every child in our schools has been tested by the teachers and the results recorded and tabulated. The teachers were individually taught to make these tests of vision, and their results were occasionally tested; and it has been found that they are quite capable of carrying out this work in a satisfactory manner. In most cases the teachers have tested the vision of the children in their own classes, and this is, I think, a decided advantage, as the teacher thus learns more about her pupils, and gives special attention to the avoidance of eye-strain among those whose sight may be defective.

The appended table gives the results of these examinations of the eyes of the children.

Each school is supplied with a card of distance test types. The letters are of such a size as to be read at 20, 30, 40, 60, and 80 feet respectively. The child to be tested is placed at a distance of 20 feet from the test types. If at this distance he can read the letters which ought to be read at 20 feet the vision is expressed as a fraction $\frac{20}{20}$, but if only those letters intended to be read at 30 or 40 or 60 or 80 can be seen then the vision is expressed by the fractions $\frac{30}{20}$, $\frac{40}{20}$, $\frac{60}{20}$, $\frac{80}{20}$, respectively. If none of the letters on the test types can be seen the vision is expressed as $\frac{0}{20}$.

All those children whose vision is below $\frac{3}{80}$ may be regarded as having defects which interfere with their school efficiency.

In the following table the results of the examinations made are tabulated and stated as percentages.

SUMMARY OF EYESIGHT TESTS.

GIRLS.

Age.	Number Examined.	20		30		40		60		80		Nil.	
		R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
5	115	26'9	22'6	30'4	31'3	32'1	37'3	6'0	6'9	2'6	0'8	—	0'8
6	775	44'7	43'7	29'0	30'8	14'3	13'9	6'5	5'9	3'0	4'0	1'9	1'5
7	1,115	45'7	40'8	29'0	30'4	10'9	13'5	7'9	7'5	4'6	4'6	1'4	2'8
8	1,275	46'5	41'1	30'2	32'0	10'2	11'6	6'3	8'1	4'7	4'7	1'8	2'2
9	1,225	47'7	43'0	28'4	30'5	9'6	10'2	6'8	8'2	4'3	4'5	3'1	3'4
10	1,295	51'8	48'5	25'0	25'2	9'1	9'6	6'1	7'6	4'7	5'3	2'7	3'5
11	1,255	51'2	48'2	25'0	26'2	10'1	9'4	5'4	6'5	5'8	5'2	2'3	3'5
12	1,200	52'2	48'3	23'4	25'5	10'5	10'0	6'1	7'3	4'6	5'5	3'2	3'2
13	490	53'8	49'3	19'7	21'6	8'1	10'4	8'1	9'7	6'3	4'4	3'6	4'2
14	50	42'0	38'0	18'0	24'0	12'0	10'0	18'0	18'0	8'0	10'0	2'0	—
8,795													

Boys.

Age.	Number Examined.	20		30		40		60		80		Nil.	
		R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
5	55	30'9	23'6	21'8	32'7	40'0	40'0	7'2	3'6	—	—	—	—
6	625	44'8	43'6	29'4	29'9	15'0	13'7	4'8	5'7	4'4	4'4	1'4	2'4
7	1,005	44'0	39'6	28'5	31'2	12'4	13'5	8'2	8'2	5'7	5'5	1'1	1'7
8	1,160	52'2	50'8	25'1	25'2	9'5	10'8	5'6	5'8	5'0	5'1	2'3	1'8
9	1,235	55'4	52'2	23'6	24'7	8'1	9'2	6'4	6'1	4'2	5'1	2'0	2'5
10	1,200	60'0	55'3	19'9	23'5	7'1	7'4	6'1	6'0	4'7	4'7	2'0	2'9
11	1,135	61'2	59'2	20'4	21'3	6'7	6'4	5'2	5'9	4'0	3'7	2'2	3'2
12	1,185	64'3	60'7	17'4	18'9	5'8	8'9	4'6	4'3	4'3	3'2	3'2	3'4
13	440	64'7	57'2	17'7	22'9	6'3	7'2	4'7	5'4	4'3	2'9	2'0	3'8
14	65	53'8	50'7	20'0	24'6	6'1	7'6	6'1	4'6	9'2	9'2	4'6	3'0
8,105													

Those who were reported to be so defective as to require spectacles were subsequently examined by Dr. Butterworth (who had fortunately very valuable eye hospital experience). A scheme was set on foot for the purchase of spectacles at a reasonable price for the pupils, and all those who desired were prescribed for and glasses supplied at 3/6 per pair. The money was deposited by the children with the school teacher, who received it, if necessary, in small sums, and as soon as the whole was subscribed, the child was sent down for examination and prescription. There was a small margin of profit on this price, which has been applied to the provision of free spectacles to really needy children.

Since the inauguration two years ago of the scheme for supplying

spectacles at a low and uniform price, 327 children have been specially examined and supplied with spectacles. They suffered from the following errors of refraction.

Hypermetropia	..	..	..	..	174
Hypermetropic Astigmatism	..	..	..	..	55
Myopia	..	..	..	..	44
Myopic Astigmatism	..	..	..	..	17
Mixed Astigmatism	..	..	..	..	18
Unclassified	..	..	..	..	19
					327

Little has yet been done with regard to hearing, beyond encouraging the teachers to notice any children who may be somewhat defective, and keep them near to them.

6. *Anthropometrical Records.*—During the past three years anthropometric measurements have been taken in six of our schools. These schools were selected as being characteristic, two of the best, two of the medium, and two of the worst type in the Borough. In the tables appended to this paper the results of this examination are set forth, and it is interesting to observe that whereas at eight years of age the children in all the schools differ but slightly one from another, at thirteen there are marked variations, the better-fed children showing marked superiority in development.

The taking of these records, which has been done personally by Dr. Butterworth, has occupied a great amount of time; and, interesting as they are, it is doubtful whether they are worth the time expended upon them, considering the limited extent of the staff and the great amount of work of other kinds which requires attention.

7. *Structural Conditions.*—Plans for all new buildings or alterations have been examined, and many consultations with architects, ventilation and heating engineers have been held, resulting, I believe, in alterations which have improved them in regard to ventilation, heating, lighting and general sanitary conditions.

8, 9 and 10. *Examination of and Visits to Employés.*—All teachers and employés of the Committee, all candidates for pupil teachership and bursaries, have been medically examined; and many teachers and employés absent from duty on account of illness have been visited and examined, a measure which, I believe, is necessary, considering the large number of persons employed by the Education Committee; but I am pleased to state that there has been no attempt to take advantage of the Committee.

11. *Examination of Unfit Children.*—One afternoon a week has been devoted to examining children who are stated to be physically unfit to attend school. These children are brought under our notice by the school attendance officers, and this examination has resulted in the discovery of cases which have been sent to special schools, other cases which have been permanently excused school attendance, many who have been returned to school not being really unfit.

In addition to the above, cases of pediculosis have been seen to, parents being advised as to the methods to be adopted, and in cases of persistent dirtiness parents have been prosecuted by the Society for Prevention of Cruelty to Children. In other cases where difficulty has arisen, the exclusion of children from school, and at the same time threat of prosecution for non-attendance has been effective.

Infectious Diseases.—With regard to infectious diseases in schools a great deal has been done. The teachers notify the medical officer of health of any cases or suspected cases that occur. No printed instructions have been given to the teachers on the symptoms of such illnesses, but demonstrations are given in the schools on such cases as occur. The teachers are also kept informed of the outbreak of any epidemic by the sanitary inspector, the school attendance officers, and by circular from the medical officer of health.

An epidemic of small-pox broke out in the borough in 1904-5. In two or three cases direct or indirect contact of schools with patients occurred. In these cases the teachers were re-vaccinated, and almost all the children in the schools, permission being first obtained from the parents.

Here, I believe, distinct advantage was gained by the medical officer of health being in close touch with the schools and cases.

Diphtheria.—The occurrence of two or three cases in any school is at once followed by the examination of the throats of all the children in the schools, and the exclusion of children with any signs of sore throat. In a few instances where rather more children were affected, swabs from the throats of all the children were taken, resulting in the discovery of cases which might otherwise have been missed. The spread of diphtheria in schools has been strictly limited, and I believe that the measures thus adopted have materially assisted in producing this result.

Measles.—A few outbreaks of measles in the Infants' Departments have occurred. These are at once reported by the teachers, and the school is visited, all the children in the department being medically examined. All children that do not appear to be in perfect health are sent home whether they show signs of measles or not, and the

teacher is instructed to look for the signs of disease. On the following day the school is again visited, and the teacher then makes examinations under our superintendence. On the third day the teacher is left to make the examinations herself, she being assisted again on the fourth day, and again later if necessary. As the result of these measures there has not been the slightest reason for closing the Infants' Department of any school.

All children in the Infants' Department from houses where measles has occurred are excluded, but children in the upper schools are allowed to attend, and although we have watched very carefully we have failed to see any indication of infection having been carried.

Throughout the whole of our work we have received the most cordial assistance from the teaching staff of the schools; and, with the exception of the taking of anthropometric measurements, there has been practically no interference with the ordinary routine of school life.

The Teaching of Hygiene.—A series of lectures has been given to the teachers on hygiene, and has been very largely attended, although held in the evening. So far as I have been able to observe, the teachers are extremely anxious to do the best they can for the health of the children in the schools.

The Education Committee has adopted a complete scheme for the teaching of hygiene in schools, which I believe will produce most important results in the future. This has been placed under the general superintendence of the medical officer of health.

After nearly four years' experience as medical officer of the schools I have come to the conclusion that in order to fulfil ideal conditions at least one medical officer is required to every 10,000 school children, and to get the best results from his services two nurses at least are needed to assist him. With this staff I believe it would be quite possible to ensure that every child requiring medical assistance in any way would be discovered, and steps taken to procure the attention it requires, either from a private practitioner or public hospital, as the case may require.

I am further strongly impressed with the advantages which result from the union of the school work with that of the Public Health Department. The increased information and the large staff at disposal are great aids to efficiency, and the identity of the objects of the two offices makes it very undesirable to separate them. No one suggests two Town Clerks or two Borough Engineers. Why, then, should there be two medical officers, whose duties must to a certain extent clash one with the other?

The maintenance of the proper sanitary condition of the schools would be thoroughly supervised and all necessary instructions to teachers in the physical care of the children placed in their charge would be ensured.

APPENDIX AS TO ANTHROPOMETRIC MEASUREMENTS.

The boys were measured at the following age periods :—

Between 7 years 9 months and 8 years 3 months.

Between 9 years 9 months and 10 years 3 months.

Between 12 years 9 months and 13 years 3 months.

This method gives three age periods, the average of which is in each school, approximately, 8, 10, and 13 years. The measurements are therefore almost strictly comparable.

Each teacher was asked to make lists of the boys of these ages in his own class. These lists were checked by the head teacher and by myself at the time of examination. The possibility of boys of other ages being included was thus reduced to a minimum.

The measurements were taken as follows :—

Height, without boots, standing erect, knees braced, hands by side, heels together, feet forming an angle of 60°.

Weight, all clothes removed except trousers and stockings.

Chest, standing erect, arms stretched out level with the shoulders, with palms upwards, the lower edge of the tape being placed level with the nipples. Several deep inspirations and expirations were taken and the maximum and minimum girth recorded.

A preliminary examination of the weights of various articles of clothing worn by boys was made, and the average results were as follows :—

Increase in height due to boots	..	..	1 inch.
Increase in height due to stockings	..	..	$\frac{1}{6}$ inch.
Total weight of clothes	..	..	7 lbs.
Weight of boots	..	..	2 lbs.
Weight of trousers and socks	..	..	2 lbs.

As the boys were measured without boots and weighed with trousers and stockings, it will be necessary in the following tables to allow $\frac{1}{6}$ inch from the height and 2 lbs. from the weight in order to obtain the actual measurements of Salford boys.

The total number of boys measured is 1,329.

TABLE SHOWING GREATEST AND LEAST IN AVERAGE OF HEIGHT AND WEIGHT.

Age.	School.	Height.	School.	Weight.
8 years	E	46'9 inches	E	48'7 lbs.
"	D	46'8 "	D	47'0 "
"	A	46'5 "	A	46'8 "
"	General Average	46'1 "	General Average	46'6 "
"	C	45'8 "	C	46'6 "
"	B	45'3 "	B	46'2 "
"	F	44'9 "	F	46'1 "
10 years	D	50'5 inches	D	56'7 lbs.
"	E	50'4 "	E	56'6 "
"	A	50'3 "	A	55'2 "
"	General Average	49'9 "	General Average	55'3 "
"	C	49'7 "	C	55'0 "
"	F	49'1 "	F	54'2 "
"	B	48'4 "	B	53'4 "
13 years	E	56'2 inches	E	75'1 lbs.
"	A	55'7 "	A	69'8 "
"	D	54'4 "	D	69'1 "
"	General Average	54'4 "	General Average	68'6 "
"	C	54'0 "	C	67'4 "
"	B	53'4 "	B	67'1 "
"	F	52'6 "	F	64'8 "

TABLE OF AVERAGE CHEST MEASUREMENTS AT EACH SCHOOL.

Age.	School.	Maximum.	Minimum.	Difference.
8 years	A	23'3 inches	21'3 inches	2'0 inches
"	B	23'3 "	21'5 "	1'8 "
"	C	23'3 "	21'4 "	1'9 "
"	D	23'2 "	21'4 "	1'8 "
"	E	23'9 "	21'9 "	2'0 "
"	F	23'3 "	21'6 "	1'7 "
	General Average	23'3 inches	21'5 inches	1'8 inches
10 years	A	24'6 inches	22'4 inches	2'2 inches
"	B	24'5 "	22'4 "	2'1 "
"	C	24'6 "	22'6 "	2'0 "
"	D	24'8 "	22'7 "	2'1 "
"	E	24'9 "	22'7 "	2'2 "
"	F	24'9 "	22'7 "	2'2 "
	General Average	24'6 inches	22'6 inches	2'0 inches
13 years	A	26'6 inches	24'5 inches	2'1 inches
"	B	26'3 "	24'1 "	2'2 "
"	C	26'6 "	24'1 "	2'5 "
"	D	26'4 "	24'1 "	2'3 "
"	E	27'0 "	24'6 "	2'4 "
"	F	26'3 "	24'3 "	2'0 "
	General Average	26'5 inches	24'2 inches	2'3 inches

In the following table the measurements of Salford boys are compared with the measurements of school-boys in Edinburgh and Glasgow, with boys in the English Artizan Class, Public Schoolboys and the Anthropometric Committee's Standard Average.

COMPARATIVE TABLE OF HEIGHT

Ages.	*Salford.		Edinburgh.		Glasgow.		English Artizan. (Roberts.)		Public School Boys.		Anthropometric Committee Standard Average.	
Number of Observations.	1,329		300		300		1,000		2,000		30,000	
Years.	ft.	ins.	ft.	ins.	ft.	ins.	ft.	ins.	ft.	ins.	ft.	ins.
8	3	10.1	3	9.8	3	10.6	3	11	—	—	3	11
10	4	1.9	4	2.7	4	3.7	4	2.5	4	5	4	3.8
13	4	6.4	4	7.8	4	7.6	4	7.5	4	10.5	4	8.9

AND WEIGHT.

Years.	Lbs.		Lbs.		Lbs.		Lbs.		Lbs.		Lbs.	
8	44.6		45.3		44.0		52.0		—		49.9	
10	53.3		55.6		52.4		59.0		58.0		62.5	
13	66.6		70.6		70.0		71.0		79.0		77.6	

* Two pounds have been deducted from weights of Salford boys.

THE MEDICAL TREATMENT OF SCHOOL CHILDREN.

THIS important subject was reported on by the Day Schools Sub-Committee of the Education Committee of the London County Council at their meeting on June 27th.

They stated that the difficulties which were constantly being experienced with regard to vision testing appeared to arise from the fact that the work that ought to be done was very much greater than the hospitals could possibly perform. After giving the matter very careful consideration, the sub-committee had come to the conclusion that it was desirable that full enquiry into the whole question of the medical treatment of children attending public elementary schools should be made by a special sub-committee, consisting of members of the Council and representatives from hospitals, charitable institutions, aid societies, etc. By this means evidence could be taken from hospitals, school managers, doctors, teachers, and others with the view of drawing up a report to form the basis of future action. A recommendation founded on these terms was agreed to.

THE TEETH OF SCHOOL-CHILDREN.

By T. H. C. STEVENSON, M.D., D.P.H.

THIS important subject has recently been attracting much attention—and, especially since the publication of the report of the Inter-Departmental Committee on Physical Deterioration in 1904—many communications respecting it have appeared in the various dental and medical journals. These exhibit great diversities of opinion upon almost all points except the prevalence and the baneful effects of dental caries in the young, as will be seen from the following comparison of some of the views put forward. The problem of ameliorating the present shocking state of affairs is one of the most important which can occupy the attention of the hygienist.

The position at the present day may be summarized in the statement that of children of school age only about 3 per cent have healthy teeth. This applies with substantial accuracy to all classes of the community and to most civilized countries. The President of the British Dental Association in summing up the situation in his recent presidential address at Cardiff, adopted this estimate.¹ It is the figure arrived at by Mr. Sidney Spokes² as the result of his examination of 1,300 boys at Haileybury College; and in Strasburg, where the care of the teeth of school-children has been developed to a fuller extent perhaps than in any other place, out of 4,000 children examined 2.5 per cent had sound teeth.³

Some observers record even smaller proportions of healthy dentures. Mr. Sim-Wallace⁴ estimates that at the age of 5-6 99 per cent of all children suffer from dental caries to some extent, and Mr. Hall⁵ recently found only four sound sets of teeth amongst 270 Leith children. On the other hand, an examination of the children in two Edinburgh schools⁶ of an average age of 11½, showed that in the poorer school 11 per cent and in the richer 7.5 per cent of the children had healthy dentures. And the report of the British Dental Association to the Inter-Departmental Committee on Physical Deterioration⁶ records that of 10,517 children of the average age of 12 examined 14.2 per cent had sound teeth. These children, however, must not be taken as typical of the community at large, as many belonged to Poor-Law institutions, where inspection, cleansing, and treatment of the teeth were compulsory.

Many other statements of much the same nature might be quoted, recording a proportion of healthy mouths from 8 per cent downwards:

in Russia (5 per cent), America (7 per cent), Italy (8 per cent), Switzerland, Scandinavia, Hungary, etc., also in England in Swansea, Southport and elsewhere. Some figures from Manila³ are particularly interesting, as they apply to an entirely non-Caucasian population (500 Filipino and Chinese children). Of these 4.8 per cent had healthy mouths.

On the other hand, 17.9 per cent of boys at an industrial school at East Barnet⁷ were found to have healthy teeth, though their mouths had been absolutely neglected before admission at an average age of 10; but the examination here was not a searching one. In New South Wales a recent investigation of school children's teeth revealed much less caries than was anticipated; though in contrast to this, of 106 New Zealand children only one had sound teeth. And it is even stated that 75 per cent of certain West of Ireland children have sound teeth⁹, though in Dublin the condition is as elsewhere.

On the whole, then, skilled investigators agree that in England, as in Germany, only 3-5 per cent of school children have sound teeth, and the latest opinion seems to be more in favour of the former figure. It should be noted that the great bulk of these figures are derived from the examination of town children. This may be slightly unfair to the average child in England, where the condition of the teeth in the rural districts is very generally supposed to be superior to that in the urban.^{10, 11} But in Germany Prof. Miller of Berlin states that rural children in some poor districts have scarcely any sound teeth at all¹².

Social Conditions and Dental Caries.

The condition of the very poorest class of children, as illustrated by the industrial school referred to, may be somewhat above the average in England, where it is generally held that "the higher the class the worse the teeth" (Dolamore)¹³, but this view does not seem to prevail in Germany, where it is found that bad teeth, physical defects, and mental incapacity go hand in hand^{14, 15}. It is specifically stated, in recording the results of an examination of the Mannheim school children that children of the lowest social class showed the greatest defects. But the results obtained by many observers in England point definitely in the opposite direction. This is so in the case of the Edinburgh schools referred to above⁶; and Rice Morgan¹⁶ found 9.3 per cent of industrial school boys in Swansea had sound teeth, as against only 3.3 per cent in the ordinary schools there. H. J. Thomas also, comparing two Swansea schools, one in an industrial and the other in a residential district, found more caries (and more use of the tooth-brush) in the latter.¹⁷ His explanation is that

when toothache occurs the better-class child is treated with palliatives, whereas the lower class child is sent to "have it out," and so infection of other teeth is prevented. Rice Morgan, on the other hand, believes the better teeth of the industrial school boys due to their getting less coddling and harder food. The results from East Barnet⁷ referred to above should be noted in this connection. Sim Wallace also believes that the upper social classes are more subject to caries as the result of eating softer food, but makes the point that the lower classes suffer more in health as the result of it, because of retaining septic roots from which septic matter is absorbed into the blood.²⁶ This would appear to be the direct converse of the opinion of H. J. Thomas, which has just been quoted; but possibly Thomas' "upper-class" children come from a less enlightened social grade than those Sim Wallace has in mind. In that case the population may be divisible into three classes. (1) Those adopting indiscriminate extraction; (2) Those who avoid extraction, but do not obtain proper conservative treatment; (3) Those able to appreciate and obtain such treatment. Sidney Spokes also points out that children of the poorest class, finding their way into Poor-Law institutions, are much better off than those a little higher in the social scale; while of course the children of the upper classes are the most favourably circumstanced.

An exception to the common rule for British children is noted from Glasgow, where Broughton-Head¹⁹ finds caries of the permanent teeth less prevalent amongst children with a good environment.

Not only is caries generally found in this country to be more prevalent amongst the upper classes, but its increase is stated to be greatest amongst them²⁰.

There is little difference of opinion as to the fact of progressive increase during recent years, though the materials for estimating it are scanty. The Physical Deterioration Committee reported that "there is no question that the teeth of the people have become much worse of late years."²¹ The Hygiene Committee of the British Dental Association reported to this body that there are no comparative statistics bearing on the point.²² They had, however, circularised a number of dental practitioners of fifty years' standing, who all agreed as to the fact of increase. This not altogether convincing evidence appears to be supported by the evidence obtainable from the ancient British skulls of varying periods, in which, it is stated, the increase of caries can be clearly traced. Thus, the earliest, dolichocephalic British race, which was non-agricultural,²³ had excellent teeth, free from caries but much worn (showing the hard nature of the food).

The next, a bradycephalic race, still pre-Celtic, but agricultural, ate softer food, and their skulls show a considerable proportion of carious teeth, but the disease is nearly always limited to mere specs. Intermediate between these conditions and those of the present day come 181 jaws dug up from plague pits (date about 1665), and preserved in University College, London, which show a considerable amount of caries, but not nearly to the extent common at present.

Not only had uncivilised man in the past teeth immensely superior to ours, but, speaking generally, this is true at the present day also, especially as regards caries. Eskimos, living on an almost exclusively carnivorous diet, have magnificent teeth,²⁴ and the teeth of the pygmies who recently visited this country were large and strong. Many negro races also have teeth very free from caries.²⁵ On the other hand, caries was common amongst the civilized peoples of ancient Egypt and Rome.²⁷ The teeth of the civilised races of China and Japan are stated to be greatly superior to ours,^{28, 29} notwithstanding the soft nature of their food, which is all boiled; but we have seen that the only numerical observations available, those from Manila, do not support any great difference from European conditions.

Supposed Causation of Caries.

These references to the hard nature of his food as a probable cause of the superiority of the teeth of primitive man lead naturally to the consideration of the etiology of caries. This is obviously a most important point in discussing the dental question in the schools, for until we know the cause we are not in a position to apply the remedy. Unfortunately, the dental profession is not as yet in a position to make any very clear or definite pronouncement on the matter.

There is a very general agreement that the undue softness and refinement of the food to which we have become accustomed is largely responsible for the present state of affairs. Sir Lauder Brunton, Prof. Cunningham, Dolamore, and others are quoted in the report of the Committee on Physical Deterioration as agreed upon this point. Coarse food cleanses the teeth, and by exercising the jaws leads to their healthy development. Soft food fails in both respects, and in addition is apt to leave behind particles lodged between the teeth, upon which their decomposition has a prejudicial effect. This especially applies to carbohydrate foods, the acids arising from the fermentation of which were shown by Miller to attack the teeth and by their softening effect to produce caries. This statement of the mechanism of caries, however, does not explain its cause—the factor which causes some teeth, though well cared for, to decay, while others,

though neglected, do not. The question at issue with regard to food is whether it is a dominant influence in the sense that if suitable food were chosen the teeth would not decay. This is the position taken by Mr. Sim Wallace, who has written much upon the subject. He attributes caries to oral indigestion, the result of our unphysiological dietary. Others, while not denying the beneficial effect of hard and "fibrous" food, believe that an individual or a race accustomed to such a dietary may yet suffer from caries. Thus Goadby states that many native races, eating hard food but not cleansing their teeth, suffer much from oral sepsis.³⁰ And conversely it is stated³¹ that a race of East African negroes who eat soft food but cleanse their teeth thoroughly is free from caries. In this case, however, the softness of the vegetable food prepared by pounding with stones has been challenged.

In addition to the two extreme views—that to preserve our teeth we must alter our dietary, and that caries may prevail independently of diet—there is an intermediate position which finds many advocates, namely, that if we had a physiological dietary our teeth would be preserved, but that as things are it is impossible to alter the dietetic habits of the race, and that art, in the shape of the tooth-brush, is capable of replacing the natural cleansing agency, and is therefore properly invoked to do so. Thus Dolamore stated before the Physical Deterioration Committee that with a perfect set of teeth and hard food mechanical aids to cleanliness are hardly necessary.

Should the tooth-brush be used?

Sim Wallace attributes two bad effects to the dental toilet as usually carried out, quoting Miller in support of his views. The brush removes the protective fatty or mucoid film with which the teeth are naturally covered, and the antiseptic used along with it destroys the natural bacteria of the mouth which prevent the growth of those pathological bacteria whose activity induces caries.³² He points out that many persons who make abundant use of the tooth-brush have very bad teeth, and that many others who never use it have perfect teeth. The tooth-brush is, in his opinion, chiefly of cosmetic utility, and he goes so far as to say that the aphorism "clean teeth do not decay" should be rewritten "cleansed teeth are most susceptible to decay."

Other bad effects also have been attributed to excessive and ill-directed zeal in the use of the tooth-brush, such as the horizontal lines of erosion so often seen in the enamel on the labial surface of the front teeth, and the opinion appears to be growing that the tooth-brush is

frequently used to excess.³³ On the other hand, it is to be noted that the Physical Deterioration Committee endorsed the statement that neglect to keep the mouth clean is chiefly responsible for the decay of teeth (though if this refers to artificial cleansing why should caries be more prevalent amongst the upper classes?), that the British Dental Association in its pamphlet on "The Preservation of the Teeth" recommends frequent and thorough brushing without reserve, and that at Strasburg, which is setting the world an example in this matter of care for children's teeth, they are trained in the schools to use the brush thrice daily.

Other supposed Causes of Caries.

Two other alleged causes of caries must be briefly mentioned, namely, malnutrition during infancy or before birth, and deficiency of lime salts in the dietary. The Physical Deterioration Committee attributed little influence to the former, stating that there is no exact evidence as to greater frequency of caries in children fed on artificial food as infants. It is also pointed out that as the enamel and dentine of all the temporary and four permanent teeth are laid down before birth, and of twelve other permanent teeth in the first month after birth, no malnutrition acting after this period can influence their formation. On the other hand, a variation in natural resistance to disease, assumed as the essential cause of caries, has been thought to depend upon diet in infancy: the superiority found in the teeth of Jews has been attributed to the fact that their children are more frequently suckled, and Gibbs and Sim Wallace state that artificial feeding has a positive ill effect,³⁶ though the latter attributes this, not to interference with the formation of the enamel, but with the general health, the sickly child using its teeth less when cut.

Deficiency of lime salts has been discounted as a cause of caries, because little difference can be found chemically between hard and soft teeth. Local variations in prevalence of caries,³⁷ and instances of coincidence of change of abode and cessation of caries have, however, been attributed to varying hardness of water supply, and Risa³⁸ states that a diet rich in calcium salts increases the quantity and alkalinity of the saliva, and that high alkalinity of the saliva antagonises caries.

Consequences of Caries.

There is little difference of opinion as to the extreme gravity of the consequences of caries, but much need for enlightenment of the public on this matter. Prof. Osler tells us that more physical degeneration is produced by bad teeth than by alcohol,³⁹ and some enthusiasts go

very much farther in their statement of the case. The diseases chiefly mentioned in this connection are tubercle, anæmia, and dyspepsia, gastric and intestinal. There are at least five different ways in which abnormal or diseased teeth are said to originate tubercle. A carious tooth may become the primary focus of the disease. Projecting incisors may prevent the closure of the lips and so cause mouth breathing, which predisposes to phthisis.⁴⁰ Oral sepsis is common in phthisis, and may cause it.⁴¹ Carious teeth lead to enlargement of the cervical lymphatic glands, which are then apt to become infected by tubercle. Oral sepsis causes gastric indigestion which, by lowering nutrition, paves the way for tubercle. The two latter methods are probably those chiefly operative.

Oral sepsis is also frequent in chlorosis, which is often greatly benefited when the mouth is put in order.

The relation between carious teeth and the acute specific fevers is probably two-fold. They are pre-disposed to by oral sepsis,⁴² and in its presence the septic complications of scarlet fever are stated to be more frequent and more grave.⁴³

In addition to the foregoing, nervous effects of carious teeth, e.g., chorea, are not infrequently met with.

Remedies.

Scarcely any progress has as yet been made in England towards applying a remedy for the terrible state of affairs which has been brought to light. It is only within the last few years, however, that much interest in the matter has been excited, even in professional circles. Things are a little more advanced in Germany, where many municipalities are preparing to tackle the question, and an account of what is being done there will be found in the next article, giving extracts from Jessen's writings. Doubtless we shall have to move on much the same lines here as there. The evil is the same, and its remedy must be similar, the schools offering much the most favourable field for combating it. The teeth of the children must be put in order, and they and their parents taught the necessity and the means of keeping them so. The Committee on Physical Deterioration in its report endorsed recommendations to the Board of Education in favour of teaching the care of the teeth in schools and enforcing their daily cleansing, as well as of the employment of dentists by school authorities to examine and treat the children's teeth. This is nowhere in England being done as yet in elementary day schools on more than an experimental scale. The facts as to prevalence of caries are now so thoroughly established that further examination, unless it is to be followed by treatment, is needless.

Darwen and Carmarthen have provided for the examination of the teeth of their children, the latter by inviting the local dentists to act as honorary dental officers to the schools! Experiments in treatment are arranged for or in progress at Cambridge and Birmingham. In the former town Mr. Sedley Taylor has provided £500 for the purpose, and in the latter Mr. George Cadbury is devoting £1,200 to the purpose of having all the children's teeth in Summer Lane school put in order. He has also offered to provide 6,000 tooth-brushes for tooth-brush drill in the King's Norton schools, but difficulties in the shape of lack of utensils and lack of teachers' time for supervision were found to stand in the way. Not only children and parents, but teachers (and councillors) require to be taught the importance of the subject. Mr. Denison Pedley finds that 99 per cent of our teachers are absolutely ignorant in the matter, whereas in Strasburg, Jessen reports that there is now not a teacher who does not appreciate the situation.

Medical officers of health can do much by impressing upon their authorities the need for action and the fact that we are being left behind in this matter by other countries. Dental practitioners who ventilate the subject find themselves liable to the suspicion either of being faddists magnifying their own office, or of ulterior aims in the shape of salaries as dental officers. There is need therefore that the medical profession, and especially its preventive branch, should join in voicing their demand, for until further progress is made in the enlightenment of public opinion it is to be feared that little practical advance will be made towards reform.

In all discussion of the question as a matter of "practical politics," the matter of expense will naturally be prominent. A recent estimate for the whole country was £1,200,000 per annum,⁴⁴ or 3s. to 4s. per child. In Strasburg, however, all that is necessary can be done for 1s. per child, so that, allowing for higher salaries here, the total cost for England and Wales should not on this analogy exceed £500,000. The expense in Hamburg, however, works out at 2s. per child,⁴⁵ so that it would probably be unsafe to estimate for a total expenditure of much under £1,000,000 per annum.

There are several difficulties in the way of the application of such a scheme besides the financial one. One is the differences of opinion existing at present as to the cause, and therefore as to the prevention of caries. Probably the assumption has too much been made in the past that all that is required is the regular and frequent use of the tooth-brush. Unfortunately, that prophylactic often proves inefficient. Dietetic habits are doubtless hard to change, but one

cannot help feeling that they lie more at the root of the matter than does the tooth-brush. And if the present dietetic ignorance of the population is to be lessened this must be done through the schools. Possibly in the advocacy of the tooth-brush the tooth-pick has been too much neglected. This instrument avoids the alleged dangers of the brush, and possesses positive advantages as well in the shape of convenience, readiness of application immediately after meals, and capacity to reach crevices not attained by the brush. Its habitual use, along with that of the brush once daily, while undressing, would seem to present some advantages over the Strasburg three daily brushings, which it would often be impracticable to carry out.

Another difficulty is that dental decay is often well advanced by the time a child commences school attendance. This consideration, however, does not affect the educative, which is, perhaps, the most important side of the question. When good parents realise the situation they will look after the teeth of all their children; at present unfortunately, the situation is not realised.

Mention should be made of the good educative work, by means of pamphlets on the care of the teeth and otherwise, which is being done by the dental and other hospitals, notably in London, by the North Eastern Hospital for Children. Here a salaried dentist is employed to do conservative work, and the reports from the hospital as to its educative effect upon the parents of the neighbourhood are most encouraging.

This and other similar experiences prove that the people can be taught. At present they are without a teacher. While this is so all who realise the situation must strive to alter it.

¹ *Brit. Dental Jour.*, 1907, p. 486; ² *Report of Medical Officer (Education)*, L.C.C., 1905-06, p. 16; ³ F. W. Thompson in *Brit. Dental Jour.*, 1905, p. 923; ⁴ *Lancet*, 1907, I, p. 253; ⁵ *B.M.J.*, 1907, I, p. 275; ⁶ *Appendix to Report of the Inter-Departmental Committee on Physical Deterioration*, p. 98; ⁷ *Brit. Dental Jour.*, 1906, p. 210; ⁸ *Lancet*, 1905, I, p. 1101; ⁹ *Brit. Dental Jour.*, 1905, p. 823; ¹⁰ *B.M.J.*, 1904, II, p. 390; ¹¹ *Brit. Dental Jour.*, 1906, p. 1164; ¹² *Ibid.*, 1905, p. 561; ¹³ *Physical Deterioration Committee Report*, p. 83; ¹⁴ *Deutsches Zahnärztlichen Wochenschrift*, February, 1907; ¹⁵ *Zeitschrift für Schulgesundheitspflege*, 1907, No. 1, p. 38; ¹⁶ *Lancet*, 1905, II, p. 255; ¹⁷ *Brit. Dental Jour.*, 1906, p. 294; ¹⁸ *B.M.J.*, 1904, II, p. 390; ¹⁹ *Brit. Dental Jour.*, 1906, p. 913; ²⁰ *Ibid.*, 1906, p. 1164 (V. Knowles); ²¹ *Physical Deterioration Committee Report*, p. 83; ²² *Appendix to Ibid.*, p. 99; ²³ *Brit. Dental Jour.*, 1906, p. 290; ²⁴ *Ibid.*, p. 224; ²⁵ *B.M.J.*, 1905, I, p. 629; ²⁶ *Ibid.*, 1904, II, p. 290; ²⁷ *Brit. Dental Jour.*, 1906, p. 268; ²⁸ *B.M.J.*, 1904, II, 708; ²⁹ *Ibid.*, 1905, II, p. 575; ³⁰ *Ibid.*, 1904, II, p. 1375; ³¹ *Ibid.*, 1905, I, p. 629; ³² *Brit. Dental Jour.*, 1906, p. 1; ³³ *Ibid.*, 1906, p. 296; ³⁴ *Appendix Physical Deterioration Committee Report*, p. 100; ³⁵ *Lancet*, 1905, II, p. 1192; ³⁶ *Ibid.*, 1907, I, p. 252; ³⁷ *Brit. Dental Jour.*, 1905, p. 823; ³⁸ *Lancet*, 1906, p. 1057; ³⁹ *Ibid.*, 1905, II, p. 1192; ⁴⁰ *Ibid.*, 1906, II, p. 1240; ⁴¹ *Ibid.*, 1906, II, p. 1086; ⁴² *B.M.J.*, 1904, II, p. 390; ⁴³ *Ibid.*, 1907, I, p. 271; ⁴⁴ *Brit. Dental Jour.*, 1907, p. 770; ⁴⁵ *Ibid.*, 1907, p. 772.

THE PRESENT POSITION OF THE DENTAL HYGIENE QUESTION.

(An Address by PROF. JESSEN, of Strasburg, at the decennial celebration of the formation of the Dental Society of Alsace-Lorraine, 19th January, 1907.)

GENTLEMEN, having been asked by the President of the Society to contribute a paper, I shall endeavour in a few words to present a comprehensive picture of the present position of our hygienic efforts.

We shall be in a better position to understand and appreciate the progress which has been made in this matter if we recall the commencement of the movement and keep clearly in mind the difficulties which have been overcome. In the year 1861 the Central Association of German Dentists at its annual meeting in Dresden resolved to offer a prize for the best essay in popular language upon the care of the teeth and mouth.

Thus it was in the year 1861 that a dental association first took up the question of hygiene and made itself responsible for the enlightenment of the population as to the importance to the health of the whole body of the care of the teeth. Of many essays submitted that of Süersen in 1864 received the prize. It has gone through a large number of editions, and was translated into almost all languages.

Since then the Society has greatly increased in strength, and many of our colleagues have in co-operation with it undertaken and powerfully furthered these efforts. At conferences and international congresses dental hygiene is now scarcely ever absent from the programme. The number of expository pamphlets is legion. Gradually, however, more practical activity is being attempted. Dental examinations in school, as initiated by Röse, have been carried out on all sides where official opposition could be overcome. 1894 saw the publication of the first results of these examinations as to dental disease in elementary schools. In the same year, before the Society for Internal Medicine in Berlin, Ritter demanded that much greater importance should be attached to the care of the teeth and mouth in relation to the health of the population.

In 1895 I requested the municipality to allow me to examine the teeth of the elementary school children in Strasburg. This request was curtly refused by the school administration. It was repeated three years later, and was then granted only after opposition. A rich statistical material was hoped for as compensation for the

considerable loss of school time involved by such an extensive investigation.

The result of the examination of 10,000 scholars was for the laity absolutely frightful. Only 4·3 per cent had sound teeth; the remainder had 102,456 diseased teeth. In Germany in recent years 157,361 school children have been examined on a uniform plan. The statistics are edited by the Dental Hygiene Association of Dresden, and on that account may be accepted as free from objection. They point to the following conclusions:—

1. The physical development of school children is notably impaired by dental disease.

2. The poorer the physical condition the smaller, on an average, is also the mental capacity of the children.

3. The worse the teeth, so much the worse on an average are the results obtained by the children in examinations.

This chain of reasoning must give food for reflection to those officials upon whom devolves the furtherance of hygiene amongst the population. The administration will no longer be able to avoid drawing the necessary conclusions from it. Every dentist must be a hygienist, and the training of the coming generation of dentists is a matter of great hygienic importance.

In the year 1839 the first dental school in the world was founded in Baltimore. From 1863 onwards a new college has arisen annually in North America, so that their number by now amounts to sixty. The first dental institute in Germany was opened at Leipsic in the year 1884. Berlin followed in the same year and Breslau a little later. The dental institutes of the German universities do not so far receive from the State that support to which the importance of the subject entitles them. Very many are dependent on the voluntary services of the teachers, and have to contend with great difficulties. These, however, will steadily diminish when, in consequence of better teaching and further development, dentistry is recognised by the medical faculties as a speciality of equal rank, just as the Ministry of Education and Federal Council have already done as a matter of principle. Every university will possess a State institute (i.e., of dentistry) with good quarters, staff, and teaching material. This is a necessity for the training, so essential for the health of the people, of the representatives of a profession which is of the greatest importance for the whole of the human organism.

An unhealthy mouth is the starting-point of so many diseases, both local and general, that, especially amongst the rising generation, the mouth must be quite healthy. This is an imperative necessity

for a capable race, a healthy people, a strong nation. On this account the school dental institute is for every town an indispensable necessity for the treatment of elementary school children. In Germany we are on the point of attaining this goal, but this is not sufficient; it must also be reached abroad, in all civilised lands. Care for the teeth must be introduced in all schools of all towns of all countries. I have, therefore, for some years made it my aim, and I may say with some success, that officials and teachers should join the movement. In Strasburg there are probably no longer any elementary school teachers who are not convinced of the importance for the health of the children of care for their teeth. That the officials are of the same opinion is shown by the establishment of school dental hospitals in the different cities throughout the Empire, in the number of which Alsace-Lorraine and Baden are foremost. Dental treatment of school children either is already or soon will be carried out in: Strasburg, Mülhausen, Metz, Colmar, Darmstadt, Offenbach, Frankfort-on-Main, Freiburg, Carlsruhe, Heidelberg, Mannheim, Constance, Ulm, Würzburg, Lahr, Freiberg, Siessen, Malstatt-Burbach, Danzig, Bielefeld, Frankfort-on-the-Oder, Worms, Mayence, Wiesbaden, Altona, Nordhausen, Charlottenburg, Dresden, Leipzig, Kiel, Fürth, Erfurt, Cottbus, Lucerne, Zürich, Helsingfors, Stockholm, Vejle, London. Its importance for the promotion of the public health is recognized, but it will not attain its full development until every town possesses a school dental hospital, and the care of the teeth is introduced into the rural schools also. This dental treatment is particularly important, because we have in it a means for combating anæmia and chlorosis, scrofula and infectious diseases, and especially for the prevention of tuberculosis, better than any other which can easily be found. This point may be explicitly emphasized and exemplified in a few words.

Tuberculosis which, according to the reports of the Imperial Office of Public Health, carries off annually 87,000 individuals of working ages, is estimated to have attacked one million persons, that is, 2 per cent of the total population of the German Empire. This implies an enormous economic loss, as the sick are not only incapable of earning, but also require nursing and endanger the health of their companions. The struggle against this popular scourge is everywhere recognized as an imperative necessity.

The sanatorium movement occupies an important position amongst the means for combating tuberculosis. Millions are spent without special benefit in order to control the disease.

Its prevention is more important than its cure.

August, 1907]

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tuberculosis is, apart from other factors of circumstances—bad housing, insufficient supply of food, and lack of nutrition, and the most important of these is the healthy mouth. This fact can be brought home to all by expositions in the schools. The only preliminary condition for school children—in all schools in town and country—leads spontaneously to the enlightenment and enlightenment of the people, and thereby to the promotion of the public education of the people, and thereby to the promotion of the public health, more than can be so simply attained by any other means. The care of the teeth in school is an important weapon in the struggle against tuberculosis, and instruction in school is the best preparation for the erection and administration of a school dental hospital.

A properly administered school dental hospital is the best and most fruitful tubercle sanatorium. and Alsace-Lorraine demonstrates its

The example of Strasburgst. importance, organisation, and the Strasburg school dental hospital

I may assume the service of the Strasburg school dental hospital to be well known. It is circumstantially depicted in the last annual report, and published in the *International Magazine of School Hygiene*. It is therefore accessible to teachers and physicians throughout the world, and may stimulate the universal provision of institutions upon the Strasburg model.

The care of the teeth in school must be followed by similar care in the army. Here also beginnings have been made. While Bavaria had in Munich the first dental station at a military hospital, it has now several of these; Saxony also has three such stations; in Leipzig, Dresden and Chemnitz, and Alsace-Lorraine likewise has for the past year possessed one in Strasburg. These stations are conducted by local sanitary officers with a dental qualification. But so long as there are not such sanitary officers at the headquarters of every army corps, and as one-year "volunteer" dentists do not serve as their assistants in these stations at every military hospital, the care of the teeth in the army is, and must remain, entirely inadequate. This must be said in blunt words. The demands which have quite rightly been put forward upon scientific grounds by dentists for many years back must at once be acted upon by the authorities. Their accomplishment is a matter of the very greatest importance for the defence of the nation.

The question of expense cannot be raised here, for the existing contracts with dental practitioners, by which the need is far from being met, cost the State much more than the institution of one-year "volunteer" dentists will ever claim. Only the equipment of the

stations is provided by the State, the "volunteer" dentists themselves finding their own instruments. In this way more than ten times the number of soldiers could be treated at small expense. Many prevalent diseases would be avoided. Many days' nursing in the military hospitals would be obviated, and the capacity of the troops in garrison and field would be increased.

The examinations of Röse, Kimmle, Lührse, Port, Steffen, Bartels, Seitz and Bruck of a total of 10,148 men yielded only 578 perfect dentures, or about 6 per cent only. Bruck examined in Breslau 3,000 soldiers of an average age of 22 years, and found amongst them 26,394 teeth either carious or destroyed as the result of caries, while 4,380 teeth had already been extracted, 172 men had already claimed dental assistance, and only 184 possessed healthy teeth. Bruck quotes from the Health Report of the Royal Prussian Army that in five years 33,421 men suffered from diseases of the teeth and jaws, for whose cure there were required the huge number of 149,762 days of treatment, while in the same five years 4,845 men altogether were treated for 33,602 days for diseases of the mouth and throat.

On the other hand, Port has demonstrated that by timely treatment of dental disease, through the introduction of a rational care of the teeth in the Munich garrison, it was possible to attain a diminution of sick admissions by 1,200 men and a reduction of days of treatment by about 7,000 in the years 1891-1894.

These conclusive figures prove the absolute necessity of introducing dental care into the army in order to strengthen and increase the capacity of the soldiers in war and peace, and thereby at the same time to promote the public health.

As regards the disposition of the friendly societies towards the dental treatment of their members, this has in the last few years become somewhat more liberal. The value of this treatment however, has not yet been fully recognized.

The hospitals have in a single instance, in Berlin, begun thoroughly to recognize the necessity of dental treatment for their patients. In striking contrast to this we have whole hospitals for venereal diseases and sanatoria for pulmonary disease.

In spite of much progress, we are still far from having reached our goal; there is still need of much continuous and tiresome work. But work is life, and unity is strength. The goal is now within our grasp.

Some extracts from the annual report referred to may be appended by way of further illustration of the progress made in Germany.

A new school dental hospital has lately been opened in Dresden,

with four operation rooms and ten dentists, who are to be at the disposal of the children all day long. The building is provided with a chemical (sputum) and a bacteriological laboratory, and rooms for photography, microphotography and Röntgen ray work. Provision on such a scale can only be made where the generosity of the rich supplies the means, but such expense is not essential. The Strasburg institution was founded in October, 1902. The town is one of over 150,000 population, and all the children in school, about 18,000, are entitled to treatment. The expense up to the present has been: 1902, £115; 1903, £137; 1904, £272; 1905, £335; and 1906, £427. At this expense the following work has been carried out:—

	Examined.	Treated.	Fillings.	Extractions.
First year	5,343	2,666	699	2,912
Second „	6,900	4,967	4,832	6,530
Third „	4,372	6,828	7,065	7,985
Fourth „	834	7,491	8,340	8,552

Professor Jessen, however, estimates in another paper that this expense will have to be increased in the future to about one mark per child, an amount which will suffice for all essential purposes. He characterises the higher estimates of expense which have been made as entirely theoretical and valueless, and his opinion on this point must carry great weight, as few are in the same position of being able to speak from practical experience. The salaries paid in Strasburg, however, are low. Of the total expenditure in 1906 of £427, £308 was devoted to salaries, apportioned as follows: 1st assistant, £150; 2nd assistant, £120; Attendant, £38.

It is pointed out that in no other department of public health can such great results be attained at so little cost. These great results are two. The children's teeth are being put in order, and they and their parents are being taught how to preserve them. Experience has shown that the health of the children has been improved in Strasburg, and that dental care has helped to avert tubercle and infectious disease.

The treatment, except in the infant schools, where attendance is not compulsory, is quite voluntary. No child is allowed to go to the holiday colonies (corresponding to our fresh-air fund arrangements) without a dental certificate. The table shows the increasing trust of the children and their greater inclination to conservative treatment. This increasing confidence is shown also by the fact that more than half of the children attending last year did so on account of toothache, but only one-third the year before.

Educational methods adopted are: Addresses in school, explanatory

pamphlets, wall charts, persuasion of parents individually, meetings for parents, and publication of the good results obtained. The first assistant visits the schools regularly in turn, examining and teaching the children and inducing them to come to him for treatment. The infants especially are given tooth-brush drill and taught to wash their mouths, and that industrious chewing of hard rye bread cleanses the teeth and strengthens the bones.

Special attention is paid to stammerers and lead-workers. Dental oversight must be extended to rural schools. Contracts with a neighbouring dentist, where there is one, are suggested; elsewhere "flying clinics" are recommended, i.e., that a number of districts should unite to appoint a dentist for this sole purpose, providing him with a light and easily packed equipment, with which he would circulate throughout his districts.

THE Acton District Council have increased the salary of Dr. D. J. Thomas, medical officer of health, from £400 to £450 per annum, with a further increase of £50 next year.

THE NOTIFICATION OF BIRTHS BILL.—The Marylebone Board of Guardians have passed a resolution asking for amendment of the Notification of Births Bill, which imposes on the father or some person in attendance the obligation of notifying the birth to the medical officer of health within 48 hours of its occurrence, by substituting for the medical officer of health of the district the superintendent registrar, to whom the notification of births shall be sent. The Guardians urge that the registrars of births and deaths, who already supply the medical officer of health with returns of all births in their district, could accordingly be empowered by the Bill to amplify such information, and the information could be supplied at more frequent intervals. They are furthermore of opinion that if such independent notification were enforced, the majority of the poorer classes would be led to believe that notification means registration.

CANCER STATISTICS.—Dr. R. K. Brown (Ann. Report, 1906), referring to deaths from cancer, says that the figures unfortunately show an upward tendency; but "probably the explanation given by Mr. Jonathan Hutchinson, who is one of the greatest living authorities on the subject, will account for the greater part, if not the whole, of this increase. He states that cancer is essentially a disease of degenerating tissues, and is, therefore, a disease of old age. Owing to improved sanitation and consequent increased longevity there are more people arriving at old age now than 50 years ago. It is, therefore, clear that the very increase of old people itself will produce an increase in cancer." Death-rates corrected for age and sex distribution of population unfortunately show that only a small proportion of the registered increase in the death-rate from cancer is explicable by the increased longevity of the population; and we are therefore driven back on the conclusion that the registered increase is either due to (1) a real increase in the cancer death-rate, or (2) an apparent increase due to more accurate diagnosis and certification of causes of death, or these two operating together. There is at present no satisfactory evidence of increase of cancer.

OPEN-AIR SCHOOLS.

AT their meeting on June 17th, the General Purposes Committee of the Education Committee of the London County Council reported that they had had under consideration the desirability of establishing open-air schools for unhealthy children during the summer months, on lands under the control of the Council, or in the country, with the view of attempting one or more experiments during the forthcoming summer. They had also had under consideration a letter from the Committee of the Royal Arsenal Co-operative Society (Limited), in which they stated that, being impressed with the importance of open-air schools, particularly in the county of London, they had unanimously decided to offer to the Council the use of the society's woods and recreation grounds at Bostall, Plumstead, for the purpose of an experiment with such a school, which they suggested should be opened for the months of July, August, and September. The committee added that the woods and grounds were privately enclosed and contained a shelter, and would, in their opinion, be very suitable premises in which to conduct an experiment of the character indicated. They were about twenty acres in extent, beautifully wooded, and situated on a slope. On the lower part there was a large cleared space with turf, from sixty yards to seventy yards in diameter, surrounded by a single circular row of benches. There were two large and well-constructed sheds, open on three sides, which could easily accommodate about one hundred children. At the rear of the larger shed was a small store room. Close to this, water supply was provided, and two large cauldrons with heating arrangements had been supplied. The larger shed and the cleared space were provided with electric lighting. The whole of the grounds were well fenced in on two sides, and the upper part adjoined Bostall Heath. There were also one or two smaller clearings provided, in some cases, with seats. There were plenty of wild flowers, shrubs, and different kinds of trees, and generally the site was well adapted for the purposes of an open-air school.

The offer of the society furnished an unusually good opportunity for making an experiment with an open-air school, and the sub-committee were of opinion that it should be accepted with many thanks. After very careful and full enquiry, the sub-committee considered that the school could best be organized under the powers of the Elementary Education (Defective and Epileptic Children) Act, 1899. It

was proposed that the school should be conducted for a period of three months—namely, July, August, and September; that it should be limited to one hundred children who were anæmic or otherwise unhealthy, and who, it was believed, would receive benefit from attendance at an open-air school. The children would be carefully selected by the medical officer, and the consent of their parents would in every case be previously obtained. The hours of attendance would be from 9 a.m. to 7 p.m. each week day, and from 9 a.m. to 1 p.m. on Saturdays. The children would be drawn from the immediate district within the county, and from Greenwich and Deptford, and provision would, where necessary, be made for their conveyance by tramcar to the Bostall Woods, which were situated about twelve minutes' walk from the tramway terminus.

On the question of expenditure, the sub-committee submitted an estimate of that part which would be incurred by the Council. This amounted approximately to £400. In addition to the cost, which would fall on the County fund, an expenditure, which might be put down at £200 for food and £10 for boots, would be necessary. Towards the cost of food the parents would, however, be expected to contribute according to their means, and the balance would be made up by voluntary contributions.

It should be remembered that the children who would be received in an open-air school were now irregular in attendance owing to ill-health, that the amount of Government grant was consequently reduced, that the children were also from the same cause a serious obstacle to the general progress of the scholars with whom they were now working, and that, assuming that the new school be sanctioned, a substantial Parliamentary grant would be received.

A recommendation of the sub-committee, based on the proposals in the report, was unanimously agreed to.

MR. EDWARD CARNALL, D.P.H., has been appointed medical superintendent of the Newton Abbot Joint Hospital District, Devon, *vice* Dr. John Lacy, resigned.

FLORISTS' SHOPS.—In a recently published monthly report (Marylebone), Dr. A. Wynter Blyth says: "The Factory and Workshops Act provisions have lately not been applied to florists' establishments because one of the stipendiary magistrates decided that as flowers were a natural and not a manufactured article, they did not come under the Act. This decision, however, has now been appealed against, and it has been definitely laid down by the High Court that the preparing of a natural article for sale is included in the definitions of the Factory Acts."

MEDICAL INSPECTION IN THE SCHOOLS OF MASSACHUSETTS.*

By GEORGE H. MARTIN,
Secretary of the Board of Education.

MEDICAL inspection of school children in Massachusetts began in Boston in November, 1894. Dr. Samuel H. Durgin, chairman of the Board of Health, had been for several years urging upon the city government the importance of school inspection as a preventive measure in the interest of public health. His request for money was denied by successive mayors until an outbreak of diphtheria in the fall of 1894 came to his aid.

The disease spread rapidly after the schools opened in September and reached its height in December.

During the vacation months of July and August the number of cases varied from 25 to 40, and the deaths from 5 to 14.

In September the number of cases reported weekly reached 100 and the deaths 30.

In October the maximum report was 115, and the deaths 30.

In November the number of cases reached 152, with 35 deaths; and in December the cases were 125, and the deaths 41.

During that year (1894) there were 3,019 cases and 817 deaths.

The urgency of the situation forced the city government to accede to Dr. Durgin's request, and he was able to appoint fifty physicians to make daily visits to the schools. The efficiency of this work attracted attention outside of Boston, and similar work was undertaken in one suburban city and town after another, until in 1900 school physicians were regularly at work in some fifteen places.

The movement spread through the efficient work of enlightened school superintendents, aided by various social organizations, especially women's clubs and civic leagues. The effectiveness of the propaganda was increased by the wide-spread movement for the prevention of tuberculosis with the travelling exhibits. By means of these the public thought was drawn towards the subject of health and disease and all measures of a sanitary nature acquired new interest. The unceasing activity of the State Board of Health, too, aided greatly in enlightening public opinion and in developing public sentiment.

Up to this time there had been no recognition of this work in the public statutes. Boards of Health had carried on the work as a part

* From the Monthly Bulletin of the State Board of Health of Massachusetts, April, 1907.

of their function of caring for the public health, or School Boards had included it in their several administrative plans.

During 1905, at the instance of Mr. Joseph Lee, of Boston, a man whose life is devoted to the public welfare, especially to the welfare of children, numerous conferences were held, attended by physicians and school officials, for the purpose of formulating some general scheme for medical inspection. The work already done was explained and compared, its deficiencies exposed, and plans submitted and discussed. The outcome of these meetings was the preparation of a Bill, which was presented to the Legislature of 1906, making medical inspection compulsory throughout the State.

Another Bill had been presented by a member of the Legislature, copied from the Vermont law, requiring an annual test of the vision and hearing of all school children. This Bill would have gone through easily, but the more comprehensive one required a good deal of effort at committee hearings and in private conferences with members. A paragraph in the Governor's message favouring it helped to give it standing, and it was finally passed and approved, and became known as chapter 502 of the Acts of 1906.

The law requires the appointment of school physicians in every town and city in the State, so that we have now in Massachusetts four classes of school officials of equal legal standing, school committees, superintendents, physicians and teachers, having mutually co-operative functions centring in the welfare of the children.

The purpose of the school inspection as presented by the law is twofold. It includes those precautionary measures which would naturally be taken in the interest of public health—the examination and exclusion for contagious diseases. But it goes far beyond this in Section 5, which reads as follows :—

SECTION 5. The school committee of every city and town shall cause every child in the public schools to be separately and carefully tested and examined at least once in every school year, to ascertain whether he is suffering from defective sight or hearing, or from any other disability or defect tending to prevent his receiving the full benefit of his school work, or requiring a modification of the school work in order to prevent injury to the child or to secure the best educational results. The tests of sight and hearing shall be made by teachers. The committee shall cause notice of any defect or disability requiring treatment to be sent to the parent or guardian of the child, and shall require a physical record of each child to be kept in such form as the State Board of Education shall prescribe.

I suspect that this will prove to be one of the most far-reaching measures in the interests of public education which has ever been enacted by a legislative body.

The law as finally enacted contains two weak points. Under the

terms of the first section, in cities the school physicians must be appointed by School Boards, except when Boards of Health are already carrying on such work, or may hereafter do so. This invites controversy between the two boards, and already in several cities friction at this point has delayed the work. The Bill as originally drawn placed the whole matter in the hands of School Boards, but the opposition was so strong from several cities where Boards of Health were doing satisfactory work, that a compromise seemed necessary, with the usual result of compromises.

The other weakness is in the last section, which was added by one of the committees during the progress of the Bill. This limits the expenditure for the services of school physicians to the amount specifically appropriated for the purpose either by a town or by a city council. If an appropriation is refused, nothing can be done; or, if the appropriation is inadequate, the work can be only partial and ineffective. This is not wholly a misfortune, because it throws upon the friends of the movement the responsibility for continued effort to enlighten and convince the people. By the advice of leading oculists, the law provides that the annual tests of vision and hearing shall be made by the teachers, and the expense of this is borne by the State. The limitation contained in Section 7 of the law does not, therefore, affect this part of the work.

In accordance with the law, the State Board of Health prepared directions for these tests, and the necessary material was furnished to all the schools by the Board of Education. These tests have now been completed, including more than 400,000 children, and the statistics of the results are being gathered.*

Vision tests have been made widely during recent years, and there is no reason to think the results in Massachusetts will vary from those already recorded elsewhere. The same differences which mark the work of teachers in other lines are apparent in these tests. Doubtless some reports exaggerate the number of defectives, and others make the number too small, but the average will probably be nearly correct.

Some surprise has been expressed that the law should direct that teachers should make these tests. But all the oculists consulted agreed that this preliminary investigation was well within the grasp of the ordinary teacher, and that her familiarity with the children would tend to relieve the examination from the nervous excitement likely to attend examination by a stranger.

* Reports have been received from 253 towns and cities, in which 224,632 children have been examined. Of these, 44,123, or about 20 per cent, are reported as having defective vision, and 13,145, or about 6 per cent, as having defective hearing.

So far as statistics of examinations have been published, there has been no evidence that the work of teachers as a class is less reliable than that of specialists.

It will probably be found that the effect of this work upon the teachers themselves is not less important than the direct benefit to the children. Defective vision is not a misfortune confined to school children. Teachers are discovering that their own eyes have been singularly blind to the condition of their pupils. "I am astonished," "It is a revelation to me," "I am ashamed not to have known my own school better," "How stupid I have been," are expressions heard from teachers whose own eyes have been opened.

It is too early to reach final conclusions regarding this part of the work, but certain facts seem to be indicated:—

1. That for defects found by the use of the Snellen cards parents should not be notified if the vision is better than 20/30.
2. That there is danger that too many children will be made to wear glasses.
3. That there is danger from poor glasses sold by so-called opticians.
4. That some means will need to be provided for supplying glasses to poor children.
5. That the children will suffer from the ignorance or wilfulness of parents. Several illustrations of this have come to my knowledge.

A child has been supplied with glasses left by a recently deceased grandmother.

A father held an apple and an orange in his hands, and finding his child could distinguish them across the room, declared that nothing was the matter.

Another father tried his own glasses on his child, and because the child could see nothing refused to buy others.

How many of the 354 towns and cities have made appropriations and appointed school physicians is not yet known, but probably nine-tenths. The failure to do so in many towns is due to indifference rather than active opposition. No one cared enough about the matter to bring it up at the town meeting, and it went by default. There is a good deal of scepticism among the people as to the need of inspection, especially in the country towns. They think of it as another school fad.

I have heard of several towns which have shown their regard for law and their contempt for inspection by appropriating five or ten or fifteen dollars for the purpose.

The campaign of education will need to be continued for another year at least.

There is as yet no satisfactory basis for estimating the proper cost of this inspection.

In a circular issued by the Massachusetts Civic League, it is suggested that \$11 for each 1,000 inhabitants might be the appropriate cost in small towns. This is based on the expenditure of several towns and cities in previous years.

Few reports have yet been received as to the scope or results of the work throughout the State; but enough has been done to show that the most serious defects and disabilities exist in the towns and smaller cities, as well as in the more congested centres. Epidemics of contagious diseases appear in all parts of the State.

During the school year of 1905-1906, 316 rooms were closed, for a period varying from one or two days to four weeks, on account of diphtheria, scarlet fever and measles. These rooms were in 69 towns, and they contained 12,078 children.

Filth and vermin seem to be almost universal. The following cry from a mother in a rural community would probably have an echo in many others:—

Is there nothing that can be done to protect us mothers from the vermin acquired at school? Some of the children come with "stock" enough to infect the bodies and clothing of a whole school.

The lot of farmers' wives in these hill towns who have Rooseveltian families, but not Rooseveltian means to care for them, is not an easy one at best; but when it comes to spending two or three hours a day in cleansing our children from vermin "got at school," to say nothing of spending no inconsiderable amount of money on vermicides and fine-toothed combs, the burden is really a serious one.

Some interesting study has been made in Brookline of the relation of the physical condition to the class standing of pupils.

Of 420 children examined, 40 per cent had perfect vision, 30 per cent had mild defects, and 23 per cent had serious defects.

Of scholars ranked as "excellent," 50 per cent had normal eyes, and 14 per cent had serious defects.

Of scholars ranked as "unsatisfactory," 40 per cent had serious eye defects.

Of the "excellent" scholars, 17 per cent had diminished hearing.

Of the "good" scholars, 20 per cent had diminished hearing.

Of the "unsatisfactory" scholars, 52 per cent had diminished hearing.

Of the "poor" scholars, 42 per cent had diminished hearing.

Certain facts concerning some of the so-called ungraded classes in Boston are significant. These classes are composed of children who have failed to keep up with the work in the lower grades. They are grouped in small classes, and given chiefly individual work.

Of 43 girls of this class in one school, but 2 were found normal in vision and hearing.

Of 66 boys in another school, 64 per cent were found defective in vision; while of the rest of the school, 473 boys, 36 per cent were defective.

In another school, boys and girls, of 40 children in ungraded classes, 65 per cent were found defective in vision or hearing, or both; while of the remaining 707 children, 36 per cent were defective.

In order to make the inspection called for by the law of 1906 more uniform and effective throughout the State, His Excellency Governor Guild called into conference the State Board of Education and a number of physicians of Boston and vicinity.

The result of this conference was the appointment of a committee of three, consisting of Dr. Robert W. Lovett, Dr. Charles Harrington, secretary of the State Board of Health, and the secretary of the Board of Education, to prepare a manual of suggestions for the guidance of school physicians.

Conferences were held with the heads of departments in the medical schools and in the hospitals, all well-known specialists, to obtain from them suggestions as to the defects and disabilities likely to be found in school children, and the means of discovering them. It early appeared that the primary observations must be made by the teachers, and, consequently, that the manual must be simple in its description and free from technicalities. The men gave freely of their time and thought, and furnished to the committee material of great value for the purpose intended. It has been arranged and printed and published by the Board of Education in numbers sufficient to furnish a copy to every school teacher and school physician in the State, and have some left for missionary work among other classes. One city board of health has asked for 500 copies. As a tract for the promulgation of the new gospel of health, it seems likely to prove of considerable value.

This is a plain story of a beginning. It is in the nature of a report of progress. The outlook is encouraging, and in another year we hope to have sufficient data to make our work useful as a precedent.

ENTERIC FEVER AND SHELL-FISH.—Dr. Caldwell Smith reports the occurrence in Wandsworth of several cases of enteric fever caused by shell-fish sent from a remote part of Scotland, and, "what is more serious from a public health point of view, from a part where polluted shell-fish was known to exist, as attention had been called to the locality by an outbreak of enteric fever in Glasgow in 1903, when the shell-fish were gathered on the same spot." We agree with him that this outbreak once more shows the necessity of further legislation for the purpose of giving powers to local authorities to inspect shell-fish layings and to prohibit the sale of shell-fish from polluted layings or beds.

THE MEDICAL EXAMINATION OF STATE SCHOOL CHILDREN IN TASMANIA, 1906.

DURING the summer of 1906 Dr. Elkington, chief health officer to the Government of Tasmania, conducted a medical examination of over 1,200 children attending State schools in Hobart. A similar examination was made of fifty-one children attending the Campbell Town State School, and of the thirty-five inmates of the Boys' Training School, New Town. The report was issued from the Department of Public Health of Tasmania in October, 1906. Owing to the wide-spread interest the subject is receiving at the present time, both at the hands of educational authorities and the medical profession, Dr. Elkington's report is especially worthy of attention. The full scope of the work, and the amount of time that will be needed for it, can only be appreciated after reading a full report of this nature. It is interesting to note that Dr. Elkington recommends for the Government Department the appointment of a qualified woman as a whole-time medical officer. In addition to advising on medical and hygienic questions connected with school health, her duties would include dealing with school outbreaks of infectious diseases, the instruction of teachers in preventive measures and in hygiene, the collection of normal standard measurements of the children and their correlation with mental conditions, the visitation of country schools, and attention to the health of the school teachers. The systematic inspection of schools in Hobart and Launceston could be effected, according to the report by one local practitioner in each place acting, as part-time medical officer. The only objection to the employment of whole-time officers is one of expense.

Dr. Elkington is fully conversant with the great importance of the subject in all its bearings. He is careful to indicate the large part the teachers must play if the work is to be successful, and explains that the provision of medical inspection is not intended to absolve the teaching staff from the necessity for exercising due care and watchfulness over school health. He is anxious not to wound the susceptibilities of the general practitioner, many of whom erroneously think their practice is being interfered with, by saying that treatment forms no part of school medical inspection, save possibly in the case of parasitic infestation. The detailed account of the particular inspection he records shows that the work should not stop short

at noting defects in the child and in the school sanitation. The psychology of the growing mind falls within the province of the medical man. The child may be healthy, well clothed and fed, but it may remain an educational debt to the State if its mind is stocked in the wrong order, or if the material is offered to it in too large quantities or too frequently without sufficient intervals for rest. The medical inspector should, therefore, consider it a part of his duty to have knowledge of the curriculum of the school, and to offer reasonable criticism when obvious psychological errors are being made.

The general body of the report is taken up with the actual figures obtained in the various special examinations of the children. These are height, weight, chest measurement, acquired deformities, teeth, cleanliness, eye defects, connection of eye defects with bad lighting, influence of eye and ear defects on mental capacity, ear defects, adenoids, heart defects, communicable diseases, clothing and feeding, vaccinal condition, skin diseases, nervous diseases, defective children, buildings, and furniture. In connection with each of these, interesting results and observations are found. Of the students at the Teachers' Training College, 24 per cent were found to suffer with defective acuity of vision. From a comparison of heights and weights of children of different class schools it would appear that the better-off girl children tend to mature earlier than those in less favourable home circumstances. Filling or extraction of teeth was required in 1,119 out of 1,207 mouths examined (ages 6 to 15). Dr. Elkington states, "The possession of a perfect set of teeth is not necessarily correlated with high mental capacity or cleanly habits, but rather the reverse." This statement needs confirmation by a larger series of figures or other reasonable explanation. The figures relating to eye and ear defects and their connection with mental capacity are suggestive, but not quite convincing. As many as 90 per cent of the dull and defective children show eye and ear trouble, while 38 per cent of those whose mental condition is returned as excellent show similar defects. If the mental dulness were closely related to the eye and ear disease it is improbable that among the class "excellent" the figure would be as high as 38 per cent.

It is unnecessary to give in detail the results of the many investigations made on these children. Dr. Elkington does not pretend that the enquiry has been exhaustive. It is merely the beginning; and one of the clearest signs that he has made the right start is his statement that so far as the duties of the medical inspector are concerned the best practical methods will require to be brought out by actual experience.

MEASLES AND SCHOOL ATTENDANCE.

BY PROFESSOR DR. EBERSTALLER,
Stadtphysikus of Graz.

IT was established fifty years ago by Prof. Franz Mayer, in his revision of the chapter on measles in Virchow's "Handbook of Special Pathology and Therapeutics" that (1) Measles is infectious even in the prodromal stage; (2) The nasal mucus is the chief carrier of infection; and (3) Neither convalescent ('desquamated') patients themselves nor healthy intermediaries can to any extent transmit infection. These generalisations have been confirmed, and to some extent extended, by von Kerschensteiner (1883), Furbringer (1885), Jurgensen (1896), and others. Nevertheless, the measures still customary for dealing with measles in schools invaded by it have not quite kept pace with our scientific knowledge of the etiology of the disease. Thus, although Mayer observed that the incubation period is 12-14 days, that there is danger of infection during the catarrhal stage, and that healthy intermediaries cannot transmit infection, and though others have confirmed these observations, the definite conclusions which naturally follow from these facts have not been drawn and utilized. Too little attention is often paid to the method of spread of measles, which differs so materially from that of other exanthems, and the same prophylactic measures are used for all; in short, people have generalised instead of specialising. It would be impossible otherwise for authors, even of recent date, such as Th. Weyl ("Sanitation, the Prevention of Epidemic Diseases," 1904) to take up the position that children in whose families infectious diseases, such as diphtheria, rubeola, scarlet fever, measles, and so forth prevail, must be interdicted from school attendance, and that when in a class many cases of these infectious diseases, "e.g., of diphtheria, scarlet fever, and measles," are observed, the room must not be used again till after thorough disinfection; or, as Dieudonné ("Hygienic Precautions in Infectious Diseases," 1904) to plead for the exclusion from school of children with measles for four to six weeks, and eventually even longer, on the ground that convalescents can still infect three to four weeks after the disappearance of the rash, the expectoration containing a contagium "which persists longer in the dry condition."

The Prussian "General Directions of the Ministry, dated July 14th, 1884, with regard to the closure of schools during the prevalence of

infectious disease, with directions for the prevention of transmission of infectious disease through the schools," may serve as typical of the health regulations for schools, as similar regulations have been commonly adopted by provincial educational councils. All these quote measles amongst the infectious diseases on account of which inmates of the same house are to be kept away from school.

This leads to hardships, if not even to absurdities. Legal regulations, enforced under penalty, should have a proper and scientific foundation; should extend no further and no less than is warranted by medical experience; and each infectious disease must be considered from its own individual standpoint. In proportion as parents are thankful that precautionary measures against danger to their children are taken by the sanitary officials, will they be indignant against medical officers when these precautionary measures exceed necessity to an extent recognisable perhaps even by the laity, or when to the criticism of the private physician upon the excessive nature of the precautions enjoined only the text of the regulations can be opposed, and not their scientific foundation.

But this is the case when, *firstly*, the principle is adopted that healthy home-companions of measles patients must, without exception, be excluded from school; and, *secondly*, that a school or class must not be closed until cases increase in considerable degree amongst the scholars, or display an especially malignant type of disease.

(1) This point is clear without further discussion when we bear in mind the etiology of measles. Only the patient can infect, and he chiefly in the prodromal stage, when the cough has begun, the rash is already out upon the mucous membranes of the air passages, and with every cough, with every sneeze, hundreds of minute droplets are projected into the air, to which the infectious material can and probably does adhere.

The mistake is commonly made of not commencing isolation from the moment when the catarrh begins. This, apparently, is more easily said than done. When Eulenberg, in his "School Health Directions," advocates a timely medical inspection of schools when measles threatens, to secure early exclusion of the affected scholars from school attendance, it is objected that a daily inspection of all school children, or even only of those of the lower classes in urban schools, is scarcely feasible, on account of the numbers to be dealt with; and that even if it were feasible, it would be of little use. We search in vain for an infallible sign of the approaching onset of measles, visible before the exanthem. Not even the Koplik spots, as Widowitz has proved on the strength of very extensive material, are a certain

and reliable symptom. They are often easily overlooked, are occasionally absent, and occasionally also are observed in other diseases, and not only in measles and röteln.

How then shall we ascertain, before the commencement of the infectious stage, whether any, and if so which, children should be excluded from school attendance? Once the measles catarrh has appeared, exclusion comes too late, for the mischief is already done.

We must now sharply distinguish between two possibilities—that danger arises from a child who attended while actually suffering from measles, or merely from brothers and sisters or other house companions of infected scholars. In the first case all the susceptible children in the same class are liable to fall ill, and only one preventive measure is available, that is the closure of the class during the days on which secondary cases may be looked for.

If danger threatens only from home companions, we have the disease immediately under control; for in each infected family only those members who have not already had measles at an earlier opportunity will sicken. Dr. Ingl has found, on the strength of the data concerning 13,242 measles cases collected by him in the years 1887–1902, in his capacity of medical officer of Brünn, that 3,400 cases occurred in the same households, and that 3,239 of these, or about 97 per cent, occurred in the family itself within the first fourteen days by mutual infection of household companions, while in only the remaining 3 per cent could an outside source of infection not be excluded with certainty. Once a member of the family falls ill all isolation is, as a rule, in vain, and the removal of susceptible children from the house is equally useless, for they had already caught measles before the first illness was noticed.

The regulation simply reads: "Household companions of measles patients are excluded from school," but this is proper only when they themselves have not had measles already. This exception is exceedingly important, for nothing justifies the exclusion of a scholar who has already had measles, whether in the present or a former outbreak. The case is quite different from that of small-pox or scarlet fever, where demonstrably fomites can convey the infecting organism. It is no objection to this position that one and the same person can catch measles a second time. For all the workers in this field who have investigated the question by scientific analysis of their own careful observations have concluded that second cases of measles are exceedingly rare. Widowitz flatly declares that among several thousand cases he could observe only one single instance of a second attack of measles.

The above exception is the more necessary with a view to the avoidance of needless loss of attendance, inasmuch as the elder brothers and sisters of a scholar with measles have much more probably had it in an earlier epidemic than the younger, who possibly were then still unborn. For these older scholars an absolute exclusion from school involves a hardship for which no sufficient scientific foundation can be claimed. The value of the school day of a high-school scholar is very different from that of the day of a child in the lower elementary school, and no hygienic precaution should involve a disadvantage which is greater than the benefit aimed at.

The practical point arises, how trustworthy evidence of a former attack of measles can be obtained. The mere statement of the parents cannot be relied upon, as they often cannot distinguish separate exanthems, especially when it is a question of one for which different terms are customary in different neighbourhoods. It has repeatedly happened to me that parents have come to request me to confirm the statement that the child A.B. has already had measles in the year so-and-so; the age and dwelling of the child at that time are stated with precision, and even the physician who attended, but no entry is found in the measles register. On consulting the alphabetical index of notifications of infectious disease in the year in question, I find that the child at that time had not measles but perhaps chicken-pox or r  theln. Nor can a private practitioner's certificate be regarded as decisive if first applied for when required, and then possibly written by the practitioner without notes or positive recollection of the case to guide him, perhaps even not by the doctor who treated the patient. The certificate is in such cases nothing but a paraphrase of the parent's statement.

In this connection Eserich has made the useful suggestion that a certificate of recovery from measles should be drawn up for the family at the time by their physician, as is done in the case of successful vaccination. Notes in family records, as they are kept by many mothers, have often served me as valid proofs of insusceptibility to measles; and in schools in which the directions of the school doctor are carried out, and personal records are kept for every child, these will probably furnish the best estimate of the number of unprotected children. But in individual cases the objective proof is the entry in the register of notifiable infectious diseases which is kept at the Public Health Office. I possess registers for the town of Graz of all cases of infectious disease notified since January 1st, 1889, in which the patients are recorded by name, dwelling-place, condition of parents, school circumstances, day of sickening and recovery, and name of medical

attendant. An alphabetical name-index, newly started for each year, in which the Roman figure affixed to the name signifies the disease (thus for Small-pox I, Scarlet Fever II, Diphtheria III, and so forth), and the Arabic figure (thus e.g., II 35) the page of entry in the register, renders it possible to find the entry concerned without delay. On the strength of these registers I have drawn up hundreds of certificates permitting children to continue school attendance, although younger brothers and sisters were suffering from measles or whooping-cough; and I have never found the slightest harm arise in consequence. This procedure always earns the sincere gratitude of the parents; many also express astonishment that the official information should be so readily available; even doctors come to consult the register in order to confirm their recollection of old cases.

Children who are known to have already had measles can without hesitation be permitted to attend school, even when a new case of measles occurs in the family or household to which they belong. For the possibility of indirect infection is still more questionable than the occurrence of second attacks of measles, as was convincingly proved from very abundant material by von Kirchensteiner as early as 1882. But the only valid evidence of a previous attack of measles is either the testimony of the medical attendant or the official record founded upon his diagnosis. I am rejoiced to be able to report that on the recommendation of the Styrian Board of Health the principle which has just been developed has found explicit acceptance with regard to both measles and whooping-cough in the new Styrian regulations for the limitation of spread of infectious diseases through schools, dated April 11th, 1905. Since that date much unnecessary loss of school attendance has been avoided.

This Styrian ordinance has certainly made a second breach in the principle of exclusion of house companions of measles patients, which is less welcome to me. It permits all children over twelve years of age to continue in attendance, even when they cannot prove that they have already had measles; in fact, the completion of the twelfth year of life is, as it were, represented as of equal value with immunity acquired by a previous attack. It was intended thereby to make allowance for the value of a school day to the secondary school scholar, the underlying assumption being that there could be few persons over twelve years of age who had not had measles. In fact, during the preliminary discussion of the question by the "Association of Styrian physicians," expression was given to the opinion that he who reaches the twelfth year of life without having had measles is either almost or entirely insusceptible.

This concession is, in my opinion, a mistake, for it abandons science in favour of mere supposition as foundation of the regulation, and the fact has been overlooked that measles, as Bohn appropriately remarks, is only *de facto* and not *de jure* a children's disease, and further, that predispositions may change.

When it is fully considered that the final result of the struggle against school infection, if it attains any success at all, must be that more individuals will pass school age without having had measles, this concession implies that a scholar over twelve years of age will be liable to fall ill and infect others in his prodromal stage, but will still be able to come to school. I cannot agree with this, for the secondary school, as well as others, is under a moral obligation to prevent everything which endangers the health and life of its pupils.

In fact, I can already report upon an observation apropos of this, although the new regulation has not yet been a year in force. In February, 1906, two scholars of the fourth class of the second gymnasium in this town suddenly fell ill of measles at a time when the whole left bank of the Mur, the area served by this gymnasium, was free from measles; simultaneously it was noticed that the son of a landowner living outside Graz stayed away for twelve days without giving a reason. Investigation proved that the sister of the latter had had measles at home in January, but that he himself, being over twelve years old, continued to attend school without hesitation and without mentioning his sister's illness; after twelve days he developed a rash. Had this boy, in a case so clear and so well supervised, remained at home even from the ninth day onward after his sister fell ill, the infection of the gymnasium would not have occurred. By limiting the exclusion of such older yet unprotected house companions to the period from the ninth to the fourteenth day after the occurrence of the first case in the family, we can make this exclusion less severe. But that must be done only with cases under efficient medical supervision and in which there can be but one source of infection, otherwise Eserich's warning holds good, rather to renounce the slight advantage gained by allowing children to attend school until the seventh (or ninth) day of the incubation period, because it is often difficult exactly to define the period during which the family is, or may be, infectious; and an error would negative the whole value of the precautions taken on account of the extreme infectiousness of the exanthemic stage.

Here we reach the discussion of point 2 quoted above.

(2) Formerly the medical officer was first sent to a school when an epidemic had broken out; in fact it was the fiscal and not the hygienic point of view which counted. It was known, indeed, what decisive

importance attached to the schools as regards the spread of measles, but it was believed that school closure was unjustifiable before the time when, "according to medical opinion, the infected scholars increase in considerable degree or display a specially bad type of disease." People did not reflect that in a measles epidemic this almost necessarily implies infection of the whole susceptible material; and the closure of a school or class which now followed could not therefore claim the value of a prophylactic precaution, but at best merely that of an educational expedient, successful continuance of education being impossible when half of the scholars are simultaneously absent for fourteen days and longer.

To-day the importance of the first case is recognized, and the Graz physician, Dr. Widowitz, has rendered good service in making out a clear and convincing case for a proposal already made by Casper, but renewed by him, exemplified by his own observations, in the *Vienna Clinical Weekly*, 1898, No. 36.

Having observed that the scholars infected by the first cases of measles which find their way into a school communicate the disease in turn to other children in the school from about the ninth to the thirteenth day after their own infection occurred, he proposed that when in any place measles had not yet attained epidemic proportions, those school classes in which the first case occurred should be closed for five days from the ninth day after the sickening of the first child. The invasion of a school by measles as a rule takes place by the sickening first of all of a child who is either a newcomer in the district or has recently returned from a holiday. Perhaps ten or twelve days later a few children fall ill, frequently those sitting next to, or those who have had most intercourse with, the child who is ill. In the third "generation" cases occur for the first time *en masse*, and probably extend also to other classes. Only in overcrowded or overheated class rooms in the winter months do explosive outbreaks occur, as a rule, in the second generation, and not first in the third. (Here the "drop infection" studied minutely by Flügge-Neisser evidently plays a part.) As Eserich expresses himself, a certain mass and density of infection material is required in order that it may become effective; in homœopathic dilution the poison is as inefficient as our own drugs.

It is therefore, so to speak, unavoidable that the first case should involve secondary cases; for it is not known that the first child will develop measles, and he is allowed, therefore, even in the prodromal stage, to mix as usual with the others. But it is known to-day, from careful observations, that the second "generation," if the class in question is not protected by previous attack, will produce much more

harm than the first, and that can now be avoided if one prevents, or at least tries to prevent, this second "generation" from coming in contact with other children while in the prodromal stage.

The argument is theoretically so convincing that I determined to establish a precedent for the first time in October, 1898. The circumstances indeed were somewhat unfavourable, for we had at the time a summer epidemic in Graz, which was not stamped out during the holiday month. On October 17th a brother and sister fell ill of measles, of whom the boy attended class 1B of an elementary school which had till then remained free from measles. Enquiries proved that this boy had attended school while possibly infectious, and as during the previous year only nineteen measles cases in all had occurred in Graz amongst a population of about 125,000 inhabitants, it was to be supposed that there was plenty of susceptible material in the class. The class was therefore closed from October 25th to November 3rd. A secondary case occurred on October 31st amongst the children in this class, the next was notified during the Christmas holidays; throughout the whole remainder of the school year the class remained free from measles.

This was a success. But the inference was not free from possible objection, inasmuch as the secondary infection of the case of October 31st might possibly have occurred from some other source; if so, the boy who had occasioned the closure had fortunately been kept away in good time in any case. At any rate we secured that the failure of the second boy happened during a time when the class was closed, and was therefore as little capable of harm as the isolated third case which has been likewise mentioned, and which occurred in the Christmas holidays. This was not too dearly paid for by the loss of eight educational half days. The result was therefore such as to encourage further progress in the same direction, and I do not hesitate to declare to-day, in spite of the experience of many failures, that a modern well-organized epidemiological service possesses an important and indispensable weapon in class closure of short duration after the occurrence of a case of measles.

Since then I have, according to my notes, made use of the procedure in 103 cases altogether during eight years, partly with, partly without, success, according to the circumstances; in 91 cases only one class was closed, on ten occasions two contiguous classes of the same school were closed at the same time, once three and once four classes. Of these prophylactic school-closures 44 were attended by complete success, i.e., absolute and lasting freedom from measles after reopening. In 10 cases no secondary infection occurred during the closure, which

may therefore be termed superfluous, while in 28 cases the procedure had no apparent success, inasmuch as further cases resulted immediately afterwards, and the class had then either to be closed afresh or have its closure prolonged on account of the rapid increase of cases. In the remaining 21 cases the result remained in doubt, as these classes were again attacked a little later by the epidemic, which had meanwhile increased outside the school.

In the following paragraphs I may be permitted to quote a few characteristic examples.

(1) A scholar in the third class of the royal practising school of the Graz training college was infected early in November, 1901, by a boy from Pettau who had come to Graz on account of a funeral, and immediately after his return home developed a measles rash there. The parents, who lived in Graz, had no idea of the infection of their son, and allowed him to attend school until the last day of the prodromal stage. The previous history only became known after the appearance of the rash. Closure of the third class of the practising school from November 16th to 20th. Of 37 scholars in this class, 19 fell ill during the school-closure; all the other classes in the school remained free, not only at the time, but also during the whole school-year. A few of the 19 would certainly have come into repeated contact in the exanthem stage with other, especially younger, scholars, while running about during the forenoon interval, as well as on the way to and from school; the five-day closure prevented this, and as the parents (see below) were expressly warned, the intercourse outside school, whereon Netolitzky lays so much stress, was evidently prevented. But a measles case occurred in this third week of November in the united second and third classes of the practising school for female pupils, which is located in the second story of the building, completely separated from the boys' school, and has an entrance of its own from the other side of the building. Here infection evidently occurred in the street from the first infected boy, probably on the way to school. The second girls' class was now closed from December 2nd to 4th inclusive. Six secondary cases amongst the scholars in this class proved how fully justified was the prophylactic precaution. From now on, the girls' department also remained free from measles.

(2) In spring, 1903, measles was tolerably prevalent in Graz. On April 22nd a boy belonging to the first class of the practising school was sent home by the class teacher on account of a notable cough; on the next day he had a rash. As the institution had till then remained fairly free from measles, the first boys' class was closed from May 1st to 6th. Within the six days 16 scholars of this class

fell ill ; but apart from this the whole school remained free, although in May of the same year 327, and in June 133 measles cases were notified in Graz.

(3) In October, 1905, the disease was simultaneously introduced into the boys' and girls' elementary schools in the Langergasse by children from one house who were accustomed to play with each other in the courtyard. In this house a case of measles in a child of infant-school age had been concealed. Short closure of the classes concerned, as above. During the five days' closure 22 secondary cases occurred, but a further spread beyond this time was prevented by the closure.

These were local epidemics, which certainly did not cease on account of exhaustion of susceptible material, and without timely interference would assuredly have spread further.

(4) In the first girls' class of the municipal elementary school in the Keplerstrasse two cases of measles occurred shortly before the Christmas holidays of the year 1905. Re-opening after the holidays was deferred only two days (three educational half days) for this class, i.e., put off from the 2nd to the 4th of January. In the critical time seven secondary cases were notified from the scholars in this class, but from January 12th, 1906, onwards, no more cases of measles at all occurred on the right bank of the Mur (about 60,000 inhabitants).

But we have also had many less favourable experiences, as the following examples will prove.

(5) On October 3rd, 1902, a case of measles was notified from the kindergarten in the Kepler school. Enquiries seemed to determine that the child got the rash on September 30th. It was intended to close the kindergarten only for the days from October 9th to 12th. But a whole series of secondary cases occurred as early as the 7th and 8th, and a longer closure of the kindergarten and of several girls' classes was therefore necessary before the institution was again free from measles.

It may here be remarked that the procedure mostly fails altogether in kindergartens and places where small children are cared for, because attendance is not compulsory in these institutions: as a rule only summary attendance registers are kept, children often stay away on account of the weather, and even in normal times more than one-third of the children enrolled are absent, and so the date of last attendance before sickening cannot afterwards be established with certainty. The statements on this point of parents and relatives belonging to the poorer circles of the population, which are often very vague, cannot be checked through school notifications, and so great uncertainty in the fixing of dates results.

(6) On January 8th, 1904, a boy belonging to class 1B of the first town gymnasium, who had spent the Christmas holidays at home in the country, sickened with measles. The class was closed for the period when secondary cases might be expected, i.e., from January 16th to 20th. Strange to say, not a single secondary case occurred in this class, but during the critical days six pupils of class 1A and four of class 7 were attacked. The explanation must be sought in the fact that these three classes are situated on one corridor, apart from the rest of the school, with the doors of class 7 directly opposite those of 1B. The infection probably occurred in the common corridor, in which during the forenoon play interval little and big children joined in play. There was then naturally a third "generation" of measles, which appeared in eight relatives of children belonging to the seventh class. After that Graz was once more free from measles, and remained so for quite two months. The disease did not in any single case extend beyond the families infected through the gymnasium, a conspicuous proof, on the one hand, of the fact that the contagium can only be transferred personally, and, on the other hand, that in the best circles of the town isolation of the family and of single dwellings suffices to prevent spread of infection.

(7) When the Graz elementary schools were re-opened after the Christmas holidays, on January 2nd, 1901, three girls in the first class of the evangelical school fell ill on the following day, with symptoms indicative of the probable onset of measles. In consequence of immediate notification by the doctor called in, the class was declared closed for the next following days on January 3rd, on which day, by order of the Imperial Council, there was in any case no school. But it was evidently already too late, for on the re-opening on January 7th 47 girls out of 68 were absent. Among the absentees were several girls who were at school on January 2nd and had since developed the rash. Here the infection, as it was proved later, occurred through a girl who attended school with the rash out immediately before the Christmas holidays, but whose illness was concealed at the time. A violent epidemic, extending over the whole school, ensued. This is what happens when precautions are not taken after the first case, but only after the second generation, as Jürgensen, e.g., still recommends in his "Handbook." Although he mentions the importance of the incubation period he enunciates the following mistaken proposition: "The teacher is to pay particular attention to the children who sat beside the measles patients; if new cases appear about the tenth day after he must seek to secure the interruption of public education."

I shall, however, refrain from wearisome enumeration, as I only

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wished to quote types. I do not conceal from myself that the success of short prophylactic school-closures depends upon a whole series of conditions, of which none must be wanting.

Above all, the exact fulfilment of the duty of notification by physician, teacher, and head of household, is indispensable. This must be drummed into the consciousness of the population, and must be inculcated anew by printed communications at the beginning of each school-year. In addition to this, efficient supervision by the school doctor is also indispensably necessary. The epidemic service provides one of the most important exercises of the activity of the school doctor, and one productive of the best results. Furthermore, a painstakingly exact enquiry into the first case is necessary in every instance. The investigation must take place at the home, partly for the purpose of confirming the diagnosis, partly in order to establish as accurately as possible the time of occurrence of the first symptoms. The school registers serve to control the statements of parents and to enable us to determine whether any other scholars are absent under suspicious circumstances, and, if so, for what length of time. If any such suspicious absences have occurred, the investigations must be extended also to the homes of these children before a decision can be pronounced, which has been founded upon all the available data. Finally, great importance is to be attributed to an explanation individually to all families affected by the closure. As a period of nearly a week generally intervenes between the time when the illness which causes the closure becomes known and the actual commencement of exclusion, this can be utilised to obtain information, and everything can be quietly arranged and prepared beforehand. Only the management of the prospective precautionary measures now remains to be explained by the medical officer of health, but these are still kept secret. On the last school-day, however, every child receives, along with the announcement that school will now be interrupted, the following "explanation."

"From.....till.....the.....class of.....school will remain closed because measles has been introduced there, and further infection through secondary cases can be obviated only in this way.

"It will be necessary to watch over the children carefully, during this time, and in the case of even slight symptoms (catarrh, frequent sneezing, cough, sore or watering eyes) to keep them away from all intercourse with other children.

"Should measles actually break out it must be immediately notified at the school."

The parents are now warned, exaggerated rumours are checked,

and the object of preventing the further spread of disease is considerably promoted, for although many parents will not, still a proportion will follow the advice, and will be careful as to the isolation of children in the prodromal stage outside school.

This leads me to the discussion of the question whether it is expedient to limit the spread of measles, and not rather to allow fate to take its course; whether, in fact, as Netolitzky ("Handbook of School Hygiene") supposes, the interruption of instruction really in most cases only leads to a prolongation of the epidemic.

Even experienced physicians sometimes indulge in such reflections, and (as for example, Tobeltz has done, on the occasion of a discussion at the Medical Congress in Styria in 1901, as to the desirability of altering the directions for exclusion in infectious disease) propound the further question, whether experience and statistics teach that our regulations are capable of preserving a child during the long succession of school years from infection with the almost inevitable diseases of childhood; whether, therefore, any real advantage results when a school child is on one occasion preserved therefrom by means of the different exclusion regulations, but perhaps falls ill in consequence, even during the same epidemic or in a subsequent one, and, having risen to a higher class, misses more than he would have before.

Eulenberg has already, in his "Manual of School Hygiene," answered such questions with a decided negative, for to play the idle spectator at the outbreak of an epidemic would violate all the prophylactic principles which have always been acted upon during danger to the public health. I shall even disregard the observation frequently made, that the intensity of the cases generally increases with the height of the epidemic and the width of its spread. The weight of the reply lies, in my opinion, much more in the proposition formulated by Thomas ("Ziemssen's Handbook of Infectious Diseases"): "The spread of infection amongst children occurs most frequently through the school, but family life is responsible for multiple family infections, which include even sucklings."

Now we know, however—and Thomas has put this in an equally pregnant sentence—that measles is really dangerous only to very young children, and that its danger quickly diminishes with increase of years, and becomes negligible even in later childhood.

On this point I need not use the figures of other authors, for I can found my argument upon my own records in Graz for the last sixteen years. These relate to a total of about 22,000 measles cases, with 853 deaths. The mortality of children in the first year of life in the eight recorded epidemic years varies from 16 to 35 per cent, of children

aged 1-5 from 2.6 to 5.5 per cent, while the mortality of children aged 5-10 years is only 1-3 per cent. If we succeed therefore by prophylactic measures in postponing even for a few years only the incidence of measles upon the rising generation, that itself will be advantageous. For the older scholars can scarcely have as many brothers and sisters of tender years at home as those of the lower elementary school classes. Even a postponement of the invasion implies an advantage for the younger members of the family in the shape of a probably benignant course of disease. Besides, when this result can be attained with the least possible interruption of education—and that is the purpose of the short school-closures—hygienists may hope to meet with the approval of educationists. In fact, as Eserich puts it, there is not such an abundance of time available for education that we can needlessly dispense with any portion of the school course, and when in any case mankind, according to Pettenkofer, loses twenty working days in each year through disease, it certainly would not do to lose a further twenty to forty days through needless exclusion.

I believe that I have shown under division 1 that such is the case when a scholar, whether he has already had measles or not, is excluded from school attendance for fourteen days on account of a case in the same house; but that careless treatment of measles in schools involves similar losses for the scholars as a whole I deduce from a comparison of our school-closures of earlier years (before 1898) with those of the more recent past.

During the epidemic of the late autumn of 1895, with 2,878 notifications in Graz, no fewer than eighty-three classes were closed for two and even three weeks, corresponding to about 2,400 educational half days, on account of rapid spread of measles, a third to a half of the children being absent in many classes. During the epidemic of the year 1905, however, with 2,825 notifications, I find only forty-five classes recorded as closed for a total of 360 educational half days. School-closures are not only of shorter duration now, but we have become more sparing of them, in so far also as it only happened quite exceptionally that during the course of the last quoted epidemic a class had to be closed on account of total infection, and therefore for a prolonged period. Of course I recorded on the whole more negative results (failures) than positive. But if a positive result should follow, even in only a quarter or a fifth of the attempts made, that itself would amply reward the effort expended.

Of course a more conclusive result, which must silence all doubters, will come to hand first when experimental proof harmonizes with theory, and in later epidemics older children actually fall ill in greater

percentage than younger; for if more children escape in the lower elementary school classes more susceptible children must be present in the higher classes. I applied this touchstone to my records of notifications with a certain degree of timidity, but the answer was not in the negative. I had to choose as objects for comparison epidemics which were more or less equally distant from the inauguration of short class-closures in the winter of 1898-99, that is, the epidemic of the winter of 1895-96, and that of the winter of 1902-03, the former with 3,141 notifications and 134 deaths, the latter with 2,373 notifications and 114 deaths. The former was of nine, the latter of seven months' duration; in the former the proportion of patients aged 5-15 amounted to 45.7 of the total, in the latter to 44.1. That is to say, there were fewer patients of school age to record after than before 1898, and that not only absolutely, but also relatively in proportion to the total number of patients. In other words, the incidence on school age has received a check, perceptible though not considerable. The result was small, but it is valid, because the statistics relate to a tolerably large material.

In the following year (1904) the share of age 5-15 was somewhat higher again, namely 45.8 of the total morbidity. If one investigates the reason of the increase and divides the decennium of age into two quinquennia, one sees immediately that it is the second of these which is responsible; for the share of age 5-10 fell in the contrasted years 1896 and 1904 from 40.8 to 34.1 per cent, but that of age 10-15 rose from 4.9 to 11.7 per cent; that is to say, that in 1904 relatively more older children fell ill than younger, the patients on an average having become older. Judging by the percentage, that would be a favourable result, but these statistics unfortunately are not convincing, for 1904 was not a measles year, and the higher percentage is based only upon the exceedingly modest number of eighty-five cases in all. I propose to return to the subject when the figures for 1905 have been classified, for 1905 was again a measles year, and therefore affords figures adequate for statistical purposes.

But even to-day my observations justify me in the warmest recommendation of short school-closures in measles; the schools are the places where most good can be done. Every advance in this direction deserves to be noted and appraised.

THE Warrington Town Council have appointed Dr. J. Coote Hibbert, of Newcastle-upon-Tyne, medical officer of health at a salary of £450.

THE Local Government Board have sanctioned the appointment of Dr. T. O. Halliwell as medical officer of health for the borough of Dewsbury.

THE EFFECT OF THE CLOSURE OF SCHOOLS ON MEASLES IN SOUTH SHIELDS DURING THE LAST QUARTER OF 1906.

BY S. G. MOSTYN, M.A., M.B., D.P.H.,
Medical Officer of Health of South Shields.

IN his report to the Local Government Board in 1895 on measles in England and Wales, Dr. Theodore Thomson remarks with regard to the statistics at his disposal, that "they have reference less to school closure as a means of reducing incidence of measles upon children attending the particular school or schools closed than to school closure as a measure whereby spread of the disease throughout the invaded district may be prevented or materially lessened. Accordingly these statistics take account, not of the relative incidence before and after school closure of measles upon children attending the particular schools closed, but only of the known amount of this disease in the whole of the invaded neighbourhood before and after the adoption of this measure."

During the last quarter of 1906 an outbreak of measles of exceptional virulence occurred in South Shields, similar to serious outbreaks which occurred in 1891, 1896, and 1902, at approximately five-yearly intervals, the death-rate in each year exceeding 90 per 100,000. In the outbreak of 1906 I had an opportunity of obtaining statistics of the kind which Dr. Thomson did not obtain, and the results are of interest.

When a school had been closed on account of measles I obtained from the teachers a few days after its re-opening the names and addresses of all children then said to be absent on account of measles who were not known to have had the disease when the school was first closed. As the schools were closed for three weeks at least, and the information was obtained from the mothers or relatives during the following week, it is evident that the statement as to the date of taking ill of the children would be less trustworthy the earlier the date of the taking ill, so that the later the date of the taking ill the more accurate will be the corresponding entry in my Table (II) below.

A history of the beginning of the outbreak is of interest. During the first six months of 1906 only four deaths occurred in South Shields from measles; in the third quarter there were 18, and in the last quarter 87. In the earlier part of the year German measles was very wide-spread in the town, but it had disappeared before measles became prevalent. The serious outbreak began in one of the schools in the

northern end of the town. A boy who had been excluded from school earlier in the year for a rash, probably that of German measles, showed a second rash in June. The teacher, thinking he had had measles earlier in the year, did not send him home. From this patient 30 cases occurred in the school, 19 or 20 being in one class. This class was closed on July 6th and was not re-opened until the end of the summer holidays on August 20th. On re-opening, 6 cases were notified to me in the following week. From my later experience with other schools I think it probable that these cases were infected before school closure. One case was notified in September, and only 2 in October, but in November an outbreak occurred in consequence of which three classes were closed on December 6th, this being the last school closed during the epidemic. It is interesting to see that while there was a large number of susceptible children still at school and measles was widespread in the town, for the three months following the closure after a first serious outbreak the school was almost free from the disease. The susceptibility of the children is shown by the occurrence of the second outbreak in November.

The next school to be affected was East Jarrow. This is a mixed school, and Standard 1 and the Infants' class were closed on September 13th. During the closure four cases were reported among the scholars still attending; but as so few of the elder scholars are susceptible and the younger ones among whom the disease was prevalent were now absent, measles died out, and no cases have been reported since the classes were re-opened.

In consequence of the further spread of the disease, classes in the thirteen schools enumerated in Table I, were closed.

On the re-opening of Gilbert Street School the head-mistress notified to me a large number of newly reported cases of measles, and in order to see how many of these had been infected before the school was closed I had enquiries made at the houses of all these pupils. The result was surprising; only 2 out of 34 had taken ill during the last week of the school closure. As I mentioned above, the accuracy of the more recent dates is greater than that of the earlier ones, so that we may be fairly confident as to this result.

The character of the result obtained led me to make similar enquiries in connection with six other schools. Table (I) shows the times during which the various schools were closed, and it is indeed very remarkable that the first school closed, on July 6th, was not closed again for five months, during the period most of the other schools in the town were seriously affected.

The Table (II) gives the results obtained. The Table shows the

TABLE (I).
LIST OF SOUTH SHIELDS SCHOOLS CLOSED DURING 1906
ON ACCOUNT OF MEASLES.

School.	Classes Closed.	Date of Closure.
* Baring Street ...	Class 7 ... Classes 6, 7, 8 ... (Standard 1 & Infants' Class)	July 6th. December 6th.
East Jarrow ...		September 13th.
* Gilbert Street ...	Class 5 ...	October 4th.
	Remainder ...	" 10th.
* St. Bede's ...	Classes 5, 6, 7 ...	" 4th.
	Remainder ...	" 17th.
* Mortimer Road ...	All ...	" 10th.
* St. Stephen's ...	Class 3 ...	" 12th.
	Remainder ...	" 17th.
* Westoe Road ...	All ...	" 12th.
* Laygate Lane ...	Classes 8a and 8b ...	" 23rd.
	Remainder ...	November 3rd.
* Stanhope Road ...	Classes 8, 9, 10, 11 ...	" 13th.
* St. Hilda's ...	Class 4 ...	" 13th.
	Remainder ...	" 20th.
* Holy Trinity ...	All ...	" 13th.
* Barnes ...	Classes 2, 3, 4, & 6 ...	" 22nd.
	Remainder ...	" 24th.
* Cone Street ...	Classes 2, 5, & 6 ...	" 22nd.
	Remainder ...	" 29th.

number of children at each school said to have taken ill on each day from ten days before school closure to five days after re-opening. The Table may be summarized by saying that in 36 cases the illness was said to have begun before the school closed; in 68 cases in the first week of school closure; in 29 cases in the second week of closure; in 6 cases in the third week, and in 6 cases subsequent to the re-opening. Considering the incubation period of the disease, we cannot fail to conclude that an overwhelming majority of these children contracted measles at school. The very small proportion of these cases occurring in the third week of school closure or after school re-opening shows, as might be expected, that the meeting of children a few at a time in their homes is almost negligible as a source of disease, compared with the intimate association with far larger numbers in school. Since obtaining the above information I have enquired into all new cases reported as measles from these schools, with the result that I had only learnt by December 18th of 8 cases that have broken out subsequently.

I may mention that the seven schools of the thirteen involved, where the enquiries were made were selected from the thirteen quite

* Infants' Departments.

TABLE (II).

Onset of Disease.	Days.	Schools.							Total.	Grand Total.
		Gilbert Street.	Mortimer Road.	Westoe Road.	Laygate Lane.	Holy Trinity.	Cone Street.	Baring Street.		
Before School Closure.	10	—	—	—	—	—	—	1	1	36
	9	—	—	2	—	—	—	—	2	
	8	1	—	1	—	—	—	—	2	
	7	—	—	—	—	1	—	—	1	
	6	2	—	—	2	1	1	1	7	
	5	2	—	—	1	2	1	—	6	
	4	—	1	—	1	1	—	—	3	
	3	1	—	—	1	1	—	—	3	
	2	—	1	1	2	—	—	—	4	
	1	1	—	3	1	1	1	—	7	
During School Closure.	1	1	—	4	5	—	2	2	14	68
	2	2	1	3	2	1	—	—	9	
	3	3	2	—	5	2	—	—	12	
	4	2	—	1	1	1	2	1	8	
	5	2	—	8	1	—	—	—	11	
	6	4	1	1	—	2	1	1	10	
	7	3	1	—	—	—	—	—	4	
	8	2	1	3	—	—	—	—	6	29
	9	1	1	1	—	—	—	—	3	
	10	1	1	1	1	1	—	—	5	
	11	1	—	2	—	1	1	—	5	
	12	1	—	1	—	2	1	—	5	
	13	1	—	1	—	1	—	—	3	
	14	1	—	—	1	—	—	—	2	
	15	—	—	—	—	—	—	—	—	6
	16	—	—	—	—	—	—	—	—	
	17	—	—	—	—	—	1	—	1	
	18	—	—	—	—	—	—	1	1	
	19	1	—	—	—	—	—	—	1	
	20	—	—	1	—	—	—	—	1	
	21	1	—	—	—	—	—	1	2	
After School Closure.	1	—	—	—	—	1	—	—	1	6
	2	—	—	1	—	—	—	—	1	
	3	—	—	1	—	—	—	—	1	
	4	—	—	2	—	—	—	—	2	
	5	—	—	—	—	—	1	—	1	
Totals ...		34	10	38	24	19	12	8	145	145

at random, and the enquiries were not made at the remaining six for reasons which have no bearing on the final result.

The conclusion to which this leads me is that last year in South Shields school closure did exert a real influence in checking the further spread of measles, and in consequence of a report embodying the substance of the information here given the Health Committee recommended that in the future schools should be closed on account of measles earlier than had been the practice previously.

Though I believe that by early school closing something may be achieved, I am fully aware that to get rid of the appalling loss of life now due to measles, work must be directed to raising the parents to a higher state of cleanliness and intelligence and a better appreciation of their duties to their children.

DISCUSSION.

Dr. Armstrong considered that it was futile to close a school for measles except at an early period of the outbreak. After a lengthened period of experience, he considered that the advantages of notification of measles did not warrant its cost. He believed that measles was propagated chiefly by the contact of infected with susceptible children, and that clothing played a very minor part in its spread.

Dr. Hibbert believed if there were less than 30 per cent susceptible children in a school that measles was not at all likely to spread in that school.

Dr. Taylor agreed with Dr. Armstrong's remarks, and considered the paper a valuable one, and suggested that it would be of advantage if Dr. Mostyn followed the enquiries he had instituted in this outbreak in any future outburst. He endeavoured to have non-susceptible children excluded from school during measles, whilst the elder and probably immune members of a family in which there was a case of measles were permitted to attend school. This practice was found not to be popular with parents or medical practitioners. The former desired to have the elder girls at home to assist in the house work. To the latter, the practice appeared nothing short of heresy, and one gentleman characterized the medical officer of health as a madman to suggest such a thing. The practice was persevered in, and probably in the future it might become more popular.

MISSED CASES.—It is not the notified, but the unnotified case of scarlet fever that causes all the mischief. When one considers the number of cases that come to light simply as it were by chance, one can imagine what a large number escape detection. I firmly believe that not more than half of the actual cases of scarlet fever are ever notified, and with a mild type of the disease, presenting, it would seem, year by year an increasing variety of anomalous symptoms, we can hardly expect anything like complete notification, and consequently nothing like complete control.—(Dr. Gibson, Ann. Rep., 1906.)

THE CONTROL OF MEASLES.

BY D. J. THOMAS, M.R.C.S., D.P.H.,
Medical Officer of Health of Acton.

FEW questions confront medical officers of health more regularly or more persistently than the control of measles; and I might add that on no other subject is there such a lack of uniformity displayed in the measures adopted to deal with it. From time to time the experience of different sanitary authorities has been recorded, but as these records show, the methods in vogue in one district have been rejected in another, even though the conditions in both were identical.

In 1904 Dr. Howard Jones read a paper before the Incorporated Society of Medical Officers of Health, and pleaded for united action in the matter, and the subsequent discussion fully justified the plea; but in our present state of knowledge it is difficult to see how united action is to be attained. Until some of the factors in the etiology of the disease are settled, every man will be a law unto himself.

Those who consider the infection of measles to be simply a direct one from person to person, and who opine that the germ when isolated will be found to be a short-lived one, possessing a low power of resistance, are sceptical of the dissemination of measles by means of books sent out from public libraries, and do not prohibit persons residing in invaded households from attendance at work.

For the same reasons, in some districts disinfection is not carried out. On the other hand, in 1903 the London County Council issued an Order applying Section 60 of the Public Health (London) Act, 1891, relating to the spread of infectious diseases to measles.

As far as I can gather, the only practical effect of the Order has been that a certain percentage of the premises invaded by measles have been disinfected by the London Borough Councils.

Measles is infectious before the rash appears, and during the period that elapses between the initial symptoms and the appearance of the rash, the child is rarely kept in one room. When the disease is recognized, little attempt is made at isolation in one room, and the child is allowed to roam about the house, possibly before he is free from infection. Obviously it is useless to disinfect the bed-room alone, when other rooms have been exposed to infection. But, apart from these difficulties, is there sufficient evidence to justify the expense of disinfection?

The following figures, quoted from Dr. Newsholme's Annual Report

for 1904, will suffice for our purpose. In the spring of 1904 there was an epidemic of measles in Brighton, and in August and September of the same year every house was visited in which during the previous seven months cases of measles had occurred. No disinfection had been carried out in any of these houses. Six hundred and twenty-five houses had been invaded; in 534 of these, the occupants were the same as on the first visit, and no further children had been attacked by measles. The immunity of the 169 children in these houses, who had not previously acquired measles, had continued. Of the remaining houses, twenty-three on investigation were found to be empty, and in sixty-six of these new families were living or new babies had been born. Eighty-six new children had come into these presumably infected houses, and twenty-seven of them were unprotected and possibly exposed to infection. The duration of their exposure in the presumably infected houses varied from seventeen days to four and a half months. None of them acquired measles, and Dr. Newsholme concludes that if there had been a few instances of measles among the number, he should have refrained from pressing a case based on scanty data, even though the majority of the children had escaped infection. But in view of the fact that the entire experience points in one direction, it is justifiable to infer provisionally that the infection of measles is short-lived, and that domestic cleansing suffices for disinfection. This conclusion is obviously subject to revision if a series of unfallacious positive facts are forthcoming at any future time in contradiction to the negative facts here adduced.

In spite of the age incidence of fatal cases, most of us agree that school attendance is one of the most potent factors in the spread of measles; but we have arrived at no uniform system of school exclusion or school closure. In some districts all the children from an infected household are excluded from attendance at school. Following an exhaustive enquiry by Dr. C. J. Thomas for the County Council, in London, children coming from houses where measles exists, but who are not themselves suffering from the disease, are dealt with as follows:

A child attending other than an infants' school, who has had measles, need not be excluded from attendance at school.

A child attending other than an infants' school, who has not had measles, must be excluded from attendance at school until the Monday following the expiration of fourteen days from the occurrence of the first case.

A child attending an infants' school, whether or not it has had measles, must be excluded from attendance at school until the Monday

following the expiration of fourteen days from the commencement of the last case.

These rules have been followed in other places; but it does seem inconsistent to adopt them and then insist on disinfection. If the germ of measles can attach itself to articles of apparel, or if a healthy person can be a carrier of infection, then all children should be excluded from school. Per contra, disinfection seems unnecessary.

In those districts where the older children are not generally excluded, measles does not spread in the boys' and girls' departments, and it is a moot question if it be possible for a healthy child to introduce measles into a household.

At the present time school closure is more closely related to economic questions than to public health. It is resorted to primarily for the sake of average attendance, and not with any decided hope of checking the spread of an epidemic. Under the conditions obtaining in urban districts, school closure must be resorted to before the fall of the "first crop" if it is to be of any avail. The practice of waiting until the attendance falls below a certain mark does no good, and the responsibility of protecting the average attendance could well be placed on shoulders other than those of the sanitary department if a definite rule be adopted. How widely the practice varies in different districts is made evident by the replies received by Dr. May, the medical officer of health for Aston Manor. He submitted to ninety-nine authorities the question of what percentage of children absent from a school or department led to a recommendation of school closure, and the replies were as follows:

No fixed percentage	..	..	..	47
Under 10 per cent	..	..	..	8
10-20 per cent	..	..	..	18
20-30 " "	..	..	..	4
30-40 " "	..	..	..	7
40-50 " "	..	..	..	2
Over 50 per cent	..	..	..	2
No replies	..	..	..	11

Under present conditions our hope of success depends on earlier information and improved means of dealing with the early cases. Opinions differ as to the desirability of adding measles to the Schedule of notifiable diseases. In the discussion mentioned above, Dr. Robinson claimed that compulsory notification had been exceedingly valuable in Dover, and well worth the money spent on it. The results of their experience at Aberdeen and Burton-on-Trent have been published, and are very discouraging.

As early as 1881 the Corporation of Aberdeen obtained powers for the compulsory notification of measles. Under the Aberdeen Local Act of 1881, notification by the medical attendant only was required. After the passing of the Infectious Diseases Notification Act, 1889, the Town Council adopted it in 1891, in order to obtain the advantage of dual notification, that is, by the medical attendant and by the householder.

After a report from the medical officer of health, the compulsory notification of measles was stopped in February, 1903, as experience appeared to show that the benefits scarcely justified the large cost. No doubt a question may arise as to the completeness of the record of cases of measles during these years. It must be admitted that the notification of any disease is rarely absolutely complete. Some cases are unrecognized, and others may be wilfully concealed. In Aberdeen though, the compulsory powers were rigidly applied throughout the whole period, and, when required, proceedings were instituted against defaulters. The following table gives the average annual mortality in Aberdeen from measles per 100,000 inhabitants:—

1856-1872	1873-1887	1888-1900
61	44	51

The conclusion which Dr. Hay, the medical officer of health for Aberdeen, comes to is, "it is obvious from these considerations as to the prevalence of measles, and as to the mortality from the disease, that it is impossible to assert with confidence that notification has enabled us to exercise any distinct and effective control; and it can scarcely be urged that we have not made a sufficiently lengthy trial."

In Burton-on-Trent measles was scheduled as a notifiable disease from 1894 to June 30, 1900. During the period notification was in force there was no diminution in the number of deaths, nor were the inter-epidemic periods lengthened. If the six years before notification was adopted be compared with the same period during which notification was in force, the number of births during 1888-1893 slightly exceeded that of 1894-1899, and, therefore, the number of susceptible children would, if anything, be larger in the former period, but the mortality of the disease was higher during the latter period.

In view of the experience gained by Aberdeen and Burton-on-Trent, success appears more probable along other paths, more especially in a development of school notification.

To ensure success, the information from the schools must be systematical, and notification of absence on account of illness carefully made during inter-epidemic periods as well as when epidemics of measles prevail. The history of a recent outbreak may serve to emphasize this aspect of the question.

On December 18th, 1906, a school card was received stating that a child was absent on account of measles. On visiting the case, it was ascertained that the illness commenced on December 6th, the rash appeared on December 11th, and in the intervening period the child had attended school. Before we had received the information, the first crop was due to fall, and subsequent events went to prove this to have occurred. The school was closed for the Christmas holidays on December 21st, but during that week some of the "first crop" were attending school suffering from the early symptoms of the disease. On January 10th, when the school was re-opened after the holidays, twenty-four children were absent on account of measles. The history of these cases showed that the rash appeared between December 20th and December 26th, and the illness commenced between December 16th and 20th.

The history of the outbreak is significant. The seed was sown between December 6th and 10th, the "first crop" fell between December 16th and 22nd. Our information was received on December 18th, after the "second crop" had been infected, and when the outbreak had got beyond the stage when school closure could be of any avail.

If inter-epidemic notifications had been more thorough, the school could have been closed for the Christmas holidays a week earlier, the first crop would not have fallen in the school, and the chances of infection would have been greatly lessened.

Few have been sufficiently daring to suggest the general isolation of measles in hospital, but arrangements might be made at the commencement of an outbreak for the removal of cases where home isolation is obviously inadequate. In Brighton, the medical officer of health recommended that he be authorized, as far as the accommodation would permit, to admit cases of measles which cannot be properly treated at home. During the height of an epidemic, the present supply of hospital accommodation could not possibly cope with the demand.

A SEPARATE WATER SUPPLY ON EACH STOREY.—The Police and Sanitary Committee of the House of Commons have passed a clause in the London County Council (General Powers) Bill, making it compulsory for every tenement house to have sufficient provision for the supply of water for domestic purposes on each storey or storeys in the separate occupation of a family, provided that the storeys are not at a height exceeding that to which the Metropolitan Water Board may be required to furnish a supply of water for domestic purposes, and to which a supply is not being supplied by the Board at the time of the passing of the Act. It is also provided that the Section shall not apply to any tenement house in respect of which it can be shown that any such provision for the supply of water is not reasonably necessary.

A NOTE ON AUXILIARY CLASSES FOR BACKWARD CHILDREN.

By H. MEREDITH RICHARDS, M.D.,
Medical Officer of Health, Croydon; and
STEWART A. ROBERTSON, M.A.,
Inspector, Croydon Education Committee.

THE advisability of establishing one or more day schools for the education of mentally defective children has long engaged the attention of the Croydon Education Committee, but the adoption of a complete scheme has been postponed pending the publication of the belated Report of the Royal Commission on the care of the Feeble-minded.

In coming to this conclusion the Council was influenced by the consideration that it was not impossible that the report of the commission might result in legislation that would materially modify the present status of special schools, as well as by the hope of assistance in resolving some of the difficult problems connected with the education and care of the feeble-minded.

Now, the fundamental difficulty of justifying "special schools" as at present conducted in London and various large towns is the small proportion of the scholars that can reasonably be expected to become self-dependent members of the community. Thus, in London we are told "that only about one-third of these children can be expected to become responsible, self-supporting members of the community, and that in the case of many of the remaining two-thirds, both for their own sakes and for the sake of society at large, it is more than desirable that custodial care should be provided."*

In Birmingham and Manchester, on the other hand, the London results are regarded as unduly favourable, the difference being doubtless due to variation in the standard adopted by those responsible for admission to the schools.

Speaking generally, therefore, it would seem that for the bulk of their scholars special schools are doing either too much or too little.

They are doing too much in so far as they are expending time and money† in endeavouring to accomplish the impossible, and too little

* Annual Report Special Schools Sub-Committee: Year ended March 20th, 1903.

† In London the gross cost of each defective child amounts to £9 5s. per child, as compared with £4 14s. 10d. in the ordinary elementary schools.

inasmuch as they are neglecting to provide that life-long supervision which most defective children need, not only for their own sake, but for the sake of the next generation.

On the other hand, the fact that the London special schools can get highly satisfactory results in the case of one-third of their scholars, and are able, after longer or shorter intervals, to transfer a considerable number of the children to ordinary elementary schools, demonstrates the value of these institutions, and the duty of educational authorities to make provision for such children, even if they ultimately decide to relegate the mass of mentally defective children to residential institutions or colonies, where they will, in most instances, remain under permanent supervision.

Pending a decision of these larger issues, our Authority has recently decided to adopt a system of "auxiliary classes," which will, we believe, be of permanent service whatever policy is subsequently adopted for the training of the mentally defective. It may therefore be of interest to describe briefly the class of children for whom these auxiliary classes are intended.

Children whose stage of mental development is other than normal may be classified, for educational purposes, as :—

(a). Imbeciles, whose welfare it is universally acknowledged is best secured in special residential institutions.

(b). Mentally deficient, to a degree beyond influence by ordinary school methods.

(c). Backward children or mental laggards, in whom intellectual action is tardy, and who, under the conditions of large classes, cannot be treated with that individual attention and systematic stimulation which may in time bring them on a level with the normal.

It is much to be desired that the term mentally defective or deficient should not be applied to the last class. Such usage confuses the problem of treatment, and raises implications that have reference only to classes (a) and (b). The most effective influence with regard to mental laggards is encouragement and sympathy, and scarcely anything could be more unwise than for teachers to describe such children, especially in their own hearing, or to the ears of their companions, as mentally defective.

It is for these backward children that it is now proposed to make special provision.

Age of Admission to Auxiliary Class.

With regard to children under seven years of age, it seems wisest to defer decision. In the present state of our knowledge of the growth

of the mental power, it is beyond the wit of even a skilled alienist to decide whether constant mental languor in a child, not imbecile, under seven years, is related to mere general retardation, which may disappear in the changes synchronous with second dentition, or to mental defect. For "backward" children under seven years of age, the home with a garden which affords a wide variety of sense-impressions, familiarity with nursery rhymes, and abundant play is the best place. For "backward" children under seven years whose home conditions do not present such an environment, the infant school where reading is wisely neglected and kindergarten occupations and games are carried on under conditions favourable to free movement is better than a special school. The experiment might be made of requiring the attendance of any such children for the morning session only, as is already done when complaint of strain or undue fatigue is made to the medical officer.

Method of Selecting Children for the Auxiliary Class.

It is suggested that for the present no child should be admitted to the class without having been under observation for at least six months in a senior school. Children should be admitted to the class only on the suggestion of a head teacher when approved by the medical officer and inspector, all cases to be notified to the Elementary Education Sub-committee.

In most instances children would eventually be relegated to the special class at the age of about seven and a half years, though for the time being it will be necessary to experiment with a number of somewhat older children who, for want of individual attention, have made little progress in the ordinary school. When the scheme for the medical inspection of school children is fully matured, the physical condition of the children will be ascertained on admission to the infant school, and again on promotion to the senior schools, and the examination necessary for admission to the special classes will be mainly concerned with the child's intellectual development. We do not propose to adopt any rigid system of classification for the children whom we would relegate to the special classes, but they would mainly fall into the three following classes :—

1. Children whose development has been retarded either by illness, by debility, or by unfavourable environment.
2. Children whose mental development is more tardy than their physical progress, though there is no obvious external cause for their retardation.
3. Children whose mental capacity is in the aggregate little removed

from normal, but who by reason of special disabilities are incapable of responding to the educational methods of the ordinary school. In this group would be included children suffering from modified word-blindness, and children who are partially deaf or are suffering from considerable visual defects short of blindness.

In all cases we should aim at selecting children who might reasonably be expected to benefit by attendance at an ordinary school, provided they received the initial impetus which individual attention in small classes would afford. In many instances we shall doubtless be disappointed and be compelled to draft some of the pupils to a mentally defective school, though the obviously hopeless cases would be eliminated by the simple process of refusing, with rare exceptions, all children who have been found unable to profit even to a small degree by six months' attendance at a senior school.

Features of the Auxiliary Classes.

What mental laggards need for their education is individual attention, concentration of interest, longer and more varied stimulations of the sluggish brain through the avenues of sense, and, above all, the continual presence of such aid and sympathy as the normal child requires and receives only occasionally or at times of special intellectual effort. If the classes in our ordinary schools contained twenty pupils or fewer, one such "tardy" child in a class might receive all that can be done by education to help towards the psychic quickening that not infrequently arises in such cases when boyhood or girlhood is left behind. In the conditions now prevailing, such is impossible, and the mental laggards are either cooped in the lower classes, to the disadvantage of their companions, and the still further retarding of their own sluggish powers, or they move from class to class, a cause of fretfulness to the teacher, who cannot give to them the time they need, and whose intermittent consideration of them too often accentuates that fatigue in mental effort and that consciousness of inequality with their fellows, the destruction of both of which is almost the first necessity if quickening is ever to take place.

In the interests of these mental laggards, but also to the advantage of the other pupils and the teachers, the committee have decided to establish in one district a special class in which such children could receive that individual attention and variation of method which may accomplish so much for them. Any suggestion of labelling the class as one for "defectives" will be avoided, nor will emphasis be laid upon departure from ordinary school methods or purposes, so far as they are wise, though manual training of some kind will naturally be

given prominence. The interest and co-operation of the parents will be secured if it is understood that the main method of such a class is individual attention to each pupil. The natural opposition of parents to special schools will thus be avoided as far as these particular children are concerned. Such a class should not number more than twelve pupils, and, as the children would be of ages varying from eight years to twelve years, its teacher, who should be a woman, besides the special gifts of sympathy with such work and power of stimulating children to self-expression, should be able to teach all the subjects of the elementary school curriculum. The success of such a class will rightly be judged by the number of its pupils who, after longer or shorter attendance at the class, have been found fit to take their place beside the average pupils of the ordinary school at not too great disparity of age.

A report on each pupil of the class will be made annually by the teacher of the special class to the medical officer and the inspector, who will decide upon the continuance of the child at the special class or his return to the ordinary school. No boy over twelve years of age will be admitted to the class unless by special approval of the Elementary Education Sub-committee on recommendation of the medical officer and inspector.

With regard to the number of children for whom this special accommodation will be required, we can only form a very rough estimate, but from a recent investigation of three representative schools, with an aggregate of some 4,300 children on the register, we believe that about three to four per 1000 represents the more urgent needs of Croydon.

It is to this extent and for this group of schools that an auxiliary class is to be provided in the first instance. Should the experiment prove a success, it will be a simple matter to arrange for similar classes in connection with the other elementary schools in the borough.

Though our scheme is a modest one, we believe it will be of service, as it not only commends itself to educationists, but will make provision for a special class of children without any additional expense beyond some slight extra cost per head for the teaching staff.

The development of some such internal specialisation, as it may be called, within the elementary schools is one of the first needed modifications of a system hitherto too rigid, a system calculated for and worked for the average child. The child of special ability, the N+ child, will not suffer though he has to restrain his steps to harmony with his less forward fellows until the eleventh or twelfth year is reached. From that age at least there should be N+ classes, from which the "lads of pregnant parts" would be chosen to pass to higher schools. But the backward child, the N-, if he is ever to step in line

with the average of humanity, must have the aid of auxiliary classes, for a period proportional to his declension from the normal, in the years between the seventh and the eleventh. A system, based on such recognition of the variations of intellect in children, has been working for some time in Mannheim, backward children after preliminary trial in the ordinary school being transferred to the Förderklassen, from which, as benefit results, they return to the classes of the ordinary school.

On some such line of recognition of the diversity of mental capacity and rate of mental progress, the elementary school system of our country must move forward if it is more fully to accomplish the work the nation has entrusted to it.

The paradoxical view of Helvetius, in his insistence on the potential mental equality of all men, is now cast into limbo, but it cannot be denied that the ordinary system of class and school arrangement is in harmony with such a theory; another instance of the methods of to-day following the psychology of yesterday.

HEALTH ADDRESSES TO MOTHERS.*

IN Croydon during 1906, the three lady health visitors made 7,833 visits to houses where illness had occurred, in addition to 5,297 visits to houses where infants had been born. Health lectures on domestic and personal hygiene were organised as in previous years. The following is a *resumé* of the principal matters dealt with:—

Lecture I.—Dwelling Houses, Past and Present.—(a) Cleanliness; (b) Ventilation; (c) Disposal of Refuse; (d) Furnishing. How the law can help the tenant; The duty of the tenant.

Lecture II.—Infancy and Childhood.—(a) Preparation for motherhood; (b) Healthy parents; (c) Intelligent care; (d) Healthy home; (e) Cleanliness; (f) Suitable food. Diseases of infancy, their cause and prevention.

Lecture III.—Habits and Health.—Effects of good habits on health. Value of the formation of good habits in—(a) Eating and drinking; (b) Self restraint; (c) Cleanliness and neatness; (d) Attention to nature's calls, etc. "Sow an act, reap a habit; sow a habit, reap a character."

Thanks to the co-operation of those who are responsible for the organisation of the various mothers' meetings in the town both rooms and audiences were found ready for the lecturers.

DR. J. A. GIBSON, who formerly acted as deputy to Dr. Groves, has been appointed medical officer of health of the Isle of Wight rural districts, at a salary of £300 per annum.

* From Dr. M. Richards' Annual Report, Croydon, 1906.

THE MEDICAL INSPECTION OF SCHOOLS.

(PROCEEDINGS OF WEST OF ENGLAND AND SOUTH WALES BRANCH.)

IN view of Mr. Walter Rea's Bill providing for the medical inspection of children attending public elementary schools—drafted on lines which were approved by both Houses of Parliament in 1906—Dr. J. M. Martin recently opened a discussion on the administration of schemes for medical inspection of schools. The possible scope of this work was indicated by the list of duties of medical school inspectors drawn up by the Inter-Departmental Committee on "Medical Inspection and Feeding of Children attending public elementary schools."

1. Structural—inspection of plans, etc.
2. Infectious diseases.
3. Children physically unfit.
4. Periodic examination of physical condition.
5. Anthropometric survey.
6. Defective and epileptic children.
7. General advice to education authority; lectures to teachers; school curriculum.
8. Examination of health of teachers and other employes.

It was pointed out that with the exception of (6) all the above were preventive measures, but that possibly treatment in future would be more extended. As regards methods of carrying out the work, it was evidently anticipated in the discussions in Parliament during 1906 that a large share in the work would be given to nurses.

In towns with a whole-time medical officer of health the work would naturally come into his department if overlapping and waste of energy were to be avoided; some assistance of doctors and nurses would be necessary in many cases.

In counties the district medical officer of health is rarely a whole-time officer, and his private practice demands most of his interest; further, the difficulty introduced by the distance schools are apart is considerable. It was thought that to meet the conditions some such scheme as follows would probably answer requirements, and important that district medical officers of health should be included.

1. County medical officer of health as adviser to Education Committee—practically administrative officer only.

2. Medical assistants, with areas, to work under county medical officer of health and, with respect to infectious diseases, in conjunction with district medical officer of health.

3. District medical officer of health—for infectious diseases and to report on schools to Education Committee much as he does at present to Home Office on factories and workshops.

4. Local medical practitioners—one for each school—as immediate referees for school teachers.

5. Special nurses with smaller areas than those of medical assistants.

It would be an advantage that where possible the medical assistants should also be the district medical officers of health, and gradually 2 and 3 should be everywhere combined.

The medical assistants would gradually work round the schools in their areas, examining new children, testing eyesight, etc., giving special attention to schools affected by infectious disease; in the former work probably the preliminary observations would be made by the teachers and nurses. The latter would also examine the children's heads, and might be trained for such work as taking swabs from throats, making rough tests of eyesight, etc.

Dr. Martin also gave a short account of the scheme of medical inspection carried out in Gloucestershire during 1904-5, and of the events which led up to it. He advocated the recording of each child's school history, together with the results of medical inspection, on a card which would accompany the child through its school life; this would have the further advantage of preventing, or at any rate systematizing, promiscuous and frivolous changing of schools by many children.

THE RECOGNITION OF CONGENITAL FEEBLE-MINDEDNESS.*

REPORTED BY DR. F. WALLENSTEIN, Berlin.

BY the term "Congenital Feeble-mindedness" Ziehen understands the incapacity of acquiring ideas and of appreciating connections between ideas.

In the examination of the congenitally feeble-minded much importance was formerly attributed to knowledge of numbers and "historical" knowledge, as well as to the physical condition, but later experience teaches that the earlier methods of examination are no longer applicable. The author prefers the following methods:—

1. A detailed physical examination.

In this connection great importance was formerly attributed to the skull formation, but Ziehen believes it has little real importance,

* Paper read by Prof. Ziehen on October 26, 1906, before the Association of School Doctors in Berlin.

being a matter of mere scientific interest. The following points are of practical importance :—

(a.) The simple measurement of skull circumference. It is quite sufficient to keep to certain so-called “standard” numbers. These are

End of first month 35.5 cm. (14.0 ins.)

End of first year 45.0 cm. (17.7 ins.)

End of second year 48.0 cm. (18.9 ins.)

End of third year 50.0 cm. (19.7 ins.)

After the fifth year 52 cm. (20.5 ins.) are, as a rule, not exceeded by the feeble-minded child. So then, in adults with a skull circumference of 52 cm. or less, congenital feeble-mindedness is to be suspected. Ziehen considers this a sign of great value, which has seldom left him in the lurch. The circumference is measured in the so-called plane of Bieger, that is, in a line which lies over the brows in front and over the occipital protuberance behind.

(b.) In the second place, signs of congenital syphilis, especially of the nervous system, must be noted. This affection of the nervous system may point to congenital feeble-mindedness without the presence of any other physical defects occasioned by the disease. For this indeed absence of one of the principal reflexes often suffices, e.g., sluggishness of one or both pupils, or absence of tendo-Achilles jerk or of knee-jerk while motility is well maintained. Such symptoms, pointing to hereditary syphilis, are observed with disproportionate frequency in feeble-minded children.

It used to be supposed that the first symptoms of congenital syphilis must occur before the age of ten. More recent observations disprove this. Charcot has even described a case in which the first symptoms appeared in the twentieth year of life. Epilepsy, for example, suddenly appearing for the first time in the twelfth year of life, points towards congenital syphilis.

(c.) In the third place, rickets must be looked for. Here also the examination of the nervous system is most important. Definite bony deformities are not always to be expected. For we look upon rickets at the present time as a disturbance of metabolism which injures osseous and nervous systems alike. The one is by no means subordinated to the other, but both are co-ordinated. The congenitally weak-minded child may be stripped naked without displaying the slightest symptom of rickets of the osseous system.

The signs of congenital syphilis and of rickets are also of great importance for the treatment of congenital feeble-mindedness; for in these cases treatment is not only possible, but also most successful, as the intellectual defect frequently undergoes notable improvement when the appropriate remedies are used.

(d.) The thyroid gland must be examined carefully (myxœdema, cretinism, and mongolism are connected with congenital feeble-mindedness).

(e.) Hysterical phenomena are frequent with these children. In this connection the degree of susceptibility to pain is especially important. A lowering of this susceptibility in new-born children after the fifth week is a frequent early symptom of congenital weak-mindedness (Tinius).

(f.) The mode of execution of co-ordinated movements is also of importance. In this case also one must know certain standard movements which are acquired by normal children at definite times, namely :—

- | | |
|--------------------------------|-------------------------------|
| 1. Head-balance | End of the fourth month. |
| 2. Body-balance (sitting) | End of the sixth month. |
| 3. Standing | End of the ninth-tenth month. |
| 4. Walking | Third half-year. |
| 5. Holding an object | End of the fifth month. |
| (clasping in the arms). | |
| 6. Grasping (with the hand) | End of the sixth month. |
| 7. Most direct way of grasping | End of the seventh month. |

A deviation from these dates of more than two months points to congenital feeble-mindedness. Of course accidental causes, such as disease, which prevent the acquisition of these “standard” movements at the proper time, are allowed for when making a diagnosis. Speech, moreover, has to be considered along with these co-ordinated movements. In speech the understanding and the imitation of spoken words are to be distinguished.

The understanding of speech should be attained at the end of the first year and its imitation at the age of sixteen months. A child in the eighteenth month, e.g., has a vocabulary of 20 to 60 words which it uses properly, although it naturally cannot pronounce them correctly. Congenital weak-mindedness is to be suspected if the vocabulary of a child of this age is notably smaller. “Baby language” disappears as a rule in the fourth year of life, but sometimes lasts longer; in the latter case also feeble-mindedness must be suspected.

The second method of examination and recognition of congenital feeble-mindedness consists of the examination of the intelligence itself.

The following tests are made in this connection :—

1. Simple object-concepts (one gets the child to describe, for instance, glass, chair, and so forth).
2. Colour-concepts, by means of strips of coloured paper or coloured

wool. The child is got (a) to name colours (b) to pick them out, and (c) to group similar colours. To the feeble-minded child certain colour-concepts are difficult. This test, however, is of no importance up to the fifth year of life; it becomes reliable from the fifth to the sixth year onwards.

3. Number-concepts, e.g., "Give me 3-5-7 matches." This is now and then correctly done up to number 5 even by the feeble-minded child of six years old, but not with higher numbers. In the normal child the sense of numbers and their value is developed as early as the latter part of the second year, and is quite obvious in the third year. With mentally deficient children, on the other hand, number-concepts are absent even in the fifth and sixth years.

4. Conjunction-concepts, e.g., the idea of using the conjunctions, "also," "and," is acquired by normal children about the end of the third and beginning of the fourth year of life, but is absent with the feeble-minded.

5. Abstract concepts. This test is of especial value in the ethical sphere in relation to the recognition of morally deficient children. Examples of gratitude, e.g., are narrated to the child, and he is asked, "What is that called?" It is of importance to establish whether the child is capable of forming a definite idea of a thing at all; if he is not, the incapacity is a gross defect of intelligence.

6. The child is questioned with regard to distinctions, e.g., What is the difference between snow and rain, chair and table, jacket and trousers, window and door, etc.?

7. Memory questions. The child is got to repeat, for example, the following: How much is 3×7 ; 4157; 25198. Then he is asked, "What did I get you to say before?" A seven-year-old child of normal intelligence repeats correctly what he has heard, an older child even to the extent of nine figures. The figures must be repeated to the child in a certain rhythm. The mentally deficient child of equal age is incapable of repeating what he has just heard. One can make this test also in another manner. A figure is drawn for the child, who is got to look away and then asked to re-draw the figure. The mentally deficient child fails completely in this also.

8. The child is tested as to construction and comprehension. (a) He is given a series of pictures and got to describe them; or (b) He is got to group a series of pictures; or (c) He is given a picture-fitting game. Feeble-minded children fail at these tests, while normal children become very interested in them. Test (b) is of special legal importance, and also for the detection of simulation in older mentally deficient children.

The Erbinghaus test may also be mentioned here. It consists in the completion of a sentence, some words of which are written down for the child. The test is of importance in the recognition of developmental dementia. Patients suffering from this disease complete the sentences absurdly. The test of course is only to be used in the case of children who can read. The Maselon test also comes under this category. The child is given three words, e.g., "hunter," "hare," "shot," and from them the corresponding sentence is formed for him. Then he is given three other words and has got to form a sentence from them himself. The feeble-minded child is incapable of doing so. Or the child is given equations to solve. A child in his seventh year knows, e.g., that $4 + 2 = 6$. So he is asked, "I am thinking of a number; when I add two to it it makes six, what number is it?" Here also the feeble-minded child fails. One must, however, choose only addition, not subtraction or multiplication.

The re-telling of stories forms another construction and comprehension test. If the comprehension alone is to be tested, the child is got to repeat immediately the stories which it has been told, but if its power of construction is also to be tested, about half an hour is allowed to elapse before the repetition. The abnormal imaginativeness of the mentally deficient makes itself felt in this. This is of importance in forensic medicine. A person suspected of feeble-mindedness is got to repeat a story after twenty-four hours. It is then perfectly astonishing what transformations are effected by the mentally defective, and how their memory deceives them. The "point" or "pith" of the story plays a great part also in this test. The feeble-minded child is unable to retain the point of the story so as to repeat it. In concluding the examination one more control test is carried out in order to investigate the attention of the child. This is the

9. Test of Bourdon. It consists in getting the child to strike out all the final syllables in the writing shown him. The degree of attention of the child under examination is ascertained in this way.

No single test of course suffices to decide the question whether a child is feeble-minded or not. Only the general result of all the tests, in combination with the physical condition, is of importance for the recognition of congenital feeble-mindedness.

[Published in *Zeitschrift für Schulgesundheitspflege*, 1907, No. 1 (Hamburg).]

A MONUMENT TO PROFESSOR BROUARDEL.—A Committee has been formed under the auspices of the President of the French Republic for the erection of a monument in Paris to the memory of the distinguished scientist Professor Brouardel. The monument is to be executed by M. Puech, Member of the Institute, and subscriptions are invited from the medical and scientific world.

THE PRACTICAL PURPOSES SERVED BY THE MEDICAL INSPECTION OF SCHOOLS.*

By H. MEREDITH RICHARDS, M.D., D.P.H.,
Medical Officer of Health of Croydon.

NOW, it is obvious that we shall only be ploughing the sands if inspection simply leads to the recognition and tabulation of physical defects and deformities.

What practical purposes, then, will medical inspection serve? In the first place, the regular visits of the medical officer will stimulate the teacher to pay more attention to the health of the scholars. The indirect gain that will thus accrue will be considerable, as anyone will recognize who compares a school in which the head teacher possesses a sanitary conscience with one in which that troublesome organ has not been developed.

In the next place, the defects found must be notified to the parents. This will be work for trained women health workers, who must visit the homes, find out any social conditions (such as ignorance, alcoholism, overcrowding) on which the ill-health of the child may depend, and see that steps are taken to obviate these evils. In many instances steady pressure by a tactful but energetic worker is all that is required. In other instances a letter for a convalescent home may be needful, and the health visitor must therefore be in touch with local charitable agencies. In many cases something more is necessary. We will take three typical examples: A child suffering from defective vision, another from "sore throat," and another from ringworm.

At present the parents of the child are urged "to take advice." As general practitioners rarely undertake eye work, this means procuring a letter for the nearest hospital with an ophthalmic department. In Croydon it also means the payment of a small fee at each visit to the hospital. Owing to the crowded state of hospitals much time is lost, as several visits have sometimes to be made before a complete examination can be secured. In the end the child is given a prescription for glasses, for which the parents cannot pay. Under these circumstances the medical inspector, health visitor, parent, and hospital doctor have all wasted valuable time, and the child remains *in statu quo*. If education authorities test sight they must ultimately prescribe glasses, and it would then be a simple matter for some voluntary agency to arrange for the supply at a reduced

* Extracted from an Address delivered to the Association of Women Health Workers

price of the cheap and simple lenses required by school children. A voluntary association is already doing this for the L.C.C. schools.

Moreover, the relief to the hospitals would be considerable. They are already suffering from over-pressure, and it is obviously unfair to expect the unpaid staff of our voluntary hospitals to undertake such an immense amount of extra work as the medical inspection of school children will ultimately entail.

In Croydon the present system of remitting eye cases to the hospital means that many children fail to attend and nothing is done.

Take, again, a child absent from school with "sore throat." This may be mild diphtheria, and (from the point of view of preventive medicine) the milder it is the more dangerous to the community. In these cases the advice "to take advice" is frequently not followed, as the child is not sufficiently ill to need physic. In Croydon we endeavour to look after cases of this kind directly, but if they increase we shall want a special staff for this purpose.

In the case of ringworm, and especially ringworm of the scalp, the attempt to deal with the disease on "take advice" basis was a complete failure. Some parents did nothing at all; others sought the nearest chemist, who said the ringworm was "only scurf"; others paid perfunctory visits at long intervals to the medical practitioner whose fees were smallest, and possibly got value for their money. In only a minority of cases were the circumstances such as enabled parents to pay a private practitioner the necessary fees for the long-continued treatment that ringworm requires. Nearly a year ago no fewer than 180 Croydon children were away from school on account of this disease alone. This meant a loss of valuable months of school life to a large number of children who, instead of attending school, were contracting habits of slackness and carelessness, which the absence of discipline almost necessarily entails. It also meant a loss to the borough of about £360 a year in Exchequer grants, which are paid for average school attendance. The control of ringworm, therefore, was clearly a case of "philanthropy and 5 per cent," and the Council accordingly decided to offer the free treatment of ringworm, and, so far, have had every reason to be satisfied with the result. It might be argued that in so doing we were sapping parental responsibility, but the practical result is quite the contrary. Since we are in a position to offer free advice and treatment, we can take a strong line with parents who neglect their children, and who formerly wriggled out of any pains and penalties on the plea of poverty.

Ultimately there is little doubt that more and more treatment will be undertaken at the expense of the State with advantage to

voluntary hospitals, to medical men, and to the community. This indirect result of medical inspection I cannot now discuss, but in conclusion would impress upon you the importance of the advance which preventive medicine made when it captured the schools, and would congratulate health-workers, and especially trained women workers, on the part which they will play as servants of a State, which

“ unwillingly sees
One of its little ones lost.”

has determined that they shall not be lost, but “have life, and have it ‘more abundantly.’”

REVIEWS.

THE HEALTH OF THE STATE. By Geo. Newman, M.D. (Social Science Handbooks, No. 2.) Headley, Bros. Cloth limp. 1s. net. pp. 199.

Dr. Newman, in the preface to his little book, describes it as an elementary handbook dealing in plain language with some of the more important problems of public health. It does this, and does it admirably; but it also gives a general survey of the field of preventive medicine, which will be read with interest and profit by those actually engaged in public health. Every page is readable, full of interesting and instructive matter, put in a manner which commands attention. As this is a “missionary handbook,” may it have a very wide circulation, and thus be an effective agent in promoting the physical and moral uplifting of our countrymen.

The subject is dealt with in thirteen chapters, treating in succession of the rise and progress of preventive medicine, the sanitary government of England, the protection and value of food, the problem of the milk supply, the necessity of fresh air, the cause and prevention of infective diseases, the white man's plague (why, however, this generally used name, as phthisis is more fatal in negroes than in whites in England and the States?), infant mortality and methods for its prevention, the hygiene of childhood, the charter of the factory worker, overcrowding, the physical efficiency of the people.

There are remarkably few mistakes; but we notice that certain remarks are ascribed to Sir W. MacCormac which were written about Sir William, the boy “whose coverlet had on it a fringe of white snow,” by his father, Dr. H. MacCormac of Belfast. The period of quarantine for mumps should, in view of its protracted incubation, be longer than twenty-four days.

Dr. Newman strikes a greatly needed note of personal responsibility; responsibility for the government of the country, and responsibility for one's personal health. His conclusion that “there has been an ebb tide in almost everything in which the individual helps and develops himself” carries with it a warning, which makes us wish—as does likewise the book as a whole—that his present work could be in the hands of every adult in the community.

THE NURSING: THE FEEDING AND HYGIENE OF PREMATURE AND FULL-TERM INFANTS. By Pierre Budin, Professor of Obstetrics, Univ. Paris. Translated by W. J. Maloney, M.B., with an Introduction by Sir A. R. Simpson, M.D. Caxton Pub. Co., 1907, pp. 199, 128 figs.

Both translator and publisher are to be congratulated on this very handsome volume, which introduces to English doctors Professor Budin's authoritative work. Its first four chapters deal with the management of the prematurely born and the specially feeble, the last six chapters with the general feeding of babies. Sir Alexander Simpson contributes an eloquent Introduction, in which he recalls the fact that Isaac Newton was a premature posthumous child, and was so small at birth that his mother told him he could have been put into a quart mug. He also states that while in Paris from 1897-1904 the infant mortality amounted to 178 per 1000, that among the infants cared for at Budin's Consultation for Nurslings or School for Mothers, was only 46 per 1000.

We cannot discuss in detail the contents of this work, but must content ourselves with referring to special points. Some weaklings require a wet-nurse instead of the mother. In such cases Prof. Budin places a vigorous infant at the mother's breast, thus establishing her lacteal secretion and enabling her later to suckle her own babe. Prof. Budin concludes that the popular belief that pregnant women are dangerous wet-nurses has no foundation in fact.

In the eighth lecture Prof. Budin deals with the view generally held that undiluted cow's milk is harmful to infants, and concludes that it is best given sterilised and undiluted. He has never seen a case of infantile scurvy in babies fed on sterilised milk. At the same time he insists on the fact that artificial feeding by sterilised milk is vastly inferior to breast-feeding. He has not seen a case of rickets in his Consultations since they began in 1892.

The tenth lecture, dealing with Consultations for Nurslings, is especially interesting to public health workers, and the whole work can be strongly recommended as an invaluable guide to the management and treatment of infants.

METABOLISM AND PRACTICAL MEDICINE. By V. Noorden. Translated by Walker Hall. Publishers: Heinemann; (size 10 by 6½). Vol. 1: The Physiology of Metabolism; Vol. 2: The Pathology of Metabolism.

These two volumes, the one on the physiology, the other on the pathology of metabolism, form a monumental piece of thorough work. A thousand or so pages, full of old and recent results and important generalisations, clearly and methodically arranged, the books give to the physiologist what he has long needed, a sterling work of reference. It can scarcely become popular as an ordinary textbook, for such size and such detail are apt to make shy that type of student of science who takes a peck here and a peck there and then moves on to fresh intellectual feeding grounds. But to serious-minded medical or more purely scientific investigators the book will be of the utmost value. It is a rare treat to have all sides and side-issues of a subject collected and collated into a single work, and so to have the luxury of an account of the most recent work in that subject without the great labour of having to hunt up each reference for oneself.

The one defect of the book is that in parts general principles are rather drowned in detail. But that is inevitable in so complete a study. Each volume, however, has a complete table of contents and a full index, which enables ready reference to be made.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

PROVINCIAL MEETING.

THE Annual Provincial Meeting of the Society was held in the Town Hall, Colchester, on Saturday, July 13th, 1907. Present: Dr. D. S. Davies (President), Sir Shirley Murphy, Drs. H. W. Beach, Wynter Blyth, J. F. Butler-Hogan, H. Beale Collins, J. W. Cook, A. D. Cowburn, R. Dudfield, Oliver Field, W. H. Hamer, Sinclair Holden, Randle Harper, A. G. R. Foulerton, H. Cooper Pattin, E. Seaton, W. G. Savage, Hugh Stott, J. S. Tew, C. W. F. Young, Herbert Jones, and Mr. W. Thomson, F.R.S.E. (members). The following visitors were also present: the Deputy Mayor of Colchester (Alderman Goody), Alderman E. J. Sanders, Mrs. Butler-Hogan, Mrs. Reginald Dudfield, Mrs. Cowburn, Mrs. W. G. Savage, Dr. and Mrs. Stafford Archer, Mr. and Mrs. Stuart Blyth, and Mr. Herbert Goodyear. A full report of the proceedings will appear in a later issue of PUBLIC HEALTH.

North-Western Branch.—An Ordinary Meeting of the above Branch was held in the Town Hall, Blackpool, on June 22nd, 1907. Present: Dr. W. Berry (in the Chair), Drs. Brindley, Coutts, Henry, Fisher, Gough, Hamilton, Harris, and Hulbert. Dr. Sergeant attended later in the afternoon at the Fever Hospital.

The Members of the Branch were welcomed by the Mayor and the Town Clerk, and a cordial vote of thanks was accorded to these gentlemen for their presence and kind welcome.

Letters of apology for absence were read from the President (Dr. Greenwood), Drs. Barlow, Peck, Niven, Wheatley, Meredith Young, and a large number of others.

The minutes of the last meeting were read, confirmed and adopted.

Dr. J. Coote Hibbert was unanimously elected a Member of the Branch.

The question of altering the day of the monthly meeting from Friday to Wednesday was considered; proposed by Dr. Berry, seconded by Dr. Coutts, that reply post-cards be sent out to each Member of the Branch so as to obtain the opinion of each on this question.

Resolved that the hearty congratulations of the Branch be conveyed to Drs. Meredith Young and W. N. Barlow on their being called to the Bar.

A letter from Dr. Wheatley concerning Representatives on the Council was read, and the consideration of the same was deferred until the next meeting.

On account of the small number of Members of the Committee present, the Honorary Treasurer's Report and the election of Officers, etc., was adjourned.

Dr. Coutts then read a paper describing the various buildings, etc., to be visited, viz., the Destructor, Abattoirs, Infectious Diseases Hospital, and Observatory. A hearty vote of thanks was unanimously carried to Dr. Coutts for his instructive paper.

The Members present then visited the Destructor, Meteorological Observatory, Public Abattoirs, and the Infectious Diseases Hospital, at which last place the Members were entertained to tea. A hearty vote of thanks was accorded to Dr. Coutts for his kindness in arranging the various visits, etc.

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SCARLET FEVER IN RELATION TO MILK SUPPLIES.

By WILLIAM ARCHIBALD, M.D. (GLAS.), D.P.H. (CAMB.),
Assistant Medical Officer of Health, City of Glasgow.

It has long been recognized that the milk supply is pre-eminently a channel by which the infection of scarlet fever is spread, and an account of several "milk epidemics" investigated by the writer may be of interest as illustrating this fact.

Epidemic I.—On August 5th, 1905, a case of scarlet fever was notified in connection with the milk supply of a dairy in the Southern District of the city. On August 15th three other cases were notified, and by the middle of September nineteen cases had occurred.

On August 31st two cases of scarlet fever were notified as obtaining their milk from a dairy in the Northern part of the city, and these were followed by five cases during the next fortnight.

On August 25th, two cases were notified in connection with another South-side dairy, and these cases were followed by three others, all in separate families.

Each dairy was visited, and careful investigation made for evidence of any illness; all the milk carriers were examined, but no suspicious circumstance was discovered. The milk supply was then enquired of, and here several interesting facts were brought to light.

Dairy A derived its milk from three farms in the Mearns district. One of these farmers (a) after leaving milk at A took the remainder of his milk each morning to Dairy C.

Dairy B was supplied from a farm adjacent to that supplying A and tenanted by a son of the owner of the latter farm (b).

The keeper of Dairy B stated that his supply was augmented about August 23rd with part of the milk which formerly went to Dairy A, and he obtained some of farmer (a's) milk through (b). It will be

noted that the cases in connection with Dairy *B* occurred on August 31st, i.e., one week after the milk was said to have been diverted. This story was denied by the farmer, although dairyman *B*'s daily returns showed an increase in the number of gallons of milk about that date. These facts pointed strongly to farm (*a*) as the source of infection. Another farmer (*c*) supplied milk to Dairy *A* each morning, and left the remainder at Dairy *C*. The only connection this milk could have with the other supply from farm (*a*) was that the farmers were on very intimate terms, and, indeed, on visiting the farm (*a*) on September 5th, farmer (*c*) with his wife and child were visitors at tea. No evidence of illness was discovered at any of the farms, and all the cows were in good condition. All the dairymen were advised to sterilize the milk before selling, and this resulted in stopping the epidemic.

It seemed as if no explanation would be found to account for the epidemic, but on September 25th a case of scarlet fever was notified in the Southern District as having sickened on July 28th and being now "desquamating," the diagnosis only having been ascertained on the appearance of peeling. Investigation revealed the fact that during all the time this child was ill the household was supplied with milk from Dairy *A*. The cans were left at the door each morning, taken inside, and returned the following morning. In disinfecting the cans the handles were never treated, and it may be through these cans that the butts became infected, and that the infection spread in this way from the house to the dairy, from the dairy to farm (*a*) from farm (*a*) to Dairy *B*, and farm (*c*), and from farm (*c*) to Dairy *C*. No further cases occurred after this child was removed to hospital, although sterilization of the milk was stopped on recommendation.

Epidemic II.—About the beginning of April, 1904, it became evident that scarlet fever cases were occurring in connection with the milk supply of a dairy in the Western District of the city. The first case was reported on April 5th as having sickened on April 1st, and from the former date to April 22nd sixty-six cases were notified. Immediately upon the discovery of scarlet fever associated with this dairy, enquiries were instituted. The dairy staff was medically examined, as were also the members of the dairyman's household. Information was sent to the medical officer of health for L—shire asking for immediate examination of the farm supplying the milk. The carriers of the milk were visited, and they, with the other members of the family, were examined. The milk supply was cut off until a report came from the County medical officer of health. Disinfection of the whole dairy premises was carried out, and instructions were

given that no milk vessels be allowed to enter infected households.

The farm having been declared free, and the dairy disinfected, the milk supply was resumed. A few days elapsed, during which cases that had been previously infected developed, but when new ones appeared the farm supply was again stopped, and the farm inspected by the Glasgow Authorities, with negative result.

On April 8th another dairy in the Central District of the city deriving milk from the same farm, began to have scarlet fever cases among its customers, and from the 8th to the 25th sixteen cases occurred. All the carriers were paraded, and seven who showed abnormal condition of the throat were detained from further work. The dairyman's son, whose throat was in a similar state (but who had been in hospital with scarlet fever a year before), was sent off for a holiday, and the premises disinfected. After April 25th the cases were almost entirely secondary ones, occurring in the households already affected. Several of the others were doubtful cases which had sickened early, but were being kept under observation until peeling of the skin occurred. In many cases the symptoms were slight, and by no means conclusive of scarlet fever. In many instances there was little or no rash, and the throat symptoms were very mild. No cases were reported after May 2nd, and although every conceivable point was investigated, no source of infection was ever traced. There had been no teat eruption, or any other sickness among the cattle at the farm.

Epidemic III.—On February 19th, 1903, information was received from the inspector of the South Suburban District that several notifications of scarlet fever had been received, and that the milk supply in each case was derived from one or other branch of a certain dairy. On going over the cases the following was found to be the state of affairs. Out of a total of seven cases, three were connected with branch *A*, two with branch *B*, one with branch *C*, and one with the cart from the main depôt. One case sickened on February 14th, five on 16th, and one on 17th. All the cases, with one exception, were adults, and this of itself excluded school infection.

On visiting each branch the following particulars of milk supply were obtained:—

A. (2 cases) morning milk from farm (*a*), mid-day from wholesale depot. Total 25 pints.

B. (3 cases) morning milk from farm (*a*), midday from depôt. Total 33 pints.

C. (1 case) morning milk from farm (*a*) and farm (*b*).

Total supply 91 pints, supplemented by about 15 pints from depôt.

One case occurred where the milk was derived directly from the wholesale depôt.

Farm (a) supplied all the affected branches, and also the depôt. The fact that one case occurred in connection with the cart coming directly from the depôt would seem to throw suspicion on the wholesale depôt. The manager stated that it was practically impossible to ascertain the source of the milk carried by this particular cart, but he supplied a list of all his supplies. A list of the names and addresses of the carriers was also obtained, although the evidence was entirely against the presumption that these were the source of infection. No illness had occurred in connection with the dairies themselves.

Information was sent to the County medical officer of health for the district in which the farm was situated, and a request made that the farm staff and cattle be examined. He replied on February 21st as follows:—

"I have to inform you that a case of scarlet fever, sister-in-law of farmer (not a dairy-worker), was notified at this farm on February 12th, and was removed to hospital on the same day. I visited the farm yesterday, and learned from the medical attendant that he had two of the inmates under observation for scarlet fever. The first of these was a dairy-worker (M. S.), who has had a sore throat, sickness and vomiting, but no rash. The illness in this case dates from February 5th. The other is the case of a milker, who has a sore throat, followed by rheumatic pains in wrists and ankles, but without a rash being noticed. His illness dates from February 13th.

"Both cases have been removed to hospital for observation, and the premises have been disinfected."

No other cases occurred thereafter, and in this case the evidence of infection spreading from the farm through the milk supply is undoubted.

SUMMARY AND CONCLUSIONS.

The generally accepted view at present is that scarlet fever is spread mainly by personal contact, and that the infection is direct. Now, in order to keep a disease present in a community such as Glasgow, it would appear necessary that about 10 per cent of the population should always be capable of infecting susceptible persons. That personal infection plays a very important part in the spread of the disease is not denied, but recent work on the subject tends to point to "milk" as being the chief channel of infection in scarlet fever. The investigations of Klein in the historic "Hendon" outbreak, when published, were received with grave doubts in certain quarters,

but, nevertheless, Klein may be held to have proved conclusively that scarlet fever in the human being may be spread by means of a disease affecting bovines. The examples detailed above, although none of them tally with the Hendon cases, serve to demonstrate the dangers of a milk supply which has been contaminated with the scarlatinal virus.

ANNOTATIONS.

MEASURES FOR TRACING THE SOURCE OF MILK CONTAMINATION.

DR. A. ROBINSON, in his annual report for the county borough of Rotherham, states that a meeting was called in July last by the County Councils of the West and East Ridings of Yorkshire, and attended by delegates from the Town Councils of Sheffield, Leeds, Bradford, Hull, and Rotherham, and was held at Leeds, at which a resolution was unanimously adopted to the effect that it was desirable to undertake a systematic investigation into the conditions of milk supply in the area of the Councils, with a view to ascertain the extent, if any, to which the supply is contaminated, and the sources of such contamination. A committee was formed (subject to confirmation by the various Councils represented) with instructions in the first instance to follow samples from the farm to the consumer, examining and testing it at different stages of its transit, so as to find, if possible, where contamination occurs. The amount to be spent on the inquiry is limited to £500, to be provided by the authorities in proportion to rateable value.

It is proposed that samples of milk should be taken on the same day at the farm, the places of wholesale and retail delivery, and at the shop from which milk is sold; the temperature of the air and of the milk, and the general surroundings being noted at each place at the time of sampling. The results of this inquiry when complete will throw much light on the subject of milk contamination.

HOW TO ASCERTAIN THE "MIXED CASES."

CASES such as I have described illustrate the difficulties met with in dealing with infectious diseases, and they help to explain the comparative ineffectiveness of our present methods for the control of such diseases by isolation and disinfection. For the success of these methods it is necessary that the sanitary authority should be made aware of the existence of practically all the cases of the disease it is endeavouring to control as such cases arise. For this purpose compulsory notification was instituted, but it has now been abundantly proved that compulsory notification of identified cases, though useful, is not an adequate safeguard. In addition we require some method of discovering those patients who at present do not come under medical observation. In the outbreak of scarlet fever at West Hampstead I received very valuable assistance from the teachers of the school chiefly affected, and there is no doubt that in the prevention of communicable disease much could be done by a more intimate co-operation between the education and sanitary authorities. The prompt notification by teachers or school attendance officers of all cases of illness among school children, and the examination of all those patients so notified who were not already medically attended, are measures that would lead to the discovery of many cases which now escape observation, and consequently spread disease. The general adoption of such a scheme would greatly increase the work of the Health Department, but such an increase is inevitable if we wish to exercise a really effective control over the spread of communicable disease.

* From Dr. McCleary's Annual Report, Hampstead, 1906.

THE VARYING FATALITY OF SCARLET FEVER.*

THE fatality of scarlet fever is so low that I am inclined to think that if it had always been at this rate, large hospitals for its isolation would not have been built. In the seventies and eighties the death-roll from this disease was often a heavy one; this disease was indeed at that time a very much more malignant one than it is now. The question necessarily presents itself as to whether this comparatively benignant character will be maintained. A study of epidemiology shows that the change of type of an infectious disease is not uncommon, and that the change is usually not permanent; in other words, not only do such diseases occur in epidemic "waves," at varying intervals of years, but their character or malignancy also varies in somewhat similar "waves."

Death, however, is not the only evil consequence to be reckoned with in such a disease as scarlet fever; the complications that are liable to arise are numerous and often lasting. On going through my notes of the 308 cases that were admitted to the City Hospital during the year suffering from this disease I find that only 133 went through the illness without any complication. Of the others, 34 suffered from otitis media; two of these had mastoid disease, one requiring operation; one other of the ear cases developed meningitis and hyperpyrexia, ending in death; 51 had rhinorrhœa; 92 adenitis; 56 some amount of albuminuria, some of these were slight, but others assumed the form of acute Bright's disease; 19 had rheumatism; 3 endocarditis; 1 erythema nodosum; 3 conjunctivitis; 6 had secondary rashes; 2 post-scarlatinal diphtheria, one of these afterwards suffering from facial paralysis; 1 pneumonia; 1 jaundice; 1 pyæmia; and 1 severe bronchitis.

NEW CUBICLE WARD AT THE SOUTH-WESTERN FEVER HOSPITAL, STOCKWELL.

TWO large wards at this isolation hospital have recently been converted into cubicles, in order to supplement the existing isolation accommodation. Each ward, which originally contained 18 beds, is divided, by glass partitions framed in iron, and reaching to a height of 7 feet above the floor level, into 16 cubicles. The proportion of total floor space per bed is 175 square feet, and of this about 120 square feet are enclosed within the cubicle. The ward is ventilated as a whole by means of large fan-lights placed above the windows, and the partitions are so disposed as to provide each cubicle with a separate window. Every cubicle is furnished with a fixed basin, the waste pipe from which is carried through the wall, and over it is fixed a tepid spray worked by a pedal action.

Separate overalls are hung in each of the cubicles, which are worn by the medical and nursing staff when attending to that particular patient; while a sterilized towel hung in proximity to the spray affords convenient opportunity for ablution of the hands immediately before leaving the cubicle.

A bathroom attached to each of the wards is furnished with a portable enamelled iron bath, which can easily be run into the cubicles, while a gas-heated copper sterilizer, furnished with a hot water supply and a controllable waste, provides facilities for sterilizing every article which has been used for the patient's treatment. In the scullery attached to the ward is a second sterilizer of larger size, for the disinfection of the plates, mugs, knives, forks and spoons, etc., after they have been removed from the cubicles.

It is believed that for certain cases sufficient protection is furnished by the relative isolation afforded by cubicles, *provided* scrupulous care is exercised by the attendants, both medical and nursing, who are entrusted with their administration. The principle underlying the system is, of course, "aseptic" in its conception.

By means of the cubicles now installed it is hoped that in each of the two wards it will be possible to provide the manifest advantages of *separate* and

individual isolation for 18 patients (16 in the ward, and 2 in an adjoining room) at an expenditure of 5, or at most 6 nurses, both day and night staff inclusive. This should represent a material economy in the cost of isolation.

For the present, Dr. Caiger, the medical superintendent, states that these cubicles will be exclusively utilized for the temporary isolation of doubtful or anomalous cases, and for certain recognized attacks which are believed to be unattended with a high degree of infectivity.

If experience shows that these cubicles can safely replace separate isolation rooms with separate nurses, an additional valuable means of economizing isolation hospital administration will have been shown to be practicable.

SCARLET FEVER WITHOUT RASH.*

THE extreme mildness of some of the cases of scarlet fever renders it very difficult to check the spread of the disease; for example, in one case which was notified when commencing to desquamate it was found that the child had not been away from school on account of illness. In this connection it is of importance to note that it appeared in several cases that other members of the household in which a case occurred had suffered, or were suffering, from "sore throats." This occurred in 13 cases. In one of these cases, a sister who had only had a sore throat when the patient was notified, later began to desquamate, and was notified as scarlet fever. It has been proved in the case of diphtheria that the germs of the disease may be present in the throats of those who have none of the typical signs of the disease, but only complain of soreness of the throat, and may even be present in the throats of those who feel perfectly well, provided that in either case they have been exposed to infection. I have little doubt that the same thing occurs in scarlet fever. Scarlet fever without a rash is a recognized form of the disease, and it is easy to understand that in still milder form the disease might show no symptom but slight soreness of the throat. The importance of this, however, from the public health aspect, can scarcely be over-estimated; for such cases, in spite of their mildness, are capable of spreading the disease. A bacteriological test is needed, but it has not yet been discovered.

WARRANTY PROVISIONS.

DR. R. DUDFIELD states that the "warranty" provisions of the Sale of Food and Drugs Acts, as interpreted by the Courts, "are rendering those Acts and practically nugatory. Each year that defence becomes more common, and although the adulteration, especially of milk, is beyond dispute, it is impossible, owing to such defence, to allocate the responsibility or secure a conviction. A similar difficulty is experienced in connection with diseased meat. The defence provided by Sub-Section 3 of Section 47 of the Act, 'that the vendor did not know and had no reason to believe' that the meat was unsound, etc., has been so interpreted as to relieve the vendor of all need of proper precaution—that is, examination prior to sale."

HOUSING OF THE POOR.

DR. E. H. SNELL, medical officer of health of Coventry, in his annual report advocates the erection of much smaller and cheaper cottages than those which are commonly regarded as representing the minimum for working-class dwellings. He says, "I am forced to the conclusion, having regard to the local circumstances, that if your authority is going to cope with the housing problem in a radical way, your efforts should be directed entirely, at any rate in the first instance, to the erection of cheap two and three-roomed houses, those houses, in fact, which are not being erected by private enterprise. I see no reason at all why one-roomed houses should not be erected. I have seen such houses in Norway and Sweden, with recesses for the beds, built there, of course, of the cheaper material (wood), to which it would be very difficult to take exception for the healthy living of the small poor family."

* From Dr. Snell's Annual Report, Coventry, 1906.

* From Dr. Beatty's Annual Report, Northampton, 1906.

ALCOHOLISM AND THE POOR-LAW.

ON this intensely practical subject, Dr. Toogood, the medical superintendent of the Lewisham Infirmary, has contributed a valuable paper to the July number of the *British Journal of Inebriety*. He faces the difficult problem as to how far poverty causes alcoholism, and how far alcoholism causes poverty, and although both statements are undoubtedly true, his conclusion is that in this vicious circle "poverty is the main cause of alcoholism, and alcohol perpetuates and accentuates poverty." He admits that the general impression is that the order given by him is usually inverted. "Relieving officers, district medical officers, guardians of the poor, alike regard alcohol as the main cause of chronic poverty"; but while admitting that alcohol is a most potent cause of poverty, he asks, "Does the dung-heap produce the fungus, or does the fungus cause the dung-heap? Probably each is necessary for the continued existence of the other."

The statistics of admissions to the workhouse are very striking. Of 601 admissions, 358, or 60 per cent, have been persons known to the officials as habitual drunkards; males 253 out of 353, females 105 out of 218. What this means financially is calculated by Dr. Toogood for the whole of London. There are about 39,000 beds in all the London workhouses. If it be assumed that only 50 per cent of the inmates have been brought there by alcohol, this means, at 8/- a week, an annual cost to the London ratepayers of £405,600.

The consideration of remedies is beset with difficulties. Improvements in housing and general betterment of environment must help. Dr. Toogood lays especial stress on the early opening of the public houses as the cause of a tremendous amount of drinking. The legend, "Coffee at 5 a.m.," seems sufficiently innocent, but implies a large amount of early morning tipping. It is interesting to note Dr. Toogood's remarks on the indirect effect of the Employers' Liability Act, and the Workmen's Compensation Acts. They have effected changes little dreamed of by the originators.

"The cry of 'too old at forty' represents the determination of the employer to run no risks in employing men who have lost the first sprightliness of youth, and are therefore more liable to meet with accidents, and, having met with them, are less likely to recuperate speedily. Hence the knowledge that an alcoholic appearance, with its attendant disabilities, means the loss of employment, must encourage sobriety. Some firms have instituted a quarterly medical examination of all their employees, and this, again, must have a great educational effect."

THE CONTROL OF PHTHISIS IN BELFAST.

IRELAND differs from the rest of the United Kingdom in showing evidence of no decline in the death-rate from pulmonary tuberculosis; and Belfast, although commercially prosperous and flourishing, is little better in this respect than the rest of Ireland. Hence special interest attaches to the step forward made by the Belfast Corporation at their meeting of the 17th June. At this meeting they decided to enter into an agreement for 10 years with the Committee of Management of the Forster Green Hospital, by which the latter would reserve 25 beds for patients nominated by the Public Health Committee, and approved as suitable by the medical superintendent of the hospital, the Corporation being represented by two members on the Committee of Management of the hospital. The payment for these beds is to be at the rate of 35/- per bed, per week; while the Governors of the hospital undertake that in the event of there being any vacant beds in the hospital over and above the 25, they will admit to these beds patients nominated by the Public Health Committee at 20/- each per week. The intention is that patients will be kept in the hospital for 13 or 14 weeks, though admitted in the first instance for six weeks, the further treatment being granted only if a favourable report is received from the medical officer at the end of this time.

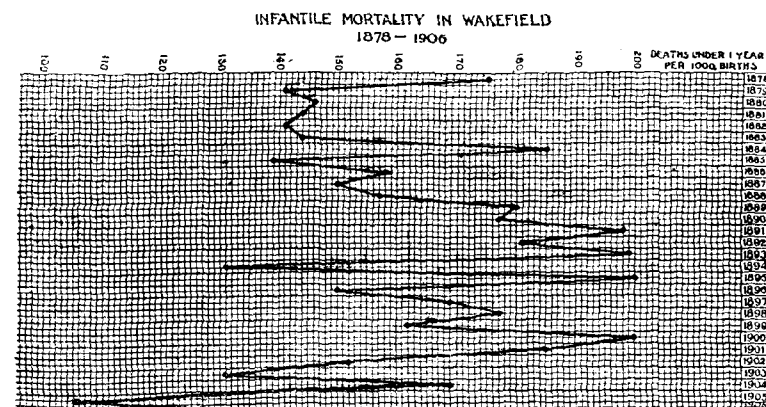
The scheme is one that is likely to have a most beneficial influence, both from a curative and from an educational standpoint, on the future course of

phthisis in Belfast; and although the number of beds is small for so large a city, it will we hope be increased as experience shows the value of the new methods now being adopted.

A REDUCED INFANT MORTALITY.

THE fact that a comparatively low infantile death-rate followed an unprecedented low one is a most satisfactory feature of the year's record for Wakefield. The two lowest rates previous to 1905 and 1906 were 131 in 1903 and 131 in 1894, and each of these was followed by a high rate, namely, 169 in 1904 and 201 in 1895. I personally anticipated a considerable reaction from the marked drop of 1905, and I was both surprised and gratified to find the rate for 1906 as low as it is. It is hardly safe to prophecy, but I must say that I see more hopes of permanency in the lowered infantile mortality than I would have admitted a year ago, and I feel justified in saying that the efforts to reduce the infantile mortality that are being made by the Corporation and other agencies are meeting with the most gratifying success, and should encourage you to continued and extended effort in this most important branch of the public health service.

Most excellent work has been done by Miss Boileau, the Health Visitor of the Wakefield and District Sanitary Aid Society, and, in considering the factors that have improved our infantile mortality record during the past two years, the eminently practical work of this lady must be recognised as not the least important. (Dr. Gibson, Ann. Rep., 1906).



THE PREVENTION OF INFANT MORTALITY.*

THE prevention of an unduly high rate of infant mortality is a problem of the first importance to the State.

In Ipswich the following plan of action has been adopted during the past year:—

- (1) Notification of births to the medical officer of health within 48 hours of their occurrence.

It is obvious that it is impossible for the Sanitary Authority to hope for good results from remedial measures when the infant's constitution has already been ruined by the injudicious care of an ignorant mother.

Therefore, if good is to result from any course of action, that action must come into play before the damage is done. Therefore, it is essential that the Sanitary Authority should become acquainted with the fact of an infant's existence at the earliest possible moment.

With this object in view, the Sanitary Authority have decided to pay the sum of 1/- to any responsible person notifying a birth within 48 hours of its occurrence.

* From Dr. Pringle's Annual Report, Ipswich, 1906.

- (2) The second step, the value of which is dependent on the first, was the arriving at the determination to appoint a qualified lady health visitor, whose duties will consist in visiting the infants as the births are notified, and the giving of such advice as will secure, if possible, breast-feeding, or, if that is impossible, the next best mode of procedure, viz.: the feeding of the infant with cow's milk, properly diluted, properly kept, and properly administered, and of proper quality in the first instance.

CONVOCAION AND HOUSING PROBLEMS.

THE co-operation of the clergy in the improvement of the conditions of living is always welcome, and we are glad therefore to place on record the following resolutions passed by the House of Convocation at their meeting on the 3rd of July:—

1. That the housing problem is one of special urgency, both in town and country, claiming for its solution the interest and co-operation of all members of the National Church.
2. That compulsory registration of ownership, or of claim to ownership, is urgently required to bring home a sense of responsibility to the owners, and to enable the authorities to deal with over-crowding and sanitation.
3. That it is the duty of those who have house property and employ agents for its management to make themselves acquainted with the condition of their houses, so that over-crowding and other kindred evils may be kept in check.
4. That the Church, occupying an exceptionally responsible position in every parish in the land, should utilize its organizations and agencies in discovering evils when they exist, and in seeking to apply the most effective remedies.
5. That for this purpose the clergy should co-operate actively with local authorities; and that in their parochial visitation they should endeavour to elevate the standard of feeling as to decency, sanitation, and over-crowding.
6. That in some places the formation of voluntary housing and sanitary committees, including clergy, medical men, and other practical workers, has led to valuable results and shown that there is much room for useful co-operation with local authorities.
8. That efforts should be made to check the appalling rate of infant mortality, especially in the congested parts of towns, both by proper instruction and by more stringent legislation.
9. That amongst the means of remedy for over-crowding a prominent place should be given to schemes of co-operation and co-partnership which enlist the interest of the operative and occupying classes, and aim at securing housing extension under wholesome and methodical conditions.
10. That to promote the healthy and orderly development of new districts municipal authorities should be assisted to acquire all necessary powers to control the planning and laying out of the areas which are about to be covered with houses, in such a way as to hinder the creation of slums and to secure healthy conditions of life.

DRAFT SCHEME OF HOSPITAL ACCOUNTS.

THE following draft scheme of hospital accounts has been prepared by Dr. Hugh Stott. The object of the scheme is to obtain a basis for the comparison of hospitals one with another.

ANNUAL COST OF HOSPITAL.

1. *Structural Expenses*:—
Cost of site, buildings, furniture (including payment of principal and interest on loan, or rent), additions to buildings, alterations, and structural repairs.
Receipts to be deducted:—
Rent of beds by schools, other district councils, etc., and rent of land if not used by hospital.

2. *Establishment Expenses*:—

- (a) For keeping hospital in a state requisite for the comfort of patients, viz., ordinary repairs, painting, cleaning, renewal of, and additions to, furniture and linen, rates and taxes, insurance, water, garden, and sundries.
- (b) Salaries and uniforms of permanent staff. Extra nurses: special fees to medical officer, etc.
- (c) Provisions for staff.
- (d) Fuel and lighting.
- (e) Sundries: postage, stationery, etc.

Receipts to be deducted:

Produce of garden and land, loan of nurses, etc.

3. *Patients' Expenses*:—

- (a) Provisions for patients, including ice, mineral waters, wines and spirits.
- (b) Dispensary—drugs, instruments.
- (c) Conveyance—disinfecting of patients, and burials.

Receipts to be deducted:—

- (1) From patients and other local authorities.
- (2) Presents in the form of money from patients.

Special patients' expenses (private nurses, etc.), which have been recovered, to be omitted.

Where disinfection of bedding, etc., is undertaken for the council (apart from the hospital), the cost of this in Establishment and Patients' items to be deducted.

COMPARATIVE STATISTICS.

Data:—

1. Diseases admitted.
2. Number of beds with full air space.
3. Number of patients in year.
4. Average patients.

Cost:—

How Expressed:—

- | | |
|---|--|
| 1. Provisions for patients only (3a) | Per patient per week. |
| 2. Structural and permanent Establishment charges (1 & 2 a) | Per bed space. |
| 3. Variable Establishment charges ("services") 2 b, c, d, e | Per 1000 of population, or as amount of rate. |
| 4. Total cost | Per 1000 of population, as amount of rate, per patient per week. |

COMMON SENSE IN SANITATION.*

OF sanitary legislation there is little in Shanghai, nor does the placing of public health work on a proper legal footing appear probable. As to sanitary matters, the Settlement is governed by common sense and not by regulations; often a more effectual method, and one that does not excite resistance to enforced action. Common sense, or in other words science, which is organized common sense, is therefore the desired mainspring of local sanitation. But a little benevolent despotism is necessary, inasmuch as the reasons for sanitary action are often beyond the comprehension of many people, and especially where so many nationalities are represented, each with their own mode of thought. It is, however, irrespective of nationality, an easy matter to deal with those who have the welfare of Shanghai at heart.

In public health matters it is necessary, in the first instance, to direct public opinion so as to secure a popular demand for those things which are known to be good for the community. The average man has drains on the brain, and neglects the most obvious precautions in his anxiety about them. As a result of increased knowledge, vague and general sanitary measures are being replaced by precise and definite measures against disease.

* From Dr. Stanley's Annual Report, Shanghai, 1906.

SCARLET FEVER EXPERIENCES.*

By R. H. TROTTER,
Medical Officer of Health, Holford.

EXTRAORDINARY events in a small and restricted field of observation may well be matters of everyday occurrence with men whose public health outlook is, by the very nature of their position, necessarily wider, and the cases I here bring forward have also in part rather a clinical than a public health interest, being the experiences of a Medical Officer of Health who is also a general practitioner; but this dual capacity has enabled many cases to be followed personally throughout their course, and they are, after all, brought forward rather as suggestive than as material upon which to found dogmatic views on the epidemiology of scarlatina.

The urban districts of Holme, Holmfirth, Honley, and Netherthong (combined for the purpose of the Medical Officer of Health appointment) contained at the census of 1901 a population of about 15,000. They lie in the extreme north-west corner of the West Riding, and possibly their comparative immunity from serious epidemics is in part incidental to their somewhat isolated position. Though all urban districts, over considerable portions of their area at all events they have a semi-rural character.

Compulsory notification has been in force over the whole area since May, 1899, and up to the end of November, 1906, 274 cases of scarlet fever have been notified, with only three deaths. In fact, so mild and clinically unimportant has the disease been during the last ten years, that one has come to look upon it rather as a cause of unpleasantness between parents and parents, and between parents and the officials of the Sanitary Authority, than as a dangerous infectious ailment. We have had an isolation hospital since August, 1904, and now fully three-fourths of the scarlatina cases are removed thither.

Such is a brief account of the local conditions under which the cases occurred, and for the sake of order these cases are grouped under different heads.

I.—*Prolonged vitality of infection in imperfectly disinfected houses.*
—Several cases illustrate this, the following especially:—

(1) B. M., notified September 19th, 1900. Pre-hospital days, therefore kept at home. The house had only two bedrooms, and individual isolation was impossible, but there was no other dwelling

within a quarter of a mile. Brother, A. M., notified September 28th. On September 25th, mother, who had previously had scarlet fever, developed typical scarlatinal throat, but had neither rash nor subsequent desquamation. On October 5th another brother, H. M., was notified. As mother only was available as nurse, the whole house was freely exposed to infection. At the termination of the cases the dwelling was cleaned throughout, but no other disinfection was possible. On June 15th, 1901, a cousin, aged 6, came to live here; he was one of a family of eight children, none of whom had scarlet fever at the time, or subsequently developed it, and he came from a neighbouring sanitary district where there were no cases of scarlet fever; he was driven over in a cart some eight or ten miles by the father of the previous cases. On June 18th he developed scarlet fever. Of course there is no denying the possibility of infection from another source, but careful enquiry rendered it extremely improbable, and I think this child was infected in the home of the earlier cases eight months after they had apparently ceased to be infectious. I may add that none of these earlier cases had any of those complications which are supposed to render the infectious period unusually prolonged.

(2) In the next case the intervening period is much shorter, but the death of the first patient removed all possibility of personal inter-infection. E. L., notified July 30th. Died August 6th. The bedroom was "stoved" with sulphur, and cleansing carried out under the supervision of the inspector of nuisances. Five weeks later the child's sister, who had in the meantime certainly not been exposed to any other infection, developed scarlet fever.

(3) This case I quote as curious, though the distance of time between the first and second cases seems to make any connection between the two almost impossible. C. B., notified September, 1901; absolutely no personal isolation, but house cleansed at end of illness. On April 11th, 1904, H. B., her brother, developed the disease, and most careful enquiry utterly failed to suggest any possible origin for his ailment save in his own home.

(4) M. B. Illness began March 26th. Careless mother; no attempt to keep child in one room. On June 11th, nearly three months later, a second case followed in the same house, for which no origin other than home infection could be discovered.

The foregoing cases were in the pre-hospital days. The following series occurred since the hospital was in use.

(5) G. R., began September 20th, 1905. Removal followed by disinfection September 22nd. R. R., his brother, who was away at

* Read at Meeting of Yorkshire Branch, 14th December, 1906.

school, came home for the week-end September 29th. Began October 2nd. Removal and second disinfection October 4th. Three months later, January 20th, 1906, G. R., aged 2 years, who had never been away from home nor been in contact, so far as could be discovered, with any infectious person, developed scarlet fever.

(6) J. W. S., removed October 6th. One other child. After removal of brother, house was thoroughly cleansed and disinfected by sanitary officer with sulphur; the other child, so far as my enquiries could show, was never exposed to infection outside after the brother's removal, but nine weeks later developed scarlet fever; fortunately a day or two before her brother was discharged, or she would have been labelled a return case.

In the present state of our knowledge of the epidemiology of scarlatina, it is difficult or impossible to set a term to the vitality of the infection in imperfectly disinfected houses, and as an explanation of otherwise inexplicable outbreaks such prolonged vitality seems certainly worth bearing in mind.

II.—*Scarlet fever infection apparently carried by water.*—On September 14th, 1900, after the occurrence of two cases of scarlet fever in a house where isolation was impossible, cleansing of the house was carried out. On the other side of the wall, against which mats, etc., were beaten, and which encloses the yard in which carpets were shaken, is an open well, the overflow from which is piped directly to a farmhouse a quarter of a mile or more away, for which it forms the only supply. On September 17th a young man living at this farmhouse developed scarlet fever. There was no other case of scarlet fever in the district at the time, and the tenants at the farm, being newcomers, were absolutely unacquainted with the members of the recently infected household, and had never been into their house. Six days and eight days later respectively other members of the family were attacked, but of course direct infection from the first case was very possible. Very careful investigation failed to suggest any possible origin for the primary case, until the questions as to water supply in the course of the ordinary routine enquiry led me to the idea that infected water was the possible causative agent.

III.—*Scarlatina with typical onset and course, but entire absence of subsequent desquamation.*—Though a scarlatinal throat without rash is in my experience not uncommon, the occurrence of a scarlet fever with rash but without desquamation does not seem to be generally admitted, but the following experiences suggest that it does sometimes occur.

(1) N. R., aged 12, attending school from which several scarlet fever

cases had recently been notified, began to be ill during night of September 20th to 21st. On the morning of September 22nd, when first seen, she had developed an extremely well-marked scarlet rash and severe throat affection of typical scarlatinal character. So severe in fact was the throat condition as to cause some anxiety, and she was seen by another medical man, who unhesitatingly concurred in the diagnosis. The ailment ran the clinical course of a moderately severe attack of scarlet fever, but though repeatedly and carefully examined, no trace of desquamation was ever observed. She was isolated at home for four weeks, and then mixed freely with the rest of the family without other cases occurring.

(2) H. W. Scarlet fever prevalent in the district. Illness began January 10th; rash and sore throat January 11th. Apparently a clear case of scarlet fever. Never desquamated.

(3) A. T. Onset February 15th; rash February 17th. Severe throat affection and well-marked rash lasting four days. Had later nasal discharge causing impetiginous-looking patch at opening of nostril, and had also prolonged cervical glandular enlargement, but never a trace of desquamation. Brother had scarlet fever, followed by usual desquamation, in same house ten months previously.

(4) S. No scarlet fever in the district, but six days before his illness began he visited a district in which the disease was prevalent. Onset with vomiting, sore throat, and scarlatinal rash. Seen by second medical man, who concurred in diagnosis. Never desquamated, but isolated at home for 3½ weeks.

These cases at all events illustrate that the intensity of the rash does not determine the extent of the desquamation, but the obvious reply to the diagnosis of scarlet fever without desquamation is, "Such cases are not scarlatina at all," and of course we have no means, as in the case of diphtheria, of setting doubts at rest by the identification of the specific causative agent. But in each case the clinical history was absolutely in accord with that of normal scarlet fever, save that desquamation failed to follow in the usual course. To establish my hypothesis it would be desirable to produce a case of the kind which had been an infecting agent, and though two cases which were possibly of this nature are in the registers, they are both open to fallacy. I therefore quote them rather as suggestive than in definite support of my proposition.

(1) Case of scarlet fever in an adult in a district supposed to be free from infection. Enquiry revealed the fact that her niece from a district a few miles away was staying in the village, and had had an indefinite illness (sore throat and vomiting) four and a half weeks

before; since she left home her brother had developed scarlet fever, and word had been sent that she was to remain away lest she might also catch it. This child was looked up and examined; she had a sore nose, with discharge from the nostril and glandular enlargement, but no desquamation, and none had been observed by friends. She had attended the village school, and an outbreak of scarlet fever in connection with the school followed, necessitating school closure and causing the death of one child.

(2) During an epidemic associated with an elementary school a non-school-goer in an isolated group of houses some distance from the village got scarlet fever. Her elder sister was found to have been away from school fourteen days for a "cold"; she had sore nose and enlarged glands, but no desquamation. Another child in the same group of houses who was a school-goer and had played with the baby began to be ill (scarlet fever) and developed a rash the same day as the infant did, so quite possibly she was the infecting agent, though the something like simultaneous onset is against this, and the child with the sore nose may have infected both.

Of course I am well aware that desquamation as an element in carrying infection has come to be disbelieved in. I think no one will deny its value as an aid to late diagnosis of scarlet fever: yet if my cases suggest anything they suggest that its absence is no guide at all.

In connection with this "incomplete scarlet fever" the following recent experience is interesting. Three boys living in the same yard and attending the same school began to be ill simultaneously; scarlet fever was prevalent in association with the school they attended. All three presented the same symptoms at first, viz., sore throat, vomiting, and fever. One developed a rash, and was removed to hospital; the other two, though under careful observation for some time, cleared up without any further developments, and had to be discharged for want of evidence. Eighteen days afterwards the young brother of one of these cases, who had never been away from home, developed scarlet fever.

IV.—*Return Cases.*—Our hospital era is not sufficiently long to have furnished many instances of these; there are only three, and one is at least doubtful as regards the precise nature of the ailment in the second case.

(1) G. F. M., began November 16th; removed November 20th (this case was taken by a neighbouring authority, as our own hospital was not built). Six members of family unprotected by previous attack, ages 21 years to 4 years. In hospital eight weeks, had sore behind

ear, but this absolutely well on discharge. Had two attacks of nose bleeding *after the other cases began*, but no nasal discharge or soreness. Twenty days after his return home, brother aged 5 and sister aged 10 began simultaneously, and thirteen days later another sister aged 8.

(2) E. L., onset July 15th; removed July 17th; returned September 7th. September 13th brother aged 3 began to be suddenly ill during the night (vomiting, sore throat, heat of skin); mother, suspecting scarlet fever, looked for rash, but found none. Twelve days later, ill and fretful again, and urine bloody. Seen by doctor for first time two days later; no trace of desquamation, but urine bloody and glands at angles of jaw much enlarged. Never isolated, made rapid recovery, and no further cases occurred. The nature of his illness must remain doubtful, but the concatenation of circumstances is certainly curious. The original patient presented no symptoms of prolonged infectiousness.

(3) N. L., rash September 13th; removed September 14th. In hospital about six weeks. No trace of nasal discharge when she came home. Few days later this began, and persisted when discovered in school, accompanied by soreness at opening of nostril. After her return she was kept in nearly a fortnight, mixing with three sisters, ages 17–26, unprotected by previous attack. On November 4th, thirteen days after return, spent the evening in company with a school-fellow who twenty-four hours later had an attack of vomiting, diarrhoea, and sore throat (no rash seen by parents and no desquamation discoverable when medically examined later). On November 5th she went to school for the first time. On November 7th and November 10th respectively two children in the same class were attacked. An examination of the school-children following the notification of these cases led to the discovery of N. L.'s condition, and a further exclusion from school.

V.—The following cases illustrate the *low infecting power of scarlet fever when apparently circumstances were eminently favourable for a rapid spread of the disease*. In each case isolation may be fairly described as non-existent, yet no further cases followed.

(1) H. H., five house-mates, not had it, ages 9 to 23 years; only two small bed-rooms. No further cases.

(2) T. H., two other children, ages 4 and 3, unprotected by previous attack; mixed freely with patient, but escaped.

(3) T. M., two unprotected house-mates, ages 3½ and 2, no isolation, but they escaped.

(4) M. R., six, not had disease, ages 11 to 21, one bed-room divided into three cubicles. No further cases.

(5) C. K., six, not had disease, ages 10 to 24, no isolation. No further cases.

(6) H. A., six weeks after illness began returned to school still desquamating and wearing the undisinfected clothes worn during whole convalescence. Discovered after attending half-day. No outbreak followed.

(7) E. T., rash May 24th; at home a day or two, then attended large elementary school until June 6th. No further cases.

(8) A. B. and sister; seven others in house, ages 5 to 23, not had scarlet fever. Fourteen days after illness began returned to school and mixed freely with other children. Discovered in school fourteen days later, A. B. still desquamating freely. No outbreak followed.

These cases certainly suggest that remarkable escapes from epidemics, due to the eccentricity of the disease, must have frequently occurred in the days

"When wild at home the ignoble scarlets ran,"

escapes which a later generation is wont to attribute, with pardonable pride, to its magnificently equipped isolation hospitals.

VI.—Unfortunately, as is of course well known, the converse is at times equally true, that is, *scarlet fever can be contracted after an extremely short exposure*, and can be carried a long distance in clothing and other articles. I have found in the registers several striking instances of these facts.

(1) G. O. One other case of scarlet fever in the district. The father of this case came to see the mother of G. O., who was secretary of the District Nursing Committee (not herself a nurse); he sat twenty minutes in a chair, which was occupied by G. O. immediately after he left; five days later she developed the disease, though there was absolutely no history of any other exposure to infection.

(2) Two cases of scarlet fever in isolated group of houses (cases in one house). It appeared that just before they began a relative who lodged in a house from which cases had recently been removed, but himself quite well, had come home for the week-end, walking six miles to do so.

(3) A. T. Person from infected house walked three-quarters of a mile to fetch this child's night-suit as a pattern; mother of A. T. gave it to her, and then hearing that she had a sick child (case then not diagnosed) called her back when she had gone a few yards and took night-dress back. A. T. developed scarlet fever three days later, though no other exposure could be traced.

(4) E. J. Rash January 31st. No cases in this part of district,

but enquiry revealed that uncle, whose child began to be ill with scarlatina on January 28th, had walked over to see E. J. (two miles) the same day. There had been no other communication between the families.

(5) Mrs. T. M. literally nursed her infant aged 2½ years through an attack of scarlet fever in January, 1903. In January, 1906, went into an infected house, but hearing of case here did not sit down, and remained a few minutes only. Went home panic-stricken, and thirty-six hours later developed severe scarlet fever.

(6) Five persons in house, one a baby. First case April 12th, kept at home. No further cases until May 1st, but between 1st and 9th all the rest of the family, save the baby, were attacked.

It is a common practice with the artisan classes in our district to increase the bed-clothes by the addition of overcoats and other articles of clothing in daily use. If an overcoat lies during the night on the bed of a scarlet-fever patient and during the day being worn by the father on his way to and from work, hangs close beside or upon the coat of a fellow worker, it may readily become a carrier of infection. The following case may possibly be accounted for in this way.

(7) A. A. H. lives in isolated village, no other cases of scarlet fever in district and not been away nor had any visitors. Father, however, works in a mill in another district two miles away, where scarlet fever is epidemic.

In concluding my paper I must again confess that extensive opportunities for observation are essential for the collection of materials which may bring us nearer to the solution of the many problems which scarlet fever presents, for it is of all infectious disorders the most prone to vagaries at present inexplicable.

IS SCARLET FEVER LESS PREVALENT AS WELL AS LESS FATAL THAN FORMERLY? *

By J. C. McVAIL, M.D., D.P.H.

Medical Officer of Health of Stirlingshire.

THE lowering of a death-rate from a given disease may depend either on diminished prevalence of the disease, or on diminished fatality, or on both. Now, in enteric fever it is known that the fatality-rate, that is, the number of deaths per 100 attacks of the disease, is practically unchanged. The type of enteric fever from which the country suffers now seems practically identical in its severity

* From Annual Report, 1906.

with that from which it has suffered at any time during the past half century or more. The diminution, therefore, of the death-rate from enteric fever corresponds with the diminution in the prevalence of the disease, as is shown in the notification figures given below. In scarlet fever the facts are quite different. It is well known that that disease is now very much milder than it was a generation ago, or even ten years ago. The important question, therefore, arises whether the remarkable fall in the death-rate from 243 in the first quinquennium to 187 in the second and 1036 in the third is wholly due to change in type, and is independent of any lessening in the number of cases. The subjoined figures give the answer—

ENTERIC FEVER NOTIFICATIONS PER 1,000 OF POPULATION.

1892-1895.				1896-1900.				
1892	1893	1894	1895	1896	1897	1898	1899	1900
1'571	4'055	2'253	2'173	1'199	'809	1'378	1'499	'866
Mean Annual Rate, 2'513				Mean Annual Rate, 1'150				

1901-1905.				
1901	1902	1903	1904	1905
'950	'970	'818	'712	'829
Mean Annual Rate, '856				

SCARLET FEVER NOTIFICATIONS PER 1,000 OF POPULATION.

1892-1895.				1896-1900.				
1892	1893	1894	1895	1896	1897	1898	1899	1900
6'299	8'900	10'383	5'980	4'405	5'956	4'595	8'746	9'548
Mean Annual Rate, 7'890				Mean Annual Rate, 6'650				

1901-1905.				
1901	1902	1903	1904	1905
6'625	2'769	2'274	1'369	1'182
Mean Annual Rate, 2'844				

They show that the prevalence of the disease in the last period is very little more than one-third of what it was in the first period. Both factors, therefore, have been at work in reducing the death-rate. There have been fewer cases of the disease, and among the cases there have been fewer fatalities. The question of the value of hospital isolation for scarlet fever in diminishing prevalence of the disease has been much discussed within the last few years; but whatever the causal relation be, the fact is that in Stirlingshire increased resort to hospital isolation is associated with diminished prevalence of scarlet fever.

THE HOSPITAL AND HOME TREATMENT OF SCARLET FEVER.

By HENRY MALET, M.D.

Medical Officer of Health of Wolverhampton.

SINCE 1894 we have kept records of all cases of scarlet fever, the number of rooms in the house, the number of persons in the house, the ages of non-adults, and any previous attack of scarlet fever amongst them. These records are summarized yearly, and all instances where there are other susceptible persons in a house besides the primary case are tabulated. Persons over eighteen years of age, and those who have had a previous attack of scarlet fever are considered insusceptible.

The summary for the borough for 1906 is as follows: Hospital removal was effected in 247 houses. After the first removals there remained in these houses 629 children. In 221 of these houses there was no recurrence after removal, 547 children escaping. In 26 houses there was recurrence, 33 children being attacked. In these twenty-six houses 49 children still escaped after final hospital removals. Of the 33 secondary cases 11 were ill within two days of the previous removal, and probably infected before it; 3 were more than three weeks after the removal, and probably due to independent infection. This leaves 19 cases, possibly due to failure of hospital removal; or to speak more correctly, due to failure to secure complete disinfection.

Cases were treated at home with reasonable facility for isolation in 30 houses, where there were 50 children besides the primary cases. Secondary cases occurred in 5 of these houses, 5 recurring. One of these cases was ill within four days of the primary attack, and therefore probably infected before any care was taken.

The following tabular statement shows the results at a glance:—

	Hospital Removal.	Home Isolation.
Total houses ...	247	30
Cases recurred in ...	26	5
Number of children after primary cases ...	629	50
Number subsequently attacked ...	33, or 5'2%	5, or 10'0%
Number possibly due to failure ...	19, or 3'0%	4, or 8'0%
Number of children escaping ...	596, or 94'8%	45, or 90'0%

The following is the total for the thirteen years, 1894-1906:—

	Hospital.	Home.
Total houses ...	2,904	376
Cases recurred in ...	295	129
Number of children after primary cases ...	7,766	721
Number of these attacked ...	372, or 4'8%	179, or 24'8%
Number possibly due to failure ...	183, or 2'4%	120, or 16'6%
Number of children escaping ...	7,394, or 95'2%	542, or 75'2%

The cases treated at home were, of course, in roomy houses where isolation was possible;* those removed to the hospital include a great majority from small and comparatively crowded houses; thus, the evidently greater protection afforded the latter is very striking. There is, however, one correction which should be made in estimating the amount of protection which hospital removal affords the children left in the houses. In some instances, after the return home of a hospital case fresh cases occur. This year we had 16 such cases. If we add these cases to our 19 failures we have 35 cases due to hospital failure out of 629 children in the year, or 5.6 per cent, compared with 8.0 per cent in the home cases. During the past thirteen years we have had 225 of these return cases, far more than the 183 cases due to failure in the case of the first removals. Together these amount to 408 re-infections in 7,766 children, or 5.3 per cent, compared with 16.6 per cent of the children in the case of home isolation.

Many persons are nevertheless much disappointed with the failure of hospital isolation to stamp out, or at least more completely limit, scarlet fever. This disappointment is due to ignorance of the causes of the failure, and of the difficulties that have to be contended with. The actual failure is, of course, in the first place, to secure complete destruction of infection when a patient is removed. Practical disinfection of rooms and clothing, especially in the houses of the poor, is a very difficult thing to attain; in few cases can we hope for a perfect result; this is the first cause of failure, and considering its gravity it is really remarkable that we have so few cases recurring after removals from poor houses. The second and more potent cause of failure is the number of cases that remain undetected until they have had free scope to spread infection; this being intensified by the ignorance or gross negligence of so many of the public. We have continual examples of this, and while we have, any very great limitation of scarlet fever during times when it is at all epidemic in character must be quite impossible. The following are a few typical cases which occurred during the year:—A. Taken ill in school and sent home; mother sent the boy to school again next day ailing; teacher sent him home, doctor called in and found scarlet fever. B, being subject to sore throats no notice was taken at first, and case attended school until teacher noticed peeling, then was sent home, and

* Besides the patient, in one instance 5 children were in a 16-roomed house with 9 bedrooms; in another, the same number in a 7-roomed house; in another, 2 children in an 8-roomed house, and 2 in a 7-roomed house; 1 child in 11-roomed house, and 1 in 10-roomed house. In such cases home isolation ought to be easily practicable.

taken to a doctor. C, a child, was ill while away from home, kept in bed for a fortnight, thought to be German Measles; after a total four weeks' absence came home by train; eleven days later mother and two other children had scarlet fever, and C was found peeling. D had a rash, supposed to be nettle rash, no doctor; after thirteen days, during which D was attending school, another child had scarlet fever, and D was found peeling. E was ill in school, stayed away for a week, then returned for a week, when teacher found peeling. F, similar to last, was away from school with a sore throat for a few days, returned for a fortnight before teacher noticed peeling and reported; on Inspector enquiring mother said child had had mumps; doctor was called in and certified scarlet fever. G had a rash, was not ill nor kept from school; 8 days later a brother had scarlet fever, doctor called in and certified both cases. Even without definite negligence obscure cases will at times give trouble:—All three children in a house had scarlet fever at intervals of 20 and 3 days, each case being promptly removed to hospital; then it was found that a young servant had had a sore throat six days before the first child was taken ill, and she had been, and was then, peeling. A doctor saw a boy with presumably indefinite symptoms, saw him again a week later; eleven days later the boy was taken to the doctor and found peeling; meanwhile a child had played with him and got scarlet fever.

THE USE OF ISOLATION HOSPITAL ACCOMMODATION FOR PULMONARY TUBERCULOSIS.*—During a part of the year the vacant accommodation at the Sanatorium (St. Helens) was utilized for the isolation and treatment of cases of phthisis. The object aimed at has been to place the patients in such circumstances that at any rate a partial recovery may be facilitated, and at the same time to teach them such simple hygienic measures as can be carried out in their own homes. A large pavilion was set apart for the purpose, the windows of which were kept open night and day, so that the patients might be taught the harmlessness of fresh air. The patients were specially instructed in the manner in which the expectoration was to be dealt with, and they became accustomed to the use of the pocket sputum bottle. It was mostly advanced cases of the disease that were admitted, but remarkable improvement was noted in many from the new hygienic conditions, the more severe constitutional symptoms became abated, the cough and spit became much diminished, the physical signs improved, and many began to gain in weight. The symptoms of improvement had a marked educative effect on the patients treated, and encouraged them in the continuance of the régime, and although several have relapsed since their discharge from hospital into their old habits, yet in others some permanent improvement has been carried out, both in arresting the disease in the sufferer himself and preventing its spread.

* From Dr. Buchan's Annual Report, St. Helens, 1903.

ON AN OUTBREAK OF SCARLET FEVER AND SCARLATINAL SORE THROAT DUE TO INFECTED MILK*.

By ARTHUR NEWSHOLME, M.D.

Medical Officer of Health of the Borough of Brighton.

IN October last an interim report was made concerning an outbreak of scarlet fever and scarlatinal sore throat, associated with a particular milk supply. The administrative measures which were taken were fortunately successful in preventing extension of the epidemic, and as they were largely independent of statutory powers, it appears desirable to record the circumstances for future guidance.

For the right understanding of the epidemic, it is convenient to summarize certain facts as to the spread of infective diseases. Such diseases are, probably in every instance, due to a specific microbe, the illness being caused by the poisonous products of the growth of the microbe. These products may be manufactured by the microbe in the blood or tissues of the patient, or they may have been prepared in advance by the growth of the microbe in some other substance. In either case, the probability of producing disease and the severity of the attack depends partly on the virulence or poisonous qualities of the microbe to man, partly on the dose of microbes received, and partly on the susceptibility of the patient. In scarlet fever, as well as in other microbic diseases, a difference arises according as the microbe elaborates its poison in the body of the patient, or is prepared in advance in some other medium. In the former case the incubation period is usually more prolonged before the poison has accumulated sufficiently to overcome the natural resistance of the patient and recognizable symptoms of scarlet fever appear. In the latter case, when the microbe has lived in a suitable substance, it may elaborate in that substance doses of poison large enough to cause recognizable symptoms within a few hours after this substance has been taken into the patient's body. Clinical evidence shows that the microbe of scarlet fever grows readily in milk; and the subsequent distribution of scarlet fever produced by this milk would obviously be much more rapid and extensive than could possibly occur in connection with personal infection, being limited in fact only by the distribution of the milk. Personal infection passes slowly from person to person, infection by milk acts on the same day on a large proportion of the total number consuming the milk in question. There are thus, at

* From Annual Report, Brighton, 1906.

least, two differences between epidemics of scarlet fever due to milk infection and those due to personal infection. (1) In milk epidemics the incubation period in each attack is most often extremely short; and (2) the total epidemic is explosive in character; while in epidemics due to personal infection, the incubation period of each individual attack is somewhat longer, and the total epidemic is much more prolonged. In one instance the epidemic is usually a question of a few days, in the other of weeks, or more often of months.

These facts are stated, not for their theoretical interest, but because they give certain guiding rules for preventing the spread of scarlet fever, of which the most important are that when cases of scarlet fever and scarlatinal sore throat appear in suddenly increased and rapidly increasing numbers, first the milk supply should be promptly and carefully investigated; and secondly, inasmuch as the delay of a few hours is competent to increase an epidemic to a disastrous extent, action must at once be taken on the best evidence that is available, irrespective of whether that evidence is conclusive as to the cause of the outbreak, so long as it justifies a reasonable apprehension of public danger.

It follows from these rules that in dealing with an outbreak of scarlet fever any procedure involving delay through legal or administrative routine is dangerous to the public safety, and that when this disease is conveyed by milk the community is dependent largely for its control on the fulness and promptitude of the information obtainable from the dairyman. In view of this circumstance, in November, 1905, I issued to the dairymen of Brighton a circular, of which a copy is appended to this report, inviting them to keep a constant record of the separate sources of the milk distributed daily on each round; and this recommendation has been largely adopted, and has been so adopted in the dairy in which the present outbreak occurred, thus enabling me immediately to identify the source of the milk supplied to the implicated households.

The first two cases of scarlet fever in the present epidemic were notified on October 15th, and on the same evening the inspector's routine report stated, among other things, that the families were supplied with milk from A.'s dairy. Although these two cases were totally insufficient to justify a definite conclusion, my suspicion was aroused by the fact that several "swabs" from suspected diphtheria patients had arrived during the same day; scarlet fever in its early stages presenting symptoms often difficult or impossible to distinguish clinically from diphtheria. I at once telephoned to the dairy, and found that it supplied the milk to each of the houses from which the

"swabs" had come, as well as the two houses where scarlet fever had occurred. These facts, although they made me apprehensive, did not justify immediate action in regard to the milk; but from this point every doctor seen was recommended to advise the temporary boiling of milk among his patients. Next morning (16th October) at 9.0 a.m., I was informed by a doctor that he had several cases of sore throat in his practice. Particulars of these were obtained; and when the manager of the dairy later in the day called on me by previous appointment, I found that in these cases not only had their milk come from the dairy A., but also from B.'s farm, whence the chief part of A.'s milk was received. The facts so far collected, conjoined with those relating to the boarding school Z., which had meanwhile come into my possession, justified the conclusion that the outbreak was attributable to this source, and the action which this conclusion demanded. A special meeting of the Sanitary Committee was called for the following morning (17th October). In the meantime, I went over the facts with three representatives of the dairy; and the farmer suspended from his work a milker to whose circumstances suspicion attached. The Committee authorized the payment to the farmer of partial compensation at the rate of 4d. per gallon, in consideration of his destroying all his milk for a week, and this arrangement was extended subsequently for a second week. With this measure the epidemic stopped. The total amount paid to the farmer was £93 10s.

These facts in themselves show that the epidemic was caused by the milk in question, and it is indeed seldom that a sanitary authority has, in such cases, so high a degree of probability on which to base its action. In controlling the epidemic within two days of the notification of the first cases the measures taken at each stage were only possible through the co-operation of the dairyman. Had it been necessary to proceed by compulsory powers, some days, and perhaps a week, would have elapsed in the routine procedure involved; and, if the infection had persisted, the dimensions of the epidemic would have been enormously larger than the considerable numbers which actually occurred. It is extremely difficult to prevent accidental infection even in a dairy, in which, as in Dairy A., the management is good; and it is thus most important for the town to show to the dairyman the utmost consideration consistent with its safety; and even after the event to show on the basis of the facts of the entire epidemic as it eventually became known that the original induction was completely accurate.

Of course this does not imply that even if fuller knowledge had

shown that all the previous coincidences between the supply of milk from B.'s farm and the cases of scarlet fever, in association with the absence of scarlet fever where this milk was not supplied, and with the striking experience of the boarding school Z., were accidental and not significant, the action of the Sanitary Committee would thereby have been shown to be improper. In the case of a rapidly spreading disease it is as important to the community that what is reasonably apprehended to be a source of infection should be stopped, as it is to a family that a suspected case of infection should be isolated; and

TABLE I.
NUMBER OF CASES OF SCARLET FEVER AND SORE THROAT
AMONG CUSTOMERS OF A.'s DAIRY IN THE BOROUGH AND
IN THE REST OF THE BOROUGH.

Number of cases during the month of—	A.'s Dairy.*		Rest of the Borough.	
	Scarlet Fever.	Sore Throat.	Scarlet Fever.	Sore Throat.
August	—	1	14	16
September	1	18	14	19
October	38	215	17	27
November	3	3	22	25
December	2	2	20	12
Number of cases from the 8th to 22nd October inclusive ...	33	203	7	17
Number of cases from the 8th to 22nd October inclusive, not reckoning cases found by visiting homes of customers of A.'s dairy	33	99	7	17
Number of families supplied with milk from A.'s dairy or from other sources	755		About 28,000	

the action taken must be that which will minimize danger, if the reasonable apprehension is subsequently confirmed. In most epidemics the early evidence is not so clear as in this case, and the fuller information necessary to incriminate a milk supply with certainty must consist of the actual continuance of the epidemic; and it is therefore in such instances inconsistent with public safety to delay action in the face of reasonable apprehension, even though conclusive evidence

* Including 5 cases of scarlet fever among customers of U.'s dairy.

may not be available. If, however, the co-operation of dairymen, on which the rapid suppression of these dangerous and costly epidemics depends, is to be secured, they can reasonably expect that the fuller facts of the entire epidemic shall be investigated and set forth, in which the evidence as to cases known when administrative action was taken and those subsequently coming to light shall be sifted and stated. In the following pages this has been done.

The accompanying coloured chart (Fig. 1) shows for the month of October, in which the epidemic occurred, and for the two previous and two subsequent months, the number of cases of scarlet fever and of sore throat which occurred (*a*) among the families supplied with milk from the incriminated dairy, and (*b*) in the rest of the borough. In a lower part of the same chart are shown the cases of scarlet fever and of sore throat occurring outside the borough among customers of the dairy in question which came to my knowledge.

For obvious reasons I cannot supply corresponding data for the remaining parts of the population of these districts outside the borough. Each primary case of scarlet fever is shown in Fig. I. by a red square, and of sore throat by a black square; secondary cases, infected from previous patients in the same outbreak, being shown by circles. The same facts, classified according to months, are set forth in Table I., so far as relates to the borough. In regard to all these figures, which represent the dates of probable onset of the disease, it must be borne in mind that they cannot be stated within a day or two with actual certainty. In the charts and tables they have been taken at the earliest probable date.

Sources of Information.—Information as to cases was derived from the following sources:—

1. Notifications of cases of scarlet fever.
2. Informal notification by doctors of cases of sore throat, which were not recognizable as scarlet fever. Many doctors consulted me as to puzzling cases under this heading which had occurred among their patients; and by this means, as well as from official sources, I received information as to illness outside the borough. Notification as to similar cases of sore throat reached me through the following further channels.
3. A certain number of cases were notified as diphtheria, but were found not to have diphtheria-bacilli in their throats, and were associated with the outbreak of scarlet fever.
4. In other cases diphtheria was suspected, and throat-swabs were sent to me for examination, with a negative result. The clinical diagnosis of diphtheritic from scarlatinal throats is often very difficult.

5. When the outbreak was fully established, and very numerous messages and letters were being received from both inhabitants and doctors on the subject, the opportunity was taken to make a house-to-house enquiry among the customers of A.'s dairy.

At this enquiry the date of onset of any cases of sore throat was ascertained, and no mention of milk supply was made. These enquiries were made after the supply from A.'s farms had been stopped; and the opportunity was taken, when suspicion had been already aroused, to state that the then supply of milk was quite safe. One hundred and four cases were ascertained in this way, and precautionary measures were thus rendered practicable which, had they not been taken, might have been followed by a considerable crop of secondary cases. There can be little doubt that the information obtained by these different means understates the full magnitude of the epidemic.

Looking back at the facts gradually collected by these various means, it is evident that some cause of scarlet fever and sore throats came into rather sudden and extensive operation during the month of October.

TABLE II.
NUMBER OF CASES OF SCARLET FEVER AND SORE THROAT
IN THE BOROUGH PER 100 FAMILIES HAVING OR NOT
HAVING MILK FROM A.'s DAIRY.

Month.	A.'s Dairy.			Rest of the Borough.		
	Scarlet Fever.	Sore Throat.	Total.	Scarlet Fever.	Sore Throat.	Total.
August ...	—	0'1	0'10	0'05	0'06	0'11
September ...	0'1	2'4	2'50	0'05	0'07	0'12
October ...	5'0	28'5	33'50	0'06	0'10	0'16
November ...	0'4	0'4	0'80	0'08	0'09	0'17
December ...	0'3	0'3	0'60	0'07	0'04	0'11
Special period from the 8th to the 22nd October inclusive	4'4	26'9	31'3	0'02	0'05	0'07

Evidence of Milk Infection.—1. That this was no ordinary spread by personal infection is almost proved by inspection of the chart. It is, as is pointed out above, characteristic of scarlet fever that when spread by personal communication it spreads slowly and gradually. The present outbreak was explosive in character. Such peaks as that in the chart are never seen in the experience of a large town

FIGURE II.

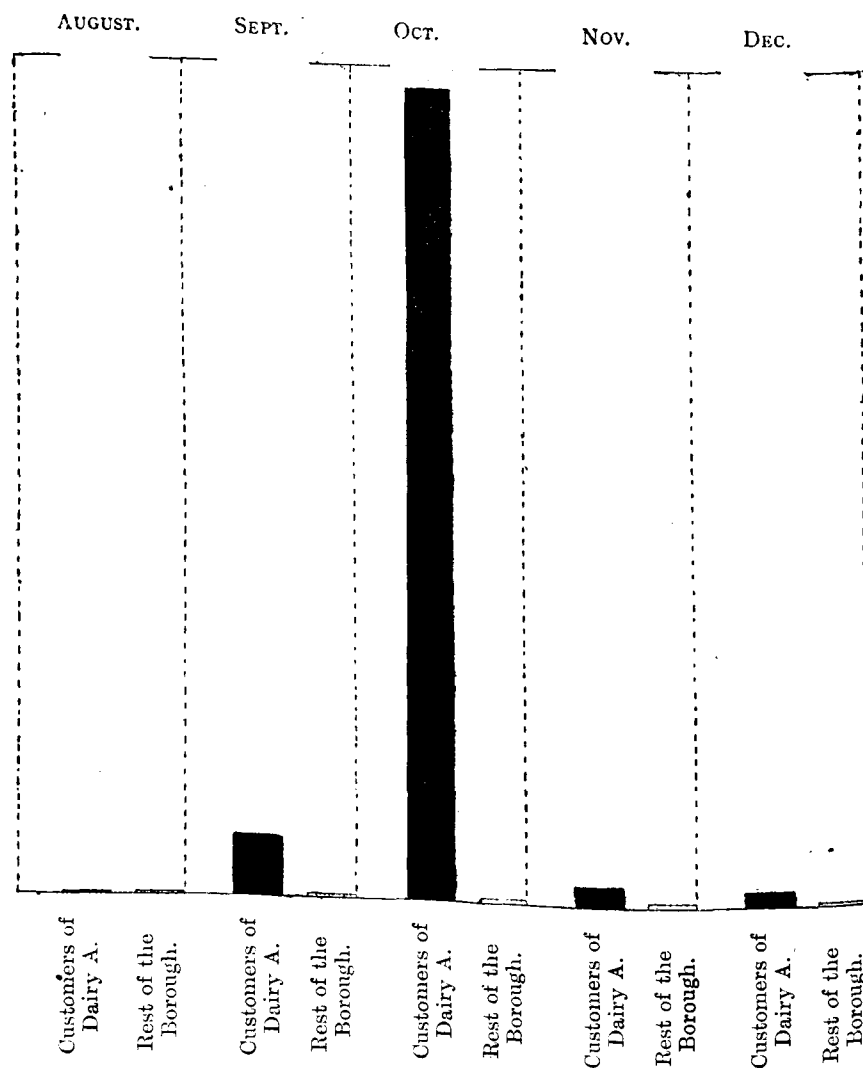


Diagram showing the relative incidence of Scarlet Fever and Scarlatinal Sore Throat in every 100 houses.

(a) Among customers of A.'s Dairy.

(b) In the rest of the Borough.

unless a water supply has become infected on a large scale as in enteric fever, or a milk supply as in scarlet fever.

2. That the milk of A.'s dairy caused the chief outbreak is proved by the chart relating to the borough, in inspecting which it must be remembered that the upper part relates to 755, and the lower to 28,000 households. This is shown more clearly when the incidence of sickness is stated in proportion to every 100 families, as in Table II. The differences there indicated are set forth graphically in Fig. II. The immense preponderance during October of sore throats and scarlet fever in connection with the milk supply is very obvious.

3. The social and domestic circumstances of the vast majority of the patients excluded personal infection as a primary cause of the epidemic. Of the total 236 cases of scarlet fever and sore throat occurring in the borough between the 7th and 23rd of October among customers of A.'s dairy, six of scarlet fever and twenty-three of sore throat occurred in six boarding schools and small homes connected with schools. The occupants of these establishments live a relatively segregated life, and their movements can be traced with exactitude. Exhaustive enquiries were made, and in not a single instance could the importation of infection be traced, apart from milk. A similar investigation showed that in the private families involved similar personal infection was very improbable. The chart shows that at the time when the epidemic occurred among the customers of A.'s dairy, there was for a population of about 125,000, only a small amount of scarlet fever in the rest of the town.

The special circumstances of several cases almost certainly excluded personal infection. Thus, attacks occurred in bedridden patients, and in children who had been confined to the house for a fortnight.

4. The geographical distribution of the cases followed the distribution of the milk from A.'s dairy over two towns and to a boarding school which was outside both towns. Complete information as to locality of cases can only be given for the borough itself. Various parts of the borough were dotted with cases of illness in fair accordance with the amount of milk distributed by A. in these parts. The incomplete information available for the areas of supply outside the borough (shown graphically in the lower part of the chart) indicates that the distribution of illness in these parts, constituting about a third of the total supply, was similar to that in the borough. In arriving at this conclusion, it has to be borne in mind that 104 cases were discovered in the borough by means of domestic enquiries, which could not be extended beyond the limits of the borough.

This concession is, in my opinion, a mistake, for it abandons science in favour of mere supposition as foundation of the regulation, and the fact has been overlooked that measles, as Bohn appropriately remarks, is only *de facto* and not *de jure* a children's disease, and further, that predispositions may change.

When it is fully considered that the final result of the struggle against school infection, if it attains any success at all, must be that more individuals will pass school age without having had measles, this concession implies that a scholar over twelve years of age will be liable to fall ill and infect others in his prodromal stage, but will still be able to come to school. I cannot agree with this, for the secondary school, as well as others, is under a moral obligation to prevent everything which endangers the health and life of its pupils.

In fact, I can already report upon an observation apropos of this, although the new regulation has not yet been a year in force. In February, 1906, two scholars of the fourth class of the second gymnasium in this town suddenly fell ill of measles at a time when the whole left bank of the Mur, the area served by this gymnasium, was free from measles; simultaneously it was noticed that the son of a landowner living outside Graz stayed away for twelve days without giving a reason. Investigation proved that the sister of the latter had had measles at home in January, but that he himself, being over twelve years old, continued to attend school without hesitation and without mentioning his sister's illness; after twelve days he developed a rash. Had this boy, in a case so clear and so well supervised, remained at home even from the ninth day onward after his sister fell ill, the infection of the gymnasium would not have occurred. By limiting the exclusion of such older yet unprotected house companions to the period from the ninth to the fourteenth day after the occurrence of the first case in the family, we can make this exclusion less severe. But that must be done only with cases under efficient medical supervision and in which there can be but one source of infection, otherwise Eserich's warning holds good, rather to renounce the slight advantage gained by allowing children to attend school until the seventh (or ninth) day of the incubation period, because it is often difficult exactly to define the period during which the family is, or may be, infectious; and an error would negative the whole value of the precautions taken on account of the extreme infectiousness of the exanthemic stage.

Here we reach the discussion of point 2 quoted above.

(2) Formerly the medical officer was first sent to a school when an epidemic had broken out; in fact it was the fiscal and not the hygienic point of view which counted. It was known, indeed, what decisive

importance attached to the schools as regards the spread of measles, but it was believed that school closure was unjustifiable before the time when, "according to medical opinion, the infected scholars increase in considerable degree or display a specially bad type of disease." People did not reflect that in a measles epidemic this almost necessarily implies infection of the whole susceptible material; and the closure of a school or class which now followed could not therefore claim the value of a prophylactic precaution, but at best merely that of an educational expedient, successful continuance of education being impossible when half of the scholars are simultaneously absent for fourteen days and longer.

To-day the importance of the first case is recognized, and the Graz physician, Dr. Widowitz, has rendered good service in making out a clear and convincing case for a proposal already made by Casper, but renewed by him, exemplified by his own observations, in the *Vienna Clinical Weekly*, 1898, No. 36.

Having observed that the scholars infected by the first cases of measles which find their way into a school communicate the disease in turn to other children in the school from about the ninth to the thirteenth day after their own infection occurred, he proposed that when in any place measles had not yet attained epidemic proportions, those school classes in which the first case occurred should be closed for five days from the ninth day after the sickening of the first child. The invasion of a school by measles as a rule takes place by the sickening first of all of a child who is either a newcomer in the district or has recently returned from a holiday. Perhaps ten or twelve days later a few children fall ill, frequently those sitting next to, or those who have had most intercourse with, the child who is ill. In the third "generation" cases occur for the first time *en masse*, and probably extend also to other classes. Only in overcrowded or overheated class rooms in the winter months do explosive outbreaks occur, as a rule, in the second generation, and not first in the third. (Here the "drop infection" studied minutely by Flügge-Neisser evidently plays a part.) As Eserich expresses himself, a certain mass and density of infection material is required in order that it may become effective; in homœopathic dilution the poison is as inefficient as our own drugs.

It is therefore, so to speak, unavoidable that the first case should involve secondary cases; for it is not known that the first child will develop measles, and he is allowed, therefore, even in the prodromal stage, to mix as usual with the others. But it is known to-day, from careful observations, that the second "generation," if the class in question is not protected by previous attack, will produce much more

It will be noted that in each successive series of cases (1) B.'s milk was supplied wherever cases of sickness occurred; (2) milk from T. was absent in the first series from 35 per cent, and in the second and third series from at least 39 per cent of the families supplied with and suffering from the effects of contaminated milk. It follows certainly that the milk from T. had no causative relationship to the entire outbreak, and almost certainly played no part in causing the outbreak.

That the milk from B.'s farm caused the outbreak is shown by a number of further circumstances, one of which amounts to what in scientific investigations is known as a control experiment. This will be described later as a "control experience."

(1). *Experience as to definite cases of scarlet fever.*—During the month of October thirty-two cases of scarlet fever occurred in the borough among customers of A.'s dairy, and six further cases infected secondarily by personal infection. Six further cases occurred in the boarding school Z. The facts as to source of milk supply can be given with exactitude for these thirty-eight primary cases of scarlet fever, and they are set forth in tabular form as follows:—

Milk from B.'s Farm. (370 gallons daily).	Direct to Boarding School Z., outside the Borough, 6 cases of scarlet fever.	
	To A.'s Dairy about 370 gallons a day distributed in the Borough and elsewhere. (Two-thirds in the Borough).	<i>Distribution in the Borough.</i>
		To dairymen U. 5 cases of scarlet fever.
Milk from T. (68 gallons daily.)	B.'s milk only.	To families having 13 cases of scarlet fever.
	B.'s milk and occasionally milk from T.	to families having 3 cases of scarlet fever.
	B.'s milk mixed with milk from T.	to families having 11 cases of scarlet fever.

* The facts in Table III were compiled from information from the manager of A.'s dairy. At first this information was given without any reservation. Subsequently he stated that the above grouping of supplies could not be absolutely depended upon, and that in the rounds supplied with B.'s milk, a small amount of milk from T. may occasionally have been distributed. The substantial accuracy of the information originally supplied by him is, however, proved not only by the preceding facts, but also by those contained in the next paragraph.

(2). *Experience as to cases of sore throat.*—The information at my disposal does not enable me to give corresponding information relating to the 215 cases of sore throat occurring in the borough during October among customers of A.'s dairy. It has been possible to obtain it for 102 cases of illness with the consistent result shown in Table III.

(3). *The experience of the dairy U.* confirms the same conclusion. This dairymen supplied 150 gallons of milk daily to his customers, and at the time of the epidemic was purchasing from A.'s dairy ten to twenty-five gallons of milk daily. This milk came from B.'s farm and was unmixed with milk from T. It was distributed in a special localized district, and no cases of scarlet fever occurred among U.'s customers except in this localized district, in which five cases occurred simultaneously with the cases among the direct customers of A.'s dairy. There were no other cases of scarlet fever in this localized district at the time.

(4). *The experience of the boarding school Z.* gives a conclusive "control experience." This school has forty-five resident pupils, among whom six cases of scarlet fever and four of sore throat occurred from the 13th to the 19th of October inclusive. The first patient was a boy with a sore throat, who was strictly isolated from the 13th to the 15th of October. On the latter day a second boy fell ill with sore throat, on the 16th four boys failed with scarlet fever, and on the 17th one boy failed with scarlet fever, and on the 19th one case of scarlet fever and one of sore throat occurred. The first patient had not been exposed to any outside source of personal infection, and the isolation arrangements were so good as to render it improbable that this first patient could have infected the nine subsequent patients. The ten patients were distributed over three dormitories, and the patient who fell ill next after the first slept in a separate dormitory. After the first few days, these ten patients were all transferred to a special ward in our Borough Isolation Hospital, where they were all nursed together. To imagine that ten patients would thus rapidly be infected from one another in an admirably organized boarding school, under daily medical supervision and control, is contrary to everything known about the conditions of spread of scarlet fever. That such an explanation would be erroneous is further indicated by the contemporaneous events in the neighbouring borough, including six other boarding schools, which are shown in the chart. During the same days on which the boys at the school Z. were falling ill, numerous similar cases were beginning in many different districts, all having one factor, and one factor only in common, that they were supplied with milk from A.'s dairy or B.'s farm.

The relationship of the school Z. to this dairy was peculiar. The headmaster of the school, in his anxiety to secure the best possible milk supply for his pupils, had a rigid agreement that he should be supplied with milk in a sealed and locked four-gallon can, this milk being always put into this can at the farm B., and never mixed with any other milk at the dépôt connected with A.'s dairy. There can be no doubt that this agreement was never in default, and this particular arrangement, therefore, forms conclusive evidence, if further evidence were required, that the infectivity of the milk of A.'s dairy originated on B.'s farm. The special incidence of illness among boys at this school having an extra milk diet has already been stated.

Circumstances of B.'s Farm.—It has been conclusively shown that the milk supplied by A.'s dairy was not contaminated by its auxiliary supply from T., but on the way from B.'s farm to the dairy dépôt or actually on the farm. The contamination of the milk in transit was extremely improbable for all the churns, and impracticable so far as the supply to Z. was concerned. The carter was examined, with a negative result, and there was no illness in his family.

B.'s dairy farm is kept under conditions as to cleanliness and sanitary supervision which are much above the average. Each milker is under an obligation to report any suspicious case of illness. At the time of the outbreak 148 cows were kept. These were milked by eighteen men in the morning, and ten in the afternoon.

How did the Milk on B.'s Farm become infected?—Milk is known to produce scarlet fever when those suffering from this disease or possibly those coming from infected households are brought into close contact with it, as in milking. It is also believed that a certain disease of cows, the "Hendon disease," may sometimes cause scarlet fever in human beings consuming unboiled milk from the affected cows. These two lines of investigation were taken up. It should be stated at this point that the farmer gave every facility for inspection by myself or my deputy, of the cowsheds and of all employees and of the cows by the veterinary surgeon of the Corporation. This is specially mentioned, because, as I have already pointed out, had we been obliged to wait the adoption of the legal procedure under Section 4 of the Infectious Disease Prevention Act, considerable delay in the investigations at the farm would have arisen. In actual fact I was previously familiar with the cowsheds and cottages on this farm, which are much more sanitary and better kept than the majority of similar premises on farms.

(1). As regards employees and their families, these were all examined on several occasions by several doctors without finding definite evidence

of illness. Two cowmen, father and son, were suspected to be desquamating, but I was unable on examining the men to confirm the suspicion, and apparently they had not been ill. The child of another cowman fell ill during the epidemic with supposed scarlet fever and was removed to an isolation hospital. Whether this child was infected from the milk, or her father had previously had an unrecognizable attack of scarlet fever could not be certainly stated. The child of a third cowman P., near the end of July, was removed from a cottage on the farm to an isolation hospital suffering from supposed scarlet fever. Two or three weeks later while in hospital she developed a very severe attack of scarlet fever. It is possible that the first attack was mistakenly thought to be scarlet fever, and that she caught this disease in hospital; it is equally possible that the second attack was a relapse. At the time of writing I have under my care a case of such relapse of scarlet fever, in which the relapse is much more severe and complicated than the undoubted first attack of scarlet fever for which the patient was admitted to hospital.

At the time when the milk at B.'s farm became infected, the preceding child was still in hospital. She had been visited weekly by her father, who had been back at his milking work for several weeks at the time of the milk-produced epidemic. There is every reason to think that he could not have brought home infection from the hospital, and apparently he himself had remained well. On September 2nd another child of this cowman became feverish, after visiting the hospital earlier in the same day. A doctor saw the child the same evening and again the next day. The possibility of scarlet fever was canvassed, and after some hesitation excluded. During the three weeks preceding the milk-produced epidemic, this child played in the cowsheds on different occasions. It should be added that on December 2nd, this child went to the village of S. to visit his sister, who by this time had left the hospital, and on the 4th of December he fell ill with scarlet fever.

From the preceding sketch of facts, it is evident that one cannot with any certainty state a definite human medium by which the milk became infected. The evidence stops at the stage of suspicion and surmise, and does not throw any blame on anyone concerned; though I think we may draw the moral that cowmen's children should not be allowed to visit, and that their homes should not be near cowsheds.

(2). As regards cows, the veterinary inspector reported on the 18th October, that a cow had a pustule on its udder, but that this was not, in his opinion, of the same nature as those present in the "Hendon disease." Unfortunately in the rush of work, the opportunity

of obtaining cultures from this pustule was lost. The cows were also seen by the superintendent of the Brighton Public Abattoir, and he reported that one cow which with seven others had come from M. C., on October 6th, had an abscess on the udder, with a scab over it. This is the same case as the one reported by the veterinary inspector, and subsequently got well. Another cow had a small abscess of the udder, and was slaughtered on the initiative of the farmer. A hairpin had been swallowed, penetrated through the stomach, and produced an abscess between the diaphragm and the stomach. Two further cows, when examined on 29th October by a veterinary surgeon, acting for the dairy, were found to have abscesses of the udder.

The preceding summary does not lead to any certain conclusion as to the source of the infection, and if it were of human origin this is not surprising. The cases of illness undoubtedly due to this milk varied greatly in character. In some there was only slight sore throat; in others a very severe tonsillitis with acute adenitis; in others a well developed and unmistakable scarlet fever (see chart). Some of the cases of scarlet fever only desquamated partially; while on the other hand some of the cases having only sore throat and no rash had considerable desquamation. In one case the sore throat was followed by rheumatic fever and pneumonia. In another patient (fatal), who at the time she became infected was suffering from gastric ulcer, and therefore living chiefly on milk, the symptoms resembled general septicaemia, pneumonia supervening. In another patient (fatal), so much vomiting followed the sore throat that the patient was suspected to have a perforated gastric ulcer, though this was not so.* If, then, the person infecting the milk in the cowshed was only slightly ill, he might have infected the milk without his illness being recognized. Milk is an excellent medium for the growth of scarlatinal germs. A glance at the chart and at Fig. I. shows that probably the milk of A.'s dairy was infected at intervals to a less extent during the four weeks preceding the great outbreak.

* I have not thought it necessary to enter into further details as to the clinical features of the cases in the epidemic. It may be mentioned that cases of scarlet fever and of sore throat were treated in the scarlatinal wards of our isolation hospital with scarlatinal patients unconnected with this outbreak. No case of cross-infection occurred. Some of the cases lend colour to the supposition that a dual poison was working, and the facts previously stated as to cows' udders may support this view. All the unusual complications present are, however, occasionally found in epidemics of scarlet fever due to personal infection, and the presence or absence of rash in scarlatinal sore throats is probably in the main a question of dosage of infection. One reason why scarlet fever has not been able to be brought more completely under administrative control is the non-recognition of the scarlatinal nature of sore throats in persons associated with cases of scarlet fever.

An attempt was made, without success, to trace the milk supplied to the school Z. to a particular cowman, but without success. The foreman at the farm always poured the milk for this school into its special locked can, and no special cowman always milked for this particular supply. The milk milked by the cowman P. was mixed with the rest of the milk before leaving the farm.

The main conclusions from these facts are as follows:—

1. The epidemic was due to milk from B.'s farm.
2. Its immediate control was due to the prompt action of the Sanitary Committee, and the active and intelligent co-operation of the dairymen and the farmer.
3. The expense and loss entailed both on the town and on the dairy and farmer by the measures that were taken were far less than would have resulted from the continued supply of infected milk.

I may add that the whole cause of the epidemic illustrated strikingly the advantage to public administration of voluntary co-operation between officials and the sections of the community whose operations have a bearing on public health. This is only one added to several instances given in previous reports, in which satisfactory results have followed on the encouragement given by the Sanitary Committee to such co-operation.

Copy of Circular letter sent to Dairymen in 1905.

THE IMPORTANCE OF BEING ABLE TO IDENTIFY THE EXACT SOURCE OF MILK SUPPLY.

Public Health Department,
Town Hall, Brighton,

November 24th, 1905.

DEAR SIR,

Circumstances have drawn my attention to the difficulty which arises in identifying the original source of milk distributed in the town, especially in the case of large dairies obtaining milk from a number of different farms. It may be within your knowledge that occasionally, though rarely in the experience of Brighton, infectious diseases such as scarlet fever, diphtheria, and typhoid fever, have been spread by milk supplied. In order to enable the Sanitary Authority to ascertain the true facts in any case of suspicion, dairymen are under a legal obligation (Section 55 of the Brighton Improvement Act, 1884) to furnish when required a full and complete list of their customers to the medical officer of health. It is obvious, however, that if enquiries were made at each house named on a list thus furnished, some risk would arise of damaging the business of the dairyman, and the above powers have therefore been seldom utilized. When utilized, or even if the necessary information were obtained otherwise, the result would, when infection is traced to a given milk supply, be that the entire supply by a given dairyman or Company would need to be stopped; whereas if the method which I am about to suggest were universally adopted, it would at the worst scarcely ever be necessary to stop the milk from more than one farm, and this could be done with the utmost privacy, without any injury to the trade.

The method to which I allude is one already used at my suggestion by some dairymen in the town, and one which has been found to be of great utility in the interest of the public health, and has obviated serious expense and loss of custom for the dairymen who have employed it.

The method consists in ear-marking the source of the milk distributed in each round by each milk carrier, and recording the facts day by day. It implies also that the milk from different farms will not be mixed. When this method has been adopted it is easy to place one's finger at once on a source of infection, to visit the farm or other place in which the infection has originated, and by this means to prevent more than a minimum amount of disorganization of business, as well as a minimum amount of infection.

I venture to ask your co-operation in introducing into your business the above method of booking each day the source from which the milk in each milk-round is derived, and thus insuring your business against disturbance, as well as co-operating in preventing the introduction of infection into the town.

Believe me,

Yours faithfully,

MEDICAL OFFICER OF HEALTH.

TYPHUS FEVER AND FLEAS.

By PROFESSOR MATTHEW HAY, M.D.,
Medical Officer of Health of Aberdeen.

THE following account of an epidemic comprising 131 cases with twenty-two deaths is taken from a report of Professor Hay, reprinted in the Annual Report of the Local Government Board for Scotland, 1906.

The disease was not found to be infectious in its early stages, say, during the first week. In every instance where the first case in a family was removed before the end of the first week of the illness, no other case followed in the family. Different views are expressed by the authorities as to the period of greatest infectiousness, some placing it early and others late, but all appear to be agreed in regarding typhus as one of the most infectious of diseases. For example, Osler, in his well-known work on medicine, after referring to it as one of the most highly contagious of febrile affections, says that "in epidemics nurses and doctors are almost invariably attacked," and further, that "when the sick are aggregated in wards the poison appears to be concentrated, and the danger of infection is much enhanced." It cannot be doubted that typhus is distinctly infectious but the experience of the recent epidemic seems to show, at any rate for that epidemic, that the infectiousness is not so overwhelming as is sometimes believed. Some of the facts just stated tend to bear this out, and there are others. For example, the disease had apparently been in the city for two or three months before it was discovered and, therefore, before steps were taken to control it, yet it had not produced many cases; and, later on, when it came under the notice

of the Public Health Department, it was not difficult to control. Had measles got a similar footing in a community unprotected by earlier attacks, no doubt it would have spread like wildfire.

At the beginning of the epidemic only one member (a nurse) of the hospital and sanitary staff had previously had typhus, yet out of the members of the staff in actual contact with the typhus cases, in all about forty-six, some being in the most intimate and daily contact for three to four months, only one nurse, one wardmaid, and one ambulance driver were infected during the first eight weeks of actively dealing with the epidemic, although, later, four other nurses and one wardmaid were attacked. Some very interesting and suggestive points were observed in regard to the distribution of the attacks among the staff. No nurse in the convalescent wards was infected. Owing to the press of patients in the acute wards, several patients were early transferred to the convalescent wards, almost immediately after the active stage of the fever was passed, and presumably a week or two before they had ceased to be infectious, yet none of the nurses or wardmaids in the convalescent wards was attacked. Again, the two sisters and some of the nurses in the acute wards who were most intimately in touch with the patients during the whole course of the epidemic escaped, although not protected by having previously suffered from the disease. Also all the ambulance staff escaped, after certain precautions began to be taken.

Early in the course of the epidemic, having the analogy of malarial and certain other fevers in my mind, I began to suspect, from certain considerations and occurrences, that the infection of typhus, like that of malarial fever, may be conveyed by insects—in this case, by body vermin, such as fleas. The fleas feed on the blood of the patient, and may become themselves infected, and act as carriers of the infection to fresh human beings, as mosquitoes are known to do in malarial and yellow fevers. I regret that it was not found possible by a bacteriological and experimental investigation to test this suggestion, as the typhus germ has not yet been definitely isolated by any bacteriologist, but the following facts strongly support the hypothesis. In the first place, every case of typhus seen and examined by my assistants and myself in the hospital exhibited flea-bites, and the members of the hospital staff who complained most of flea-bites were those who were attacked by typhus. The ambulance driver, for example, had repeatedly changed his underclothing because of fleas. He had carried some of the patients in his arms. We were careful to distinguish between flea-bites and petechiæ from rash. In the second place, every case, however clean and free the

patient might personally be from body vermin, was found to have been, at the probable time of infection, in contact with vermin-infested patients. In the third place, I am not aware of the disease having in any instance spread in a family of perfectly clean habits, even although a typhus stricken patient had lain in the house during the major part of his illness, and in two cases without any attempt at isolation. In one such case the mother had slept with her child during the illness, but was not infected. In another case, where there was careful isolation at home, in a clean and excellent house, the patient was attended by two nurses who had never had typhus. The doctor, also unprotected by a previous attack, spent hours in the patient's room, and certain members of the family, also unprotected, were frequently in the sickroom; yet all escaped. This case, which died after an illness of nearly four weeks, was one of the saddest in the epidemic, for the infection had been caught while the patient—one of the most esteemed ladies in the city—was on an errand of mercy to a poor and ill-cared-for family, in which it was afterwards found that typhus was present. In the fourth place, every nurse and wardmaid at the City Hospital who had been attacked was, with two exceptions, employed in removing the typhus patients to the hospital, or in cleaning and bathing them on admission. They were, therefore, exposed to the vermin on the patients' bodies and clothing. Of the two exceptions referred to, one was of much interest, and serves to give additional strength to the theory. It was of a nurse who had never been in the typhus wards, but who was employed in cleaning some dirty children who had been removed as contacts from a typhus-infected family. These children were not themselves ill at the time, though some of them developed the disease a few days later. There were many fleas on their clothing, and the presumption is that some of these fleas had come from the typhus-stricken member of the family. The second exception was that of a nurse, who, although not directly employed in conveying or cleaning patients, had been in proximity to patients while being cleaned. No nurse or wardmaid, however intimate her contact with the typhus cases, or however prolonged the exposure to infection, who did not assist in removing patients to hospital or in cleaning them, was attacked—for example, all the nurses on night duty in the acute wards, and all the nurses, both day and night, in the convalescent wards. In the same category may be placed the doctors and the matron. In the fifth place, after the commencement of the illness of the ambulance driver, I arranged for the rest of the ambulance staff taking precautions against invasion by fleas

from typhus patients or clothing by wearing top-boots, and stuffing their trouser legs inside the boots, by donning closely-fitting overalls that buttoned closely at neck and wrists, and smearing neck, wrists, ankles, and tops of boots with a solution of eucalyptus oil in olive oil. Eucalyptus is believed to be unpleasant to insects. After these precautions were taken, no member of the ambulance staff took typhus, and they practically did not suffer from flea-bites.

These are the chief considerations, derived from my recent experience in this epidemic, which have impelled me to put forward the theory of the flea or vermin transmission of typhus infection. It derives support from the reported observations of other writers, although they have not offered the same explanation. For example, in the Liverpool fever hospitals, Dr. Russell has remarked on the curious freedom of the wardmaids from the infection of typhus, although they are daily employed in sweeping and cleaning the wards, and therefore freely inhale the ward dust. He also observed that typhoid patients nursed in the same ward with typhus patients did not take typhus. Dr. Russell further remarks that throughout three or four years, in which over 800 cases of typhus were recently treated in the Liverpool hospitals, no doctor or medical student visiting the wards took the disease; and he contrasts this immunity with a different state of matters in the old-time epidemics. The same difference has been experienced in Aberdeen. But the difference can be readily explained by the scrupulous cleanliness of a modern hospital ward, with its ample bathroom accommodation, as compared with the practically bathless hospitals of former times. The older hospitals were probably never free from body vermin. Of course, it must be admitted that modern hospitals are greatly improved in respect of air-space and ventilation, which tends to dilute every form of infection. Some writers have remarked that the clothing of a typhus patient appears sometimes to be more infectious than the body of the patient. This is precisely what we should expect with a dirty, flea-infested patient, after he has been divested of his clothing and washed. The fleas remain with the clothing, but as, in such circumstances, they are naturally on the outlook for new quarters, they are more likely to transfer themselves to a fresh host than when the clothing still invests the original host. For the same reason, a person immediately after death may be more infectious than before death. With the cooling of the dead body, the fleas forsake it for a living host. In one of the cases during the recent epidemic the infection was apparently got during a visit to a house shortly after the death of a typhus patient. The visitor ate nothing during his visit.

The theory of flea transmission also explains how typhus is chiefly confined to the poorer and more wretched classes, although proving by its attacks on others, for example, on hospital nurses, that other classes are not insusceptible. Many of the persons attacked during the recent epidemic, although living in small and dirty houses, were well nourished and apparently well fed. It was, therefore, not their poverty which made them susceptible; and dirt of itself, as so much dead inert "matter out of place," is not necessarily provocative of typhus. But wherever there is a dirty house there is almost certain to be an abundance of body vermin.

If this theory be confirmed by the experience of future epidemics, not only will it modify our methods of approaching and dealing with the disease, but it will furnish a fresh argument for cleanliness of person and home. Along with the abuse of alcohol, and perhaps resulting in a large measure from it, uncleanness in the persons and homes of too many of the poorer classes is one of the chief hindrances to the further improvement of the public health.

As to the measures taken to control the epidemic, all known and still infectious cases, except one, were removed to hospital. If the house was dirty and flea-infested, all the other members of the family were removed to the reception wards of the hospital, and cleaned and kept under observation. So long as they continued to be in good health, the working members were allowed to go out to their employment, but they otherwise lived in the reception wards. If the house was clean, the other members of the family were left at home, but they were visited by a medical or sanitary officer every second day for the first fortnight, and twice a week for the next fortnight. This system worked admirably, and without a hitch. The infected bedding and clothing was removed to the disinfecting station by ambulance porters, who used the personal precautions already described. To aid these precautions, houses, when dirty, were thoroughly fumigated with sulphur before the bedding was removed, in order, if possible, to kill or stupefy the body vermin. It is well known that sulphur is more potent for this purpose than formaldehyde. After removal of the bedding, the house was sprayed with formaline by the Lingner apparatus or the ordinary pump spray. The wall-paper, if any, was usually removed, and the walls lime-washed. Finally, all woodwork was washed with soap and disinfectant solution. There was no evidence in any case of the house having retained infection after such treatment.

DEATH TRANSFERS AND CORRECTED DEATH-RATES.*

BY A. CAMPBELL MUNRO, M.B., D.Sc.,

County Medical Officer of Health of Renfrew.

A COUPLE of years ago, circumstances directed my attention to the fact that a considerable number of deaths over the country were not accounted for in the official death-rates of any of the Local Authorities in the country, namely, the deaths of persons belonging to particular towns or districts which occurred during the temporary residence of these persons beyond these towns or districts. In the case of public institutions, such as poorhouses and lunatic asylums, directly connected with particular districts, although situated beyond these districts, there was, or ought to have been, no great difficulty. Even in these cases, in some instances, no particular effort was made to obtain returns of the deaths occurring in these institutions. But many persons died away from home—in hospitals, in nursing homes, at health resorts, etc., of which the officers of the Local Authorities to whose districts they belonged had no knowledge. Such deaths were omitted from the vital statistics of the districts in which they occurred as well as from the returns of the districts to which they belonged. The deaths of tramps and other persons of unknown antecedents were sometimes included in the returns of the districts in which they occurred, and sometimes were not.

I brought the matter before the Society of Medical Officers of Health, with a view to arranging some method of "death transfers" which would obviate the leakages referred to. Obviously, the most efficient arrangement would have been one whereby the Registrar-General would have required the local registrar of deaths to enter in his register and returns, in each case in which the person deceased was not usually and normally resident in the district, the "usual" or "former" residence of the person. The Registrar-General would cause transcripts of such entries to be transmitted to the registrars of the districts to which the persons belonged, and those registrars would enter them in their statutory returns to the Local Authority of those districts. The matter was taken up by the Society, which approached the Registrar-General on the subject without result. The Society then entered into communication with the Local Government Board on the subject, and the final result was that the Board issued to all the medical officers of

* From Dr. Munro's Annual Report for 1906.

health in the country model transfer forms, upon which they instructed those officers to communicate to the officers of outside districts the deaths of persons belonging to those districts, which might occur in public institutions or otherwise in their own districts. It was arranged that the deaths of tramps, or persons without a known "place of residence," should be accepted by the local authorities of the districts in which the deaths occurred.

I adopted this system in my report for last year, thereby raising the death-rate by 670 per thousand in the Upper District and 552 in the Lower District, as compared with former years. The thorough-going adoption of this system in this report has the effect of adding 280 to the death-rate of the Upper District and 1216 in the Lower District.

Another reform in the comparative statement of death-rates remains to be accomplished, that is what is known as "the correction of death-rates for the sex and age distribution of the population." At nearly all ages, the death-rate of females is lower than that of males.* And between the ages of five and fifty-five the death-rate per thousand living at each age period, in both sexes, is lower than the death-rate for all ages. It follows that if in the population of any district there is an excess in the proportion of females and of persons at ages between five and fifty-five, that district will have a lower death-rate, apart from the hygienic conditions of the district, than a district less highly favoured in the sex and age distribution of its population. A method has been devised whereby a factor can be calculated which, applied to the gross death-rates of districts, serves to abolish the fallacies attaching to the comparison of the gross death-rates of districts having populations of different sex and age distribution. I am of opinion that the Registrar-General should furnish this factor of correction to the Local Authority of each district in the country. As the result a good deal of trouble, including a reference to the last census returns in the custody of the Registrar-General, I have calculated the factors of correction for the Upper and Lower Districts of the county. That for the Upper District is a *plus* factor, showing that the sex and age distribution of the population there is somewhat favourable to a low death-rate; while the factor for the Lower District is a *minus* factor. The factors for the districts are, respectively, 1.0562 and .9940. Multiplying the gross death-rates of the districts for 1906, as set forth below, by these factors, we find that the "corrected death-rate" for the Upper District is 12.276; that for the Lower District, 14.790. These death-rates are strictly comparable with the death-rates of any district in Scotland to which the factor of correction has been applied.

* At all age periods except 10-20 years, when it is fractionally less.

THE OPERATION OF THE HOUSING OF THE WORKING CLASSES ACT.*

By JOSEPH PRIESTLEY, B.A., M.D.,
Medical Officer of Health of Lambeth.

I HAVE considered the reference to the Public Health Committee from the Housing Committee (dated November 16th, 1905), and am of opinion that there is no insanitary area in the Inner Wards of Lambeth Borough which I could, conscientiously, advise the Council to condemn, and clear, as a whole, under the Housing of the Working Classes Acts, with a view to working-class dwellings being erected on the cleared site.

In my opinion, as medical officer of health, and with a special local experience of ten years, *area condemnation* as opposed to *house condemnation* is, as far as Lambeth Borough is concerned, undesirable and unnecessary—not only for financial reasons, but also from the point of view of efficient sanitary administration. I am of opinion, however, that systematic house-to-house inspections are most desirable, especially in the inner wards of the borough, so that all houses may be gradually levelled, and kept up to a fair and proper sanitary standard, and any individual houses, which may be found to be sanitarily unfit, dealt with under the Public Health Acts, or condemned under the Housing Acts, as may be required, with a view to them being put into proper order and condition, and so rendered fit for human habitation. To secure this, systematic house-to-house inspection is merely a question of the number of sanitary inspectors to be employed.

When a Sanitary Authority (e.g., Lambeth Borough Council) decides to take action under the Housing of the Working Classes Acts, there are practically two ways of doing so. The medical officer of health may condemn (or, in the words of the Act, *represent*) on the ground of danger to health,

- (1) A large or small sized area; or
- (2) An individual house.

The former course (i.e., *condemning large or small sized areas*) displaces large numbers of persons on account of houses being pulled down, and, in course of time, rebuilt on improved lines, but at a very considerable financial cost to ratepayers (compensation and otherwise). As a rule, all the houses within a condemned area are closed and pulled down—good, bad, and indifferent, sanitarily.

* From Dr. Priestley's Annual Report, 1906.

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Further, such action is officially and legally dilatory, and leads to inspectorial neglect, with the result that dilapidated and insanitary houses become more and more dilapidated and insanitary, and matters pass from bad to worse. As far as the Metropolis is concerned, the London County Council deals with large or small-sized condemned areas under Part I. of the 1890 Act, provided no such small-sized area contain ten or less houses.

The latter course (i.e., condemning individual houses) avoids the displacement of persons, and throws any financial cost involved upon the owner or owners concerned. By this method only really insanitary houses need be condemned. Further, action in this way is officially and legally less dilatory than in the former case, and has recently been rendered more expeditious by the new amending Housing Act. The Lambeth Borough Council deals with individual house condemnation under Part II. of the 1890 Act, and is empowered also, under the same part of the Act, to deal with a collection of houses not exceeding ten in number, and in Lambeth Borough this individual house condemnation under the Housing Acts has proved most satisfactory. Local knowledge of the amount of congestion and crowding, whether of houses over areas or of persons in houses, has always made it desirable to avoid, in Lambeth, the necessary wholesale displacing of persons consequent upon the clearing of an area, large or small. Such area condemnation simply tends, by the displacement of persons, to increase the congestion or crowding in other immediately neighbouring parts, and so to create, by means of one Act of Parliament (the Housing Act) serious nuisances, which it then becomes the duty of a Sanitary Authority to abate by the powers invested in them under another Act of Parliament (the Public Health Act). Indeed, experience shows that, where an area (large or small) is cleared on account of its so-called slumminess, neighbouring properties, which were previously, considering all things, passable, are apt to become rookeries, requiring, in their turn, to be dealt with. It is common knowledge that, amongst the persons displaced, there are those who must live in the immediate neighbourhood, so as to be near their work, which may be of a casual or irregular kind, or for other equally cogent reasons, and they necessarily tend to still more crowd and overcrowd, and so perpetuate all the evils (sanitary and moral) attendant thereon. As houses become scarce, rents increase, and over-crowding, consequently, results from the sub-letting of rooms. In this way, the difficulty is not overcome, but simply transferred from one district to another, or from one house to another, and so the continuity of the vicious circle is ensured. In view of the well-

known fact that, in the inner wards of Lambeth, house accommodation (good or bad) for the poorer classes is already scarce, the Council would be advised to pause before deciding to take steps with a view to closing a large area or areas, thereby accentuating the housing difficulty.

The method adopted in Lambeth, and approved by the late Vestry on January 18th, 1900, has been to deal with houses, singly or in the form of courts or streets, and condemn them, as required under Part II. of the Housing of the Working Classes Act, 1890, as unfit for human habitation, on account of the premises being dirty, damp, dilapidated, badly constructed, ill planned, defective in drains and sanitary appliances, insufficiently provided with water or w.c. accommodation, deficient in light and ventilation, generally worn out, etc. Displacement of persons has been, in this way, avoided.

Fortunately, in Lambeth only one instance has occurred requiring action being taken under Section 38 of the 1890 Act, dealing with obstructive buildings—a most difficult and impracticable section of the Act to carry out. In the Lambeth case the three cottages affected by a large factory were purchased, and afterwards demolished by the owner of the factory.

The result of these condemnations has been that the houses in question have been put into proper order and condition to the satisfaction of the Lambeth Sanitary Authority. In a few instances, about 100 houses, the conditions found have been such that the houses could not be rendered fit for human habitation; they have been, consequently, closed and demolished.

As against these 100 houses closed and demolished, a tabular statement could be given of thousands of houses that, during the same period, have been levelled up to a fair and proper sanitary standard. This has been accomplished by systematic house-to-house inspection, as far as the size of the sanitary staff would allow, followed by the service of notices, under both the Housing and Public Health Acts. Large amounts of money have been spent by the different owners concerned; in fact, owners have been compelled to improve their own insanitary properties—a most desirable condition of things, and one to be preferred to owners being offered a premium for slum property, as is apt to be the case where a sanitary authority compulsorily purchases such property with a view to clearing an area under the Housing Acts.

Even when model dwellings are erected on the cleared site of a condemned area, it does not follow that the displaced tenants will occupy them. Experience teaches the reverse.

The owners under Part II. of the Housing Acts, 1890, are freeholders, or, at least, lease-holders who have not less than twenty-one years' interest; and they naturally desire to render their condemned houses fit for human habitation, and not to close them, thereby avoiding even a small amount of displacement of tenants.

It must be remembered that the Housing Acts need only be put into motion in exceptional cases. In the larger majority of cases it is found to be sufficient to proceed under the Public Health Act, which also enables the sanitary authority to apply for closing orders in connection with houses unfit for human habitation by reason of the existence therein of ordinary nuisances mentioned in that Act—such ordinary nuisances as are met with in house-to-house inspections.

In Lambeth Borough, the average number of notices served under the Public Health Acts is 10,722.

Before leaving the subject of area condemnation under the Housing Acts, mention may be made of the so-called *unavoidable displacements* connected with railway extensions, improvement schemes, increase of business premises (factories, workshops, etc.)—such as are going on in the most northerly parts of the Borough. The difficulties connected with the displacement of persons is well exemplified, and should prevent the Council from adding to such difficulties by area condemnations under the Housing Acts.

In the past, the late Vestry has done well to insist upon a *pro rata* amount of suitable accommodation in the neighbourhood being provided *before any unavoidable displacement of persons is allowed to take place*, and that the displaced tenants should have the first refusal of the new rooms which are to be let at (or about) the same rents as the old ones. This is a counsel of perfection—somewhat difficult to accomplish in practice, and one that has not been carried out in London in the past.

APPOINTMENT.—T. F. PEARSE, M.D., F.R.C.S., M.R.C.P., D.P.H., has been appointed Health Officer to the Corporation of Calcutta.

BRITISH AND COLONIAL SPAS AND HEALTH RESORTS.—For a work on British and Colonial Spas and Health Resorts, which Professor Hewlett has in preparation, he is collecting the principal data in regard to individual towns, and he will be obliged to any Medical Officers of Health who would be so good as to let him have at 6, Bentinck Street, London, W., the data relating to their towns, the source of which will be duly acknowledged.

Apart from the ordinary sanitary data, information is particularly wanted as to the diseases for the treatment of which the place is indicated or *contra-indicated*. It is requested that references may be given to the sources of publication of any statements not resting on the personal authority of the writer.

REVIEWS.

SCIENCE PROGRESS: A Quarterly Journal of Scientific Thought. No. 5, July, 1907. (Murray: price 5s.)

The current number of *Science Progress* contains, as usual, most excellent material. It includes contributions from Dr. Bashford, on the application of experiment to the study of cancer; Mr. Crook, on the use of the electro-magnet in petrography; Dr. Buckmaster, on the coagulation of the blood; Dr. Cathcart, on protein metabolism; Dr. Plimmer, on the work of Emil Fischer and his school on the chemistry of the proteins; Professor Miers, on recent research upon the birth and affinities of crystals; Miss Freund, on double salts; and Dr. Vernon, on the mechanism of tissue respiration. All the authors are to be complimented on the clear exposition and great interest of their articles.

Dr. Bashford's very able paper is largely an account of work done under the auspices of the Imperial Cancer Research Fund. He deals with numerous successful transplantations of tumours from one animal to another of the same species. Such transplanting is not, of course, an infection in the ordinary sense of the word; it is merely the provision of tumour-cells with a fresh and suitable environment. The experiments, which have been done chiefly on mice, show, amongst many other points, that the clinical distinction between benign and malignant tumours depends on anatomical rather than physiological differences. In some of the experiments the transplanted tumours, after an initial period of growth, ceased to grow and even atrophied. The author seems to think that this retrogression is due chiefly to insufficient connective tissue reaction, so that the tumour lacks the necessary vascular supply and mechanical support. This is doubtless part of the cause, but there seems no reason why the formation of antibodies antagonistic to the tumour cells should not be another factor. These tumour-cells, transplanted as they are, are foreign bodies, even when they are transplanted from one animal into another of the same species; just as the blood corpuscles of a goat are foreign bodies when introduced into the blood, not only of other species, but also of other goats, though the reaction may be less marked. According to this idea, the transplanted tumour cells would grow, or cease growing, or retrogress, according to the phases of formation of antibodies. Dr. Bashford points out that phagocytosis occurs in tumour absorption.

Mr. Crook calls attention to a method by which the various constituents of rocks may to some extent be separated. The method depends on the different magnetic properties of different minerals. The rock is ground to a fine and uniform powder, and brought by suitable arrangements into relation with an electromagnet. The most magnetic constituents are attracted in greatest proportion. Thus by a process of fractional magnetization a rough separation is effected, the constituents being purified by repetition of the process. The method is ingenious. Though at first sight it is rather rough, the writer assures us that it is quite adequate for practical purposes. It is a suggestive method of attacking a side of petrography at present little considered.

Dr. Buckmaster contributes a very able article on the coagulation of the blood. Alas, that Truth is ever complex! Till recently, one was fairly content to believe that the ferment which produces blood clotting was produced by the inter-action of calcium salts and a zymogen present

in blood. Now, a third factor must needs be added, a thrombokindse, which needs the help of both calcium and zymogen to form thrombin. As Dr. Buckmaster points out, even this new supposition, though more in accord with the facts than previous notions, is still probably only a working hypothesis, and the true solution of the problem has not yet been reached. Buckmaster is to be thanked for a very clear exposition of a knotty subject; or rather, what would have been clear if some nameless humorist had not transferred half of the article, with a bit of "Protein Metabolism," into the middle of the section on the use of the electro-magnet in petrography—merely a printer's slip in the arrangement of the pages, but the result is bewildering. The average reader would consider it a work of supererogation to be told that rock, even crushed rock, contains—next page—no thrombin!

The articles on protein metabolism and chemistry of the proteins have much in common, including excellence. Dr. Cathcart supports with a series of interesting experiments his contention that proteid is usually absorbed in a much more elementary form than is generally supposed, a large proportion being broken down beyond the stages of albumose and peptone to amido-acids, which are found during digestion in the portal blood. Plimmer deals with the methods adopted by Emil Fischer and his school in elucidating the chemistry of the proteins, and his article increases our already great admiration for this most versatile of chemists.

Prof. Miers deals with various problems connected with the formation of crystals, including the relation of the temperature of spontaneous crystallization to the strength of the solution.

Miss Freund considers in detail the solubility curves and certain properties of double salts.

Dr. Vernon deals with the evidence on the much-disputed subject of an intra-molecular store of oxygen in the tissues; and then passes on to deal with the actual processes of oxidation. He emphasises the fact that oxidation occurs in several stages; of this he gives instances, including the work of Fletcher and Hopkins on the metabolism of muscle.

PROBABILITY, THE FOUNDATION OF EUGENICS. The Herbert Spencer Lecture delivered on June 5th, 1907, by Francis Galton, F.R.S. (Clarendon Press, Oxford, 1s. net, pp. 30).

In this lecture Mr. Galton advances his well-known views as to the importance of improving the racial qualities of mankind. He considers that the truest piety consists in taking action and not in passive acquiescence to the routine of nature. He illustrates this by the change of view, since it was held that it was impious to place lightning conductors to churches. He appears to endorse Karl Pearson's view that "we are ceasing as a nation to heed intelligence as we did fifty to a hundred years ago," and he is anxious to see this remedied. And he bases on this his plea for teachings of collective truths which must in the end greatly influence individual conduct. "The enlightenment of individuals is a necessary preamble to practical eugenics, but social opinion is the tyrant by whose praise or blame the principles of eugenics may be expected hereafter to influence individual conduct." Some striking examples are given of changes of public opinion in the past, as in respect of restrictions on the freedom of marriage. When Mr. Galton was young it was unpardonable for any Englishman other than a cavalryman, or perhaps some one of high social rank, to wear a moustache. Foreigners were

them and were tolerated. The necessities of the winter of Balacava made shaving a cruelty, and so beards "obtained a footing." But not so among the clergy; and it was not until a distinguished clergyman "bearded" his Bishop, that others dared to follow this bold example. The way in which public opinion can outstrip legal enactment is shown not only in the parable of the good Samaritan, but also in the fact that if A. watching B. struggling in the water and is able to help him, but refrains from doing so, he has committed no legal offence. These illustrations furnish hope to reformers, and as Mr. Galton expresses it, "when the desired fullness of information shall have been acquired, then, and not till then, will be the fit moment to proclaim a 'Jehad,' or Holy War, against customs and prejudices that impair the physical and moral qualities of our race." The main part of Mr. Galton's essay is occupied by a scheme of five lessons giving the elements of probability and its application to the problems underlying eugenics.

DEUTSCHES BAEDERBUCH, BEARBEITET UNTER MIT WIRKUNG DES KAISERLICHEN GESUNDHEITSAMTES. Size 11½ by 8½ in. Pp. civ. + 535. Leipzig: Weber.

This volume is the second and much enlarged edition of a previous publication of the "Kaiserliche Gesundheitsamts." It deals with the numerous spas, seaside and country health resorts in the German Empire. After lists classified according to the nature of the characters of the places, and again according to their geographical position, introductory chapters are contributed dealing with the geological, chemical, pharmacological, clinical, climatological and statistical aspects of these places. The sanitary data of each town are then given in detail. These include for the most part the population, means of access, analyses of springs, principal therapeutic agencies, diseases principally treated, an account of the facilities for treatment, including physicians, season and fees, number of visitors, arrangements of water supply, sewage, hospitals, disinfection, etc. The whole is covered by an index, summarized by charts indicating the relative positions of the health resorts in question, and the relative proportions of various chemical ions in their waters, and accompanied by the interesting rain chart of Hellmann based on ten years' observations in all parts of the Empire. The whole of this of three thousand stations in all parts of the Empire. The whole of this work has been done gratuitously by the distinguished collaborators whose names are given, and the work constitutes a classical source of reference for the essential particulars necessary to the selection of a health resort in Germany. The introductions include an excellent summary of the various hypotheses explaining the therapeutic action of treatment by spas and change of air. An excellent feature of the work is that the numerous data are accompanied by references to the source from which they are derived. The analytical data have all been calculated to express the amount of each ion, so that they are immediately comparable. Not unnaturally the analyses of the springs occupy an amount of space somewhat disproportionate to their relative importance; but taken as a whole the work may be commended as a classical compilation of that which is useful to be known in regard to German Health Resorts. The therapeutic value of a particular health resort cannot be expressed quantitatively in terms of ions or other physical qualities. Nevertheless, the information given in this book enables the practitioner who has to prescribe a place for convalescence or holiday the opportunity of selecting outside his personal experience upon a more accurate basis than is available for most countries.

CORRESPONDENCE.

THE NEW ADVANCE AT THE INTERNATIONAL CONGRESS OF SCHOOL HYGIENE.

To the Editor of "Public Health."

Sir,—As a slightly incorrect statement was published, it would be as well to explain in some detail the important new move in the matter of School Hygiene which was taken at the closing meeting of the recent International Congress.

The permanent International Committee consisting of about sixty members selected from almost every country has hitherto only met during Congresses. Arising out of the question of whether it would not be a proper thing to establish a Bureau, with a permanent staff, library and museum, and so on, in some central but neutral spot, such as a Swiss or Dutch town, it was decided as explained by Drs. Mathieu, Burgerstein and Kerr, that it would probably lead to greater progress if such Bureau was not localized, but if each country had its own centre for the diffusion of knowledge, and to act as a clearing house in the matter of School Hygiene, statistics, laws, and regulations. Finally to supervise in scientific matters and generally to do all that is possible at all times or places to forward the human interests which are bound up in the special lines of knowledge included in School Hygiene, the International Committee has formed a small Council.

This Council has all the powers of an ordinary Committee. It can form sub-committees of experts on special enquiries. The usual committee procedure is to sit round a table and discuss matters, but this Council will deal with the various subjects that arise, submitting the different topics by correspondence, collating the answers, and finally making pronouncements in urgent matters after a meeting of the Council.

It is obvious that for efficiency such Council should be small and yet have in it elements to secure permanence, and at the same time possibilities of slow but constant change. This has been done by deciding that it shall consist of the president of the past Congress, the president of the Congress which has just been held, and the president of the next Congress. Nine other members are to be elected, of whom three are to be from the country where the Congress was last held, and three from the country where it will be held next, three being selected from other lands.

Certain matters for instance will almost at once come under the consideration of this Council. Such might be quoted as:—

"The question of how medical inspection of schools can best be carried out with the maximum of efficiency and minimum of cost.

"The question of how far the laws of health can best be imparted to the coming generation, so that later they will know how to care for themselves and those dependent on them.

"The best systems or methods of physical training for both sexes at various ages.

"The feeding of children requiring proper nutrition, so that it shall be done without developing pauperism and with regard to those upon whom the cost falls."

These four matters are being dealt with practically in a great variety of ways, and this Council should be able to collect and analyse known facts to show which methods are best for any town or state.

It is obvious that information thus digested will have a very great value politically as well as educationally, and this Council may in time come to be officially regarded as quite analogous in matters of School Hygiene, to that other Congress of Peace now in session at the Hague.

Yours faithfully,

LAUDER BRUNTON, *President.*

JAMES KERR *Hon.*

E. WHITE WALLIS, *General Secretaries.*

LONDON, August 15th, 1907.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

FOUNDED, 1856. RECONSTITUTED, 1888. INCORPORATED, 1892.

PROVINCIAL MEETING.

THE Annual Provincial Meeting of the Society was held in the Town Hall, Colchester, on July 13th, 1907. The Deputy Mayor welcomed the Society to the town. He apologized for the absence of the Mayor, Mr. W. B. Sparling, who was fulfilling another civic engagement at that moment in representing the town at the Bury St. Edmunds Pageant, and the pleasing duty of extending to the members a most cordial welcome on behalf of the borough therefore had fallen upon him. They had met in the modern Town Hall, of which they were justly proud, but as they knew, Colchester was full of the relics of antiquity, and he trusted they would have an opportunity of visiting the Castle and Museum, and the many other objects of interest, not the least interesting being the visit to the oyster fishery on the Colne, which he understood formed part of their programme. Colchester natives were of world-wide repute, and they would that afternoon be able to form their own opinion of the conditions under which they were cultivated.

The President on behalf of the members thanked the Deputy Mayor for the welcome they had received to the interesting and historic old town. The Society celebrated its jubilee last year. It had lived for fifty years, and they all hoped that during that time it had had an influence for good upon the health and condition of the people of the country.

The Deputy Mayor then vacated the Chair, which was assumed by Dr. D. S. Davies, the President. The minutes of the meeting held at Bath on July 14th, 1906, were taken as read and signed by the President as a correct record. The Hon. Secretary read letters of apology for inability to be present from Drs. A. Newsholme, Joseph Priestley, E. Walford, and J. Howard-Jones, and Mr. J. T. Lloyd, F.C.S.

A large number of candidates were nominated for election. A paper was read by Dr. W. G. Savage upon "Recent Work upon the Bacteriology of Typhoid Fever in its relationship to preventive measures."

In the discussion which followed the following took part: the President, Drs. Hugh Stott, Sinclair Holden, A. Wynter Blyth, Reginald Dudfield, E. Seaton, Cooper Pattin, W. H. Hamer, A. G. R. Foulerton, and Sir Shirley Murphy.

On the proposition of Drs. E. Seaton and Cooper Pattin, a hearty vote of thanks was accorded Dr. Savage for his paper.

It was proposed by the President, seconded by Dr. Hugh Stott, and unanimously resolved, that the best thanks of the Society be given to the Mayor of Colchester for having so kindly placed at the disposal of the Society a room in the Town Hall, and to the Chairman (Alderman E. J. Sanders) and the members of the Fishery Board for the facilities given to the Society for visiting the Pyfleet Oyster Beds.

At the conclusion of the meeting the members of the Society and their friends lunched at the Cups Hotel, under the chairmanship of the President.

After the loyal toasts had been honoured, Sir Shirley Murphy proposed the health of the Corporation of Colchester, and expressed his sincere

* The paper will be published in the October issue of *Public Health*.

thanks for the hospitable way in which they had been received, and for the use they had been permitted to make of the Town Hall. He coupled with the toast the name of Alderman E. J. Sanders, Chairman of the Fisheries Board, who was responsible in a very large degree for the success of that meeting.

Alderman Sanders said he trusted they might be able, with this exceptionally fine afternoon, to get a breath of the East Coast air, and he also hoped to be able to show them, before they went away, a real Colchester "native." On behalf of the Mayor and the whole Corporation he offered them a most cordial welcome to the town of Colchester, and he hoped what they would see that day would induce them at no distant date to pay them another visit. Before resuming his seat, Alderman Sanders submitted the toast of "The Incorporated Society of Medical Officers of Health," coupling with it the name of the President.

The President thanked Alderman Sanders for the way in which he had toasted the Society. He said he went to the Museum that morning, and amongst other things he came across was an ancient map upon which the name of Colchester appeared, but he was sorry to see Bristol was not represented—(laughter)—although the neighbouring City of Bath was there.

Dr. Wynter Blyth proposed the health of Dr. Savage, who, he said, had contributed a most useful paper that day.

Dr. Savage, President of the Eastern Counties Branch, briefly responded.

In the afternoon a visit was paid to the Pyfleet Oyster Beds of the Colchester Corporation, upon one of the steam oyster-dredgers belonging to the Fishery Board. Alderman Sanders and other members of the Board described the methods of cultivation, and "hauls" were made in different parts of the beds.

Before returning to Brightlingsea, tea was served on board the Hospital ship off Mersea Stone, on the invitation of Mrs. Savage.

The thanks of the Society are due to Dr. and Mrs. Savage for the admirable arrangements which were made throughout the day to secure the comfort of those present at the meeting. The time-table was followed with absolute precision, except in the case of one member, who motored from London, and had to chase the steam dredger in a rowing boat.

North-Western Branch.—A Committee Meeting of the above Branch was held at the Chemical Club, Victoria Hotel, Manchester, on Friday, July 12th, 1907. Present: Dr. A. E. Brindley (in the Chair), Drs. Hamilton, Sergeant, Edlin, Martin, Wilkinson, Berry, Gaistang, Barlow, and M. Young.

The following resolutions were duly proposed, seconded, and carried unanimously:—

- (1) That Dr. A. E. Brindley should be President for the ensuing year.
- (2) That Dr. W. M. Hamilton should be Vice-President.
- (3) That Dr. Meredith Young should continue in office as Honorary Secretary.
- (4) That Dr. F. J. H. Coutts should be requested to fill the office of Honorary Treasurer.
- (5) That Dr. A. J. Laird should be asked to continue his services as Honorary Librarian.
- (6) That the Committee should be the same as in the previous year.
- (7) That Dr. Edward Sergeant should be appointed one of the Representatives of the Branch on the Central Council, and that Dr.

Meredith Young should act as the other Representative, but when the new Articles of Association came into force and Dr. Meredith Young thereby became ex-officio Representative, the President (Dr. A. E. Brindley) should step into his place as the elected Representative.

(8) It was unanimously resolved that the best thanks of the Branch be recorded to the retiring Representatives for their excellent services as Representatives of the Branch on the Central Council.

(9) It was resolved that Drs. Barlow and Buchan be appointed Auditors to go through the statement of accounts of the Honorary Treasurer.

The report and statement of accounts of the Honorary Treasurer were read, and showed that the Branch had an adverse balance. After some discussion it was resolved that the President, Vice-President, and Honorary Secretary form a Sub-Committee to consider the finances of the Branch and report to the next meeting. It was resolved that the Honorary Treasurer's statement of accounts be approved and adopted.

AN ORDINARY MEETING of the Branch was held in the Chemical Club, Victoria Hotel, Manchester, on Friday, July 12th, 1907. Present: Dr. A. E. Brindley, President (in the Chair), Drs. Goldsmith, Hamilton, Sergeant, Kerr, R. Young, Edlin, Merry Smith, Niven, A. J. Young, Fraser, Martin, Henry, Welsh, Berry, Wilkinson, Barlow, Buchan, and Meredith Young. Also Dr. Jasper Anderson as a visitor.

Apologies for absence were read from Drs. Greenwood, Laird, and A. E. Thomas.

The minutes of the Committee Meeting held immediately prior to the Ordinary Meeting were read, approved, and adopted.

The minutes of the last Ordinary Meeting were read, approved and adopted.

Dr. C. S. Brebner, M.O.H. Widnes, was nominated for election as a Member of the Branch.

Dr. Thomas U. Mercer, M.O.H. Whiston R.D.C., was unanimously elected a Member of the Branch.

The Honorary Secretary reported the result of the post-card ballot on the date of meeting for the Branch as follows: number voting for Wednesday, 32; number voting for Friday, 36; for either day, 4; for other days, but not Wednesday or Friday, 3; total, 75.

Resolved unanimously that the original day of meeting (Friday) be adhered to.

A vote of condolence with the relatives of the late Dr. Cooke, M.O.H. Hurst R.D.C., was unanimously adopted.

Dr. Meredith Young then introduced a discussion on the Home Office circular dated the 10th May, 1907, relating to the employment of women in factories and workshops. Drs. Niven, Barlow, Merry Smith, Buchan, and others spoke on the question, and it was unanimously resolved that the Home Secretary be respectfully requested to use his influence with the Registrar-General to have a special column inserted in the births and deaths certificates to show the occupation and age of the mother. It was also resolved that a sub-committee consisting of the President, Vice-President, Drs. Niven, Merry Smith, and Barlow be appointed to consider the Home Office circular of the 10th May, 1907, and questions arising therefrom, and should present the report for consideration by the Branch at an early date.

Dr. Hamilton then spoke briefly on the Vaccination Bill at present before the House. Resolved that this Branch of the Incorporated Society

of Medical Officers of Health desires to record its disapproval of this Bill as constituting a menace to the public health. It was further resolved that a copy of this resolution be forwarded through the proper quarter to the Local Government Board.

A hearty welcome was accorded to Dr. Anderson of Capetown, an old member of the Branch, on his visiting the meeting.

Southern Branch.—A Meeting of the Southern Branch was held at Warne's Hotel, Worthing, on July 19th, 1907.

The Hon. Secretary reported that the portrait of Dr. Groves was finished except for the inscription. It was decided that it should, if convenient, be presented to the Society in October.

Dr. McGlashan (Newhaven) and Dr. Sandilands (Winchester) were elected members of the Branch.

The accounts for the year 1906-7 were passed, and attention was called by the Hon. Treasurer to the altered financial prospects of the Branch under the new allowance.

The following officers were elected for the year 1907-8: President, Dr. Griffith; Hon. Secretary and Treasurer, Dr. Stott; Representative to Council of Society, Dr. Willoughby.

The Hon. Secretary presented a *draft scheme for keeping the accounts of Isolation Hospitals, and it was resolved that a copy be sent to the Branch members, with the suggestion that they should adopt it as far as possible, with a view to comparison between different hospitals.

Dr. Cameron read notes on two cases of cerebro-spinal fever, and the President gave an account of some cases which had been under his care with a history of the progress of this disease and the study of its bacteriology in past years. These were followed by discussion.

THE LIBRARY.

*All Books and Publications received by the Editor
and Hon. Librarian will be acknowledged under this heading.*

* * *

ANNUAL AND OTHER REPORTS.

Lanark, 1906, Dr. J. T. Wilson. Willesden U.D.C., 1906, Dr. Wm. Butler, and Hospital Report by Dr. W. J. J. Stewart. Scarborough, 1906, Dr. J. Knight. York, 1906, Dr. E. M. Smith. Kensington, May-June, 1907, Dr. T. Orme Dudfield. Dumbarton and Stirling, 1906, Dr. J. C. McVail. Bootle, 1906, Dr. W. Naylor-Barlow. Aberdeen, May, 1907, Dr. M. Hay. Hackney, 1906, Dr. J. King Warry. Warrington, 1906, Prudence E. Gaffikin, L.R.C.P., for the late Dr. J. G. Gornall. Experiment Station Record, May, 1907, U.S.A. Dept. of Agriculture. Dr. W. W. E. Fletcher's Report to L.G.B. upon Brandon and Byshottles U.D. Dr. L. W. Darra Mair's Report to L.G.B. on Whickham U.D. Pudsey, 1906, Dr. W. L. Hunter. Minutes of Metropolitan Asylums Board. Dr. E. P. Manby's Report to L.G.B. on Brentford U.D. Minutes of Conference of Representatives of City and Metropolitan Borough Councils on Law relating to Combined Drainage, June, 1907. Shanghai, 1906, Dr. A. Stanley. Hanley, 1906, Dr. John Clare. Bulletin du Service de Santé et de l'Hygiène, February and March, 1907, Brussels. Press CPop Bulletin, No. 1 of 1907, Province of Alberta, Canada. Weekly Returns of Registrar-General. Bethnal Green, 1906, Dr. G. P. Bate. Birmingham, 1906, Dr. John Robertson. Northamptonshire, 1906, Dr. Chas. E. Paget. Stockport, 1906, Dr. Meredith Young. St. Pancras, 1906, Dr. J. F. J. Sykes. St. Helens, 1906, Dr. J. J. Buchan. Leprosy in New South Wales, 1906, Dr. J. A. Thompson. Lewisham, 1906, Dr. A. W. Harris. Nottinghamshire,

* See p. 742 of the present issue.

1906, Dr. H. Handford. Rhondda, U.D.C., 1906, Dr. J. D. Jenkins. Salford, 1906, Dr. C. H. Tattersall. Monthly Bulletin, State Board of Health, Mass., U.S.A. Annual Report (1906) Chief Inspector of Factories and Workshops. Second Report of Departmental Committee on Ventilation of Factories and Workshops, Parts I and II. Birmingham, Second Quarter, 1907. Shropshire, 1906, Dr. James Wheatley. City of Glasgow Fever and Small-pox Hospitals, 1906, Dr. John Brownlee. Bedlingtonshire, 1906, Dr. R. S. Trotter. Kensington, Dr. T. Orme Dudfield.

JOURNALS.

The Sanitary Record. Hospital. Royal Army Medical Corps. New Zealand Medical Journal Monthly Supplement, April, 1907. Birmingham Medical Review. American Journal of Medical Sciences. Giornale della Reale Società Italiana d'Igiene. Medical Temperance Review. Glasgow Medical Journal. All India Assistants'. Royal Sanitary Institute. La Technique Sanitaire. Caledonian Medical Journal. Manchester Guardian. Pacific Medical Journal. Local Government Officer. Tropical Medicine. Water. Medical Review of Reviews. Canadian Practitioner. Australasian Medical Gazette. Journal d'Hygiène. Municipal Journal. Nursing Times.

STATUTORY RULES AND ORDERS.

Draft Regulations for heading of yarn dyed by means of a lead compound. B 12b393 M/9, Factory and Workshop Act, 1901. No. 505:—Master and Servant, Workmen's Compensation Act, 1906; as to examination of workman by a medical practitioner. Factory and Workshop Act (Sections 41 and 58). Conditions to be observed in factories and workshops in which women or young persons are employed in the process of cleaning or preparing fruit. (Repealing Order of 17th June, 1902.) Memorandum on Workmen's Compensation Act.

PAMPHLETS.

Livingstone College Year Book, 1907. Use of Fruit as Food, Dr. C. F. Langworthy, May, 1907. U.S.A. Dept. of Agriculture. Studies on the Digestibility and Nutritive Value of Legumes, 1901-5, Dr. C. E. Watt. U.S.A. Dept. of Agriculture, June, 1907. Detection of Pollution in Underground Waters, Dr. J. C. Thresh. The Determination of Racial Stock among American Immigrants, Prof. Richard Boeckh, American Statistical Association. The Alkaloids of Ergot, Dr. G. Barger and F. H. Carr, F.I.C. Ergotoxine and some other constituents of Ergot, Dr. G. Barger and H. H. Dale, M.A., B.C. Position and Prospects of Chemical Research in Great Britain, By Prof. Raphael Meldola, F.R.S., Verhandlungen der Deutschen Gesellschaft für Öffentliche Gesundheitspflege zu Berlin. Experiments with methods for rapid detection of Gelatine liquefaction in the determination of *B. coli*. Statistical Studies in Immunity: the theory of an Epidemic, by Dr. John Brownlee. An Account of five cases of Pyelitis in Enteric Fever, by Dr. John Brownlee.

PROBABILITY, THE FOUNDATION OF EUGENICS.

The Herbert Spencer Lecture delivered on June 5, 1907, by Francis Galton, F.R.S. Henry Frowde, Amen Corner, E.C.

HYGIENE OF THE LUNG IN HEALTH AND DISEASE.

Prof. Dr. Leopold von Schrötter, of Vienna University. Translated by H. W. Armit, M.R.C.S., L.R.C.P. Illustrated. Rebman, Ltd., London.

BEAUTY AND HEALTH IN YOUTH AND OLD AGE.

Mrs. John Webster, Swan, Somerschein and Co., Ltd., London.

ESSENTIALS OF MILK HYGIENE.

A Practical Treatise on Dairy and Milk Inspection and on the hygienic production and handling of milk, for students of dairying and sanitarians. By Prof. C. O. Jensen, of the Royal Veterinary and Agricultural Colleges of Copenhagen. Translated and amplified by Leonard Pearson, Dean of the Veterinary Faculty of the University of Pennsylvania, etc., etc. J. B. Lippincott Company, Philadelphia and London.

RECENT PUBLIC HEALTH LITERATURE.

BACTERIA.

HOAG (J.). "Organism X," probably of the coryne-bacterium group: its differentiation from *B. diphtheriae* and allied organisms. Its pathogenicity in man. *Boston Med. and Surg. Jour.*, 1907, clvii, 10. HUNE.—Untersuchungen über Bakterizidie im Reagensglase. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 196.—NICHOLLE et A. FROUIN. Action de la pipéridine et de quelques autres amines sur les bactéries, et en particulier, sur le bacille de la morve. *Ann. de l'Inst. Pasteur*, 1907, xxi, 443.—WEINBERG (M.). Du rôle des helminthes, des larves d'helminthes et des larves d'insectes dans la transmission des microbes pathogènes. *Plate. Ann. de l'Inst. Pasteur*, 1907, xxi, 417.

CAISSON DISEASE.

VERNON (H. M.). The solubility of air in fats, and its relation to caisson disease. *Proc. Roy. Society*, 1907, Ser. B, Vol. lxxix, 366.

CANCER.

BAINBRIDGE (W. S.). Transmissibility and curability of cancer. *Bost. Med. and Surg. Jour.*, 1907, clvi, 835.—BASHFORD (E. F.). The application of experiment to the study of cancer. *Science Progress*, 1907, ii, 1.

CHILDREN.

LEE (P. G.). The need of study of child life from a medical point of view. *Jour. Roy. Inst. Public Health*, 1907, xv, 417.

CREMATION.

RÜHS (C.). Einrichtung von Krematorien. *Vierteljahrs für Gerichtl. Med.*, 1907, xxxiv, 123.

DISINFECTANTS.

BICKEL und A. KRAUS. Versuche über die desinfizierende Wirkung von Saprel-Leinol-Kresol und Pretroleumkresol-Präparation auf flüssiges infektiöses Material. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 172.—CODE OFFICIEL DE LA DESINFECTION (Conseil Supérieur d'Hygiène publique de France) *Ann. d'Hygiène Publique*, 1907, viii, 4th ser., p. 12.—FOWLER (MAJ. C. E. P.). Some disinfectant values. *Jour. Roy. Army Med. Corps*, 1907, ix, 44.—KRAUS (A.). Untersuchungen über Desinfektionsmittel. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 130, 153.—PAUL (T.) et F. PRALL. Die Wertbestimmung von Desinfektionsmitteln mit Staphylokokken, die bei der Temperatur der flüssigen Luft aufbewahrt wurden. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 73.—XYLANDER. Desinfektionsversuche mit zwei neueren Formaldehydpräparaten Festoform und Formobor. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 180.

DRAINAGE.

PARKES (L. C.) and others. Discussion on suggested amendments of the London County Council By-Laws as to drainage. *Jour. Roy. Sanitary Inst.*, 1907, xxviii, 225.—PRESCOTT (A. E.). The main drainage of Eastbourne. *Jour. Roy. Sanitary Inst.*, 1907, xxviii, 209.

DYSENTERY.

DOPTER (CH.). Anatomie pathologique de la dysenterie bacillaire. 4 plates. *Arch. de Méd. Expérimentales*, 1907, xix, 282.

ENZYMES.

CALDWELL (R. J.), COURTAULD (S. L.), ARMSTRONG (H. E. and E. F.). Studies on Enzyme Action, ix. and x. *Proc. Roy. Society*, 1907, Ser. B, Vol. lxxix, 350, 360.

EXPERIMENTAL MEDICINE.

HERRICK (J. B.). The relation of the clinical laboratory to the practitioner of medicine. *Bost. Med. and Surg. Jour.*, 1907, clvi, 763.

FOOD.

FIEHE (J.). Über den Nachweis von Pferdefleisch in Fleisch und Wurstwaren mittels der Präcipitat-Reaktion. *Zeit. für Untersch. der Nahrungsmittel*, 1907, xiii, 744.

HEREDITY.

MORROW (P. A.). Hygiene in relation to the heredity of disease. *New York Med. Jour.*, 1907, lxxv, 1162.

HYGIENE, PUBLIC.

HOPE (E. W.). Administration of the Liverpool Sanitary Amendment Acts, 1864, and the Housing of the Working Classes Act, 1901. *Liverpool Med.-Chir. Jour.*, 1907, xxvii, 8.—SANDERS (W. H.). State Medicine: its foundation, superstructure, and scope. *Jour. Amer. Med. Assoc.*, 1907, xlix, 1.

IMMUNITY AND INFECTION.

BOURMOFF (T.) and T. BRUGSCH. Das neutrophile Blutbild bei Infektionskrankheiten. *Zeit. für klin. Med.*, 1907, lxxiii, 189.—BUZZARD (E. F.). On certain acute infective or toxic conditions of the nervous system. *Brain*, 1907, xxx, 1.—VON EBERTS (E. M.) and W. H. P. HILL. Bacterial inoculation in the treatment of localized infections. *Amer. Jour. of Med. Sciences*, 1907, cxxxiv, 35.—LEDINGHAM (J. C. G.). The pathological histology of the spleen and liver in spontaneous rat-plague, with observations on the experimental infection. 2 plates. *Jour. of Hygiene*, 1907, vii, 359.—VAUGHAN (V. C.) and M. WHEELER. Experimental immunity to colon and typhoid bacilli. *New York Med. Jour.*, 1907, lxxv, 1170.

MILK.

HARRINGTON (C.). Infantile mortality and its principal cause—dirty milk. *Pediatrics*, 1907, xix, 399.—LEDERER (E. J.). The milk supply of Vienna. *Jour. of Amer. Med. Assoc.*, 1907, lxxi, 986.

PHAGOCYTES.

DEAN (G.). An experimental enquiry into the nature of the substance in serum which influences phagocytosis. *Proc. Roy. Society*, 1907, Ser. B, Vol. lxxix, 399.

PLAGUE.

REPORTS on plague investigations in India, issued by the Advisory Committee. 6 plates. *Jour. of Hygiene*, 1907, vii, 323.

RABIES.

VIALA (J.). Les vaccinations antirabiques à l'Institut Pasteur. *Ann. de l'Inst. Pasteur*, 1907, xxi, 485.

SCHOOLS.

ARKLE (A. S.). Child life in Liverpool schools. *Liverpool Med.-Chir. Jour.*, 1907, xxvii, 22.—GRAYSTON (W. C.). Attention to the teeth of children in attendance at public elementary schools in England and Wales. *Brit. Dent. Jour.*, 1907, xxviii, 763.—O'BRIEN (Rev. C. M.). Some defects in primary schools. *Jour. Roy. Inst. of Public Health*, 1907, xv, 437.—RICHARDS (H. M.). The medical inspection of school children. *Jour. Roy. Sanitary Inst.*, 1907, xxviii, 251.

TUBERCULOSIS.

CALMETTE (A.) C. GUERIN et M. BRETON. Contribution à l'étude de la tuberculose expérimentale du cobaye. *Ann. de l'Inst. Pasteur*, 1907, xxi, 401.—CARRINGTON (P. M.). The climate of New Mexico, nature's sanatorium for consumptives. *New York Med. Jour.*, 1907, lxxvii, 1.—SCHROEDER (E. C.) and J. R. MOHLER. The tuberculin test of hogs and some methods of their infection with tuberculosis. *Jour. Comp. Pathol. and Therapeutics*, 1907, xx, 125.

THERAPEUTICS.

EHRICH (P.). The Harben Lectures, 1907. Experimental researches on specific therapeutics. *Jour. Roy. Inst. Public Health*, 1907, xv, 385.

TYPHOID FEVER.

REILLE (P.). Huitres et fièvre typhoïde. *Ann. d'Hygiène Publique*, 1907, viii, 4th Ser., p. 45.

TYPHUS.

GAEHTGENS (W.). Erfahrungen über der Wert des Gruber-Widalschen Reaktion für die Typhusdiagnose. *Arb. aus dem Kais. Gesundheits.* 1907, xxvi, 226.

YEAST CELLS.

DRABBLE (E.) and D. G. SCOTT. On the effects of acids, alkalis, and neutral salts on the fermentative activity and on the rate of multiplication of yeast cells. *Bio-Chemical Jour.*, 1907, ii, 340.

LAW REPORTS.

HIGH COURT OF JUSTICIARY (SCOTLAND).

March 8th, 1907.

BEFORE LORDS ARDWALL, DUNDAS, AND MACKENZIE.

SOUTAR v. KERR.

Sale of Food and Drugs Acts—Milk—Sample—Article as supplied to Public—Refusal.

An inspector under the Sale of Food and Drugs Acts on applying to purchase a sample of milk from a can out of which a retailer is selling it, is entitled to be supplied in the same manner as the retailer was supplying the public.

This was an appeal by way of case stated from a decision of a Sheriff Substitute dismissing the complaint. The complaint alleged that the respondent Kerr, a dairyman, having been selling sweet milk from cans in his cart, the appellant, an inspector under the Sale of Food and Drugs Acts, had thrice applied to purchase a sample from a particular can, and to be supplied from the cran of the said can, in the same way as the respondent was supplying the milk to his customers. The respondent refused to supply the milk except from the top of the can. It was contended that this refusal rendered him liable to a penalty under Section 17 of the Sale of Food and Drugs Act, 1875, or, alternatively, under Section 16 of the Act of 1899.

The Court allowed the appeal, holding that the refusal amounted to an offence under Section 17 of the Act of 1875.

LORD MACKENZIE, after referring to Sections 6, 12 and 13 of the Sale of Food and Drugs Act, 1875, said the provisions of these must be kept in mind in construing Section 17, which provides that if any such inspector "shall apply to purchase any article of food . . . and shall tender the price for the quantity he shall require for the purposes of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such . . . inspector, such person shall be liable to a penalty not exceeding £10." This means that the inspector is entitled to get what is exposed for sale to the public so as to determine if the public are prejudiced within the meaning of Section 6 of the Act of 1875. In this case the milk was offered and supplied to the public from the cran and not from the top of the can, and the inspector was entitled to get it from the cran. There was therefore a refusal within the meaning of Section 17 of the Act of 1875, but Sect. 16 of the Act of 1899 was not applicable. Lords Dundas and Ardwall concurred. [For full report see 44 Sc. L. R., 462].

COLQUHOUN v. PROVOST ETC., OF DUMBARTON.

Sale of Food and Drugs Act, 1875, Sections 13, 33 (9)—Complaint in name of Local Authority.

A local authority have no title to sue a complaint for a contravention of the Sale of Food and Drugs Acts. They must proceed by their officer who submitted the article for analysis or by the Procurator Fiscal.

A complaint was laid at the instance of "the Provost, Magistrates, and Councillors of the Burgh of Dumbarton" against the appellant Colquhoun, for an offence under Section 6 of the Sale of Food and Drugs Act, 1875, when

the appellant was convicted. Colquhoun brought a bill of suspension, *inter alia*, on the ground that the Provost, Magistrates, and Councillors had no title or authority to present the complaint.

The Court allowed the appeal and quashed the conviction.

LORD ARDWALL, in the course of his judgment, said he was of opinion that the Provost, Magistrates, and Town Council had not a title to sue a complaint for a contravention of the Sale of Food and Drugs Acts. At common law, corporate bodies were not the proper persons to prosecute in respect of offences. The Sale of Food and Drugs Acts did not empower them to do so. Section 33 (9) of the Act of 1875 provided that "every such penalty may be recovered at the instance of the Procurator Fiscal of the jurisdiction, or of the person who caused the analysis to be made from which it appeared that an offence had been committed against some one of the provisions of the Act." Although under the Interpretation Act, 1889, the word "person" included "corporation," he thought it was clear from the other sections, such as Section 13, that the officer appointed to take the sample and who submitted it to analysis was the person referred to in Section 33 (9). Lords Dundas and Mackenzie concurred.

[See 44 Sc. L. R. 465 for a full report.]

HIGH COURT OF JUSTICE.
KING'S BENCH DIVISION.

April 29th, 1907.

BEFORE LORD ALVERSTONE, L.C.J., DARLING AND PHILLIMORE, JJ.
SMITH v. GREENWOOD.

Public Health—Local Act—Substitution of Water-Closets for Existing Privies.

Under a local act empowering a Corporation to require the owner to provide such privy, water-closet, earth-closet or ash-pit as they might think fit, in any case where any dwelling-house was without a privy, water-closet or earth-closet, or an ash-pit of a construction and size approved by the Corporation, it was held that the Corporation could require the owner to substitute water-closets for existing privies, although such privies were of good construction and sufficient for the needs of the houses, and they could also require a separate water-closet for each house.

This was an appeal by way of case stated from a magistrate upon the hearing of a summons under Section 21 of the Bradford Improvement Act, 1873, for neglecting to provide water-closets and ash-pits to seven cottages. There were three privies and two ash-pits for the said cottages which were of good construction, and apart from the right of the Corporation to ask for water-closets, were sufficient for the accommodation of the cottages. The Corporation required the owner to supply a separate water-closet and ash-pit for each cottage.

The Bradford Improvement Act, 1873, Section 21, provides: "In addition to all powers vested in the Corporation, the Corporation may, in any case where a dwelling-house within the borough shall be without a privy, water-closet, or earth-closet, or an ash-pit, or without a privy, water-closet, or earth-closet, an ash-pit of a construction and size approved by the Corporation, require the owner of such house, by notice under the hand of the mayor or town clerk for the time being, to provide such a privy, water-closet, or earth-closet, or such an ash-pit, or to make such reparation or alteration of the existing privy,

water-closet, or earth-closet, or ash-pit, as in such notice shall be stated, and within a period to be therein mentioned; if such owner shall neglect to comply with such notice within the time therein appointed, he shall for every such offence forfeit a sum not exceeding five pounds, and a further penalty not exceeding the like sum for every day during which such offence shall continue." The magistrate convicted the owner.

The Court dismissed the appeal.

ALVERSTONE, L.C.J., said the case was practically covered by authority, as in *AGNEW v. MANCHESTER CORPORATION*, 67 J.P. 174, they had held under similar local Acts that the Corporation had power to order the substitution of water-closets for privies. Under Sections 35 and 36 of the Public Health Act, 1875, the Authority could only call upon the owner to put in such a convenience as shall be sufficient. Under these local Acts the Corporation have power to call upon the owner to do such work as they approve. *Darling and Phillimore, JJ.*, concurred.

[For full report see (1907) L.R. 2 K.B. 385 and 71 J.P. 353.]

CHANCERY DIVISION.

March 20th, 21st; May 3th, 1907.

BEFORE JOYCE, J.

ATTORNEY GENERAL *v.* ASHLEY.

Public Health Act, 1875, Section 21—Connecting Drain with Sewer—
Breaking up Footpath to make an Inspection Chamber.

The owner of a house cannot break up the footpath of a street in order to construct an inspection chamber for the drain connecting his house with the sewer in the street.

This was an action brought in the name of the Attorney General at the relation of the Staines Urban District Council for an action to restrain the defendant from breaking up the footway of one of the streets in their district in order to construct a manhole or inspection chamber in the drain connecting his house with the sewer in the street. The defendant claimed this right under Section 21 of the Public Health Act, 1875, which provides that the owner or occupier of any premises shall be entitled to cause his drains to empty into the sewers of the local authority. The house drain had already been connected, but new drains were intended to be laid, and in the course of laying them the defendant proposed to construct an inspection chamber in the footpath. The Council objected.

Danckwerts, K.C., and *E. G. Palmer* appeared for the plaintiffs, and contended that although the defendant could connect his drains with the sewers, he was not entitled to do anything which might amount to a public nuisance or interfere with the control of the streets.

Macmorran, K.C. and *R. C. Glen* for the defendant contended that the inspection chamber was a necessary and proper part of a drain, and that as he was entitled to use the roadway to lay a drain, he was entitled to make the inspection chamber. His property in the subsoil was his.

JOYCE, J., in his judgment, said that the defendant, for the purpose of exercising his rights under Section 21 of the Public Health Act, 1875, was entitled, if necessary, to have the street broken up. He did not think that Section 21 necessarily authorized the construction of an inspection chamber, although he saw no reason why the defendant should not put in such a chamber while he was constructing the drain, provided he could do so without interfering with the public rights. An injunction would be granted restraining the defendant from breaking up the footway, except for the purpose of exercising his rights under Section 21.

[For full report see 71 J.P. 397.]

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