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Original Articles.

*THE PREVENTION OF CANCER.

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N most countries where detailed evidence over a considerable number of years is available, cancer shows an increase in the mortality statistics. In many cases the increase is startling and noteworthy. It is partly to be accounted for by the improvement in the methods of diagnosis of internal cancer; in the Frankfort statistics the rise was solely in cases of internal, not external cancer, but in the figures for England from 1868 to 1904 there has been a real increase both in internal and external cases. To some extent this can be explained away; owing to improvements in sanitary and medical science more people now reach middle age than used to be the case, and therefore more individuals become liable to the diseases of middle life and old age, of which cancer is one. Nevertheless it is probable that there is a real rise in the death rate in spite of the fact that an increasing number of patients are cured by operation.

The very word *cancer* rings so ominously in our ears that prevention and cure alike seem to be somewhat of a forlorn hope. The parasitic theory of its origin is yielding place more and more to the opinion that the condition is due to a pathological overgrowth of the proper

* Specially contributed to *The Antiseptic*.

constituent cells of the body, which have in some way become stronger than their neighbouring cells, just as a State, originally small and on terms of equality with its neighbours, finds itself one day under the domination of an ambitious ruler who has observed that the surrounding powers have become weakened, and before long it attacks and incorporates them and commences a widespread campaign of conquest. It appears far more hopeless to prevent such a train of events as this than to identify and check the dissemination of some external parasite. Parasitic diseases can usually be avoided, but the internal abnormalities of our own bodies for the most part elude our control.

Yet cancer can be prevented. It is not going too far to say that an observant person who is willing to undergo the appropriate treatment can avoid death from this disease, and can even check the cancerous process itself on the very threshold, in the majority of cases.

A most important conviction has been gaining ground of late years, founded on well-observed facts, that there is a *pre-cancerous stage* which can be recognized in all but the most rapid cases, and that surgical treatment in this stage will not be followed by recurrence. We will consider briefly the pre-cancerous stage in each of the common localities for malignant growth: the lip, tongue, breast, stomach, vulva, uterus and skin. No doubt there is a pre-cancerous stage in the pancreas, oesophagus, intestine and rectum, but these cannot be recognised by our present methods of observation.

EPITHELIOMA OF THE LIP.—The writer has recently published a study of the end-results of forty cases operated on for this condition. Quite a number of these mentioned that there had been a slight sore or crack on the lip for years before any growth developed. Most of them were old country folk who smoked clay pipes. Only two women had a cancer of the lower lip; one of these smoked a clay pipe, and the other had a rough tooth which had fretted into the mucous membrane of the lip, forming a dental ulcer. Of 45 cases, 44 affected the lower lip.

The train of events is quite clear. Constant friction on the lower lip causes a small abrasion or thickening of the skin which becomes chronic; eventually some epithelioma is established in this irritated region triumphs over its neighbours and a cancer is established. If every such abrasion or thickening, however small, occurring in a man over 35, and not healing absolutely in a fortnight or so, was treated by a limited excision, which could easily be done under a local anæsthetic, the process would be checked at its onset and recurrence made very improbable. The excised

portion should always be microscopied, and if it is definitely malignant more would have to be taken away.

EPITHELIOMA OF THE TONGUE.—Of some thirty cases of this terrible disease treated recently at the Bristol Royal Infirmary the evidence of a pre-cancerous condition was clear in the great majority. In three or four patients there had been a dental ulcer cut by a sharp tooth. In two others the original condition was an apparently simple wart. In another case there were syphilitic ulcers. In nearly all the rest there were patches of leukoplakia. Every one of these pre-cancerous affections ought to be regarded with grave suspicion in a person over 35 years of age. Warts should be removed at once with a good wide margin—not, of course, so much as half the tongue except in very extensive cases. The patient ought to be seen every month afterwards for a couple of years, and at intervals for another year.

If dental ulcers in such a person do not get quite well within a fortnight of proper treatment (removing the tooth, painting with glycerine of borax, etc.) they ought to be excised, and watched afterwards.

A small localized patch of leukoplakia or a small syphilitic ulcer that does not soon heal ought to be excised with a small margin. Extensive patches cannot be treated in this way; they ought to be watched with great care, and any thickening or ulceration that does not respond to treatment must be removed. If it is found to be cancerous by the microscope, the ordinary operation must be done.

SCIRRHUS OF THE BREAST.—It is probable that there is a stage at which every case of scirrhus is a simple growth, a fibro-adenoma for instance. It is quite common for a tumour to be excised which is clinically innocent, and in the main the microscopical appearances are those of adenoma, but in some of the acini early malignant changes are visible. We have recently had a case here in which what appeared to be a simple fibro-adenoma recurred and was typically cancerous.

The moral is that every nodule in a breast, however innocent it may be, ought always to be excised. No doubt a number of such cases never were and never would become cancerous, but it is quite certain that many of them do.

CANCER OF THE STOMACH.—It has become a well-established fact that a large proportion of cases of cancer of the stomach supervene on a chronic gastric ulcer, and further, that many cases of chronic gastric ulcer become malignant. Nothing is more remarkable than the rapid increase in the number of cases of chronic dyspepsia, vomiting and

gastric dilatation that are submitted to operation in our large hospitals, and the benefit conferred is perhaps greater than that of any other surgical procedure. When it becomes thoroughly established that dyspepsia coming on in adult life and not yielding in a few weeks to proper medical treatment requires surgical exploration, then it is certain that mortality from cancer will at last begin to fall.

EPITHELIOMA OF THE VULVA.—This disease is almost invariably preceded by a sodden, white, thickened condition of the mucous membrane called leukoplakia vulvæ. The symptoms are slight, there is some discharge and itching, but no pain. The first beginning of an epithelioma shows as a fissure, ulcer or thickening that refuses to heal. At this stage, if the fissure and as much as possible of the leukoplakia is removed, recurrence is very improbable, but when there is a definite epithelioma corresponding to the text-book description the outlook is very doubtful. All cases of leukoplakia vulvæ ought to be carefully watched for the development of suspicious areas.

CANCER OF THE PARS VAGINALIS CERVICIS.—This growth starts with the adenomatous condition which is called granular erosion, and in some cases it is quite impossible even for an expert to distinguish the one from the other by the appearance, feel or symptoms. When the growth is ulcerated or fungous, diagnosis is easy, treatment difficult, and prognosis unfavourable. Therefore if a case of granular erosion appears to be deep or friable, or is otherwise behaving suspiciously, a part should be removed, perhaps under cocaine, for the microscope to determine whether the acini are encroaching on the unstriped muscle of the cervix. If so, it must be treated as cancer.

CANCER OF THE UTERINE BODY OR CERVICAL CANAL.—Here again it is possible to anticipate the condition, or at any rate to deal with it very early. If cases of metrorrhagia do not stop with ergot and rest, the cervix should be dilated, the uterus explored, and the adenomatous or degenerative endometritis dealt with by curetting and thorough removal. The fragments should always be microscopied, and if suspicious the uterus must be removed.

EPITHELIOMA OF THE SKIN is nearly always preceded by a chronic ulcer, wart, fissure, X-ray burn or other lesion, and these all require careful watching in persons past middle life.

*THE TREATMENT OF SPINAL CARIES AND ITS COMPLICATIONS IN CHILDREN.

BY

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Two points in connection with spinal caries are now conceded by practically all surgeons; firstly, that it is in the very great majority of cases a tuberculous joint disease, and secondly, that like all other tuberculous joint trouble, absolute rest is essential for its successful treatment. The point on which opinion still differs is the method of securing this, absolute rest.

On referring to various books on the treatment of this disease, either general surgical works, or special orthopædic treatises, I find quite a number which still advocate the use of jackets of various kinds, Plaster of Paris, poroplastie, etc., as a sufficient means of securing complete rest of the spine in children. Thus Erichsen (1895) says—"In the great majority of cases Sayre's plaster jacket is the most efficient apparatus." Holt (1903)—"It (*i.e.*, the immobilising of the spine, etc.) may be accomplished either by Plaster of Paris or some other form of jacket, or a properly fitting steel brace". Keetley (1900) speaks in the very highest terms of spinal jackets in the majority of cases. These three quotations, all of first class men—a surgeon, a physician, and an orthopædic specialist—I recognise, make it very difficult for me to venture on any contrary opinion, but I am firmly convinced that the method of treatment I am about to describe, and for which I claim nothing whatever original, is a better one. I am supported in this by the fact that many well-known surgeons, notably Watson Cheyne, an eminent authority on the treatment of tuberculous joints, are strongly in its favour.

It is a physical impossibility to get a proper basis of support for any spinal jacket from the undeveloped pelvis of young children. No jacket of any description suffices to keep the spine of a child anything like fixed, and therefore the whole principle of treatment, absolute rest, is set at naught when you put on a jacket. As the majority of cases of spinal caries occur in children under five years of age, it is important to have some method of applying to them the sound surgical principle of perfect fixation of the diseased joints, and that is, I venture to assert, obtained by the following method of treatment. Briefly this consists of complete rest in bed, with double extension and without any spinal

* Specially contributed to *The Antiseptic*.

jacket. Every child with tuberculous disease of the spine should be put at once into the horizontal position, and extension properly applied.

The simplest and best method of carrying out this treatment, is to place the child flat on its back; the prone position which was at one time the fashion is certainly most unsuitable. It does not allow of anything like perfect rest of the back, it does not permit of emptying the bowels and bladder without moving the spine, and in other ways it is quite undesirable. The mattress must be hard and on a firm spring bed, or fracture boards, to prevent any undue yielding; the whole body should be horizontal, no pillows are to be used, the thighs must be kept straight, and the head must not be lifted at all, unless the disease is quite at the bottom of the spine, and then only slightly. If the disease is in the cervical region the head and neck must be surrounded with sand bags.

A divided mattress is used, an upper portion, a lower and a middle, the last of which is in two pieces, one half of which can be withdrawn, and the bed-pan slipped in to give support, and the other half then removed. A sheet is placed over the chest and abdomen and kept in place by sand bags on each side. Extension is obtained by applying the usual strapping extension apparatus to each thigh, the legs being slightly abducted. A weight of three pounds is fixed to each; an occipital band with chin strap is attached to the head, and this is fixed to a third pulley with another three pound weight. This combination of double extension with fixation as nearly absolute as possible, is the ideal treatment and the most effectual in spinal disease in children during the progressive stage.

I will deal with the objections that can be urged against it. Firstly, it is said that the general health must suffer from the confinement, but this is not so; the improvement in the local condition which the rest to the spine ensures, reacts at the same time on the general health, and children in actual practice do most undoubtedly improve. They eat and sleep well, and grow fat and healthy. Of course it is essential that they should have proper feeding and attention to the bowels, etc., and plenty of fresh air, either by open windows, or by putting the bed out of doors.

Secondly, it has been thought the whole procedure is too complicated and difficult to carry out in general practice. This is not so. I should be glad if any one who doubts its simplicity and practicability would look at a case, any afternoon, which I have fixed in the girls ward at the Children's Hospital. She has been there some months, is

looking and feeling well, has a good appetite and a normal temperature, and is comfortable in all respects. It is a good example of the method of treatment I have advocated. Thirdly, the chief objection that I can see to this method is the time required. Undoubtedly it is difficult to keep a child in bed for many months, especially in hospital, where the bed is sure to be wanted; at home it is not really much more trouble to have a spinal case fixed in bed than fixed in a jacket and certainly the results are so much more satisfactory in the former, that I cannot think the little extra trouble should be considered.

As to the time required it is difficult to say exactly. In most cases at least a year is wanted, generally a good deal more. Then when the disease is cured, the child may be allowed to get up for short periods, and the time increased gradually. A light support should be worn for the first few months.

The two chief complications of spinal caries are paralysis and abscess. All that it is necessary to say with respect to the first of these is to emphasise, if possible, more than I have already done, the absolute necessity of employing rest on the back with double extension, in every case of spinal caries in which there is paralysis, recent or old. In recent cases it generally acts like a charm, the paralysis rapidly disappearing; the necessity for any such procedure as laminectomy is done away with. In old standing cases the method should always be tried for a few weeks before resorting to operation. There are, of course, certain cases, such as that of compression due to abscess in the spinal canal, or pachy meningitis round the cord in which nothing but laminectomy is any good. As to abscess, the only surgical treatment of any avail, is to remove the pus. Formerly this was done by opening it, scraping with a flushing curette, injecting with iodoform and glycerin and sewing up. There was always a risk, a rather considerable one, of the wound becoming septic, and this was disastrous. Now it is generally considered advisable to avoid making any incision. The abscess is aspirated, all the pus drawn off, and then iodoform and glycerin injected. This may, probably will, require to be repeated, once, twice or more times, in order to effect a cure.

As to any treatment of the deformity of healed caries, I only mention the procedure of forcibly straightening the spine, introduced by Calot, to condemn it. It is absolutely unsurgical, and I imagine no one would dream of employing it at the present time.

• **ALL-INDIA SANITARY CONFERENCE—MADRAS,
NOVEMBER 1912.**

Enteric Fever in India.

(An account to date of the results obtained from the practical working of the recommendations of the Enteric Fever Research Committee of the Government of India (1906-1908).

BY

MAJOR E. D. W. GREIG, M. D., D. SC., I.M.S.

On special Duty for the Cholera Enquiry.

As it is now nearly 5 years since the Enquiry on Enteric Fever of the Government of India completed its labours, it may be instructive and profitable to give a connected account of the results of the practical working of its main recommendations, more particularly as the subject of Cholera, the problems of which in many respects resemble those of Enteric fever, is being studied at present under the auspices of the Indian Research Fund Association. Before, however, taking up the thread of the narrative from the date of the cessation of the investigations, it will be convenient here to recall shortly the main points in the history of the research on Enteric fever in India.

It was estimated that Enteric fever in India was responsible for an annual loss of £ 2,30,000(a). Hence if looked at from the commercial point of view alone it was a subject which called for the most careful investigation. Further it was then shown that, (b) "in spite of vigorous sanitary measures a very real increase of the disease was taking place."

Accordingly the Government of India in 1905 decided to undertake an enquiry into the causation of Enteric fever amongst the troops in India. I was selected by the Government of India, and deputed by the Secretary of State for India, in September 1905, to proceed to Germany to study the methods employed by the German Government in the campaign against Enteric with a view to conducting an enquiry on the subject on my return to India. I worked in Germany at the Keonig. Pr. Institute für Infektionskrankheiten, at Berlin, with Geheimrat Prof. Frosch. I studied the problems also at the various special Institutes in Alsace Lorraine, where investigations on "Enteric carriers" were being conducted on a

• Papers read at the All-India Sanitary Conference—Madras—November 1912, and sent to *The Antiseptic* for publication.

(a) Enteric Fever in India. Roberts—Thacker Spink, Calcutta, 1906.
(b) *Ibid* 1906.

large scale. The results of my investigations were incorporated in, a Report to the Secretary of State for India (a).

On my return to India in February 1906, I was placed on special duty by the Government of India to carry out an investigation on the causation of Enteric fever amongst the troops. Up to this date no scientific research had been made in India on the question of the Enteric "carrier." This enquiry lasted for two years (1906-08); and during this period working on the lines elaborated by me in my first report (b) my colleagues and I carried out a large amount of research work on the etiology of Enteric, and, for the first time in India, the presence of Enteric "carriers" amongst the troops was demonstrated as well as their significance in relation to the causation of epidemics of the disease. The results of this investigation were published by the Government of India at the end of the enquiry (c).

Dr. J. C. G. Ledingham of the Lister Institute of Preventive Medicine, London, in his report to (d) the Local Government Board of England on the Enteric fever "carrier" says, in regard to this research, that, it is "perhaps the most thorough bacteriological investigation of typhoid convalescents hitherto reported." Still referring to our investigation he states regarding instances of the infectivity of the "carrier" that it is "the most extensive work which has so far been done in this connection."

One of the main conclusions arrived at from our research work was that the convalescent enteric should be segregated and carefully examined bacteriologically and not allowed to return to his regiment until he has been shown to be free from the B. typhosus.

When the research work ceased, the next phase of the problem was the elaboration of a means of applying the results obtained by our inquiry to the conditions met with in practice in India. This was solved by the Government of India giving effect to our recommendation to establish two Depôts for the segregation and investigation of Enteric convalescents, one at Naini Tal (1908) for the troops of the Northern Army, and later, one at Wellington for the troops of the Southern Army in India.

(a) Reports on the Methods employed in the campaign against Typhoid Fever in Germany. Also Jour. R.A.M.C., Volume VI, February 1906.

(b) *Ibid*.

(c) Scientific Memoirs of the Government of India, No. 32; also see Annual Report of the Sanitary Commissioner with the Government of India for 1906, page 16 onwards.

(d) Report of Local Government Board on Public Health and Medical Subjects (New Series) No. 43, 1910.

At these Depôts the convalescents are examined on the lines laid down by our enquiry.

I propose to give the results of the working of these Depôts from their commencement to the present date in regard to their effect in reducing the incidence and mortality from Enteric fever amongst the troops in India. I have obtained my information from the various Reports, etc., published by military medical authorities in India. Thus Aldridge^(a) writes: "As regards the effect of this measure on the incidence of Enteric fever at the stations from which the convalescents came, it is found that the admissions for Enteric fever from all stations which sent convalescents to Naini Tal showed a reduction of 9 per cent of the figures for 1907, while the remaining stations show an increase of 26.6 per cent." This is a very significant observation; the stations which did not send their convalescents showed a marked increase of admissions for Enteric and served as a control to the stations which did and which showed a distinct reduction in the admissions.

In the Report ^(b) on the Health of British Troops in India in the year 1910, Colonel Firth, R.A.M.C., the Sanitary Officer at Army Headquarters in India [now Assistant Director, Medical Services (Sanitary India)] writes: "The really remarkable diminution of Enteric infection among European troops in India during 1910 is difficult to explain by any one condition. The weight of evidence points to the dominant influence of our present day system of segregation of the infected, with the careful examination of all convalescents and their retention in the convalescent Depôt until found to be absolutely free from infection. It is difficult to appraise too highly the great part played by the two Enteric fever Depôts at Naini Tal and Wellington in controlling the disease." Grattan and Wood ^(c) writing regarding Enteric in India state:

"The incidence of enteric, which is becoming less and less each year, points to some condition or conditions at work which have a cumulative effect: we believe that these factors are in order of dominance:—

1. Segregation of the convalescent enteric patient, until he is proved to be free from infection.
2. The elimination of the "Chronic carrier."
3. Inoculation.
4. General all round improvement by attention to sanitary details."

(a) Jour. R.A.M.C., Volume XXIII, September 1910.

(b) Report on Health of British Troops in India in 1910 (quoted in *Indian Medical Gazette*) December 1911.

(c) Jour. R.A.M.C., Volume XVII, 1911.

The following table shows the recent figures regarding Enteric fever in the Army in India.^(a)

Year.	Average admission per 1000.	Constantly sick per 1000.	Deaths per 1000.
1895-1904	22.3	3.31	5.62
1905-1909	13.7	2.75	2.66
1910	4.1	0.91	0.62

Another important result of the investigation was the demonstration by strict scientific methods, that the disease called Enteric fever embraced two other infections, produced by the B paratyphosus A., and B paratyphosus B.; the former in our experience was the more common.

On May 6th 1906 the B. paratyphosus A was isolated by us ^(b) from the blood of a soldier in the Durham Light Infantry, and, for the first time in India, this disease was separated from Enteric fever by strict bacteriological methods.^(c) Since the discovery opened up the way for further investigation, a number of interesting observations have been made in India, particularly by Harvey and Grattan ^(d).

Firth ^(e) in a recent paper (September 1912) gives the following table:—

Year.	Number of cases of Enteric and paratyphoid fever.	Number of deaths from enteric and paratyphoid fever.	Case mortality percent.
1897	2050	556	27.1
1902	1012	260	25.7
1907	910	192	21.1
1908	418	191	18.8
1909	639	113	17.7
1910	335	46	13.8
1911	274	24	8.8

(a) *Lancet*, December 23, 1911.

(b) Scientific Memoirs, Government of India, No. 32. Annual Report of Sanitary Commissioner with the Government of India for 1906, Page 16.

(c) Scientific Memoirs, Government of India No 32. Annual Report of Sanitary Commissioner with the Government of India for 1906, page 16.

(d) Jour. R.A. M.C., Volumes XVI and XVII, 1911.

(e) *Indian Medical Gazette*, September 1912.

In 1910, 39 cases, and in 1911, 104 cases of paratyphoid were diagnosed. Hence the figures in the above table, column 2, for 1910 and 1911 may be divided into 296 cases of enteric and 39 cases of paratyphoid for 1910; for 1911 of the total 274 cases only 170 were due to enteric and 104 to paratyphoid.

It will be seen that although *B. paratyphosus* A was first cultivated by us (a) from the blood of a patient in India in 1906, and the results published, it was not until 1910, 4 years later, that systematic blood cultures were begun amongst the British Troops (b) as a means of differentiating this type of fever, but since the commencement of the use of this method of diagnosis the above valuable results have been obtained.

Firth (c) states in a recent paper, September 1912, that since the opening of the Enteric Depôts 1,229 cases of enteric fever have been examined and 13 cases of "chronic carriers", and 13 cases of "temporary carriers", have been detected. Also 124 cases of paratyphoid fever have been investigated and one "chronic carrier" and 17 "temporary carriers" have been found. He goes on to say, "Had the old system prevailed and no Enteric Depôts existed, these 26 "Enteric carriers" would have gone back to their barracks at once on discharge from the hospital. The aftermath of cases from these 44 men, assuming that each of them infected but 3 other individuals, amounts by the third generation to as many as 1,188 cases. From this point of view we attach the first importance to the existence of the Enteric Depôts and the elaborate technique there carried out for the detention of potentially infective individuals."

It may be asserted in the light of these results of the working, in actual practice, for a number of years of the recommendations for the prevention of Enteric amongst the troops in India, based on our researches on enteric fever, that, on the whole, the conclusions arrived at in 1907 have stood the test of time fairly well; and that their mortality has not been unduly high; and, what from the practical standpoint is the most important, that the enquiry was worth, probably, the expenditure in money and time incurred on it.

Dysentery—Problems and Proposals.

BY

CAPTAIN J. CUNNINGHAM, I.M.S., AND MAJOR W.F. HARVEY, I.M.S.

Definition.—Various definitions are possible according as we take locality, manifestations, cause, etc., as our basis; so we take as the most

(a) Scientific Memoirs, No. 32.

(b) Indian Medical Gazette, Gazette, 1912, September.

(c) Firth *ibid.*

convenient as well as the most practical, the combined definition by clinical manifestations and locality.

Dysentery is a disease of the lower bowel which manifests itself by frequent dejections and straining with blood and mucus in the stools. Such a definition affords a ready and sufficient means of the diagnosis of clinical dysentery.

Causation.—It is when we are called to decide upon the cause of the syndrome of dysentery that our difficulties begin. The problem arises as to the manifoldness or the oneness of the cause, and as to the differentiation of the causes. There can be, we think, little doubt as to manifold causation. Dysentery has been recognised as a manifestation of certain diseases—malignant disease, tuberculosis, kala azar, helminthic infection and probably others. Within comparatively recent years, however, two causes have been differentiated which may, in the sense that they have their significance only in the dysentery which they produce, be called specific causes. They give rise to the forms known as amoebic dysentery and bacillary dysentery. It is very largely in connection with these that our problems arise. Their differentiation from one another and from the other conditions which can give rise to dysentery is most important for both the treatment and the prophylaxis of this distressing disease.

The differentiation might seem to be easy—the dysentery showing the presence of dysentery bacilli is bacillary, that showing the presence of specific amoebic, is amoebic. But all is not such plain sailing as would be implied by this statement. We want to be instructed as to what is the amoeba of dysentery, what are the bacilli of dysentery, whether both amoebæ and bacilli may combine to give rise to the disease and whether the one condition may or may not pass into the other. We should like to know, in connection with the delimitation of cause, what is the relation of chronicity to particular findings. It is, for example, said to be difficult to find the bacilli of bacillary dysentery in chronic cases. We must then in the amoebic case—said to be characteristically chronic—not lay too much stress on the absence of bacilli as these would be likely to be absent in any case.

We should also make certain that the bacillary form, become chronic, does not then begin to show the presence of amoebæ.

In this matter of the determination of causation of a disease in which it may not be possible always to isolate a causal agent it becomes necessary to fall back upon indirect methods of determination. These

may consist in (1) tests applied with the help of known and isolated causal organisms, (2) tests dependent on the associations, other than specific cause, with one or other form of the disease such as the characteristic chronicity, degree of leucocytic exudation and form of successful treatment.

Take the first of these in more detail.

Tests applied with the help of known and isolated causal organisms.—

We admit, say, the existence of a bacillary dysentery and, therefore, of a bacillus of dysentery. Everyone is acquainted with the great use which is made of serum reactions not only for the diagnosis but for the differentiation of the Typhoid fevers.

We should expect, then, that a serum reaction, such as that of agglutination, would be of service in the delimitation of bacillary dysentery from the other dysenteries and also as a means for the further subdivision of this form of the disease.

In any group of dysenteries taken at random, simply on the basis of the description of the syndrome, we should expect that a certain number would be or would have been of the bacillary type and that such a test as that described would be evident in proportion to the prevalence of that type. The expectation would be capable of verification most satisfactorily in cases of actual dysentery.

This has been done by various observers and the results are variously given. We ourselves have not had dysentery cases to examine but have taken a random sample of a certain population and proceeded to examine the serum reactions of this sample to a variety of known dysentery organisms. The results were recorded and afterwards compared with the history or absence of history of dysentery afforded by the individuals with an idea that an agglutination reaction might be demonstrable in those with a recent history of bacillary dysentery. Incidentally a still larger number of individuals of the same population were interrogated as to the occurrence of dysentery among them and thus some idea, within the limits of credibility to be placed on the answers, was obtained as to the prevalence of the disease. The population was, if not an actually random sample of the population of India, at least a very varied sample of that of Northern India.

The agglutination tests are shown in the following tables in conjunction with the presence or absence of a history of dysentery.

The figures shown in Table I were obtained from the case sheets of the patients who attended the Pasteur Institute of India during the months of April, May, June and July 1912.

TABLE I.

Showing the prevalence of dysentery in an *unselected* population.

The table is divided into two subdivisions, the first *A* showing the population divided up according as they give a positive or negative history of dysentery. Those who give a positive history are also divided according to the period of time which has elapsed since their last attack.

Subdivision *B* shows the age distribution of the population.

A. DYSENTERY INCIDENCE.				B. AGE DISTRIBUTION.			
Date of last attack in months up to 1 year & in years up to 20 years.				No. of cases.	Age in years.	No.	Age in years.
1 month ago	...	...	...	35	1	3	36
2 months ago	...	...	...	24	2	4	37
3 " "	...	...	...	13	3	9	38
4 " "	...	...	...	6	4	9	39
5 " "	...	...	...	5	5	17	40
6 " "	...	...	...	26	6	21	41
7 " "	...	...	...	4	7	25	42
8 " "	...	...	...	1	8	33	43
9 " "	...	...	...	2	9	24	44
10 " "	...	...	...	1	10	26	45
11 " "	...	...	...	0	11	21	46
1 year ago	...	...	...	39	12	25	47
2 years ago	...	...	...	42	13	12	48
3 " "	...	...	...	25	14	19	49
4 " "	...	...	...	9	15	18	50
5 " "	...	...	...	24	16	15	51
6 " "	...	...	...	7	17	6	52
7 " "	...	...	...	8	18	33	53
8 " "	...	...	...	2	19	12	54
9 " "	...	...	...	0	20	37	55
10 " "	...	...	...	16	21	13	56
11 " "	...	...	...	1	22	45	57
Carried over	...	...	...	290	...	...	...

DYSENTERY INCIDENCE.				AGE DISTRIBUTION.			
Date of last attack in months up to 1 year & in years up to 20 years.				No. of cases.	Age in years.	No.	Age in years.
Brought forward				290			
12 years ago	...	...	...	4	23	15	58
13 " "	...	...	...	0	24	17	59
14 " "	...	...	...	2	25	56	60
15 " "	...	...	...	8	26	20	64
16 " "	...	...	...	0	27	11	65
17 " "	...	...	...	0	28	33	66
18 " "	...	...	...	0	29	3	68
19 " "	...	...	...	0	30	60	70
20 " "	...	...	...	3	31	4	75
					32	16	
					33	4	
					34	5	
Over 20 " "	...	...	...	4	35	39	
Never	...	...	...	592			
Total				903			

TABLE II.

Showing the agglutinating power of the serum taken from an *unselected* population when tested with a series of strains of *B. Dysenteriae*,

Organisms.	SERUM DILUTIONS WITH NUMBER OF CASES UNDER EACH.														Total No. of cases.
	-5	+5	10	15	20	25	30	40	80	100	120	140	160.		
B. Shiga 1 ...	45	61	25	10	10	2	2	1	1	0	0	0	0	...	157
„ 2 ...	40	43	24	4	3	1	2	1	0	0	0	0	0	...	118
„ 3 ...	36	38	20	5	3	3	3	1	0	0	0	0	0	...	117
B. Flexner 1	37	33	38	29	20	3	55	44	1	0	0	0	0	...	170
„ 2	2	32	43	36	20	15	15	4	2	1	0	0	0	...	170
„ 3	5	31	40	35	23	10	17	6	2	0	0	0	0	...	169
B. Strong ...	5	4	4	14	12	12	34	20	11	0	1	0	0	...	119
B. Y. His ...	21	30	24	16	17	9	2	0	0	0	0	0	0	...	119

Explanation of Table II.

The reactions to three strains of Shiga (Shiga 1, 2, 3), three strains of Flexner (Flexner 1, 2, 3), and to a single strain each of B. Strong and B. Y. His are shown. Of these cultures Shiga 1 and 2 and Flexner 1 are strains of known age, Shiga 1 having been isolated in April 1912, Shiga 2 in June 1912, and Flexner 1 in March 1912. The remainder are laboratory strains of unknown age.

In the above table B. Strong shows agglutination in the highest dilution of serum, the greatest number of cases being in the 1-30 column. The B. Y. His and the Flexner strains come next, the majority of cases showing agglutination in a dilution of 1-10.

The Shiga group (the most toxic group) comes last of all with a maximum at 1-5.

B. Flexner 1 (the strain of known age) and B. Y. His approach more nearly the Shiga than the Flexner type of reaction.

TABLE III.

Showing the agglutinating power of the serum of a population who state that they have *never* suffered from dysentery when tested with a series of strains of *B. dysenteriae*.

Organisms.	Serum dilutions with number of cases under each.														Total No. of cases.
	-5	+5	10	15	20	25	30	40	80	100	120	140	160		
B. Shiga 1 ...	26	41	15	7	4	1	1	0	1	0	0	0	0	96	
" 2 ...	24	28	17	3	1	1	2	1	0	0	0	0	0	77	
" 3 ...	22	26	18	4	3	2	1	1	0	0	0	0	0	77	
B. Flexner 1	21	28	17	22	14	2	2	0	0	0	0	0	0	106	
" 2	0	21	28	24	14	8	9	1	1	0	0	0	0	106	
" 3	1	24	22	23	13	7	13	1	1	0	0	0	0	105	
B. Strong ...	4	2	3	8	6	9	26	12	7	0	1	0	0	78	
B. Y. His ...	12	21	17	12	9	6	1	0	0	0	0	0	0	78	

TABLE IV.

Showing the agglutinating power of the serum taken from a population who give a history of having suffered from dysentery *within the past twelve months* when tested with a series of strains of *B. dysenteriae*.

Organisms.	Serum dilutions with number of cases under each.													Total No. of cases.
	-5	+5	10	15	20	25	30	40	80	100	120	140	160	
<i>B. Shiga</i> , 1 ...	11	11	4	2	5	1	0	0	0	0	0	0	0	34
" 2 ...	9	8	3	0	1	2	0	0	0	0	0	0	0	23
" 3 ...	7	6	6	0	0	1	2	0	0	0	0	0	0	22
<i>B. Flexner</i> , 1 ...	11	6	7	3	4	0	3	3	0	0	0	0	0	37
" 2 ...	1	7	7	6	3	4	5	2	1	1	0	0	0	37
" 3 ...	2	5	9	9	5	1	3	4	0	0	0	0	0	37
<i>B. Strong</i> ...	0	1	1	2	3	2	4	6	3	0	0	0	1	23
<i>B. Y. His.</i> ...	6	4	3	3	4	2	1	0	0	0	0	0	0	23

TABLE V.

Showing the agglutinating power of the serum of a series of cases who give a history of having last suffered from dysentery *over twelve months ago* when tested with a series of strains of *B. dysenteriae*.

Organisms.	Serum dilutions with number of cases under each.													Total No. of cases.
	-5	+5	10	15	20	25	30	40	80	100	120	140	160	
<i>B. Shiga</i> , 1 ...	8	9	6	1	1	0	1	1	0	0	0	0	0	27
" 2 ...	7	7	4	0	0	0	0	0	0	0	0	0	0	18
" 3 ...	7	6	4	1	0	0	0	0	0	0	0	0	0	18
<i>B. Flexner</i> , 1 ...	5	9	4	4	2	1	0	1	1	0	0	0	0	27
" 2 ...	1	4	8	6	3	3	0	1	1	0	0	0	0	27
" 3 ...	2	3	9	3	5	2	1	1	1	0	0	0	0	27
<i>B. Strong</i> ...	1	1	0	4	3	1	4	2	1	0	0	0	1	18
<i>B. Y. His.</i> ...	3	5	4	1	4	1	0	0	0	0	0	0	0	18

Explanation of Tables III, IV and V.—The above three tables show the results obtained when the population given in Table II is divided up according as to whether the individual give a negative (Table

III) or a positive history of dysentery and the latter are again divided into those who state that they have suffered from dysentery within the last twelve months (Table IV) and those whose last attack was over a year ago (Table V).

An examination of the figures will show that there is no appreciable difference between the results obtained in any of the three tables (Tables III, IV and V) when they are compared with each other or when they each are compared with Table II.

The correlation, therefore, between a history of dysentery and a corresponding serum agglutination is very slight. Those who state that they have never suffered from dysentery show very much the same agglutination reactions as those with a history of the disease. This may be due of course, to want of recentness of attack, comparative absence of bacillary dysentery among the dysenteries, or inutility of the reaction as a diagnostic procedure.

Now, before we leave this subject of serum reactions, we may refer to the usual method of differentiation of bacillary dysentery.

Starting with a known organism, say a *Shiga-Kruse* variety, we make from it a high titre serum. Then we agree that if a given case of dysentery is true bacillary dysentery the bacilli obtained in culture from the dejections will agglutinate with that serum or one similarly prepared from some other known strain. The argument is, however, somewhat weak. It depends for its validity on our assumption that the strains of dysentery in our possession and to which we have obtained high titre sera are the only possible varieties. We examine the bacteria isolated and find an agglutinating colony. This is sufficient to lead us to give up further search in the belief that we have found the true cause. But the very method of setting about the search represents a begging of the question of the possible co-existence of variations amongst the organisms present alongside that which gives the required reaction.

The test almost certainly implies the rejection of all other organisms but this one which is then put through tests such as absence of motility, fermentation reactions and indol production.

It is not to be wondered at that with such a technique we should be able to confirm previous findings as to special types of organisms. Failing to obtain such a reaction we think ourselves justified in classifying the dysentery as due to another cause than the bacillus. If at the same time amœbæ are found the disease is very likely to be called amœbic dysentery. Other criteria, such as the improvement under the

use of anti-dysenteric serum or a drug such as emetine, are also utilised by the diagnostician.

One problem of bacillary dysentery, then, would seem to be worthy of attack with some other starting point than that of the usual method of differentiation of organisms into dysenteric and non-dysenteric by means of high titre sera.

Our idea is that we should return to what must have been the standpoint of the earlier investigators into bacillary dysentery. We might take as potential criteria simply (1) the presence of clinical dysentery, (2) the determination of the most prevalent organism in the characteristic dejections, (3) specific reaction on the part of the patient's own serum to one or other of the organisms isolated from his dejecta. Our tests would be applied to these organisms, not with reference to any opinions on the subject or to any previous description of the true type. We would endeavour, as must have been done originally, simply to find out which, if any, of the organisms isolated may be regarded as the true cause.

For this purpose we must have some sort of tests over and above that of prevalence.

We would suggest an investigation which would include—

(1) An application of serum tests (particularly the patient's own serum and not merely a high titre serum). Such an investigation would take the form of a determination of the possible utility of agglutination, bacteriolysis, deviation of complement, opsonic index and similar tests.

(2) The use of the isolated "most prevalent or suspected organism" in cutaneous or ophthalmic reaction.

(3) An endeavour to complete the proof of causation by inoculation into animals with reproduction of the disease or symptoms of the disease.

If we can satisfy ourselves as to significant differences obtained with such an organism in cases of clinical dysentery, as contrasted with those obtained in healthy individuals or in those suffering from other diseases altogether than dysentery, then we may proceed to compare it with the known strains of dysentery organisms in respect of reaction to high titre sera, sugar fermentations, etc. The procedure we have outlined is a position of non-acceptance of any view as to what is or is not the specific germ of dysentery. Its only assumption is that a bacterium of some kind is the cause of some dysenteries and we hope, by

this way of attacking the subject, to be able to obtain a measure of the variability of the organism as regards the characters usually taken as differential. But let it be noted that in this investigation we have as our starting point simply the syndrome of dysentery. Our investigation into the bacteria of dysentery is to be conducted not only without bias from views as to which type of organism is the true dysentery bacillus but also without any bias due to our discovery in such cases of any amœbæ or of the amœbæ said to be pathogenic.

This search would be conducted not merely at the onset of the disease but also at intervals in its course and even after cure.

We should, likewise, even in cases exhibiting the characteristics of an amœbic dysentery, apply tests with the known types of bacilli as well as with other organisms isolated, just as if there were no probabilities in favour of the suggested causation.

Our insistence on these points is due to an ill-defined feeling, that the controls of the work already done have not been all sufficient, or at least are not given in a form which carries absolute conviction.

The suspicion that causation is, perhaps, not fully established is perhaps greater with reference to amœbic dysentery than in the bacillary form. When we are confronted with two schools of thought one of which (Schaudinn's) maintains that the amœbæ of amœbic dysentery are true parasites and are incapable of cultivation whilst the other (that of Musgrave and Clegg) assures us that there is at present no means of differentiating pathogenic amœbæ from the free living forms (capable of cultivation) found in air, water and intestinal contents, we may well be pardoned a desire to see further investigation instituted into the matter.

Such an investigation would inquire into the presence of bacillary reactions in amœbic cases, the proportion of cases of other than bacillary and amœbic causation, the presence of bacilli or amœbæ in these "other cause" cases, the occurrence of mixed amœbic and bacillary dysentery, the superposition of amœbic upon bacillary dysentery and *vice versa*, and the course of events leading up to the chronic forms of dysentery both amœbic and bacillary. It would require the strictest control in the matter of finding bacillary reactions, presence of amœbæ, etc., with a similar investigation into a sufficiently large number of persons in a healthy state or suffering from other diseases altogether. Experimental work on animals with amœbæ of culture and amœbæ of stools, bacilli of dysentery and bacilli not conforming to the type organisms would have to be conducted. Cases of liver abscess would be

especially investigated both for amœbic and bacillary findings and such cases would be specially tested for bacillary reactions to autogenous organisms and to the type forms.

The careful investigation into the occurrence of intermediate forms between the various typical amœbæ (number of cysts, colour, character of vacuoles, pseudopodia, etc.) would be very carefully gone into by recording *seriatim* all characters of all organisms obtained in purely random samples of material.

Proof or disproof of statements as to cultivation of amœbæ using proper controls to meet the objections raised to previous technique would be attempted. In fact, whereas previous investigation has gained its experience of possibilities and probabilities in the course of the investigation, such a one as we suggest would begin *ab initio* as if the ground had not already been traversed, but as far as possible with no bias to one or other opinion. The experience of others would be with us whilst we discarded all positive findings until such a time as they are refound.

So much for the problem of causation.

Treatment.—Here such confusion as exists with regard to benefit obtained is due to the absence of definitive treatment. One remedy is used in conjunction with others and the benefit claimed not for the combination, but for the single medicament. In any inquiry into the merits of well known remedies these should be used singly or, upon combination, the result should be recorded as due to the combination.

We have such remedies as Magnesium Sulphate, Emetine, Anti-dysenteric serum, native remedies such as *Isaphgul* and *Kurchee* to consider. Of these Magnesium Sulphate and Anti-dysenteric serum are of avail in bacillary dysentery whilst Emetine is of value in the amœbic form. Thus the form of treatment is evidently largely dependent on the discovery of the causation of the disease.

But if we turn to statistics of causation we are confronted with the fact that the cause of a very large proportion of cases of dysentery is undiagnosed and possibly cannot be diagnosed. Such, at least, is the impression we would gain from a statement made by Captain Wells in his Scientific Memoirs* that out of 268 cases of dysentery, 14 were diagnosed bacillary and in 52 motile amœbæ were found microscopically.

It might then be worth while to investigate the action of the various remedies on a very simple basis, namely their administration for

* Scientific Memoirs No. 52, 1912.

the condition which we know as the syndrome of dysentery. Our facts as to the effect would first be collected on this foundation alone with strict adherence to an alternative or serial method of administration. We could then proceed to test and cross test the effects obtained where causation was taken into account.

As strict controls as possible would be provided for all the trials and thus finally we might be able to make definite pronouncement as to the selectiveness of action of the advocated remedies.

We have made no mention here of the use of dysentery vaccine in treatment. This method of treatment was originated and carried out in this country with good results by Major Forster, I.M.S.

We have not done so because this remedy is excluded from use in the acute case and it seems more natural to consider its application in prophylaxis than in treatment. Prevention of relapse, maintenance of health would seem to be more important functions of this remedy than the actual cure, which doubtless it can also bring about in a certain class of case.

Prophylaxis.—Under this heading we may consider for the sake of argument four measures:—(1) Vaccination, (2) Purgation, (3) Segregation, (4) Sanitation.

(1) *Vaccination.*—We have referred to the use of vaccines therapeutically in cases which have passed the acute stage of the disease.

Our present theme is, however, the use of vaccines prophylactically for the prevention of relapses. Vaccines have been extensively used for this purpose. It would seem obvious that a vaccine, if its action is a specific one, would be of service only in cases of bacillary dysentery. It seems to us, however, that in an investigation into the limits of usefulness of vaccines we should have to apply the treatment first universally in all cases of clinical dysentery. No other remedies would have to be used along with the vaccine. In this way we should obtain results of a general kind and then the further test might be made as to the much greater benefit which we might expect to obtain when a proof of causation by the bacilli of dysentery had been substantiated. The problem would in fact be very much the same as that with which we were confronted in comparing the value of, say, Magnesium Sulphate in the treatment of dysentery in general, with its value in bacillary dysentery.

Other problems such as the relationship of the type of vaccine used to the type of organism found might be attacked if opportunity and time allowed.

(2) *Purgation*.—Captain McKendrick, I.M.S., conceived the idea that as Magnesium Sulphate was often successful in the cure of dysentery the purgative effect of this drug might have an important connection with the cure and so was led to extend the idea to prophylaxis.

Prisoners were placed at regular intervals (once weekly) on a laxative diet with the definite idea of the prevention of dysentery.

The method has also been applied by using Magnesium Sulphate itself in place of a dietetic laxative. The results were good and the method should be given a trial in controlled fashion.

(3) *Segregation*.—We may conceive of a situation in which mild cases of dysentery were treated merely as out-patients without admission to hospital or of a situation in which every case, however mild, was admitted to hospital until all symptoms had disappeared and possibly till some time after that. In the one case we should be passing back into the general population individuals who might be infective for others, whilst in the second we should be *segregating* cases in the presumably most definitely infective stage.

It is possible that in applying some of our prophylactic remedies, some of the credit claimed for the medicament used should go to the associated procedure—segregation in hospital. We should, therefore, endeavour by separate and controlled test to see what the effect of segregation alone and in conjunction may be.

Other methods of segregation than admission to hospital are also possible, but our insistence here is on the fact that admission to hospital is of the nature of segregation and should take its due place amongst measures calculated to reduce incidence and mortality.

(4) *Sanitation*.—It is likely, with a disease attacking the lower bowel and whose cause is almost certainly to be found in the dejecta that the sanitation which attends to the disposal of those dejecta, the prevention of contamination of food and water, will be effective in limiting the spread of the disease. When attention is specially concentrated upon the ravages of dysentery, special investigation is made into the causation and measures adopted for the prevention. Sanitation is invariably one of the points looked into. Here again some of the credit for the results obtained and medication may have to go to the head of sanitation and it would be well in future investigations to take this into account.

But the question of sanitation—the prevention of the distribution of infective dejecta over food and into water—raises the further question of the rôle of the “carrier” in dysentery.

The carrier.—With the advent of the conception of the rôle of the “carrier” as the real cause for the upkeep of diseased conditions entirely new views may be said to have been adopted on the subject of disease prevention. The idea had its inception with reference to Typhoid fever but has been widely extended. The preventive medicine of the future is likely to look not so exclusively to the danger of the acutely infected individual to his fellows but to the individual, or as the case may be animal, that represents the reservoir from which, as source, outbreaks of disease occur.

The carrier, then, whether as an individual just recovering from the disease or one in more or less permanent ill-health, suggests a problem for the consideration of the investigator of dysentery. Proposals for dealing with this class of case whether in restricted populations such as those of regiment, jail or asylum, or in the general population should be forthcoming in connection with any investigation of the subject. Detection, segregation, vigorous and continuous treatment of the dysentery carrier should produce good results on the transmission rate of dysentery and therefore upon incidence and mortality rates. Sanitation should produce its effect by diminishing the possibilities of distribution of infection from carriers. The investigation would be directed to determining whether the term ‘carrier’ could be applied to individuals in apparent good health as well as to those who, having contracted dysentery, never cease to suffer from recurrence of the disease in some shape or form.

Our proposals may now be formulated with reference to the special points raised in this discussion.

These proposals form the constructive side to the negative criticism which we have offered upon current ideas. We fully recognise too that these criticisms partake of the arm chair variety and accordingly we present them with all due and corresponding humility.

Proposals.—(1) That an investigation is desirable into the causation, treatment, and prevention of dysentery.

(2) That such an investigation being of a very wide scope requires careful preliminary preparation on the part of the investigators.

(3) That, in order that results should be forthcoming within a reasonable time and be as comprehensive as possible, it is clearly necessary to have a considerable number of trained hands engaged in the work.

(4) That the enquiry should start with known facts only.

All superstructure should be discarded and only foundations accepted. The superstructure to be reared would be in accordance with experience won, but would be of a form of much greater stability than any previously raised—at least such would be our hope.

Our Contemporaries.

MEDICINE.

Diabetes Mellitus.

BY

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The following is the summary of the article published in "The Candian Medical Association Journal" :—

1. Diabetes mellitus is not a rare disease.
2. While a small percentage of cases is due to severe organic lesions, most are undoubtedly the result of long continued errors in diet, particularly as to the amount and kind of food eaten.
3. Drugs are of little, if any, use in the treatment of this disease and as a rule should not be used. When drugs are dispensed with, the patient is made to realize the importance of dietetic and hygienic measures.
4. The *amount* of food permitted the diabetic is just as important as the *kind* of food. Even non-starchy foods must be used in strict moderation.
5. Mastication is one of the most important details in the treatment of this disease. Have the patient chew each mouthful of food thoroughly.
6. A mildly alkaline water is the drinking water of choice and it should be used freely. Distilled water should be prohibited.
7. Constipation must be overcome, if necessary by the aid of castor oil and olive oil. Salines and drastic purgatives should be avoided.
8. A moderate mental laziness combined with moderate physical activity is the ideal for the diabetic.
9. If gluten flours are used, they should be most carefully investigated, and their starch content ascertained before they are recommended. Many, if not most, of the gluten flours contain dangerously high percentages of starch.

10. Gluten breads of best quality must be used in moderation.
11. The starch-hunger of the diabetic makes him unreliable when his dietary is under consideration. Keep close watch of him.
12. Diabetes mellitus in children is not necessarily fatal, but a guarded prognosis should always be given.
13. Printed instructions for the patient and the requirement that he keeps a dietetic diary are great helps.
14. Co-operation on the part of the patient is essential to successful treatment.
15. The determination and elimination of the acetone bodies (acetone, aceto-acetic acid and oxybutyric acid) in the urine, is of even greater importance than that of the glucose.

Suprarenal Gland in Dyspnoea and Dropsy of Cardiac Origin.

DR. J. C. VOIGT says that, aside from the established and customary drugs that are employed in dealing with failure of compensation in heart affections, suprarenal gland and its preparations can be relied upon in some instances. The solution of the extract of the gland may be administered, either hypodermically or intravenously, or the gland-substance may be given by the mouth in tablet form.

Dr. Voigt has treated with this drug several patients having cardiac trouble in whom dyspnoea and dropsy were prominent symptoms. In all cases the dyspnoea was relieved more or less, sometimes by a hypodermic injection of from 5, 10 or 15 minims of a 1:1000 adrenalin solution, at other times by 5 grains of the suprarenal-gland substance administered by the mouth.

In the first case, the urine increased, during six days of suprarenal treatment, from 26 ounces, to 37, 49, 51, 111, and 125 ounces. At a later period the urine had again become very scanty, measuring on one day only 18 ounces. Adrenalin was then given subcutaneously three times and continued during the following day, without diminishing the salt in the diet, with the result that the next day 20 ounces of urine were voided, and, on the three following days, 43, 116, and 102 ounces, respectively.

In another case, where the patient could not be brought to limit herself to the salt-free diet or to an exclusive milk diet, ordinary diet was continued and two hypodermic injections of 7 to 10 minims each of adrenalin, 1:1000, were given daily. In this case the 24-hour amount of

urine increased, from 29 ounces, to 37, 49, 76, 74, and 93 ounces. After this the amount of adrenalin was diminished and the treatment continued for a few days longer, with the result that all dropsical swelling that had been present disappeared. The albumin disappeared from the urine, which was secreted in large amounts.—*The American Journal of Clinical Medicine.*

The Treatment of Asthma in Childhood.

H. E. KNOPP.—Whether asthma is common in childhood or not, is still a moot point. During 3 years' service in the University Polyclinic in Strassburg, the writer did not see one case among 5,000 children. He also saw very little disease of the upper respiratory passages in this town, the damp climate of which may account for the scarcity of such complaints and asthma. That climate plays an important part in asthma among children is evident from the fact that one physician alone claims to have seen 43 such cases within 2 years. It is certain that some towns are far more favourable to patients already suffering from asthma than are others, and that Berlin and Paris, for example, are often cities of refuge to these patients. But even in localities other than Strassburg, the writer at first saw no case of asthma in children although, as a rhinologist, he saw several cases of asthma in adults. Only after he had specialised in asthma for some time did several cases in children come under his notice. Pure bronchial asthma is rare in children, but it may exist from earliest childhood. More common are the mixed forms, such as asthmatic bronchitis in which chronic bronchial catarrh is accompanied by symptoms of asthma. The bronchitis of measles and whooping cough may also be complicated by asthma.

As in the bronchitis and asthma of adults, the treatment of asthma in children should primarily be directed towards improving the mechanism of respiration, for a striking feature of this disease is the faultiness of the respiratory movements, the thorax performing inspiratory, while the abdomen simultaneously performs expiratory movements. To treat the asthmatic to breathe properly will often cure the asthma, and banish the nervous symptoms. To this end a gymnasium instructor is useful. While massage is usually superfluous among adults capable of carrying out co-ordinated movements, it is very useful for small children, and for older children who are mentally flabby. Careful dieting is necessary, and it is essential that the evening meal should be so constituted and timed that the stomach is empty before the child goes to

sleep. The child should be inured to exposure, and if necessary, be transferred to another climate.

Illustrative cases.—A boy, aged 8 years, had from infancy, suffered from asthma. Attacks occurred almost every night and lasted several hours in spite of fumigating powders. Only temporary improvement was obtained by residence in the Riviera and in mountain resorts. The chest was barrel-shaped, the lungs were emphysematous, and the face was much cyanosed during an attack. Although remarkably intelligent he suffered from nocturnal enuresis. The skin over the whole body was dry and atrophic. Under the writer's treatment the fumigating powders were omitted, and the attacks grew less till they ceased altogether. Respiratory exercises were carried on for several months under the supervision of an expert, and when seen 2½ years later, the child was still free from asthma, his emphysema had disappeared, the shape of the chest was practically normal, and the skin was no longer atrophic.

A boy, aged 8 years, when at home, suffered every night from severe attacks of asthma. Elsewhere, these attacks soon ceased, and he was therefore sent from home to various localities. The first night after his return home he was subject to an unusually severe attack. He was treated in the writer's home for 5 months, after which he was able to return home without a relapse, and during the following 1½ years he remained well. His rachitic thorax assumed more normal proportions, and his general appearance was much improved.

Three other cases of recovery under this treatment are described.

Asthma in children may react satisfactorily to rational treatment. It is often, therefore, desirable that the asthmatic child should be removed from home and treated in an establishment where rational therapy is available. It is true that, like stammering, to which it is closely allied, it may disappear spontaneously at puberty; but to do nothing but to wait for this in the hope that the attacks will cease spontaneously, is to subject the child to years of suffering which may cause irreparable damage.—*The Medical Review.*

Glycosuria.

The problems presented by glycosuria are many and difficult. In the recent Lettsomian lectures they have been exhaustively discussed by Dr. Garrod, the greatest English authority on diseases of metabolism. A disease characterised by thirst, polyuria and loss of flesh has been recognised since the days of Celsus. The name "diabetes" was applied to it by Aretæus, but the fact that the urine contained sugar was not

'clearly recognised' until 1674, by Thomas Willis. In 1776 Matthew Dobson, by evaporation, obtained the sugar from diabetic urine as a solid if impure mass, and he detected the sweetness of the blood serum of a diabetic patient, thus showing the existence of hyperglycemia. During the seventeenth and eighteenth centuries British observers made all the chief advances in the study of diabetes, culminating in the introduction of the dietetic treatment of the malady by John Rolle, in 1796. Our knowledge of glycosuria came through diabetes. Dr. Garrod thinks that we do not always sufficiently realize that our conceptions of a subject depend largely on the manner in which our knowledge of it has been gained. He thinks that if we approach the study of diabetes through that of glycosuria we are more likely to obtain a just conception of both. Diabetes is no definite circumscribed disease; the disturbance of carbohydrate metabolism which leads to accumulation of sugar in the blood, and so to glycosuria is due to various causes.* No definition of diabetes yet proposed meets all requirements, but perhaps the best is the one suggested by Naunyn, that a patient who passes sugar after the free taking of starch is virtually a diabetic.

A reducing substance in urine which responds to the test usually relied upon is not necessarily a sugar; and other sugars besides glucose occur in the urine. The development of a greenish opacity, which may appear only when a mixture of urine and Fehling's solution has been boiled for some time, or as it cools, may indicate the presence of glucose in small amount, but this must not be assumed without further proof. Certain nitrogenous constituents of normal urine have some reducing power, and salicylic acid, which is present in the urine of patients taking salicylates, causes such a reduction. On the other hand, an orange precipitate, formed when hot urine is mixed with an equal volume of hot Fehling's solution *without reboiling*, affords almost conclusive evidence of the presence of glucose or lævulose. This is the safest way of performing the test, for an orange precipitate, obtained on boiling, is sometimes due to the presence of a compound glycuronate. Glycuronic acid is closely allied to the sugars, but its presence in no way indicates a disorder of carbohydrate metabolism, but of the calling into play of one of the protective mechanisms, by means of which the organism averts damage by chemical poisons introduced through the mouth, or toxic substances formed in the alimentary canal. The reduction occurring in the urine of those exhibiting the rare and usually congenital error of protein metabolism known as alkaptonuria has led to their rejection for life insurance. But other properties of alkapton urine—darkening on standing or addition of alkalis and the staining of garments, as by a

photographic developer—are so striking as to render the diagnosis easy to any one acquainted with them. Lactose is sometimes excreted during the last months of pregnancy, but much more often and in larger quantities during lactation, and especially when, for any reason, nursing has suddenly been arrested. It may also be found occasionally in the urine of breast-fed infants, when suffering from gastro-intestinal disturbances. Pentose is rarely found in the urine, as the result of a harmless anomaly of metabolism. Lævulose, sometimes appears in the urine with glucose. In pure lævulosuria the removal from the diet of this sugar or of cane sugar, of which it is a constituent, usually suffices to stop its excretion. Conspicuous lowering of tolerance for lævulose, but not for glucose, is an important symptom as in diseases of the liver, and of diagnostic value.

To ensure certainty in doubtful cases of glycosuria evidence should be forthcoming that the urine contains a dextro-rotatory reducing substance, fermented by yeast, which yields osazone crystals of the correct shape with phenyl hydrazine, melting before re-crystallisation, at a point slightly above 200 C. It is now accepted that the urine of normal individuals contains glucose to the amount of some 1 to 2 decigrams in 24 hours. Such minute traces do not suffice to yield the tests in ordinary use, and do not constitute glycosuria as ordinarily understood. The power of a normal man to dispose of sugar given by the mouth is not unlimited; on an average 150-200 grams of sugar are required to cause glycosuria. A smaller dose is needed when the sugar is taken on an empty stomach than when it is taken soon after a meal. For cane sugar the limit of tolerance is about the same as for glucose; for lævulose and lactose it is somewhat lower. Only a small fraction of the dose given reappears in the urine. No dose of starch which can be taken induces glycosuria in a normal subject, probably because it is not converted into sugar quickly enough to overtax tolerance at any given moment. There is much to support the view, enunciated by Naunyn, that alimentary glycosuria *ex amylo* as distinguished from alimentary glycosuria *ex saccharo* is nothing less than diabetes writ small. Between the patient who excretes only small quantities of sugar after meals rich in starchy foods and the sufferer from the gravest form of diabetes the difference is merely one of degree. Such lowering of tolerance for starch is most often seen in men who have reached or have passed middle life, as the initial symptom of the milder form of diabetes, which is common at that period. Its detection and treatment by restriction of diet at this early and amenable stage are important. In younger subjects, in whom the diabetic

symptoms often develop suddenly, such an initial stage, if present, usually escapes notice.

In testing tolerance of glucose it is customary to administer a single dose of 100 grams (about 3 oz.) upon an empty stomach, but in many cases far smaller doses, such as 50, 30, or 20 grams, suffice to induce glycosuria. As a rule, the excretion of sugar ceases after some 3 or 4 hours, but sometimes it persists for several days, which suggests an important derangement of carbohydrate metabolism. Febrile disorders are amongst the common causes of lowered glucose tolerance. Others are pregnancy, acute and chronic alcoholism, certain functional and organic diseases of the nervous system, affections of the pancreas, exophthalmic goitre and acromegaly. It is by no means a special feature of hepatic disease. The fact that a patient shows lowered glucose tolerance in the course of some acute disease with which that symptom is associated, does not show that he is likely to develop diabetes later on, but persistent lowering of tolerance is to be regarded as a danger signal.

When the tolerance of carbohydrates is continuously depressed the patient is of course always on the verge of glycosuria, and the temporary character of the glycosuria is deceptive, for behind it there lies a permanent metabolic defect. The patient may only excrete sugar a few hours after breakfast, which is the meal at which most starch and sugar are wont to be taken. In contrast with such cases there are others in which, after the urine has contained sugar during a longer or shorter period, tolerance for carbohydrates may be completely restored. The recovery is not as a rule abrupt, and is not always permanent. Most practitioners have seen patients who have assured them that at some previous time they suffered from diabetes, and were more or less strictly dieted for a longer or shorter period, but who have long discarded all restriction of carbohydrate foods, and nevertheless show no symptoms of diabetes and no longer excrete sugar. Such evidence, though incomplete, creates the impression that a few sufferers from a diabetes of some duration recover completely. Unfortunately, these cases are very rare and few of them are conclusive. Although slight temporary glycosuria is not very uncommon, the impression that diabetes, once established, is permanent, is justified in the great majority of cases. But the conspicuous influence which dietetic treatment exerts upon the course of the malady, and the great recovery of carbohydrate tolerance which often results from a strict dietary show that to work the damaged mechanism is to aggravate the damage, whereas if rested for a time it tends to recover some of its lost efficiency. This raises a question of great interest, whether a glycosuria that originates in a lesion which is

itself of a temporary character and admits of recovery, can be rendered permanent by neglect of dietary restrictions during the active period. At any rate there are sufficient grounds for the practitioner to act upon that assumption.

Glycosuria and the Nervous System.—So great has been the influence of Claude Bernard's discovery of "puncture glycosuria" that it has been assumed that in most of the cases in which cerebral lesions, such as hæmorrhages, tumours and meningitis, have been followed or accompanied by glycosuria, this has been due to an implication of the centre described by him. In some cases there has been evidence of such implication, but in many there is none, and it is uncertain whether a persistent glycosuria ever arises from a lesion of the medullary centre. It has long been recognised that sugar is occasionally present in the urine in meningococcal meningitis, and Garrod and Frew have recently found it in more than 30 per cent. of cases of tuberculous meningitis. The distribution of the meningitis over the brain lends no support to the idea that the glycosuria is due to the approach of the inflammation to the glycosuric centre or to the implication of the pituitary gland. It is more probably due to the accompanying asphyxia, since it is apt to appear when the respirations are shallow and grouped.

Glycosuria and Diseases of the Pancreas.—The diagnosis of disease of the pancreas presents great difficulties. The gland is so deeply seated that for the recognition of its slighter maladies we are compelled to rely almost entirely upon circumstantial evidence—chiefly the adequacy of its external secretory activity. Hence our views as to its pathology are unduly lurid, being based upon its graver lesions. The pancreas, like the salivary glands, may be the seat of mild inflammatory affections which do not manifest themselves by any unequivocal localising symptoms. A catarrhal inflammation of the pancreas may give rise to glycosuria, although it may cause little interference with the external secretion. Although it is an arguable proposition that the internal secretion of the pancreas is the sole controller of carbohydrate metabolism and that it is always concerned in the causation of metabolic glycosuria, gross disease of the gland is not necessary, its internal secretion being itself controlled by that of other organs. The temporary pancreatitis which sometimes occurs in mumps is hardly ever accompanied by glycosuria. Fibrosis of the pancreas sometimes occurs with generalised arterio-sclerosis, and in this way may be explained the cases in which diabetes originates in later life in association with granular kidney and gout.

Glycosuria and Hepatic Diseases.—Seeing how important a part the liver plays in carbohydrate metabolism, it is surprising to find how insignificant a part diseases of that great laboratory gland appear to take in the causation of glycosuria. Though some authorities consider that cases of hepatic glycosuria form a definite group, it is more probable that the association is to be explained by extension of the morbid process to the pancreas.

Glycosuria and Intestinal Disorders.—The occurrence of glycosuria in connection with diseases of the alimentary tract has only recently attracted attention. It has been met with in gastro-enteritis, mucous colitis and corrosive poisoning. The first suggestion that occurs is that here also the glycosuria is due to the extension of an infection to the pancreas, but the pancreatic efficiency tests do not support this. The great importance of the association lies in the evidence which it affords that in some cases of diabetes the metabolic disturbance depends upon primary morbid conditions which are amenable to treatment, and raise the hope that further investigation may reveal other groups of cases in which recovery is possible.

Glycosuria in Febrile Disorders.—Spontaneous excretion of sugar in febrile diseases is rare, though lowering of tolerance for glucose is much more common. It has been met with in pneumonia, scarlet fever, variola, malaria, and phlegmonous diseases such as abscesses and carbuncles. This is, of course, distinct from the special liability of diabetics to phlegmonous lesions. It seems probable that the pancreas is responsible.

Glycosuria and the Thyroid Gland.—That exophthalmic goitre is sometimes accompanied by glycosuria has long been known. More recently it has been found that all three grades of disturbed carbohydrate metabolism may occur—lowered tolerance for glucose, transitory or intermittent glycosuria, and diabetes. In most cases there is good reason to believe that the onset of the two groups of symptoms is more or less simultaneous, or that the symptoms of Graves' disease have preceded the glycosuria. However, there is the possibility of the development of the thyroid symptoms in patients already diabetic. Thus a woman developed exophthalmic goitre after hearing that her urine contained 9 per cent. of sugar. Moreover, accidental concurrence is also possible in some cases. The diabetes of hyperthyroidism runs no exceptional course, the output of sugar may be large, and all the ordinary associated symptoms culminating in death by coma, may be present. Attention has also been called to families in whom Graves' disease has been present in

some members and diabetes in others. We can hardly doubt that the excess of thyroid secretion is the exciting cause of the glycosuria; for lowering of glucose tolerance, and spontaneous excretion of sugar may be induced by administration of thyroid extract, which affords an additional reason for caution in the use of this drug. In Dr. Garrod's experience this result is more likely to occur when the thyroid secretion is normal, so that the extract acts as an overdose, than when it is deficient or absent. In one case the drug was taken for obesity, and after a week, when only 4 grams had been taken, 4 per cent. of sugar appeared in the urine. When the treatment was stopped it quickly disappeared. Further, patients with myxœdema may acquire glycosuria in this way. Thus of 11 myxœdematous patients treated with thyroid extract 4 were found to be passing sugar, and in 3 of them the excretion of sugar ceased within a week of stopping its administration. Notthafft recorded a remarkable case of a man, aged 43, who on his own initiative took about 1000 5-grain thyroid tablets in 5 weeks to reduce his weight. Glycosuria was induced with the other symptoms of hyperthyroidism. He passed over 3,000 c.c. of urine in the day, containing 1 per cent. of sugar. The glycosuria and thirst ceased after the drug had been discontinued for 10 days, but some of the other symptoms of hyperthyroidism persisted for about six months. In some cases thyroid administration has given rise to actual diabetes, and von Noorden suggests that a pre-existent tendency has been awakened by the drug. But if spontaneous hyperthyroidism can induce diabetes there is no reason why continuous thyroid treatment should not do so.

It has been suggested that hyperthyroidism tends to induce glycosuria by exercising a restraining influence upon the function of the pancreas rather than by causing actual lesions of the gland, though some cases recorded by G. R. Murray point to irreparable damage having been done to the pancreas, even when the exophthalmic goitre has been recovered from. On this view we should expect that withdrawal of the normal supply would have the opposite effect, and that the pancreas relieved of its wonted restraint, would be unusually active in relation to carbohydrate metabolism. This seems to be true, for some patients with myxœdema are able to dispose of any dose of glucose which can be given without excreting any of it. There are, however, certain paradoxical cases in which patients who were apparently suffering from myxœdema or at any rate from thyroid insufficiency, have excreted sugar, apart from treatment by thyroid extract. Some of these were more probably examples of simultaneous disease of several ductless glands, and others of combined myxœdema and pancreatic disease.

in which over-activity of the pancreas could not occur. Granting that glycosuria does occasionally accompany myxœdema, this fact does not invalidate the mass of evidence which connects that symptom with hyperthyroidism.

Glycosuria and the Pituitary Body.—Acromegaly is now believed to result from over-activity of the glandular portion of the pituitary body, and therefore to be the analogue of exophthalmic goitre. As in the latter disease, we meet in some cases of acromegaly with lowered glucose tolerance; others, with transitory or intermittent glycosuria; and yet others, with frank diabetes. Indeed, hyperpituitarism is a more potent disturber of carbohydrate metabolism than hyperthyroidism. Borchardt found in 176 cases of acromegaly that glycosuria had been recorded in 35 per cent., while in 8 other cases lowered glucose tolerance had been noted, though it had obviously not often been looked for. It is a peculiar feature of acromegaly glycosuria that in some cases the excretion of sugar ceases for a time or permanently, apart from any dietetic restriction. This is probably connected with variations in the activity of the gland, and Cushing holds that in time the hypersecretion which causes the acromegalic changes, gives rise to hyposecretion, just as in some instances myxœdema has followed exophthalmic goitre. "Frolich's syndrome," on the other hand, is believed to result from hypothyroidism. It is characterised by excessive deposition of fat, hypoplasia of the genital organs, and disappearance of the axillary and pubic hair, associated with symptoms of tumour of the pituitary gland, somnolence, head-ache, and bitemporal hemianopia. Glycosuria is almost unknown, although thirst and polyuria are common. As in myxœdema, a conspicuous rise in glucose tolerance has been observed. Goetsch, Cushing and Jacobson regard the posterior lobe as controlling carbohydrate metabolism. Their important experiments show that excess of the secretion of the posterior lobe entering the circulation has a conspicuous effect in lowering glucose tolerance, whereas deficiency in such secretion has an equally conspicuous effect in raising it. They suggest that in Frolich's syndrome administration of pituitary extract is indicated, and that the dosage can be determined by ascertaining the quantity of glucose required to induce glycosuria, the appropriate dose being that which will reduce glucose tolerance to its proper level. As regards the production of glycosuria by administration of pituitary extracts, no such bulk of evidence is forthcoming as of its production by thyroid extract, which is not to be wondered at, seeing that the former has been so much less widely used. In some cases of acromegaly, as in some cases of exophthalmic goitre, structural

lesions of the pancreas have been met with, but in most cases the pancreas has been normal.

Adrenal Glycosuria. As Blum was the first to show, injection of adrenalin in doses of from 1 to 2 mgm. excites a transient glycosuria and Dr. Garrod has seen it occur in a case of asthma for which adrenalin was injected. But there is no satisfactory evidence that gross lesions of the adrenals are to be included among the causes of glycosuria. In Addison's disease there is hypo-adrenalism, and glycosuria is therefore not to be expected. Indeed the tolerance of sugar is usually abnormally high.

Glycosuria in Pregnancy.—Matthews Duncan first awakened wide interest in puerperal diabetes, and his gloomy conclusions as to the prognosis of diabetes in pregnant women have ever since been dominant. It must be borne in mind that lactosuria of a mild degree is not uncommon during the last weeks of gestation, and that women suffering from diabetes occasionally become pregnant. Therefore it is necessary to make sure that the sugar excreted is not lactose, and also, what is more difficult to prove, that the glycosuria has developed after the commencement of pregnancy. It is clear that during pregnancy conditions exist which are favourable to the development of glycosuria, and which cease with its termination. In some cases diabetic symptoms have recurred in successive pregnancies, although absent in the intervals between them. But it cannot be safely asserted that a glycosuria which ceases after delivery is of necessity merely temporary. There is no record of a case in which glucose was shown to have first appeared in the urine during pregnancy, and after delivery the patient has lived on as a confirmed diabetic. Probably the glycosuria of pregnancy is due to the influence of that state upon the glands of internal secretion. Enlargement of the thyroid during pregnancy is well known, and enlargement of the pituitary has been shown to be common. One naturally associates with the glycosuria of pregnancy that which has been observed in diseases of the female generative organs. A case has been described in which removal of the uterine appendages on account of pyosalpinx was followed within a week by cessation of glycosuria, which had been detected 5 months before the operation and was accompanied by thirst and polyuria.

Renal Glycosuria.—It has long been known that after the injection of phloridzin glycosuria occurs without any excess of sugar in the blood; it is generally accepted that this is due to an undue permeability of the kidneys. For long no clinical equivalent of this condition was known,

but a number of cases have now been recorded in which the excretion of sugar is not influenced by changes in the amount of carbohydrate in the diet and is not dependent on any excess of sugar in the blood. That the glycosuria is of renal origin seems the only possible explanation.

Dr. Garrod concludes in a hopeful key. The result of his studies is to obliterate the conception of diabetes as a sharply defined disease, and to present the malady as the maximal phase of a series, rising by gradual steps from normal metabolism, just as myxœdema is the culminating point of the almost insensible grades of hypothyroidism. Between the sufferer from grave diabetes and the potential glycosuric there is a striking contrast, but the gulf which separates them is bridged over by intermediate cases of all degrees of severity. It follows that excepting renal glycosuria, there is no such thing as non-diabetic glycosuria, although there are many varieties which lack the sinister import which we connect with the name of diabetes. The differences are of degree rather than of kind. In saying this he does not wish to imply that a transient glycosuria is necessarily grave, but rather that diabetes is not of necessity fatal.

Whilst it is true that in some cases of diabetes it is the nervous system that is evidently at fault, and in others the thyroid, the pituitary or the pancreas, in the great majority of cases we can find no indications of the underlying lesion upon which the metabolic derangement depends. There is to all appearance a sheer, wanton, metabolic insanity. Nevertheless, we can hardly doubt that in such cases there is an underlying morbid cause; the chemical processes of the body do not go wrong of themselves. It by no means follows that the detection of the underlying cause in any given case of diabetes will enable us to cure the patient, and the multiplicity of the causes excludes the hope that any one plan will prove beneficial in all cases. But he firmly believes that in the future the range of efficient control will be greatly extended with a fuller comprehension of the causes at work. Then our present dietetic treatment will be relegated to its true position as a valuable means of holding in check the metabolic error and minimising its evil effects, whilst our main efforts are directed to the repair of the underlying lesions, so far as they admit of repair.—*The Medical Review*.

SURGERY.

Iodine in the First-Aid Treatment of Wounds.

FLEET-SURGEON A. G. WILDEY.—An alcoholic solution of iodine is now widely used for sterilising the skin both before and after operations

with satisfactory results. The immediate application of such a solution to all accidental wounds, from abrasions to compound fractures and penetrating wounds of joints, is less generally recognised as one of the simplest and most reliable means of preventing sepsis and tetanus. Experience during the last 18 months at the Royal Naval Hospital, Chatham, has shown that this method is invaluable. During this period all compound fractures have been thoroughly flushed out with the tincture, or with a 2 per cent. solution of iodine in rectified spirit, as soon as possible after admission. Many of these cases were severe. They included compound comminuted fractures of the skull and many crushing injuries to bone and joint caused by machinery accidents, both afloat and in the dockyard. The results have been surprisingly satisfactory, sepsis being practically unknown. Particularly noticeable was the aseptic course of badly crushed hands and feet—cases that under other methods are commonly followed by septic trouble. Gratifying results have been obtained in minor injuries occurring in the dockyard, where the application of iodine solution to all accidental wounds is a routine practice. Fleet-Surgeon Bradshaw finds a decrease of over 26 per cent. in the number of cases placed on the hurt list in the year 1911 as compared with 1910, although the cases of minor injury treated but not placed on the hurt list totalled nearly 10 per cent. more.

The terrible sequelæ which too often follow trivial abrasions show the need for some simple non-poisonous application for domestic use. The football player and the cyclist too often fall victims to tetanus which might be prevented by the prompt application of iodine.

The two per cent. alcoholic solution may be applied to deep wounds and compound fractures without causing irritation. The wounds are well swilled for a moment or two with the solution and then thoroughly washed out with saline solution. In cases of sutured skin wounds, abrasions, blisters, and local injuries of minor degree, the iodine is allowed to dry on, and it is often unnecessary to apply any dressings, an occasional re-application of the solution being all that is required to keep the part dry and aseptic. To get the best results the solution should be freshly made. In the writer's experience iodism has never been produced.

The solution has other uses. It is a ready means of sterilising the hands of the operator or dresser in emergency work. Wooden, porous, and plaster-of-Paris splints, may be unavoidably exposed to soiling by discharges. They can be kept aseptic by daily paintings with iodine. It is difficult to over-estimate the value of this when the re-application

of splints or other fixation apparatus is troublesome and possibly disastrous.—*The Medical Review*.

Persistent Oedema of the Hand and Forearm after Slight Injury.

F. PARKES WEBER, M.D., F.R.C.P. AND G. DORNER, M.D.—A German Jew, traveller, aged 30, came under observation. He had enjoyed good health and never had any venereal disease. Eighteen months ago he knocked his right hand against a table. Next day the hand and forearm became swollen and this condition had persisted ever since, being more marked after exertion and less during rest and mild weather. The swelling did not extend beyond the elbow and was best marked over the back of the hand, which pitted considerably on pressure. Some pitting could also be produced by firm pressure on the forearm. There was no anæsthesia of tenderness and, excepting at the time of the injury, no pain. The hand did not seem colder or hotter than the other. The blood vessels were normal and there was no cyanosis. Skiagraphy showed nothing abnormal in the bones. There were no cervical ribs and no enlarged lymphatic glands. The thoracic and abdominal viscera were apparently normal.

Cases have been recorded on the Continent of persistent œdema of the hands (chiefly of the backs of the hands) following traumatism (by Secretan in 1901 and later by others). At the Royal Society of Medicine on April 20, 1911, a boy aged 16, was shown as a case of functional hysterical trophœdema, in whom persistent swelling of the right hand followed injury. On April 20, 1911, Dr. G. Turney showed a case of chronic œdema of the right foot after an injury under the title "Trophœdema following Trauma."—*Ibid*.

Nerve-Ending Anæsthesia.

CAPT. COLIN CLARKE, F.R.C.S., M.B., B.S. (Lond.) R.A.M.C.—A 0.6 per cent. aqueous solution of beta-eucaine hydrochloride injected hypodermically has an immediate anæsthetic effect on sensory nerve-endings, while the nerve cords and fibres passing through the infiltrated area retain their conducting power unimpaired for some considerable time. The primary objects in nerve-ending anæsthesia are concentration and economy of anæsthetic, for the quantity of beta-eucaine which can be safely injected is limited to about 6 or 7 grains. For the operation the tissues are first desensitised and then divided in successive layers. No interval need elapse between the injection of the anæsthetic and the

commencement of the operation. Thus, in the ordinary operation for congenital inguinal hernia one proceeds as follows. The skin and subcutaneous tissues are first desensitised down to the level of the external oblique aponeurosis, and then divided. The needle of the syringe is next inserted into the inguinal canal, either through the external abdominal ring or through the aponeurosis of the external oblique, and the surroundings of the spermatic cord rendered insensitive by a few syringefuls of beta-eucaine solution injected along the canal. The inguinal canal is opened by dividing the external oblique aponeurosis and the exposed spermatic cord desensitised. The hernial sac is isolated, ligatured, and removed. If the conjoined tendon and the internal oblique muscle are to be sutured to Poupart's ligament they are injected with the solution and sewn together under the cord, the wound being finally closed in the usual way.

The anæsthesia lasts for about half an hour. Sensation then begins to return, and though the open wound is insensitive to touch or pressure it is necessary to inject two or three syringefuls of beta-eucaine into the loose subcutaneous tissue on each side of the wound, in order to desensitise the skin before inserting the closing sutures. The needle of the syringe should be inserted immediately under the skin for a depth of half an inch, at points half an inch apart, along the edge of the wound. Ten minims of the solution should be injected at each of these spots. This method is also the quickest and easiest way of anæsthetising an ordinary deep cut or wound which requires suturing.

In operating upon a hernia in this way with an ordinary 20-minim hypodermic syringe it will be necessary to give about 20 or 30 separate injections. This would be both awkward and tedious, so the writer uses a small magazine syringe holding 300 minims of solution, made by Messrs. Down Bros. It is made of metal throughout and is sterilised by boiling. It is kept during an operation with the other instruments in the tray. The magazine syringe consists essentially of a reservoir attached to the side of a hypodermic syringe. The cavity of the syringe can be placed in communication with either the reservoir or the needle by pressing the small bolt near the handle towards or away from the reservoir respectively.

Before commencing any operation the magazine of the syringe is filled with boiled beta-eucaine solution and the cap screwed on. The cap is, however, only loosely screwed on, two or three complete turns being sufficient; the object is to allow a small air leak to take place along the thread of the screw into the chamber of the reservoir.

Without this, negative pressure would arise in the cavity of the magazine, as the syringe extracted fluid; and increasing negative pressure would interfere with the aspirating power of the piston working in the barrel of the syringe. While charging the syringe from the reservoir the needle end must be held lowest, for the communicating passage between the syringe proper and the reservoir is at this end, and during aspiration must be kept under water. With this syringe one can give repeated hypodermic injections, and infiltrate a wide subcutaneous area through a single puncture.

The syringe is provided with two needles, a sharp one for penetrating the skin, and a blunt one which is used after the skin has been divided. The blunt needle can be inserted into the various tissues without fear of wounding any blood-vessel or nerve. The formula for the anæsthetic fluid is: beta-eucaine hydrochloride, 6 gm.; sodium chloride, 6 gm.; water 1,000 c.c. The chief advantage of this solution is its simplicity; it can be made up in large quantities, keeps well, and bears repeated boiling.

When the solution is injected into the subcutaneous tissues it at once enters the lymphatics and commences to drain away. It has thus a certain range of action, and 30 minims will anæsthetise roughly a sphere of tissue about 1 inch in diameter. If one allows then 30 minims of beta-eucaine per inch of incision, an operation is commenced by simply planting these anæsthetic spheres in the subcutaneous tissue along the line of the proposed incision. The 30 minims of solution, however, must not be injected at one spot; there must be a gradual flow of solution from the syringe as the needle is pushed along under the skin. Where the subcutaneous tissue is thick, for example, in the inguinal region, 2 or 3 additional syringefuls should be injected into the deeper layers in order to insure a thorough anæsthesia of the underlying aponeurosis and external abdominal ring. The local anæsthesia produced in this way is at its maximum almost immediately after injection, and lasts for about half an hour; after this, sensation begins to return in the infiltrated part. By introducing the needle very obliquely through the skin, only the first needle puncture is felt, for all the succeeding punctures can be made through desensitised skin. The operation incision should be made, if possible, through the line of needle punctures in order to pass through the centre of the anæsthetic area. The tissues $\frac{3}{4}$ in. to the right or left of this line are practically unaffected. Immediately after the injection the skin and subcutaneous tissue are divided, and the incision is carried down to the underlying deep fascia or aponeurosis. The operation is continued in the same way as

above, the needle advancing first to infiltrate the various tissues, and the scalpel following immediately.

The writer has found this method thoroughly satisfactory in operations for hernia, varicose veins, varicoceles, sebaceous cysts, ganglia, external hæmorrhoids, removal of foreign bodies, suturing wounds, divided tendons, etc., and minor amputations and circumcisions. Five cases of displaced internal cartilage of the knee were successfully operated upon, the cartilage being removed in each case. In 3 cases the anæsthesia was excellent, but in the other 2 anæsthesia was not complete. No pain was felt when the joint was opened, and the cartilage itself was insensitive, but a dragging, aching sensation was felt when retractors were applied to open out the capsular incision with the knee fully flexed.

For inflammatory conditions and in situations where there is dense scar tissue the anæsthesia is more difficult to obtain. Superficial abscesses, such as suppurating inguinal or axillary glands, are easily opened by first desensitising a straight line for the incision, and then injecting 30 or 60 minims of beta-eucaine into the abscess cavity itself. Five minutes should be allowed for the beta-eucaine to diffuse, and then the abscess can be opened and evacuated. Deep abscesses, as, for example, in the cervical regions, are difficult to anæsthetise. The inflammatory process appears to block up the lymphatic channels and prevent the diffusion of the anæsthetic fluid.

The prepuce of the penis is readily anæsthetised for circumcision, but in two recent operations, one for urethral stricture and the other for the removal of a dense fibrous cyst from the corpus spongiosum, it was found most difficult to desensitise the cavernous tissue. The fibrous trabeculæ opposed the diffusion of the anæsthetic, and the solution which entered the cavernous spaces was carried away in the bloodstream.

Hernia (inguinal).—The desensitising process down to the opening of the inguinal canal, has been already described. When the spermatic cord is exposed the coverings are raised at one spot with forceps, and the blunt needle is inserted obliquely through them; 20 or 30 minims of solution are injected along the cord and the raised-up coverings of solution are injected along the cord and the raised-up coverings are divided with blunt-pointed scissors. The hernial sac can then often be seen lying at the bottom of a clear translucent bleb of infiltrated tissue and is easily isolated from the other constituents of the cord. Before ligaturing and dividing the neck of the sac a few more minims of beta-eucaine should be injected into the extra-peritoneal tissue at this spot.

At the conclusion of the operation the skin must be again desensitised, as previously described before inserting the closing sutures.

Varicocele.—The process is similar to the above; a line of skin and subcutaneous tissue is thoroughly anæsthetised at the neck of the scrotum. The spermatic cord is exposed and made to present in the wound. Beta-eucaine solution is injected through the coverings into the cord itself, and the enlarged veins are isolated, ligatured, and a portion removed.

Varicose veins.—The beta-eucaine solution is injected into the subcutaneous tissue along the course of the vein to be removed. If the vein is adherent to the skin the solution is injected at the sides of the vein and is made to spread in the subcutaneous tissue by a little pressure with the fingers along the line of injection.

Displaced internal cartilage of the knee.—For the removal of an internal semilunar cartilage a vertical line of skin and subcutaneous tissue is anæsthetised $\frac{1}{2}$ inch internal to the patella. 200 to 250 minims of beta-eucaine solution should be injected along this line and made to diffuse into the deeper lymphatic vessels by gentle pressure and massage. The incision is then carried down to the capsule of the joint. Before opening the joint by a vertical incision, 60 or 80 minims of solution must be injected along the line of the capsular incision, between the capsule and the subjacent synovial membrane, in order to thoroughly anæsthetise them both. Having opened the joint, a finger is introduced into it and the knee flexed. The semilunar cartilage itself is insensitive, and can be seized with pressure forceps and cut away with scissors or a scalpel. Pain is felt, however, in the capsule of the joint if the attachments of the cartilage are dragged upon too strongly, and the margins of the capsular incision may feel tender and ache if too much traction is applied with retractors to expose the interior of the joint. A few more minims of solution should be injected into the margins of the incision before inserting the closing sutures.

Removal of sebaceous cysts, ganglia, small tumours, foreign bodies, etc.—The beta-eucaine solution is freely injected into the subcutaneous tissue all round the cyst, as well as under the skin in the line of the incision. Before commencing the operation the infiltrated tissue is well pressed and kneaded with the fingers in order to force the beta-eucaine into the lymphatic vessels surrounding the deeper side of the cyst or tumour.

Circumcision.—To produce a good anæsthesia some care is required. The deep layer of the prepuce may escape anæsthesia unless carefully infiltrated. In order to thoroughly infiltrate both layers of the prepuce

it is best to first draw the extremity forwards and well away from the glans penis. In this position the inner and outer layers lie in close contact. If the needle is now introduced at the tip of the prepuce, and passed down between the two layers towards the corona glandis, it can thoroughly infiltrate both surfaces. The needle should be inserted in this way at 4 or 5 different points on the margin of the preputial orifice, and 250 to 300 minims of solution injected and well diffused in the subcutaneous tissue, back to the coronal attachment, before commencing the operation.

External hæmorrhoids.—30 or 40 minims of beta-eucaine solution are injected into the subcutaneous tissue around and over the enlarged or thrombosed vein. A radial incision exposes the vein, which is then seized with pressure forceps, isolated by dissection, drawn down, and cut away. The radial incisions are not sutured, and the divided veins, after crushing with pressure forceps, as a rule require no ligature.

Minor amputations.—The subcutaneous tissue in the line of a racquet incision around the toe or finger to be removed is first freely infiltrated. The needle should be inserted on the dorsal surface and introduced first to one side and then the other of the phalanx. Infiltration of the periosteum renders the bone quite insensitive, but if the incision is to be carried through a metacarpo-phalangeal joint, 30 minims of solution should be injected on each side of the joint to thoroughly desensitise it.

The above details form only a rough guide for the various operations, but they may prove useful to practitioners who have often to work alone and find it difficult or inconvenient to obtain general anæsthesia. The chief points are: (1) inject the anæsthetic freely in the actual line of the incision; (2) keep strictly to the infiltrated tissues; and (3) operate immediately after injection.—*The Medical Review.*

The Massacre of the Tonsil.

PROF. JOHN N. MACKENZIE.—The writer, who is Professor of Laryngology in the Johns Hopkins University, protests against the indiscriminate removal of the tonsils, which he regards as the most glaring abuse in the laryngology of the day. In considering this operation, and especially complete removal, we must face the following facts:—

1. The functions of the tonsils are, at present, unknown. Whether they are portals of entrance or avenues of exit for infection, whether they protect the organism from danger or invite the presence of disease, whether the pathogenic bacteria sometimes found in them are coming out

or going in, whether they are manufacturers or storehouses of lymphocytes, whether they represent the extreme outlying protective ramparts and therefore their destruction would mean the removal of the battleline against infection from the throat to the cervical lymphatics, whether there is an endless flow of lymph from the interior to the free surface, which, unchecked, prevents the entrance of germs and washes out impurities, whether the organ possesses an internal secretion, *sui generis*, or whether, in fine, the tonsil structure is in any way essential to the well-being of the individual, are questions which have received no definite answer. Until the functions of the tonsil are known the final word on its removal cannot be spoken.

2. Whatever its functions, the tonsil is not, as is generally taught, a lymphatic gland. Ignorance of this fact has led to the useless sacrifice of thousands of tonsils, on the fallacious assumption that their functional activity may easily be replaced by other lymphatic glands. The physiological integrity of the tonsil is of the utmost importance in infant and child life. The gland appears in the fourth month of embryonic life, attains maturity at the end of the first year of infancy, and at or about puberty tends to diminish. It does not develop as a lymphatic gland from a plexus of pre-existing lymph vessels in the mesothorium, but as an ingrowth of endothelium from the second bronchial pouch and, therefore, in its origin, must be classed with the thymus and the thyroid, the former originating from the third, the latter from the fourth, while the parathyroid originates from the third and fourth—all by imbedding of the endothelial lining of the primitive pharynx. Gordon Wilson of Chicago has recently shown that the tonsil secretes or excretes a substance into the pharynx.

3. It is rarely possible to separate the tonsil from its neighbourhood during the acute invasion or rapid progress of a microbic or toxic poison. Years ago Jacobi called attention to the fact that in membranous throat disease, when the membrane is limited to the tonsil, there is little or no glandular swelling. If the membrane extends from the tonsil, to its neighbourhood, or starts at a distance from the tonsil, neighbouring lymphatics swell at once. Diphtheria, when limited to the tonsil, produces less adenitis and constitutional symptoms, and therefore, is less dangerous.

4. The rôle of the tonsils as portals of infection, like all new doctrines in medicine, has been greatly exaggerated. No doubt the tonsils are, in certain cases, the avenues through which pathogenic organisms reach other organs, but the long list of diseases usually attributed to

them is an exaggeration. Some absorption takes place from the tonsil, but far less than from the more abundant and receptive lymphatic structures of the nose and naso-pharynx.

5. It follows that when the throat, and particularly the tonsils, is apparently the starting point of infection, the entire upper air tract should be examined—not merely the parts visible to the eye through the open mouth. How many stop their search for the cause at the tonsil and fail to explore the deeper parts of the pharynx, the retro-nasal space, to say nothing of the nasal passages and accessory sinuses? The writer has seen a number of cases of fruitless removal of the tonsil in which relief was given only when treatment was subsequently directed to the nasal cavities and post-nasal space.

6. Hypertrophied lymphatic tissue of the vault of the pharynx (adenoids) does harm chiefly through obstruction. Restore normal respiration in the child, and in a large number of cases the tonsils will take care of themselves. Even if they should remain large, if they are giving no trouble, they may be safely left, for as their growth does not go on *pari passu* with the growth of the rest of the pharynx, they soon become inconspicuous in the fully developed fauces. The mere size of the tonsil is of itself no indication for removal except it be large enough or diseased sufficiently to interfere with respiration, speech or deglutition in which case it, or a sufficient portion, should be taken away without delay. A large tonsil does not mean necessarily a diseased tonsil, nor does a small tonsil always indicate a healthy organ. Tonsils apparently diseased may consist of normal tissue, and, on the other hand, perfectly normal-looking glands may be found pathological microscopically. The tonsil may be greatly enlarged, may extend far down into the pharynx or be buried deeply in the palatine arcade, and yet not interfere with health. Such tonsils are the special prey of the tonsillectomist.

Tonsil disease, with or without cervical adenitis, may be due to infection from the nasal passages (from pus cavities, operations, etc.) and the improper care of the teeth during dentition. Tonsillitis not infrequently follows operations on the nasal cavities, especially if pus be present, or even after a cold in the head. Infection seems to take place through the lymphatics. Lenhardt found that foreign matter injected into the mucous membranes of one nasal passage, was soon found in both tonsils. The lesson is that more attention to the nasal cavities and to the hygiene of the mouth and teeth in childhood would diminish tonsil disease and tonsil operations.

7. Equally good, and in the long run even better, results may be obtained in a large percentage of cases of tonsillar disease by measures

less radical than those usually employed. Out of a multitude of examples, take a case of recurring quinsy, for which complete enucleation is done. It is frequently only necessary to thoroughly slit up and shrink the upper lobe of the tonsil. Most quinsies occur in this situation and the destruction of that part of the tonsil is all sufficient to prevent recurrence. By this method enough of the organ is left to perform its function, and the ultimate development of quinsy of the lateral columns of the pharynx, which sometimes follows complete removal, is avoided.

8. The so called complete enucleation of the tonsil is unnecessary in the great majority of cases in which it is done. It can never be made complete except when the organ is totally diseased. It is a dangerous operation and has been attended by a long list of accidents and complications and by many unrecorded deaths. Without such risks, equally good or better results may be obtained with the guillotine or one of its modifications. That the tonsil has some important function is shown by its frequent reappearance after enucleation—a protest, as it were, on the part of nature against its destruction,—and the vicarious activity of the neighbouring lymphatic tissues when its physiological properties cease to exist. This is strikingly shown in the case of quinsy of the lateral columns of the pharynx, before referred to, when the tonsil is rudimentary or gone. In infectious diseases, the poison of which is eliminated by the throat, this compensatory action is most marked. Thus in a malignant epidemic of tonsillitis which occurred last year in Boston, due to milk, after much constitutional disturbance, the whole tonsillar ring broke into flame at once. The patients whose tonsils had been removed did not escape inflammation of the pharyngeal lymphoid tissue, the constitutional symptoms, or the cervical adenitis.

9. The tonsils are phonatory organs and play an important part in the mechanism of speech and song. They influence the action of the surrounding muscles and modify the resonance of the mouth. On the other hand they may be so enlarged, as to cripple both these functions, and should, therefore, be removed. This sometimes produces a gain to the voice of one or more octaves. But no matter how skilfully the operation is performed, the amount and character of change in the anatomical relations cannot be foretold. The adhesions and contractions left, even in the best of hands, often ruin the singing voice. The writer would hesitate long before advising such an operation in a professional singer or any one dependent upon the voice for a livelihood.

Tonsillectomy is a capital and dangerous operation, and should be done only in a hospital or other place where every facility is at hand

to meet the gravest emergency. It should be done only by a surgeon skilled in its performance and thoroughly equipped for every accident, and fully awake to the possible fatality which has so often followed. Here is a partial list from the practice, not of the ignorant, but of the most experienced and skilled: Death from hæmorrhage and shock, development of latent tuberculosis in lungs and adjacent glands, laceration and other serious injuries of the palate and pharyngeal muscles, great contraction of the parts, removal of one barrier of infection, severe infection of the wound, septicæmia, troublesome cicatrices, suppurative otitis media and other ear affections, troubles of vision and voice, ruin of the singing voice, emphysema, septic infarct, pneumonia, increased susceptibility to throat disease at the seat of operation, pharyngeal quinsy, and last, but not least, tonsillitis.—*The Medical Review*.

OBSTETRICS AND GYNÆCOLOGY.

Complete Absence of Vagina: Regurgitation of Menstrual Blood through the Fallopian Tube into the Peritoneal Cavity.

WM. FORDYCE, M.D., F.R.C.P.—A girl, aged 19, was admitted to hospital, complaining of severe pain in the lower abdomen. She had never been robust, and was always rather retiring and backward. She had suffered from epilepsy since the age of 14. Attacks of similar pain had occurred every 4 weeks for 6 months, and at irregular intervals for about one year before. The attacks lasted about one week and had been getting more severe. In the intervals she was not quite free from pain, but was able to carry on her ordinary household duties. The epileptic fits in recent months had occurred only during the attacks of pain. She had never menstruated.

For her age she was short, somewhat anæmic, and poorly developed both mentally and physically. The mammae were small. The abdomen was slightly distended and very tender, but no supra-pubic swelling was to be felt, as, from the history, was expected. The temperature was 100° and the pulse 98. The expression was anxious and indicative of suffering. The external genitals were normal, with abundance of pubic hair. There was no ostium vaginae, and no suggestion of any hymen. With a catheter in the bladder and a finger in the rectum only a thin partition seemed to separate the two as far as the finger could reach. Subsequently, under anaesthesia, the rectal finger could feel very high up a somewhat diffuse flaccid swelling, which was supposed to be

retained menstrual blood in a cul-de-sac in the upper part of the vagina. The uterus was felt to be small, and no dilatation of the tubes could be made out.

Some days later, when the pain had subsided, a careful dissection was made between the rectum and the urethra in order to make an artificial vagina and drain and provide a channel for the escape of the menstrual discharge. This seemed to be attained. The venous hæmorrhage during the dissection was severe. The canal was packed with gauze and subsequently a long glass drain put in.

Exactly four weeks later the severe abdominal pain recurred, and the swelling, which meantime had disappeared, was again felt on rectal examination. During this attack there were two severe epileptic fits. On the fourth day of the attack the abdomen was opened as it seemed that the swelling felt per rectum must be a distended uterus or tube though its softness was against this. The peritoneal cavity contained much dark fluid blood. The pelvis was full of blood, and it was the bulging of the pouch of Douglas which formed the soft diffuse swelling felt on rectal examination. There were no adhesions and no signs of any organisation or consolidation of the blood, which was of the same dark colour and consistence as found in hæmatocolpos, the result of imperforate hymen. The uterus was normal but felt slightly distended, and the right Fallopian tube was short, straight, and moderately distended with dark blood, which was oozing from its fimbriated end. On compressing the uterus, and what seemed to be a cul-de-sac of the upper part of the vagina, blood was forced along this tube into the peritoneal cavity. The left tube was normal. It seemed that the menstrual blood at each period had regurgitated along the right tube into the peritoneal cavity causing the recurrent abdominal pain and tenderness.

As the uterus, tube and ovaries were normal, excepting for the patency of the right tube, it was decided to make another attempt to establish a communication from below with the uterus after the next menstrual period. This proved unsuccessful. During an attack of pain similar to the others, the writer was again obliged to perform laparotomy. The conditions found were exactly as before—blood in the peritoneum oozing from the right tube and the uterus slightly distended but capable of being emptied by compression through the tube. The writer would have removed the uterus but the patient was taking the anæsthetic badly. He therefore removed both ovaries as being the quicker operation. He thought this would stop menstruation, and might have some beneficial effect on the epileptic fits.

Recovery from this operation was uneventful, and the patient was on the point of being discharged when, one month after the oophorectomy she began to complain of pain in the abdomen and back, which gradually became so intense that only after large doses of morphia could she get any sleep. The temperature also began to rise and the pulse got rapid. On rectal examination a tense painful swelling, quite different from that noticed before, was felt and palpated bimanually. It was in the middle line and felt like a distended uterus. Five days after the onset of the pain her condition was so serious that the writer was reluctantly compelled to do a third abdominal section. There was no blood in the peritoneal cavity, but the uterus, which formerly was small, was now distended to about the size of 2½ months' pregnancy and formed a tense globular tumour in the pelvis. The fundus was incised and much dark blood and muco-purulent fluid escaped. This allowed the uterus to collapse, and its removal was then accomplished. Amputation was done below the level of the internal os. The cervical canal was also distended, the section passing through a dilated canal which easily admitted the fore-finger. There seemed to be no vaginal cul-de-sac below this. It seemed that what was considered vagina in the first and second abdominal operations was the dilated cervix. Before closing this and covering it with peritoneum a drainage tube was carried from above downwards to the perineal region. Somewhat tedious recovery followed, but the patient left hospital quite well and has remained so since.

The interesting points in this case are the regurgitation of the menstrual blood along the Fallopian tube directly into the peritoneal cavity, and the continuance of menstruation after complete removal of both ovaries. Cases of retention of menses, in which free blood has been found in the peritoneal cavity, have been recorded, but in all there was marked hæmatometra or marked distension of the tubes. In this case neither was present. No doubt the attacks of pain were due to the escape of menstrual blood along the right Fallopian tube into the peritoneal cavity. Abdominal tenderness and rapidity of the pulse were always present during the attacks, and gradually subsided in the interval. Abdominal pain and tenderness, as symptoms of intraperitoneal bleeding, are familiar in early rupture of a tubal gestation and in secondary hæmorrhage following abdominal operations.

In this connection a case observed by Dr. Thin is interesting. A strong young woman, whose menstruation had always been normal, one day, towards the end of a period, was seized with acute abdominal pain, with great abdominal tenderness suggesting appendicitis, for which

she underwent an immediate operation. The appendix was found to be normal, but there was a considerable quantity of blood in the lower abdomen, which was found to be oozing from the right Fallopian tube. The two succeeding periods were attended by pain, but since then there has been no more than the ordinary discomfort. The Fallopian tube was not removed.

Some of the severe cases of dysmenorrhœa in which examination is negative may be due to regurgitation of the blood through the tube, or to profuse hæmorrhage from the rupture of an unusually vascular Graafian follicle. In abdominal work the writer has been repeatedly surprised to find a considerable amount of blood in the pouch of Douglas in cases in which menstruation had just terminated. Blood effused into the peritoneal cavity seems to undergo a rapid and complete absorption, leaving no adhesions as one would expect. The patulous condition of the interstitial part of the tube, which permitted the regurgitation of blood, is unusual in cases of obstruction to the outflow of the menstrual blood from the vagina. The rule is for the genital tract to be slowly distended from below upwards. First the vagina, if any is present; next the cervix, and finally, as a rule, the uterus. It is the exception for the tubes to become distended. When hæmatosalpinx is associated with hæmatometra the uterine orifice of the tube is generally found closed and the blood in the tube is often found in different loculi, suggesting some other source than the uterus. This is to be expected as the normal uterine orifices of the tubes do not permit of regurgitation of fluids, except under great pressure, and a patulous orifice is very rare.

Menstruation does not always stop at once after removal of the ovaries. It was therefore a mistake to remove the appendages without providing any channel for the escape of possible menstrual discharge. The acute distension of the uterus produced by a single period is noteworthy.

The presence of fairly well-developed uterus, tubes, and ovaries with complete absence of the vagina is of interest. Vineberg, from a study of the recorded cases, states that there is a vagina, no-matter how rudimentary, about the cervix, when a fairly well-developed uterus is present: absence of the vagina occurs only when there is practically absence of the uterus.—*The Medical Review*.

THE ANTISEPTIC.

JANUARY, 1913.

Cataract Couching.



IEUT-COL. R. H. ELLIOT, M. D., F. R. C. S., I. M. S., the present Superintendent of the Ophthalmic Hospital, Madras, has done very good service to the public of this country by pointing out very clearly and forcibly the evils resulting from cataract couching as practised in this Presidency by unqualified Indian eye practitioners. After he had read a paper entitled "The operation of couching as performed in Southern India" the South Indian Branch of the British Medical Association passed the following resolution:—

Resolution passed at a meeting of the South Indian Branch, British Medical Association, held at Madras, March 13, 1912.

"That in the opinion of the South Indian Branch, British Medical Association, the attention of Government should be directed to the vast amount of harm that is being done in the country by cataract couchers, and that the branch requests that Government may take such steps as seem to be necessary to spread the knowledge of the danger throughout the Presidency and also to take such steps as will lead to greater facilities being granted to their medical servants to perform the modern cataract extraction operation."

This resolution was referred to the Surgeon-General and that official wrote thus about it to the Madras Government:—

Letter—from the Hon'ble Col. J. SMYTH, M. D., V. H. S., I. M. S., Officiating Surgeon-General with the Government of Madras.

To—the Chief Secretary to Government.

Dated—the 23rd October 1912.

No.—100/688.

With reference to Endorsement No. 5027-1, dated 19th September 1912, I have the honour to report that Col. Elliot in his paper read before the South Indian Branch of the British Medical Association suggests the methods by which the operation of couching practised in this country may be combated—

(1) the systematic dissemination of knowledge through Government agencies amongst the people, and

- (2) the improvement of Ophthalmic Medical education.

As regards the first I would suggest the preparation of a catechism similar to the one on Hygiene by the late Mr. C. T. H. Johnson, I.C.S., for the use of schools. Col. Elliot may be entrusted with its preparation. As regards the second the proper way to set about it is, as Col. Elliot put it to me, to begin at the top and teach the medical officers. They will in turn become centres of teaching. This will be much more efficient than beginning lower down the ladder. Col. Elliot informs me that for years past he has done his best to teach medical officers. The difficulty has been that they cannot obtain the leave to come and work at the Government Ophthalmic Hospital. I would therefore strongly urge that the Government give medical officers facilities for coming to Madras on duty to work at that hospital. For instance, Government could sanction a scheme similar to that sanctioned by the Government of India in the case of officers attending the Malaria class at Amritsar (*vide* G.O's. Nos. 234, Public, dated 6th March 1911 and 976, Public, dated 9th September 1911). Officers in the districts might be permitted to attend the Government Ophthalmic Hospital by turns for a period of six weeks, their assistants acting for them at their head-quarters. They should draw full pay or salary during the period of their absence and usual travelling allowances to and fro. They may also be allowed to draw halting allowances for the full period of their stay at Madras.

On that the Madras Government have passed the following order:—
Order—No. 4, Public, dated 2nd January 1913.

With his letter, dated the 10th September 1912, the Honorary Secretary of the South Indian Branch of the British Medical Association forwarded a copy of a paper read before the Association by Lieut.-Col. R. H. Elliot, I.M.S., Superintendent, Government Ophthalmic Hospital, Madras, on "The operation of couching as practised in Southern India" and a copy of a resolution passed thereon by the Branch Association recommending that steps should be taken by the Government to disseminate a knowledge of the danger attending the operation of "couching the lens," as performed by vydians and hakims, and that greater facilities should be afforded to medical officers to perform the modern cataract extraction operation. The suggestions were referred to the Surgeon-General for report and his recommendations on them are contained in his letter, dated the 23rd October 1912, read above.

2. As regards the first suggestion, the Government consider that a note should be prepared in clear and popular language explaining the

danger of the operation known as couching. This can then be widely distributed and communicated to village heads, schoolmasters, etc. For this purpose the note must be in the vernaculars as well as in English. The Surgeon-General is requested to arrange with Lieut.-Col. Elliot for the preparation of such a note and to submit the draft to Government for approval. Orders regarding its translation, publication and distribution will then be issued.

3. In regard to the second suggestion, the Surgeon-General recommends that District Medical Officers should by turns be deputed to undergo a course of training at the Ophthalmic Hospital for a period of six weeks. The Government believe, however, that officers of the Indian Medical Service receive instruction and are required to pass an examination in surgery, including diseases of the eye, before admission

Number of operations of "extraction of lens" performed in State, Local Fund and Private aided dispensaries during 1911.

	Operated on.	Cured.
At the Ophthalmic Hospital	768	722
Elsewhere	576	545
	1,344	1,267

to the service. Moreover, from the statistics noted in the margin of operations for the "extraction of lens" performed during 1911, in the hospitals of this Presidency, it is observed that a large number of operations are already successfully performed elsewhere than at the Ophthalmic Hospital. In the circumstances, the need for further training of medical officers does not appear to be clearly made out and the Government are not convinced of the necessity of the Surgeon-General's recommendation, which would undoubtedly lead to considerable administrative inconvenience.

4. The precise meaning to be attached to the remark of the Branch Association that greater facilities should be afforded to medical officers for performing the modern cataract operation is not understood, but the Government would be willing to consider any further definite recommendations that the association may have to make on the subject.

(True Extract.)

A. G. CARDEW,
Ag. Chief Secretary.

This order of the Government is a mild snub to the Surgeon-General and the South Indian Branch of the British Medical Association. Of the two proposals put forward by Lieut.-Col. Elliot to counteract the evils of cataract couching as practised in this Presidency the first one, namely, the systematic dissemination of knowledge to the people through Government agencies has been accepted by Government. It is an innocent but useful proposal and there cannot be any two opinions on the subject. The second proposal, namely, the improvement of ophthalmic medical education is also a very useful and necessary one. But everything depends on how you are to carry it out. The Surgeon-General suggested that the best way was to begin at the top. The result is that the whole thing became top-heavy, and toppled over, and the net result of the whole proposal was a neat snub administered to the Surgeon-General by the Government of Madras. One would have thought that the best way would have been to begin at the beginning and work your way up. The operation of cataract couching and similar evils are to be found among the ignorant and the illiterate. The only agency that can safely counteract such evil effects is the Subordinate Medical agency. They are the people who come in contact with the poor people and they are the people who are to be taught and given a better equipment to fight the *vaidyan* and *hakim* and the cataract coucher on his own stronghold. It is the incapacity of the subordinate medical staff to perform a cataract operation safely and successfully that has given the opportunity to the cataract coucher. We have heard it said over and over again that most of the District Medical Officers look with disfavour upon the attempts of their Indian subordinates to perform operations. And if a man gets no opportunities of performing an operation he does not acquire the necessary dexterity in performing that operation. Operative dexterity is not a heavenly gift. Every one acquires it by constant practice. Every one makes mistakes in the beginning. Hence the necessity for making the earlier attempts under the immediate supervision of a skilled master. In England large numbers of newly qualified men get training as House Surgeons when many of them get opportunities of performing operations under the immediate supervision of their masters. The medical graduates in India get no such opportunities. Probably many of the members of the Indian Medical Service are also without such training. Passing an examination in surgery including eye diseases is one thing and removing a cataract without spoiling the eye is another thing. Take our own Presidency for instance. It will be next to impossible to make any of our medical men here into a skilled operator for removing cataract

unless he is given opportunities of watching Col. Elliot performing cataract extraction many times and then is permitted to remove a cataract or two himself in the presence of Col. Elliot and under his directions. Evidently Col. Elliot is willing to undertake such training and supervision. But the Surgeon-General wants such training to be restricted to District Medical Officers, who in their turn will go back to their district and train their subordinates. As far as we can see the District Medical Officer with no previous experience of ophthalmic operative work who comes up for a six weeks' training at the Ophthalmic Hospital will take all his time to remove cataracts successfully himself. And what sort of training can such a struggling raw beginner give to his subordinates? If the Surgeon-General and his colleagues in the Indian Medical Service want to have all medical benefits in India to proceed through the channel of their own service then we may tell them that they will never succeed in putting down quackery.

The Members of the Indian Medical Service usually go to Europe at certain intervals and they can avail themselves of Study Leave in addition to their other leave or furlough and get the necessary training in the many excellent Hospitals in Great Britain and on the Continent. The poor Assistant Surgeons have no such opportunity. It would be therefore a wiser course to train up the Assistant Surgeons in eye-work. The proposal to begin at the top was made by the Acting Surgeon-General. Now that the permanent Surgeon-General has come back we hope that he will submit first proposals to Government. Government say that they do not understand the statement that greater facilities should be afforded to medical officers for performing the operation of cataract extraction. If we explain that this has reference to the Assistant Surgeons and Sub-Assistant Surgeons there will be no difficulty in understanding the meaning. There has been some misunderstanding on the subject. We hope that the Surgeon-General will reconsider the proposal of his officiating colleague and that the Government will reconsider their order. So far as Indian medical graduates are concerned what the Government ought to do is to give them opportunities for post-graduate study of the nature suggested by Lieut.-Col. Elliot.

DRUG REVIEW.

'Paroleine' Spray Compound.

'Paroleine' Spray Compound contains suitable proportions of menthol, chlorbutol and 'Eucalyptia' in a basis of 'Paroleine', the whole

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Original Articles.

• PSEUDOENTEROLITHIASIS.

(Intestinal Sand—Calculi Intestinalis.)

BY

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CONDITION styled intestinal sand, or enterolithiasis has been described by a few writers. It appears to be an extremely rare condition, about 20 cases only having been recorded. The patient is usually a female over 30; but cases have been recorded in children. The outstanding feature is pain: intestinal pain occurring at intervals of days or months. For days or weeks the patient may never be quite free from pain. Flatulence and discomfort is a prominent symptom. Temporary relief is obtained by the passage of sand per rectum. The quantity varies. It may be only a teaspoonful or two, but may be passed in large quantities. Chronic colitis is related to the condition, and is usually present in greater or lesser degree. A number of the cases occurred in gouty people. The nature of the enteroliths varies. The colour may be whitish, yellow, brown or greenish. The size may be orange pip to hazel nut (MONGOUR), or 2 m. m. or less—thought to be a condition occurring in the intestines, analogous to gall stones in the biliary tract, and calculi in the urinary tract, and due to chronic colitis in most cases (BIEULAFOY). The concretions are made up of a mixture of organic and inorganic matter. Calcium phosphate is the principal ingredient, along with magnesium salts and silica. The inorganic matter concretions

* Specially contributed to *The Antiseptic*.

around an organic nucleus. Gall stones may be confused with the condition when small and numerous. When large and multiple, gall stones would be faceted. An occasional one would not be so, having no fellow to rub shoulders with. A distinguishing feature is said to be the absence of cholesterin in enteroliths, and its presence in gall stones. It would be curious, however, if cholesterin were absent from any intestinal concretion, and more especially if mucous colitis is associated with the condition. Cholesterin secretion is common to all inflamed mucous membranes (MAYO ROBSON). Cholesterin may be obtained from adult fæces by dissolving in hot alcohol and allowing a drop to evaporate on a slide—not always however. The characteristic notched crystals separate out, as if a smaller cake were cut out of one corner of a large cake. A few writers have recorded cases in which intestinal sand has been passed in variable quantities—sometimes in large amounts—properly called pseudoenterolithiasis. These were composed of organic debris infiltrated with lime salts, sclerenchymatous tissue from fruits such as pears, dirt and other bodies swallowed with the food. I once had a lady patient aged 19, who habitually chewed and swallowed sticks of school chalk, and refused to give up the habit. It brought her into various troubles, and I am not sure that the operation for calcareous glands in the neck subsequently undergone was not due to it. Some people bolt their food and anything along with it in the most remarkable fashion. I have recovered from adult fæces, frequently, partly digested bones—in one case as large as half the distal phalanx of my own thumb. I could not imagine such passing down my own œsophagus unnoticed. A not unusual cause of unexplainable pyrexia and exhibition of great irritability in young babies, I have found to be due to their having swallowed, unnoticed, a grain of Indian corn, pieces of wood, paper and dirt, which I have recovered from the stools. Medicines containing such salts as magnesium, bismuth and calcium form concretions. The common fault of prescribing long courses of bismuth sometimes becomes a serious matter. Bismuth ought not to be continued beyond one week without an interval of one or two weeks. I have known fatal intestinal obstruction owing to this cause. I have seen enteroliths or concretions of bismuth and fæces, larger than walnuts, removed during resection of the intestines. This case was also fatal. The operator did not see his way clear to remove them all through the operation wound in the intestine, although he might possibly have saved his patient had he risked infecting the peritoneal cavity. The scybalæ ought not to have been there. Magnesium salts also form hard combinations with other salts and fæces and are better prescribed simply. Intestinal concretions

is another instance of the evil of prescriptions; some people will go on with a prescription for years that once did them good.

In 1911 Mrs. Y, aged 62, consulted me concerning, general abdominal discomfort and continual burning pain. "So nervous" it had made her. She had a "burning heat," and was "always afire." The seat of the pain she indicated as in the left hypochondrium and downwards, and in the epigastrium. She was pale in countenance; showed a moderate degree of arteriosclerosis. Heart was enlarged, but sounds were normal. Pulse intermitted a beat every 12" to 20 pulsation. Varicose veins of the smaller kind on lower limbs. Signs of arthritis in some of the metacarpophalangeal joints. No history of gout or acute rheumatism. Greatly troubled with flatus and eructations. Abdomen tympanitic corresponding to small intestines, ascending and transverse colon. Abdomen not greatly distended. Suffered badly from constipation, going 3 or 4 days without movement at a time. Occasional attacks of diarrhœa. Appetite excellent. No history of mucous casts. She had complained of being "afire" for two years previously and often sought advice. Suspecting some intestinal irritation I examined the fæces. From the final washings I recovered an ordinary egg-cupful of intestinal sand. On questioning the patient she had noticed a gritty substance while performing her toilette. In appearance the heap of sand collected was like the whitish dry sand of the sea shore but interspersed among it numerous grains of a greenish colour and brown, the size and colour of the larger particles of sand one sees near the tidal wash. For over twelve months she passed this sand, sometimes in large quantities at intervals of weeks or months. The particles were resilient, skipping about under pressure of the examining needle, like minute bone sequestra. Odour like marigolds. Sank in water. Microscopically and by lenses, the coarser particles had definite shape and structure, like lemon tinted glass cylinders (two cemented together) with long curved horns of the same material arising from the body always on the same definite plan. Seen on the flat the horns were two in number. Seen on end, each horn was a twin, fusion taking place near the horn extremity and ending in a sharp point. The grains were a lighter tint than uric acid, with greenish-black patches in each cylinder and in the base of the horns, due to contained organic matter and salts. The cylinders and horns were hollow. They were evidently segments of vegetable origin filled with organic debris and salts.

The finer sand showed organic matter encrusted with inorganic salts and some free, clear, glass-like rosettes with short rays. This fine sand,

common in adult fæces, would readily fill and adhere to any vegetable nucleus; and hence the origin of enteroliths in chronic colitis, constipation, or sluggishly acting intestines due to pockets from dilatations or adhesions. Small wonder the woman was "afire" with thousands of these prickly grains irritating the intestinal mucosa. In these cases of colitis or intestinal pain and discomfort, an examination of the fæces may reward the searcher by the discovery of a simple cause. These grains were not soluble in, nor changed in appearance, except a slight diminution in volume, by prolonged immersion in strong sulphuric, nitric and hydrochloric acids. Incineration on platinum foil produced an exact replica of the grain, pretty pearly white, not easily fractured. No starch. To iodine a purplish red sometimes took place from the enclosed organic debris (probably transition products starch to glucose). Cholesterolin was present, by the method above described. Phosphates, magnesium and silica were present. Gwelin's test for bile pigments, biuret test, cellulose test and uric acid (murexide) all negative. The offending article of diet which ought to be excluded, I have not yet been able to pick out. Her diet given me over a long period contained:—white bread, brown bread, butter, mutton, bacon, potatoes, cabbage, meat pudding, cheese, mushrooms, eggs, lettuce, water-cress, onions, rhubarb and currant cake. *No pears.*

Her family may interest some readers:—

Mother, aet. 80, died jaundiced.

Father died from accident,
aet. 69.

Sisters: aet. 54 alive and well.

Brothers: 3 alive and well.

„ 56 alive, has internal cancer.

1 alive, suffers from

„ 65 alive, has cancer rectum.

kidney disease.

It is a matter of considerable doubt whether there is ever any true enterolithiasis comparable to gall stones or urinary calculi. Chronic colitis or other intestinal irritations I believe often has its origin in an unsuitable dietary. The practice of prescribing rough diet for constipation is not without its evils. In the case of Mrs. Y above, the grains are most likely from wheat. While under treatment, that is to say as long as the bowels were kept regular, the pains disappeared, only to reappear when treatment was stopped.

* INJURIES OF AND INVOLVING THE EYE.

BY

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PART I.

In contemplating the subject of eye injuries, the first thing that occurs to our minds is a feeling of great admiration at the wonderful and beautiful provision of Nature for protecting against injury this most important, sensitive and delicate structure. We find the eyeball, in its orbit—the latter a sort of bony case—protected on all sides from injury, except in the front where it is necessary it should be to some extent exposed, so as to allow of the performance of the visual function. Even here it lies encushioned in a soft pad of areolar tissue and fat, much as a precious jewel in a casket would lie upon a cushion placed for its protection. Although encased and encushioned in this way there is not the slightest handicapping of its proper movements, and the extrinsic muscles, together with Tenon's capsule, ever keep it in the most accurate and perfect adjustment. Even in this somewhat exposed frontage there is every provision made for its protection, for are there not two shutters—the upper and lower lids—ever on the alert to swiftly shield the eye from attacks of wind and dust and of foreign bodies of all kinds? In addition do we not also find that the free edges of these shutters are enfringed with a sort of brush, the lashes, very important for sweeping aside and preventing the passage of such tiny intruders as insects and guarding the eye against the wind that would otherwise blow into it all kinds of minute particles? The lashes may be compared to a company of soldiers on guard protecting the eye against its innumerable tiny enemies; and not only all this but the ocular surface itself is constantly being washed, bathed by the secretion of the lachrymal gland—the tears, so that even should a little dust or other irritant matter get past the lashes—the line of sentries—there is little fear of its remaining for long; it is speedily cleansed away. This provision for guarding the eye is forcibly brought to our minds, more especially when studying those diseases that arise entirely through something lacking, some acquired imperfection of this wonderful arrangement. The lashes may, owing to disease, fall out, the brush may no longer be workable, the lachrymal secretion may become dried up or scanty, the shutters may no longer close, and then we realize the vast importance to the eye of this protective arrangement. We can see how great our mercies are, or have been, when they are taken from us.

* Specially contributed to *The Antiseptic*.

For understanding the eye and especially for studying its injuries, it is absolutely necessary to thoroughly understand its anatomy and the anatomy of its surrounding structures, and, I think, we had better take the subject along the line of the anatomical arrangement, taking first of all, as * Professor Elschnig of Prague has done, the subject of (i) injuries to the bony wall of the orbit (fracture, fissure, etc.), (ii) injuries of the orbital contents around the globe, (iii) injuries to the eye ball itself; but we should also classify and consider the injuries according to their character and according to the nature of their causation, and the kind of object, implement or foreign body concerned in bringing the injury about.

Before considering the arrangement laid down by Elschnig let us briefly consider the subject of contusion. In Chapter XV of Fuch's Text Book, following the paragraph on injuries to the orbit, we have a brief but comprehensive summing up, according to an anatomical arrangement, of all the injuries that may arise from a blow, all the consequences which a contusion of the eye or of the adjoining part may entail. This summary should be of service to the general practitioner. "In the lids, ecchymoses, emphysema, solutions of continuity. In the margin of the orbit, fractures with or without displacement. Changes in the location of the eye ball including exophthalmos." "The tension of the eye greatly reduced through a perforation of the tunics of the eye having taken place." "In the conjunctiva, ecchymoses, lacerations." "In the cornea, epithelial desquamation, and, later on, deep non-suppurative inflammations; rarely purulent processes or rupture of the cornea. In the aqueous chamber and the vitreous, effusion of blood (hyphæma, hæmophthalmos). In the iris, iridodialysis, partial or complete (aniridia traumatica), radial lacerations, recession of the iris, likewise paralysis of the iris (mydriasis) with or without paralysis of accommodation. In the lens, astigmatism, subluxation and luxation due to partial or complete laceration of the zonula, likewise the formation of cataract. In the sclera, rupture in the anterior division, attended in well marked cases with prolapse of the uvea, the lens or the vitreous. In the choroid and retina extravasations of blood, detachment, rupture; in the retina alone cloudiness (commotio retinæ). In the optic nerve compression by effusion of blood, and contusion or rupture, by fracture taking place in the optic canal."

Here we have a formidable array of injuries as the result of a blow, but it is common knowledge that what usually happens is simply ecchy-

* The Medical Annual 1912.

mosis, bruising of the lids, etc.,—a "black eye." The object causing the bruise may be a man's fist, a cricket ball or a missile of some kind, or it may be caused by running or falling against some object in the dark. In this part of the world the falling branches of a tree sometimes cause severe contusion of the eyes in mahogany cutters, who are specially skilled in cutting this hard timber. I had to enucleate an eye that had been smashed up by a branch falling in a slanting direction; the cornea of the other eye was grazed so that there was an ulcer in its lower half with subsequent leucoma, but fortunately sufficient of the cornea was uninjured for him to enjoy fairly good sight. The end of a walking stick or the ferule of an umbrella may do very severe damage. The horn of a cow striking the eye of farmers, etc., in agricultural districts is a frequent cause of severe contusion and we would naturally expect far greater mischief than from a man's fist or from a cricket ball.

Let us consider, first of all, in detail, the less severe form of injury—that arising from a fist or a cricket ball. The margin of our bony case here protects the eye, the object being so very blunt. Although it be a frontal attack upon the ocular structures, the greater part of the impact is received by the orbital margin where the bone forms a hard strong rim, especially at the prominent upper margin with its beautiful covering of thick hair, the brow, which is itself a great protection.

The eyelids are peculiarly adapted to act as a buffer and so suffer protectively on behalf of the deeper structures. The brunt of the blow is primarily and chiefly sustained by what is in front of the tarsal plates. These plates used to be called the "tarsal cartilages" or the "tarsus," although their structure is not cartilage but firm dense fibrous tissue. The structures that suffer most are the thin moveable skin, the loose areolar tissue, the orbicular muscle, small blood vessels, nerves, etc. There is no fat here to get bruised; it is not needed in the lids and would be greatly in the way. The upper lid is the one most affected. As the immediate consequence of the blow, we have, pathologically, in a word, crushed tissue and extravasated blood. The crushing of the tissue means solution of continuity of the delicate walls of small blood vessels, capillaries, etc., and hence the blood extravasation. Secondary to this supervene the inflammatory processes that arise after every injury, and treatment is chiefly for the modification of the inflammation that will surely supervene, minimizing it as far as possible so that speedy repair and absorption takes place.

The impact of such a blunt object as a fist must be indeed terrific for the deeper structures to be much injured. An impression is made

upon the rods and cones and this sudden stimulation of the retina gives rise to what is vulgarly termed "seeing stars." As a result we may have the condition known as *commotio retinae*, a milk-white cloudiness of the retina, which occupies either the vicinity of the papilla or that part of the retina which corresponds to the point which suffered most from the blow. The cloudiness disappears in a few days and with it the disturbance of vision that has been produced. This latter may be marked, there being a contraction of the field of vision with some reduction of central vision. It is believed to be due to oedema of the retina. The elasticity of the globe, especially of the sclera, and the fact that the ball is pushed inwards against its soft cushion saves it from injury. The swelling of the lids closing the palpebral fissure provides functional rest necessary for visual repair.

Ice cold compresses of diluted witch hazel frequently renewed, and a little hamamelis given internally is, I think, the best treatment. After the first 24 hours substitute hot boric acid and witch hazel compresses, and it is wise in most cases from the first to instil weak Atropin drops.

Injury to the bony wall of the orbit.—This consists either in actual fracture of the eye's protecting case, or a less degree of solution of continuity, *i.e.*, fissure. There is much more likelihood of the orbital contents being damaged. The fracture is more or less serious according to its position and extent. A direct blow is most likely to smash the malar bone. An X-ray examination is needed to determine the extent of the fracture. Elschning divides orbital fractures into (a) those at the apex of the orbit, (b) those of the middle zone, and (c) those of the anterior part. At the apex it is almost always part of fracture of the base of the skull, caused not by a direct blow in front but rather by a heavy fall or blow on any part of the head, such as would fracture the skull. The optic nerve, because of its situation, is usually involved. The signs are sudden blindness, a dilated fixed pupil and no ophthalmoscopic changes. The blindness is almost or quite complete and there may be no other symptom, though sometimes we have evidences of orbital hæmorrhage. The history is that of concussion of the brain and perhaps the patient does not know of his blindness until hæmorrhagic swelling of the lids, etc., has subsided. Optic atrophy speedily supervenes from descending degeneration of the nerve, but if its destruction is only partial, as the blood clot surrounding the undamaged fibres becomes absorbed we may hope for a more or less partially reclaimed visual field.

Rupture of the internal carotid artery within the cavernous sinus gives rise to *pulsating exophthalmos*. The arterial blood poured in the sinus enters the ophthalmic vein. This forces the eyeball and the lids forwards and produces oedema of the conjunctiva and the lids with distinct pulsation. This pulsation can be heard by the patient and is appreciable by auscultation. There is severe headache and diplopia, the latter due to muscular disturbance. On ophthalmoscopic examination the veins of the eye ground are seen to be markedly engorged. The treatment consists in a bandage and an ice bag to the eye, and in systematic compression of the common carotid artery. If this does not succeed after a few days, the artery must be ligatured. The compression is carried out by a piece of drainage tube being fixed firmly along the course of the artery by means of rubber plaster, a pad and bandage.

Fracture through the middle zone of the orbit gives rise to oculomotor paralysis, as a rule, and in only a few cases is the optic nerve involved. Owing to injury of the nerves going through the sphenoidal or superior orbital fissure we may have total ophthalmoplegia with anæsthesia of the orbital contents, or there may only be injury to an isolated muscle and nerve branch. Any diminution of vision resulting from fracture of this part of the orbit usually ends in complete recovery.

Fractures in the anterior part of the orbit may be diagnosed by the localization of pain and the line of proptosis due to hæmorrhage. If the fracture be of the orbital roof, the hæmorrhage will displace the eye ball downwards and forwards; if of the inner wall, outwards and forwards, etc. Severe injury of the levator palpebræ superioris muscle in fracture of the orbital roof will give rise to ptosis. Injury of the trochlea gives rise to trochlear paralysis, shown by diplopia on looking down, the image of the injured eye being the lower. Fracture of the orbital roof also may cause anæsthesia of the brow through injury of the supra-orbital nerve. The inferior oblique muscle may be paralysed through fracture of the orbital floor and inner wall where it has its origin. The infra-orbital nerve and the ethmoidal nerves respectively may give rise to areas of anæsthesia, the one of the cheek and the other of the nasal mucosa through being implicated in these orbital fractures. Fracture of the lachrymal bone leads to epiphora and hæmorrhage into the lachrymal sac. The frontal sinuses, the ethmoidal cells or nasal passage and the antrum of Highmore may be opened up by various fractures in contiguous parts of the orbital walls and floor. If the fracture is complete, or even if only a fissure providing the periosteum has been ruptured, there will be emphysema. The air is driven into the orbit or

into the orbito-palpebral tissue by sneezing, the situation of the fracture determining whether the air goes into the tissue behind the eye ball (orbital emphysema) or into the tissue in front of the eye ball, *i. e.*, the conjunctiva lids, etc., (orbito-palpebral emphysema). If the fracture is behind the tarso-orbital fascia we have orbital emphysema, and if it is in front of it we have orbito-palpebral emphysema. In the former variety the eyeball and lids are proptosed, they are otherwise normal and they lie upon a bed of dough-like consistence. This gives a dough-like feel with crackling by pressure on the proptosed lids and the diagnosis is confirmed by the absence of any inflammatory signs. With orbito-palpebral emphysema there is crackling and marked swelling of the lids.

A fracture of the lachrymal or nasal bone anterior to the attachment of the lachrymo-orbital fascia will give rise to emphysema of the lids alone without any interference with the position or direction of the eyeball. A rare complication through infection of the nose is abscess or phlegmon of the orbit. If there is considerable dislocation of the orbital wall the eyeball may be displaced by it and to some extent paralysed although no direct injury of the orbital contents.

Traumatic exophthalmos is a very characteristic symptom of severe orbital injury. The *prognosis* of course varies according to the extent and intensity of the injury. We should specially take into our consideration whether (*a*) there is direct injury or not to the eyeball or optic nerve, (*b*) whether the soft parts are extensively damaged or not, (*c*) whether the fracture is simple or compound. Intracranial complications (meningeal hæmorrhage, concussion of the brain) must be looked for. The sense of smell should be tested, the possibility of the olfactory nerve having been injured through involvement in fracture of the frontal sinus and lamina cribrosa. In such a case there is a risk of secondary meningitis or acute pneumococcal encephalitis from impaction of a fragment of bone into the brain.

As to the eye itself, recovery is possible if the nerve lesions are simply due to the pressure of effused blood, but this is not so if the nerves themselves are directly injured. Care must always be taken to prevent drying and ulceration of the cornea through exophthalmos or through failure of the lids to close.

The treatment of fracture of the orbit varies also according to the various indications. Of course the general surgical principles, including, as far as possible, asepsis, must be strictly adhered to. In simple

fracture pressure should be used to restore the fragments to their correct position. In extreme cases of proptosis and emphysema, relief by evacuation of the blood, or air, as the case may be. In fracture of the orbital margin with dislocation immediate operative interference is called for, splinters of bone should be removed (bearing in mind the possible presence of foreign bodies deep in the orbit and carefully removing these) replacing the fractured parts in their proper position and suturing the wound. Silver wire sutures should keep the broken fragments when necessary in their place permanently. With carefully drilled holes sterile wooden or ivory pegs may be used for this purpose. In a fracture of old standing, where the globe is displaced and its movements interfered with, especially in cases of malar fractures with impairment of mastication and disfigurement making reposition urgently desirable, after exposing the dislocated fragment, detaching the orbital fascia from its marginal attachment and loosening the outer ends where firm callus has formed, replacement is effected by traction with a resection hook.

The treatment of fractures deeply situated at the apex of the orbit is inseparable from that of fracture of the base of the skull and of course exclusively conservative.

An important point, in connection with the general surgical principles already mentioned, is the danger of tetanus in open injuries of this kind. Professor A. Elschmig writes in regard to this the following advice:—"I would lay down this rule, based on various observations in the literature as well as on my own experience, that in every case of extensive open fracture, as well as in all cases of severe injury to the soft parts, in which contamination with soil cannot be excluded, a prophylactic dose of 20 *E. tetanus antitoxin* (Merck) must be given."

(To be continued.)

*ALL-INDIA SANITARY CONFERENCE—MADRAS— NOVEMBER 1912.

Some Practical Points in dealing with Epidemic of Cholera.

By

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Of the three common infectious diseases with which we are chiefly concerned in this country, occurring as they do, from time to time, in epidemic form, *viz.*, Small-pox, Plague and Cholera, I think it will be

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unanimously admitted that we are better acquainted with the nature and means of dissemination of the last than of the other two, hence we are better able to devise methods for preventing its spread.

We know little or nothing of the active cause of small-pox, we can only infer from comparison with other complaints of the kind that it is due to the introduction into the body of some virulent organism, which after running a definite course of incubation followed by certain pronounced physical lesions is cast off mostly by the skin, if the patient survives long enough.

From experience we know that the malady may be contracted by merely coming into contact with an infected individual, or even residing near him, it may also be conveyed through the medium of cloths, bedding, etc. Wherefore our only means of preventing its spread is by isolation of the patient, and vaccinating all those who have been in any way associated with him, with a view to rendering them immune, at the same time disinfecting everything which has been used in the sick room.

We know that plague is due to the invasion of a specific microorganism which we can cultivate outside the body, and there is very evidence to show that it is imparted to human beings through the medium of a certain type of parasites found on rodents, but we are still more or less in the dark as to the exact means by which it is brought about. Wherefore we organise campaigns for the destruction of rats, inoculate with immunising serum, and encourage people to evacuate the houses in which it appears.

But when it comes to cholera we are practically certain that the disease is caused by toxins produced in the body during the growth of a certain vibrio, having definite characteristics, whose habitat is in the alimentary canal and that it is invariably introduced into the system by the mouth, almost always either directly or indirectly in infected water it may be actually present in drinking water which is no doubt the commonest way people contract the disease. Or it may be that vessels or utensils used for feeding purposes have been washed in contaminated water. Soda water bottles may have been kept in a *chatti* containing infected water, a little of which is retained in the necks above the glass ball stoppers and mixes with the contents when they are opened, the acidity being much reduced by the ebullition of the Co_2 and not having time to affect the microbes.

Green vegetables may become carriers of the malady either from being washed in water containing the organism after they are gathered, or from the ground in which they are cultivated being irrigated by

water drawn from a suspicious source ; moreover it is possible that the soil in which they are grown may have been directly polluted by a person who is suffering from cholera defecating upon it.

I think we can eliminate the theory of air borne infection ; we know that the bacteria are not very tenacious of life, that they soon become inert and die when deprived of moisture or exposed to a bright sunlight ; so we may be fairly certain that if they ever became so dried up to the extent that they cannot adhere to the surface on which they are lying, and therefore liable to be blown about by the wind, they would have lost their vitality and be rendered harmless.

But there is one agency by which the disease may be disseminated, quite irrespective of water in any form which is very important and that is the part played by insects. The common house fly with his gummy plantar surfaces is undoubtedly a serious offender in this respect. Having settled on a cholera stool where a certain number of infective micro-organisms stick to his feet, he goes off and gets drowned in a milk jug or samples some delicacy at a sweetmeat stall incidentally relieving himself of a few hundred bacteria here and there while crawling over it. And lastly we must not forget that infection may be conveyed by servants, who in this country are by no means over-particular in the matter of cleanliness, in preparing or handling food. I believe not long ago an outbreak in a Calcutta hospital was traced to a ward-boy, the bacteria being actually found on the palms of his hands.

Our first object then must be to find out the source from which the disease originated, and then to prevent its further spread, either by rendering the source inert or by stopping persons putting themselves in the way of infection from it. Needless to remark, the latter presents considerable difficulties.

In the Central Division of the Bombay Presidency as soon as news reaches the Deputy Sanitary Commissioner's Office that a case of cholera has occurred in a village, a paper containing certain questions is sent there to be filled up by the *Kulkarni* (or village scribe). By this means we gain possession of certain particulars with regard to the patient's surroundings when he contracted the malady. The age, sex, position in life, what water he was in the habit of drinking, whether he was a permanent resident of the place or had lately come from some other neighbourhood, if any other member of the household had been similarly affected, etc., from which we can draw fairly accurate deductions, firstly, as to whether it was really a case of cholera or not, and secondly, whether the source of infection is actually present in the village or the disease has been introduced from outside.

An isolated case occurring in a house where the members are all living together under exactly similar conditions, none of them having lately been away from home, is hardly likely to be true cholera.

And here I may mention that we sometimes get a history of a man, who after eating a quantity of water melons while working in the fields all day, during the rains, has been taken with violent choleraic symptoms in the evening with perhaps fatal results. A case of the sort was published only a few months ago in the *Indian Medical Gazette*, the author asking if such phenomenon was within the experience of any other medical man.

During severe epidemics of course it is next to impossible to discriminate between the true disease and severe diarrhoea, possibly caused by ptomaine poisoning or some other violent irritant, from the accounts received; and the village officers knowing that they will be severely dealt with if they neglect to report an outbreak, take care to err on the safe side and enter any complaint which is accompanied by profuse evacuations and collapse in their cholera returns.

Last year in a Deccan village during a period of three or four days more than a hundred of the inhabitants developed symptoms of this kind, which lasted only a few hours and then disappeared entirely, no death occurred although the very old and infants in arms were equally affected, which at once aroused a suspicion that it could not be really cholera. And no cases of the sort were reported from other places in the vicinity, with which there was frequent intercourse.

It was all over before any systematic investigation could be made, and we never came to any satisfactory conclusion as to the real exciting cause, but it was evidently not cholera, although it was returned as such.

In addition to these queries a pamphlet in vernacular is forwarded entitled "Simple instructions to check the spread of cholera" and the *Mamlatdar* (chief revenue subordinate, I believe he is analogous to the Tehsildar of the Punjab) is requested to see that they are carried out.

I will not inflict a detailed transcript of these on you, suffice it to say that they explain that the disease is chiefly communicated by drinking water, hence great care should be taken to protect the general supply from pollution. They emphasize the necessity of observing personal cleanliness on the part of those attending the sick, and warn them of the virulently infective nature of the stools and in this connection, with your permission I will quote direct from the pamphlet.

"A fire should constantly be kept alight, and all stools and vomited matter should at once be burnt; this is very important."

There is a paragraph warning persons of the danger of eating any food or drinking any milk with which flies have come in contact, and some advice regarding abstinence from unripe fruit, particularly water melons.

I believe this injunction leads to considerable misapprehension. Of course its main object is to lessen the probability of persons lowering their vitality by the diarrhoea which often follows indulgence in large quantities of indigestible matter, hence rendering them more likely to fall victims to the prevailing complaint. But quite a large proportion of the lay public imagine that cholera can be produced merely by eating fruit.

Now it is comparatively easy to frame a complete set of directions for use, so to speak, but the difficulty is to get them put into practice. And I may admit at once that the success or otherwise of the preventive measures almost entirely rests with the *Mamlatdars*.

If he is an intelligent man, with previous experience of epidemics and has confidence in them himself, he will often contrive to nip the disease in the bud. If on the other hand he is an ignorant individual, without any progressive tendencies, and regards our efforts merely as some new fad on the part of the ever incomprehensible *Sahib-log*, he does not trouble to give any orders on the subject. The village officers take their cue from him, the pamphlets become as valuable as any other waste paper, and cholera spreads unchecked from village to village throughout the country.

To show what can be done with the co-operation of an intelligent subordinate who has influence with the people, I would cite the case of Wai in the Satara district. This is a small town of a few thousand inhabitants, the head-quarters of Brahmanism in the Western Presidency, in so much that the Holy Krishna river runs through it. It is situated at the foot of the hill station, to which Government repairs in the hot weather; cholera appeared there at the end of May just as the general exodus to Poona was about to take place, some thirty cases occurring every day, and the cart-men employed to bring down baggage contracted the complaint on their way through the place and died on the road later. This was a very serious matter and called for immediate remedy. The *Mamlatdar* had a couple of thousand copies of the pamphlet already

referred to printed at the local vernacular press and circulated amongst the inhabitants, at the same time exercising personal supervision to see that the advice contained therein was acted upon. He even went counter to the ancient prejudices of the people to the extent of having the sacred river patrolled by police to prevent the water being used for domestic purposes; it was undoubtedly contaminated with the specific micro-organism.

The severity of the epidemic began to abate at once. The only thing he did not do was to see that the stools of persons suffering from the disease were burnt, but had them buried instead. Now this is not a safe method of disposing of them, and for this reason I quoted the paragraph in the pamphlet referring to the subject, verbatim, just now. First of all their infectivity is not destroyed by merely putting them underground, and to save themselves trouble, people will deposit them in the softest and most porous soil, without any regard to the proximity of wells or other sources of drinking water, to which they may gain access later.

Furthermore the ground round many of the houses is so hard that it would take a pick to break it up, wherefore it is physically impossible to bury the excrement, and the usual alternative is to throw it away on the nearest convenient patch of waste ground, whence it may eventually be washed into a neighbouring stream, and in the meantime is the general rendezvous for all the flies in the vicinity.

There is always sufficient *cutchera* lying about in every village with which to make a fire, and nothing is simpler than to have a few handfuls gathered, and when well alight pour the excreta on to it, at the same time holding the *gumlah* or whatever vessel they were collected in, in the flames for a short time to sterilise it.

I visited Wai when the disease had been prevalent there about a week during which time there had been over a hundred attacks and some fifty-five deaths and although the daily incidence had been diminishing owing no doubt to the preventive measures which had already been taken, as soon as this method of dealing with the motions was put into practice the epidemic stopped dead, only two cases occurring during the ensuing week.

Last year cholera broke out in Sholapur, a town having a population of nearly 100,000 persons the centre of a great cotton industry. The water supply is brought into the place in an open channel from a large

bunded tank three miles away. Knowing what we do of the habits of the natives of this country this means of conveyance of water appears to me to be attended with considerable risk, particularly as no very active precautions are taken to prevent the populace gaining access to the water. There is what amounts to a public path, on either bank, with inhabited dwellings a few yards off, and it is crossed in places by plank bridges, one of which is the general means of communication with a village fifty yards away from it, wherefore it was of the first importance that the disease should not spread to this village or to any of the houses situated along the course of the conduit, as if the stream became infected nothing could avert the most appalling epidemic.

During the latter part of August twenty or thirty attacks were being reported daily. They were mostly confined to the lower portions of the town where the houses are very squalid and there is a certain amount of overcrowding, although a few cases occurred in other quarters.

There was a question of establishing a temporary hospital and insisting that all persons suffering from the complaint should be taken to it for treatment, without consulting their own inclinations in the matter.

Now this is a step which should never be resorted to, if it can possibly be avoided, as the majority of natives have a rooted antipathy to leaving their homes when they are ill; moreover they look upon it as a reflection on their domestic arrangements, hence such a procedure is a direct incentive to conceal the cases, which is the last thing desirable.

The people of the infected portion of the city drew their water supply from wells, which were carefully protected from pollution by the usual methods, a police guard being mounted at each to see that the precautions were not neglected.

A special sweeper was told off to each case, or group of cases, if two or three happened to be near one another in one street, they were provided with wood and made little fires in selected spots. Directly one of the sufferers passed a motion it was handed over to the sweeper on duty and burnt then and there. Phenyle was distributed to those attending the sick with instructions to wash the floor or any furniture soiled by the excreta, cotton clothes worn by patients were burnt, the municipality giving compensation for the loss of it in the case of the very poor, blankets and woollens were dipped in phenyle. The same old pamphlet was circulated in large numbers and pasted in conspicuous positions all over the city. The epidemic entirely disappeared in ten days. It is

hardly necessary to tell you that it is far more difficult to carry on a campaign of this sort in a large city like Sholapur, than in a small town or village.

A few months ago cholera appeared in a village about three mile from Poona Cantonment; some thirty cases occurred before we knew any thing about it, the official report having been returned by the *Mamlai dar* for correction. The same means were employed, the people being shown to render the excreta harmless by pouring them on a fire. They seem rather to enjoy the process as having some mystic signification. No further cases occurred.

To quote an instance of how the lower classes dispose of virulent infective dejecta when left to themselves. There was a woman in this village who when asked what she did with them, proudly answered that she threw them into the *nala*. The *nala* in question is an irrigation channel largely used for drinking and other domestic purposes, it flows round the village, her house being one of the furthest up stream. And with reference to this I would remark that it is with the women we have the greatest difficulty, the majority of them are so intensely stupid and obstinate, that even if they can be made to understand what is required of them, they will not do it. At Wai one old dame had a regular stand up fight with her son, a comparatively enlightened individual, when she was told not to drink the river water, to which she had been accustomed all her life, the police had to be called in to separate the parties.

In these three outbreaks, Gentlemen, I personally supervised the arrangements and saw that they were efficiently carried out. I could mention several others, some of which occurred in places I had no opportunity of visiting, where as soon as the inhabitants bestirred themselves to follow the precepts laid down, the results were more or less successful.

Wherefore I maintain that cholera is a preventible disease, and an easily preventible disease, which we understand and have the means of effectually stamping out, in contradistinction to plague and small-pox, concerning which we have only a comparatively imperfect knowledge, and I think we may look forward to a time when it will be as rare in India as Typhus is in England, a disease which not a hundred years ago was as prevalent there as cholera is here to day, but has almost entirely disappeared with the advance of sanitation.

Our efforts to check cholera so far have borne a certain amount of fruit as shown by the general decline in the figures for the last twenty

years and with the ever increasing attention which is now being paid to sanitary matters we may confidently hope to see an infinitely greater improvement during the next bi-decennial period.

The question of treatment, strictly speaking, does not come within our province, the business of the Sanitary Officers being to prevent people getting diseases and not to cure them. The first thing usually done on the appearance of an outbreak is to distribute medicines broadcast, most of the mofussil dispensaries keeping large quantities in stock, from which any one who applies for assistance is dosed. Doubtless a certain number of persons are relieved to some extent, but such a procedure does little or nothing towards combating the spread of the epidemic, and up to recent years apparently it represented the beginning, middle, and end of the efforts to stop it. Moreover of late in the Bombay Presidency the people have not taken kindly to the medicines provided.

This, however, is not on all fours with the exhibition of acids as a prophylactic measure, bearing in mind Koch's sensational demonstration of the value of these drugs in that respect. I have always been in the habit of issuing 30 m. of dilute hydrochloric acid in an ounce of water to clerks, servants and *patawallahs*, when touring in a cholera stricken district. They rather like the tart flavour and take it readily. So far I have never had a case amongst my establishment in camp although the disease has been raging in all the surrounding villages.

No dissertation on this subject would be complete without some reference to fairs and the part they play in spreading the malady. And we cannot but commend the action Government now proposes to take in holding searching official enquiries concerning them.

Every twelve years there is a very large religious gathering at Trimbak in the Nasik district, where lakhs of pilgrims congregate for a time; on the last occasion on which it was held, cholera was particularly virulent amongst them. When they dispersed in April we could trace the advance of the disease all down the main route they took to Poona, as they infected each village in turn on their way back to their homes. On reaching Poona they branched off to Satara and Sholapur, the former being particularly severely affected, and even introduced the complaint into Ratnagiri.

There is another pilgrim centre on the Bombay side, which for years used to be considered a menace to the health of the community so much so that the local Government voted 4½ lakhs of rupees as a free gift to the municipality to provide them with a water supply which should be above suspicion.

This place, Pandharpur, is situated on the Bhima river, and is the seat of a very holy shrine (Vitoba); it has a population of 25,000 under ordinary circumstances, but during the Ashadi Fair which takes place annually at the beginning of the monsoon there are often as many as two hundred thousand persons collected there. Cholera used to make its appearance there every year as regular standing dish, and the pilgrims returning to their homes spread it all over the country. In 1906 a most violent epidemic raged there. It was commonly reported that there was one long and continuous procession of biers day and night to the cremation ground. There was not sufficient wood or dung-cake available to consume the bodies, and half burnt corpses were committed to the river wholesale. This state of affairs could not be allowed to continue and strenuous efforts were made to get the place into some semblance of a proper sanitary condition.

A special cholera hospital was built. Householders had to obtain a license to take in pilgrims as lodgers, the dwellings being previously inspected and passed as fit from a sanitary point of view to harbour them. They were directed to report any case of sickness occurring on their premises, under pain of having their license endorsed; under these circumstances we could safely insist on people being treated in the hospital.

A staff of medical subordinates were employed to examine every one entering the town, either by rail, road or river.

Stringent regulations were drawn up to prevent pilgrims obeying calls of nature in any place except those set apart for the purposes for which ample provision was made, and the usual stereotyped precautions were taken to prevent the drinking water being polluted, with the result that in 1909 when cholera was extremely prevalent all over the Deccan only about forty attacks occurred during the fair time and in the following seasons 1910 and 1911 not a single case appeared. This year the fair was stopped officially owing to the general prevalence of the disease throughout the country, railway booking to the station being prohibited for the time being, nevertheless some forty thousand people gathered there, but remained for the most part healthy. Pandharpur furnishes fewer cases now than any other towns of its size in the Presidency.

An Investigatoin of an Epidemic of Cholera caused by a "Carrier."

BY

MAJOR E. D. W. GREIG, M. D., Sc., I. M. S.

On special duty for the Cholera Enquiry.

Owing to its being the celebration of the Nutan Kalebar, the number of pilgrims present during the Car Festival at Puri this year was very great. It was roughly estimated that about 300,000 attended. They came from all over India. The annual cholera epidemic was, consequently, unusually severe, 417 cases were admitted to hospital in July. After the ceremony in July was over, the town of Puri became severely infected with cholera and the number of cases returned daily reached 49 on the 30th August.

During July and August this year Cholera occurred in the Jail at Puri. I was able to make a very complete study of this epidemic. Before entering into details I may briefly summarise the facts. On investigation it was found that a patient who had been attacked by Cholera on the 6th July 1912, was discharged from the Cholera Hospital, Puri, and was wandering about until his arrest and admission to Jail on the 23rd July 1912. I made a careful bacteriological examination of the stools of this man, who was in the undertrial ward of the Jail, and found that he was excreting the Cholera vibrio in large numbers at the date of examination, 28th July 1912, that is, 3 weeks after date of attack. A few days after his admission to the Jail, cases of Cholera began to occur in the undertrial ward. Including warders, 17 cases of Cholera with 5 deaths took place in the Jail as a result of the introduction of the Cholera virus by this "carrier." The "carrier" was at once segregated, but before this was done he had an opportunity of infecting latrines and flies; the latter were very numerous in the Jail and elsewhere in Puri at that time. It had also to be remembered that, apart from the men who developed an acute attack of the disease, there were, also, others who, although acquiring the infection, remained healthy or showed very slight signs and would pass undetected. The outbreak was effectively controlled by a very complete disinfection of all fresh night soil in the Jail, this is considered by me in another communication.*

Methods.—In the examination of the stools of the "carrier," a specimen of the faeces was placed in peptone water and incubated at 37° -C. for 6 hours; from this a second flask of peptone water was

* Observations on disinfection in Cholera, Major E. D. W. Greig, I. M. S.

inoculated and incubated about 12 hours at 37°-C. After this enrichment process, a few drops of the peptone water were placed on Dieu-donne and ordinary agar plates, which were incubated for 18 hours at 37°-C. At the end of this period the plates were examined and suspected colonies tested with two high titre Cholera sera, one prepared by myself (titre 1-8000), one prepared by the Swiss Serum and Vaccine Institute, Berne, under the supervision of Professor Kolle. Reacting colonies were subcultured and the microscopic and cultural characters carefully studied. In this way the Cholera vibrio separated from the stool was fully tested and authenticated by microscopic, cultural and biological (agglutination) tests.

Bacteriological examination of the "carrier."—The following table gives the date of attack by Cholera, the date of his admission to Jail, the dates of the examination of and the presence or absence of Cholera vibrio in the stools of the "carrier."

Name	Age	Sex	Caste	Date of attack	Date of admission to Jail	Date of examination of stools	Presence or absence of Cholera vibrio in stools
1	12	M	H	6th July 1912...	23rd July 1912 ...	28th July 1912 ...	+ + +
						30th July 1912 ...	+ + +
						1st August 1912...	+ + +
						3rd August 1912...	+ + +
						1th August 1912...	+ + +

The "carrier" was a patient in the Cholera Hospital from 6th to 13th July when he was discharged, he was arrested at Sakbigopal (near Puri) for bad livelihood and sent to Puri Jail on the 23rd July. He was released from Puri Jail and sent to the Cholera Hospital till 4th August, when he left Puri and I have no further record of him after that date.

This was a very interesting case. He was discharged "cured" from the Cholera Hospital, but like other convalescents he was still infective and was proved to be so nearly a month after his attack. He left Puri to return to his home and the bacteriological examinations ceased, but it is quite likely that he will remain infective for some considerable time as he no doubt harbours the Cholera vibrio in his gall-bladder.

Bacteriological examination of acute Cholera cases.—In the examination of the stools of the acute Cholera cases a culture of the Cholera

vibrio was obtained on agar without preliminary enrichment in peptone water.

The following table gives the date of attack, the date of examination, and of recovery or death, the presence or absence of the Cholera vibrio in the stools of each of the acute cases of Cholera which occurred in Puri Jail during July and August 1912.

No.	Name.	Age.	Sex.	Caste.	Date of attack.	Date of recovery or death.	Date of examination of stools.	Presence or absence of cholera vibrio in stools.
1	C. H.	35	M	H	27th July 1912.	14th August 1912	27th July 1912.	+
2	B. M.	27	M	H	31st do. do.	10th do. do.	31st do. do.	+
3	D. U.	22	M	H	Do.	Died 1st August	Not examined.	
4	B. D.	20	M	H	1st August 1912	9th August 1912	3rd August 1912.	+
5	B. B.	23	M	H	2nd do. do.	14th do. do.	2nd do. do.	+
6	P. K.	26	M	H	4th do. do.	Died 4th August	4th do. do.	+
7	B. M.	19	M	H	5th do. do.	10th August 1912	5th do. do.	+
8	S. K.	20	M	H	6th do. do.	14th do. do.	6th do. do.	+
9	D. N.	18	M	H	7th do. do.	Do.	8th do. do.	+
10	G.	22	F	H	Do.	Died 8th August	Not examined.	
11	R. P.	12	F	H	8th August 1912	14th August 1912	9th August 1912.	+
12	B. S.	15	M	H	Do.	20th do. do.	8th do. do.	+
13	B. B.	28	M	H	Do.	18th do. do.	9th do. do.	+
14	J. S.	52	M	H	9th August 1912	Died 9th August	Do.	+
15	L.	58	M	H	10th do. do.	Died 13th August	12th August 1912.	+
16	N.	30	M	H	11th do. do.	17th August 1912	Do.	+
17	B. P.	16	M	H	12th do. do.	16th do. do.	13th August 1912.	+

The strength at the time of commencement of the outbreak in the Jail was:—

Paid Officers and workers	..	..	..	29
Male convicts	..	..	..	189
Female convicts	..	..	..	4

It is significant to note that during the period of the outbreak there were several cases of "Diarrhoea" and "Dysentery." From the 24th July to 12th August 1912:—

Number treated in Hospital	..	..	..	23
Number treated as out-patients	..	..	..	79

A chart shows in graphic form the course of the epidemic in the Jail following the admission of the "carrier," and the effect of the complete Cyllination of all fresh night soil in the Jail.

This epidemic is interesting from several points of view. In the first place because it was worked out on definite scientific lines which yielded valuable information for future guidance on several points. Further, it proved that the convalescent Cholera "carrier" is capable of causing an outbreak of Cholera. In the course of my investigation I demonstrated that a number of patients on leaving the Hospital harbour the Cholera vibrio and are still infective. It might be asked is a convalescent "carrier" really capable of causing an epidemic, and is he of any great practical importance to the sanitarian in dealing with the Cholera problem? Such an experience as the present one, carefully worked out with strict methods of modern bacteriological research, affords a definite answer to these queries. It can hardly be regarded as an isolated or peculiar instance knowing as we do that many persons recovered from Cholera are still infective. This observation is important also as showing that this "carrier" was infected about a month after his attack; and on the last occasion I examined him he was excreting Cholera vibrios in his stool in very large numbers. After that he disappeared to his home and may continue a "carrier" for some time, and some obscure epidemics of Cholera which will trouble sanitarians to explain, may follow his tracks. In view of my observations on the presence of the comma bacillus in the bile in Cholera, it is probable that this man had an infection of his gall-bladder by the vibrio and large numbers of the organisms will be poured out into the intestine and so from time to time find their way into the external world in his stools.

Without such a bacteriological investigation it would have been impossible to have accurately traced the source of infection in this Jail epidemic; and its origin could only have been guessed at. Further, having appreciated the mode of origin and spread of the disease, it was possible to effectively control the epidemic by the application of methods of disinfection based on the researches.

The mode of production of this epidemic of Cholera is very similar to that of a number of outbreaks of Enteric fever which I had an opportunity of studying. At that time there was a great paucity of scientifically ascertained facts regarding Enteric fever epidemics in India, so at the present time there is a similar absence of data obtained by modern methods of research in regard to Cholera epidemics. A belief which is

very prevalent regarding the mode of dissemination of Cholera in India is that the disease is exclusively "water-borne." Undoubtedly water is a channel and an important one, but there are others, which, because they are less obvious, have not been taken sufficiently into consideration, but they are none the less important. It remains to be determined, by carefully made scientific observation, what the relative importance of the various means of dissemination of the Cholera virus in India is: there can be no doubt, however, as to the importance of the human factor in the spread of Cholera.

As I showed in my paper on Cholera convalescents and contacts in India, the daily bacteriological examination of the stools of acute cases of Cholera which occurred amongst the prisoners, proved that at least two of them harboured the Cholera vibrio for long periods. Hence it will be seen that this "carrier" not only caused an epidemic of Cholera amongst the prisoners, but produced two Cholera "carriers" and these may become "permanent reservoirs" of the virus. In a free population where no precaution would be taken for the segregation of "carriers" produced by an epidemic, the situation is a very serious one. From the point of view of prevention probably the most dangerous issue of an epidemic of Cholera is the production of "reservoirs" of the virus. After each epidemic there must be a crop of "carriers," some "temporary," and a few more "permanent," which in their time if suitable conditions offer, will produce outbreaks of the disease in the same manner as the above described epidemic, and so the "vicious circle" of events continues. The problem, therefore, before the sanitarian is to find the weakest link in the chain and to endeavour to break it at that point. The problem is a very interesting one, but in the solution many practical difficulties will be met with, and will have to be overcome. I discuss this question in my paper. 'On Cholera convalescents and contacts in Cholera.'

INTERIM REPORT ON THE CAUSES OF DIARRHŒA IN POONA.

BY

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AND

ASSISTANT SURGEON G. D. CHITRE, L. M. & S.

Since April of the present year, at the request of the Government of Bombay, an enquiry into the causes of diarrhœa in Poona has been conducted from the Parel Laboratory. Poona, a city of 117,256 inhabitants

with an adjoining suburban Municipality and a large Cantonment comprising in all 156,693 persons, is situated on the right bank of the Mulla Mutha River as the latter flows across the Deccan plateau 1,850 ft. above the sea-level. The ancient seat of the Peshwas, its importance in point of size and the climate which it enjoys during the monsoon have made it at this season the headquarters of the Local Government.

2. In spite, however, of favourable climatic conditions Poona for some years has had a reputation for unhealthiness based chiefly on the prevalence of enteric fever and latterly of diarrhoea. No reliable records exist to enable us to test from year to year the health of the station in relation to the diarrhoea and the reasons for this are that comparatively little is known of the real extent of the disease in the city itself and that in the suburban municipality and in the cantonment the diarrhoea among a population, composed largely of European adults, though it may cause much inconvenience is not in individual cases so severe as to materially affect the admissions to hospitals or the mortality returns. Nevertheless, so familiar has monsoon diarrhoea become with the members of the European community that for some years the complaint has been known by the fanciful name of "Poonaitis."

3. A few years ago the diarrhoeas that form the subject of this enquiry were overshadowed in importance by the prevalence of enteric fever; but, in the absence of definite records, several individuals are of the opinion that diarrhoea is no new complaint in Poona and it is of interest that, in June 1825, Bishop Heber, arriving at the break of the monsoon, was confined to bed for several days with a mild attack of dysentery.

4. Preliminary enquiries elicited great differences in opinion as to what constituted the symptoms that were characteristic of the local diarrhoea. The acting Civil Surgeon and the more senior Medical Officers described the Poona diarrhoea as chronic, essentially resistant to treatment, with large loose light coloured and frequently frothy motions, free from blood and mucus. Abdominal pain was usually absent or, if present, only of a vague character. On the other hand, the Staff Surgeon, the Surgeon to His Excellency the Governor and several of the regimental doctors laid stress on the suddenness with which an attack usually began, the griping pains in the abdomen immediately preceding an urgent desire to go to stool and the copious watery motions which characterized an initial attack.

Of the latter type were the majority of the cases brought to our notice during the past season and the brief notes on the morning sick in

the records at the Station Hospital would indicate that this type was equally frequent, at any rate among soldiers, in 1911.

5. Moreover, previous to this investigation, Captain Stanger-Leathes, I.M.S., had written a valuable clinical account^(a) of the illness based on 2 years' experience as Staff Surgeon and in it accurately described the main features of the diarrhoeas that have prevailed this year. His report was dated January 1st, 1912, and he thus described the symptoms.

6. "The common ordinary form commences suddenly with violent watery diarrhoea and vomiting, loss of appetite, a feeling of great malaise, headache, griping and discomfort in the abdomen, over which on palpation, there is a good deal of tenderness and gurgling. The tongue is dirty, and there is generally some pyrexia at the commencement. The motions are generally very frequent. At first, two or three in one hour, they gradually abate under treatment, and cease in two to three days leaving the patient very weak and debilitated.

Other forms. (1) "*Subacute*.—The patient feels weak and depressed has no appetite, has a dirty tongue, suffers from dyspepsia and has three or four loose motions a day usually after meals and in the early morning very often he is not ill enough to lie up. This form is often very persistent, and if not treated at once by diet and rest, it is very likely to become chronic.

(2) "*Choleraic form*.—This is not very common, the patient has most of the symptoms of cholera; the onset is sudden with very acute griping pains, loose watery motions every few minutes, incessant vomiting, cramps in the legs and abdomen, sub-normal temperature and collapse.

(3) "*Chronic form*.—After one or two acute attacks or in continuance of a sub-acute attack the patient has a tendency to diarrhoea and dyspepsia whenever any but a very simple diet is taken, this may continue for months and generally necessitates a change from the station, when they quickly get well.

(4) "*Form in infants*.—It is very common and usually very severe. Frequent green slimy motions are present with occasional streaks of blood and very often high pyrexia, vomiting and sometimes convulsions. The diarrhoea is very persistent and occasionally ends in death from wasting or convulsions.

"Relapses of the ordinary form are common, but very often people seem to get acclimatized after long residence in Poona."

(a) Report to the P. M. O. (Poona) Division.

7. An analysis of one hundred and seven cases during the past season shows that, excluding twelve cases which we have good reason to believe were true cholera and in no way related to the other cases under consideration, fifty-nine cases of diarrhoea brought to our notice were of the acute watery type. Their stools were alkaline and were so fluid that on standing they quickly separated into two layers. Microscopically they consisted mostly of vegetable debris and bacteria; catarrhal cells and leucocytes were absent or few in number and red blood corpuscles were not seen. Of the remainder, three occurred in infants, two were sub-acute diarrhoeas, six were chronic diarrhoeas, one was a case diagnosed as sprue and the remaining twenty-four were more or less frankly dysenteric; of these twenty were acute, and four were sub-acute. Dysentery diagnosed as such by the presence of mucus and blood in sufficient quantity to be visible to the naked eye, contributed one-third of the cases.

8. To explain the causation of the common diarrhoeas some, referring to the acute diarrhoeal and choleraic types and to an extensive outbreak of diarrhoea that followed a club luncheon three years ago, dwelt on the probability of ptomaine poisoning and the opportunities that flies have of infecting cold foods with organisms of putrefaction.

Others and among them certain sufferers from subacute and chronic forms of diarrhoea blamed the drinking water the mineral constituents of which they believed increased with the onset of the rains.

Others, interested in infantile diarrhoeas, considered that milk from cattle fed on new pasture played some part.

A former Civil Surgeon and the present acting Civil Surgeon drew attention to the presence of flagellates in the stools.

Not a few held that the disease must be due to an unknown bacterium transmitted from faeces to the food by flies and in the opinion of several, chills were the factor of chief importance.

9. No group of cases has this year suggested a diagnosis of ptomaine poisoning.

An exhaustive quantitative analysis of daily samples of the drinking water has shown conclusively that in its soluble mineral constituents there is no appreciable variation with the onset of the rains.

Experiments with a small number of selected individuals have shown that immunity to diarrhoea is not secured by taking milk from specially stall-fed cattle.

10. Flagellates have been found in eleven cases. Of these in ten cases the organism was almost certainly the *Trichomonas* and in one it resembled *Lamblia intestinalis*. The flagellates occurred in all types of the disease being found seven times in acute watery diarrhoeas, twice in chronic diarrhoeas, once in acute dysentery and once in true cholera.

11. In the hope that the distribution of flies might be correlated with that of diarrhoea flies have been collected on fly papers daily from thirty houses distributed over Poona Municipality and Cantonments and Captain Lucas, R. A. M. C., kindly arranged for a daily collection at Ganeshkhind. Observations in the city were a failure as the papers were invariably tampered with.

A correlation could not be established as so many cases of diarrhoea failed to report themselves that our cases illustrate the limits of a certain Surgeon's practice rather than the incidence of diarrhoea. In a selected regiment, however, where most of the cases were reported, the correlation is not striking.

12. The ample attractions of a dirty kitchen always account for more flies in a house than the proximity of stables or cattle yards. Structural improvements such as wired doors and windows are ineffectual if the floors and the tables be greasy. Minor breeding places are fairly numerous, but, contrary to what is usually stated, horse dung and litter play little part in producing flies in Poona. The great breeding places are the filth pits for the manufacture of poudrette and the collections of cow-dung. The conditions at any one place alter from week to week but it is difficult to describe the loathsome appearance of the filth pits when seen in August buzzing with flies and crawling with maggots.

Cow-dung during the rains is collected in heaps and there are many heaps just outside the limits of the City and the Cantonment. Others are surreptitiously kept in court-yards and behind hedges and all, in June, July, and August yield ample supplies of fly larvæ. We were early aware of this, but Babu S. K. Senu discovered that droppings and cow-dung cakes were no less fertile breeding places and from one cake selected fortuitously on the 9th September we obtained 1,139 larvæ of the domestic fly. If flies play a part in the spread of diarrhoea in Poona it may be that they carry the infection to man not from the latrine so often as from their cradle of cowdung.

13. From the clinical accounts of Poona diarrhoea, which were supplied last April, it was impossible to suspect any known organism and in order that a clue might not be lost, it was thought best to avoid a search directed to the isolation of a definite pathogenic bacillus.

A study of the predominant organisms in each stool was suggested to us, but each case of diarrhoea in a small experimental series taken from a regimental hospital seemed to have its own predominant bacillus and a bacillus most numerous on one day might be altogether missed when a second sample was obtained. Even in a fatal case of acute bacillary dysentery an examination of the three most numerous organisms in the faeces during life and again in the intestine after death failed to discover the *B. dysenteriae* (Shiga) which existed in the liver in pure culture.

14. A consideration of the whole intestinal flora thus became necessary. Such a study naturally falls into two parts of which the first is a general study of the stools in health and in diarrhoea, to determine the organisms that occur in the special diarrhoea under consideration and the second part is directed to ascertain the relations which one or more specific organisms have to the disease.

In the latter part specialized methods are permissible and indeed imperative if a definite organism is being searched for, but in the general study it is probably best to have a wider knowledge of the general flora and to bear in mind that the number of times any one organism is found may be an under-estimate of its actual prevalence.

15. The examination of healthy stools, if a strictly fair comparison with pathological material is to be made, should proceed side by side with the examination of cases of diarrhoea; but early in our work it was found that a thorough study of the pathological material that came to hand taxed the resources of our staff to the utmost and our capabilities were limited by the number of test tubes a hardworking staff were able to clean and fill.

16. The procedure adopted was to plate portions of the stool, diluted with saline when necessary, on litmus lactose agar standardised to *plus* 10 acidity. Inhibitory agents such as bile-salt or crystal violet were omitted lest with aerial organisms the growth of those specific to the disease might be interfered with.

The details of the technique underwent modification as experience was gained and latterly the rule has been to examine two to ten plates from each sample. Each plate at the end of 24 hours is described and the colonies are classified as minute, small, medium and large; red, blue, clear, translucent or hazy. The approximate proportion of each class is noted as a decimal and from each class of colonies on the plate representatives are picked off and planted on agar.

17. These agar colonies our experience has shown should be replated to ensure purity and thereafter they are examined for motility, their power to retain Gram's stain, to produce indol and to ferment glucose, lactose, mannite, saccharose, dulcitol and glycerine. They are then classified in three large groups. The first group includes organisms which fail to act on all sugars. The second group with sixteen subclasses of which only seven are important includes all lactose fermenters, and the third group embraces those failing to produce gas in lactose, but giving acid and gas in one or more of the other sugars. Bacilli of the *alkaligenes* class fall in the first group. Organisms of the *coli* family fall in the second group, while all known pathogenic intestinal bacteria are included in the third. The selection of the sugars was made to facilitate the identification of the organisms of typhoid, dysentery and cholera and the known bacilli of enteritis.

18. Over fifteen hundred organisms have been studied, but without at present detailing results as these are of a somewhat academic nature and are being scrutinized and revised we may say, that no organism giving a novel group of sugar reactions has been found to be prevalent in Poona diarrhoeas but that Morgan's No. 1 bacillus, the Dysentery bacillus of Shiga and of Flexner and two unnamed fermenters of glucose and mannite and of glucose, mannite and saccharose respectively have occurred in forty-seven out of ninety-five cases and that the first three organisms, recognized as being pathogenic to man, have in certain cases agglutinated with the patient's serum.

19. In ninety-five cases of diarrhoea or dysentery an organism corresponding in morphology and in cultural reactions to Morgan's No. 1 bacillus was found sixteen times.

Of these sixteen cases ten had acute watery diarrhoea, five acute dysentery, and in one the patient, reported as a subacute diarrhoea, sent for examination a scybali stool covered with blood and slime. None of the cases had lasted for more than a few days, but one case which had acute diarrhoea had several relapses and was seen two months later suffering from acute dysentery. In case No. 103 the patient's serum on the ninth day of the disease gave a trace of agglutination in dilutions of 1 in 20 and 1 in 40, and a week later the reaction was well marked in 1 in 80 and showed to a slight degree in 1 in 200.

It is of interest to note that in four cases with blood and mucus in their stools and in two acute diarrhoeas Morgan's bacillus was associated with at least one other non-lactose fermenter; while in eight cases of

acute diarrhoea and in two cases of dysentery Morgan's No. 1 bacillus was the only none-lactose fermenter found.

20. An organism resembling Shiga's bacillus in morphology and in culture was found in sixteen cases. One case had been returned as cholera, though no cholera spirilla could be isolated from the stool and the patient made a rapid recovery. In seven cases the symptoms were those of acute diarrhoea and no mucus or blood was passed; in four others blood and mucus were present in the stool; in one more the stool was faecal and contained a considerable amount of slime; in two the stools were semi-solid, and, lastly, there was an ambulant case of dysentery who throughout his attack performed his duties in the barracks.

21. Organisms of the mannite fermenting or Flexner type of the dysentery bacillus were found in ten cases. In two cases the organisms gave an acid reaction in sorbite; the other eight resembled the true Flexner's bacillus. Six were cases of acute diarrhoea; in three others the stools were frankly dysenteric. One case of sub-acute diarrhoea proved on inspection to be passing blood and mucus. Two occurred in infants. The stool of one child gave Flexner's bacillus in pure culture and its serum agglutinated its own organism in a dilution of 1-80.

In no case have the Shiga and Flexner organisms been found together, though other observers have noted this association, but the Flexner bacillus has been found once with Morgan's No. 1.

22. Of the other non-lactose fermenters the two most important groups are those fermenting (a) glucose and mannite, type XXVIII, and (b) glucose, mannite and saccharose, type XXIX. The first class was found in seven cases and the second also in seven. In two of the twelve cases both organisms were present. One member of Type XXIX was found once in association with Shiga's bacillus in a case of acute dysentery and one bacillus of Type XXVIII occurred with a Shiga's bacillus in a convalescent case of diarrhoea. There seemed to be no clinical features to differentiate the cases in which these organisms occurred from those in which the better known organisms of the dysentery class were found, but we have not tested the serum reactions.

23. In spite of the kindly interest taken by all Medical Officers the epidemiological statistics that we have obtained are meagre and of doubtful value, but from one household the information was very suggestive.

The stool of a patient suffering from a sharp attack of acute dysentery yielded a strain of the bacillus dysenteriae (Shiga) which agglutinated with the patient's blood in all dilutions up to 1 in 400. The

Patient had come from England 10 months previously as governess to two children and since her arrival had had two attacks of diarrhoea and one previous attack of dysentery.

The previous attack of dysentery had occurred about 6 weeks before the present illness, had lasted only a day and a half and had coincided with slight intestinal disturbances in both the children. The present illness had begun two days after the head of the house had been attacked with griping pains and diarrhoea which laid him up for five days. The blood of the latter agglutinated the dysentery bacillus from the governess in a dilution of 1 in 100 and one of the children gave a partial reaction in 1-20.

Of the servants nine either cooked or served the food. The cook, the head butler, the masalchi and the bearer gave no response to the serum test. Two hamals, an elderly table boy and the children's boy gave distinct agglutinations in 1 in 20 and the children's boy a partial response in 1 in 50. Most of the servants had been for years in the household. Of those giving no serum reaction all declared that they had never had dysentery; statements, however, on which there can be no reliance.

Of the four giving serum reactions one admitted an attack of dysentery five years ago and a second informed us that he was just recovering from an attack and that his wife and child were now ill. There was no evidence to show that either of these servants were the active source of infection, but an enquiry into the household management elicited the information that milk after it had been boiled was placed in the charge of the European nurse and that the only servant who had access to it and who alone cleaned the milk vessels was the children's boy who as we have noted was one of the suspected four. The latter supplied one sample stool from which we failed to obtain Shiga's bacillus, but all requests for further samples were denied. Flies in this instance played no part.

24. It now remains to establish by serological methods the identity of the organisms that have been isolated and should the examination of healthy individuals now in hand show that the bacilli of the dysentery group are as rare in health in Poona as in healthy stools in other countries the way will be clear for the more specialized study of these infections which, it is hoped, will be carried out next season.

25. Though this is but an interim report it is our pleasant duty to acknowledge the help we have received from the Medical Officers, both

Civil and Military, in Poona and to thank them for their encouraging interest in our work and for the valuable suggestions we have from time to time received.

Our Contemporaries.

MEDICINE.

Tuberculin and Immunity.

BY

JOHN WM. TAYLOR, M. D.

IN the new Insurance Act tuberculosis, especially, pulmonary tubercle, is a marked feature, and as the study of tuberculin treatment is prominently before the profession at the present time, a brief consideration of some explanations of its action, as they strike a general practitioner, may prove of interest; but in this matter, and not only in questions of mere detail, medical men are by no means of one mind.

Let us first briefly consider some of the theories which underlie this application of vaccine therapy. It may be that there are still some practitioners who are not quite clear as to the difference between a "serum" and a "vaccine."

Serum Treatment.—This form of treatment is most clearly illustrated and seen at its perfection in the case of diphtheria antitoxin, which is produced in the horse in response to injections of diphtheria toxin. It is accompanied by an increase of globulin content in the serum and diminution of the albumen content as the globulins rise.

Later investigations have made it possible to concentrate the globulin content—containing the antitoxin—by precipitation, and to diminish the albumens in the antitoxic serum.

On injecting the diphtheritic antitoxin the form of immunity produced is termed "passive immunity," as the tissues of the infected animal do not, themselves, form the antitoxin, which is introduced from without. It is maintained by some that the toxin, when neutralised by antitoxin, can stimulate the tissues of the infected animal to form antitoxin.

The antitoxin has no direct action upon the bacteria, although when the toxin they produce is neutralised, they tend to disappear.

The danger of serum disease (anaphylaxis) from repeated doses of serum, administered after a certain time, is the great drawback to all

treatment by sera. This is due to the foreign albumen contained in the serum, and is not a part of its antitoxic character.

The effects of diphtheria antitoxin are well known, and its results in the treatment of diphtheria of the highest value, but unfortunately the value of antitoxin is mostly limited to diphtheria; with tuberculosis we are dealing with quite a different order of things. Diphtheria toxin is an extra-cellular or secretory poison; the poisons of tubercle, though possibly in part secretory, are now generally believed to be of the nature of endotoxins or intra-cellular material.

Vaccine Treatment.—Whether bacillary bodies contain protein material apart from their endotoxins has not yet been definitely proved. In all bacterial bodies after removal of toxins and endotoxins a certain protein residue is said by some to remain. The nature of this residue has been called by Buchner "bacterial protein." The nature of the bacterial proteins is by no means clear, and it is doubtful whether the separation of these substances from the endotoxins can be upheld. It has been found that extracts from various dead bacteria possess ferment properties in excess of those manifested by the same organisms when living.

T. A. (Tuberculin Koch) is protein material obtained from pure cultures of tubercle bacilli, with extractions from the bacillary bodies. T. R. consists for the most part of extracts from triturated bacillary bodies. T. O. prepared from culture fluid represent a germ-free filtrate of T. B. cultures in bouillon, containing exo-toxins only. Bacillary emulsion (B. E.) represents a certain quantity of triturated T. B. in 8 per cent. saline solution, the bacilli distributed by shaking and centrifugalization, the supernatant fluid forming a very fine emulsion. A dose of tuberculin injected into a normal person, that is to say a person never having suffered from tuberculosis, usually produces no reaction; some individuals give a reaction who are not tuberculous, and in advanced cases of tuberculosis no reaction occurs. But if injected into an individual who is suffering from tuberculosis, or has in the past suffered, what is known as "a reaction" occurs. This reaction may be focal and general, or focal only, or general only.

To what is the reaction due? The generally accepted explanation is as follows: Tuberculin is a foreign albumen, and when a foreign albumen is introduced into the body tissues at the first no reaction occurs, but the formation of "lytic bodies" (hyper-sensitiveness) takes place. These "lytic bodies" are ready to split up any further amounts of the specific foreign protein that may be introduced later; by such action the foreign protein is made more toxic, and the reaction occurs.

This explanation applies also to auto-inoculation phenomena. Within favourable bounds the result of the reaction is limited to such an amount of increased tissue reaction around the focal lesions as may cause sufficient hyperæmia to carry increased amounts of antibodies in the serum and so favour healing; but in the production of the form of immunity aimed at in the treatment we are dealing with bacillary lysis—the breaking down of tubercle bacilli, and the liberation of endotoxins (tuberculin) in more or less unmeasurable amounts—the production of more tuberculin than very often is good for the patient, and added to any auto-inoculation that may already be in action.

In administering tuberculin, in whatever form, we are using a toxic compound, or what will become a toxic compound by lysis, in the hope that the reaction may be well within bounds, beyond which the possibilities of evil are limitless.

It appears then, from the first, that tuberculin treatment is not to be entered upon inadvisedly. What indications are there to mark the way? They are few and uncertain. The agglutination test is not entirely satisfactory. The fixation of complement test has often failed to be of any value. The opsonic test index is certainly the best, though laborious. The worst test of all is the production of reactions. Sahli is very emphatic in his statement that tuberculin dosage should be so regulated that as far as possible both focal and general reactions are avoided, and further, he says, "But I am absolutely opposed to diagnostic tuberculin injections." He decides that no definite conclusions can be drawn from either a negative or positive result, but apart from this he considers the risk sufficient argument for their rejection.

Hyslop Thomson, in a recent work, suggests 0.1 cc. of either tuberculin diluted with a 30 per cent. solution of glycerine in water as an initial dose, and a rise of not less than 1° F. to be regarded as a diagnostic reaction. If no reaction, then after fourteen days 0.2 cc. If this fails, further doses may be given at intervals. It is commonly considered that these amounts are entirely unjustifiable.

The important point to bear in mind when considering the use of tuberculin in fairly large doses for diagnostic purposes is (1) the large percentage of persons in these latitudes who at one time or another have been tubercular. Nageli and Burckhardt have proved the presence of small tubercular foci in nearly every adult body, healed in ways which were not clinically perceptible. As it is almost impossible ever to say during life whether a lesion is absolutely cured or not—the finding of T. B. in sputum not always obtainable—the test of a large dose

of tuberculin may, in many cases, light up a quiescent lesion and result in disaster.

Many cases discovered by skilful diagnostic methods may be doing very well, and to interfere by inoculations may be meddlesome and dangerous.

Several forms of *serum treatment* for tuberculosis have been put forward by various workers. It is probable that antitoxin is concerned in the cure of tuberculosis, but antitoxin has its chief use in diseased conditions caused by exotoxins; the general opinion now is that endotoxins are the poisons chiefly concerned in tubercle, and antitoxins for such toxins are formed in the tissues locally, and are not present in any large quantities in the serum, and so phylogenetically adapted to local defence. The question of histogenous immunity may have some bearing upon the question. It appears that the path of active immunity, though a "thorny" one, is the correct one to follow.

Spengler produces what he calls a solution of the tuberculosis immune substances (Immune Körper) which he calls I. K., by inoculation, intra-muscular, of virulent cultures in rabbits. He also adds "pus exciters and other bacteria found in association with tubercle bacilli."

After testing, the blood is collected in a vessel containing an acid-carbol-sodium-chloride solution. He considers the presence of lactic acid prevents anaphylaxis. He claims that the serum contains both lysins and antitoxins, that I. K. produces passive immunity, and, as a secondary action, active immunity; the active immunising agents being formed in the patient's body by the action of the antitoxins upon the toxins, the toxophore groups being neutralised, these neutralised toxins possessing the power of stimulating the production of immune substances. Opinions are divided as to the efficacy of this form of treatment. Many authorities consider I. K. to be inert. Roepke concludes that the results obtained with I. K. treatment at Davos are due to Alpine climate only.

Some practical considerations.—Tuberculin used in apyretic and early cases is of value. Very careful recording of temperature per rectum is indispensable. All reactions should be studiously avoided—very small doses used in the first instance.

A mixed infection is a contra-indication.

The diagnostic use of tuberculin as an injection is dangerous.

The tuberculins of most value are those containing extracts of bacillary bodies. Sahli highly recommends tuberculin Beraneck, T. Bk.

Tuberculin possesses no direct healing power, and its application is different in principle from that of a true specific.

The presence of T. B. in the sputum is the only true and pathognomonic sign of pulmonary tuberculosis in the living.

A very large number of individuals possess cured tubercular lesions which have never caused recognisable clinical symptoms. Up to the present the only method of treatment attainable is that of active immunity, the all-important feature being the capability of the body tissues to react (power of resistance).

It appears that in many cases the use of tuberculin is unwarrantably in advance of the present state of knowledge of the problems of immunity.—*The Bristol Medico-Chirurgical Journal*.

Catarrhal Jaundice : Treatment of.

The use of water as a diuretic, two large glassfuls being taken in the morning on rising, and that of cold enemas, administered twice daily to stimulate the flow of bile, are urged by the author. Where the cold enemas are objected to by the patient, tepid enemas may be employed.

Since putrefactive processes in the intestine may play a role in the production of the condition, an antiseptic such as benzonaphthol, 15 to 23 grains (1 to 1½ gm.) daily, should be prescribed from the outset. After a period of some days, varying according to the intensity of the jaundice, but averaging about a week, calomel may be given in doses of 3 to 7½ grains (0.2 to 0.5 gm.) in the morning before breakfast, repeated every three to five days. The author believes this drug preferable to the saline purgatives sometimes recommended.

If upon using the calomel, or even before, the stools begin to show a return of color, bile extract, 4 to 6 capsules daily, will often give decidedly gratifying results, increasing the biliary discharge into the intestine and hastening the disappearance of the jaundice. Where the condition is accompanied by symptoms indicative of injury to the liver cells, such as haemorrhage, pills each containing 4 grains (0.25 Gm.) of liver extract should at once be started; 4 to 8 may be given daily.

At the termination of catarrhal jaundice, *i. e.*, in the third or fourth week, hexamethylenamine and sodium salicylate may be prescribed to keep up antiseptics of the biliary tract. These drugs are also indicated earlier in the course of the disease if there is fever suggesting the presence of infection. The former may be given in cachets in doses of

from 23 to 45 grains (1.5 to 3 gm.) daily, the latter either by mouth or rectum, 30 to 45 grains (2 to 3 gm.) a day.

In some cases the liver remains congested and enlarged after the jaundice has disappeared. The beginning of a chronic hepatitis or of cholelithiasis is then to be feared, and the patient should be ordered to drink Vichy water before each meal, and if practicable to make a sojourn at some watering-place in the succeeding summer. Instead of the Vichy water, the following combination, advocated by Bourget, may be taken in doses of 1 wine glassful an hour before each meal:—

R Sodium bicarbonate, pure, 3ij (8 Gm.) Sodium phosphate, anhydrous, 3j (4 Gm.)

Sodium sulphate, anhydrous, 3ss (2 Gm.)

M Sig: To be dissolved in a quart (1 liter) of cold boiled water.

Patients should be restrained from returning to their avocations too soon after convalescence, and should be seen again a few weeks after apparent recovery.

In prolonged catarrhal jaundice the same measures should be continued. If the biliary obstruction then gradually disappears the diagnosis is confirmed; if not, the presence of some more serious condition, such as lithiasis or neoplasm, should be thought of, and the symptoms of these carefully examined for.

Pruritus in jaundice may be combated by washing the surface morning and evening with hot water containing alcohol, vinegar, or a little phenol, followed by the application of inert powders or an ointment of zinc to which a little menthol has been added. Small doses of thyroid substance internally have been advised by Gilbert and Herscher. Hemorrhage requires the administration of hepatic substance and calcium chloride.—*Monthly Cyclopædia and Medical Bulletin*.

The Effect of Altitude in Heart Disease.

By

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ONE of the troublesome questions which every physician who advises change of altitude to a patient is: How will this change affect some member of the family who has some affection of the heart?

This subject may also become a matter for serious consideration in regard to the question of who should or should not engage in aeronautics. Probably some of the aeroplane accidents have been due to inability of

the operator to control the aeroplane at high altitudes on account of dilatation and lack of compensation of the heart, thus inducing syncope and inability to control the machine.

Dr. Loomis, in 1886, wrote a paper giving several fatal results following improper ascent to even moderate altitude on the part of patients with organic heart disease. For the purpose of making the discussion clear and exact we will assume the altitude in question to be from four thousand to ten thousand feet, and will consider the principal cardiac diseases which may present themselves for our decision.

I. *Cases of Valvular Disease with sufficient Cardiac Enlargement or Derangement of the Circulation to permit of a Positive Diagnosis.*—While a great difference in risk in such cases must be admitted, in accordance with the age, degree of compensation, etc., it is safer to forbid the change to such patients, for we know that in any case, even at sea level, compensation may suddenly cease, and of course this is more liable to happen in a change of altitude of four thousand or more feet.

II. *Cases of Chronic Myocarditis or Fatty Cardiac Degeneration.*—These should be rigidly excluded, and are the cases about which most care should be exercised. They are the ones among which there occur sudden fatalities as the result of apparently slight variations from the dull routine of daily life. A sudden change of the conditions under which the heart is laboring arrests its action altogether. This change may be one of atmospheric pressure, of nerve influence, a sudden shock or excitement, mental or physical.

Many of these cases on superficial examination have been declared sound, chiefly because no cardiac murmur was discovered, when a more careful examination would have resulted in a probable diagnosis of the above-named conditions. A careful examination should always be made of the area of cardiac dullness. It will often be found enlarged in cases of chronic myocarditis. The character of the first sound at the apex should be carefully studied. A very valvular first sound, an almost complete loss of the booming muscular quality, with a weak or irregular pulse, in a man who is no longer young, especially in connection with the subjective symptoms, points to myocarditis or fatty degeneration. Breathlessness on slight exertion, with a feeble, irregular pulse, are strongly confirmatory signs. This is a variety of case which it is much more important to keep away from high altitudes than even those of valvular disease.

III.—*Cases presenting a Murmur anywhere in the Cardiac Area, but in which no symptoms have ever been present, and which on physical*

examination show no evidence of Myocardial Disease.—This type of murmur is fast losing the undue importance which it has held for many years, and falling into its proper place as one link in the chain of evidence. Even insurance companies accept some applicants with cardiac murmurs. Patients with systolic murmurs which are known to have existed many years without any enlargement of the heart or any alteration in its normal sounds, may be allowed to proceed to high altitudes.

Patients with diastolic murmurs, however, are to be advised against such an ascent, as these murmurs are more surely indicative of serious organic disease.

IV. *Cases of Nervous Palpitation.*—Patients with functional palpitation cannot all be considered in one class. In many the condition is temporary, being due to errors in diet or mode of life which can be easily corrected. When these errors have been rectified there can, of course, be no objection to high altitude. Affections of this kind, due directly to morbid conditions of the nerve-centers, may be divided into two classes: (1) that of patients who are naturally possessed of a nervous temperament, and (2) those who are nervous from malnutrition. The latter are likely to be improved by and may be recommended to try high altitude; but the former, those of inherent nervous temperament, are usually made worse by it, and consequently should be forbidden high altitude.

A question which now naturally suggests itself is: Why and how does altitude affect the heart?

The immediate cause of dyspnoea and cardiac failure may, I think, be traced to diminished pressure on the heart walls and their consequent dilation. At sea level the external atmospheric pressure exerted against the interior of the lungs is equal to that of a column of mercury 760 mm. high. It distends these organs, and pushes them against the chest walls, heart, great blood-vessels, and other thoracic contents. The pressure thus exerted on the heart is not equal to that of the external air, since the elasticity of the lungs, equal to a column of mercury 6 mm. high, has first to be overcome. Hence, the actual pressure on the heart and great vessels is equal to 754 mm. of mercury. Now, how is this pressure changed at an altitude of ten thousand feet? The pressure of the external air at this altitude is equal to 501 mm. of mercury. The pressure, then, on the lungs and body would be lessened. There would be a slight fall in blood-pressure. But this is only temporary, for, the circulatory apparatus being a system of closed tubes, it is but little if at

all affected, and the blood-pressure soon rises to normal, owing to increased vasomotor action. There would be no increase in negative intrathoracic pressure. Finally, the only organ affected at moderate altitudes would be the heart, and this for the following reason: as we have said, the normal atmospheric pressure on the heart at sea level is 754 mm.; at an altitude of ten thousand feet it would be 501 mm.; minus 6 mm. due to the elasticity of the lungs, or 495 mm.—a difference of 259 mm. Now, the arterial pressure and therefore the intracardiac pressure would be the same as when at sea level, or 754 mm. Only one result could follow these conditions, and that would be a stretching and dilatation of the heart walls, especially on the right side, as these are the thinner; and this is precisely what is found in many who go into high altitudes. It is not so noticeable in the case of strong, healthy hearts; but in those organs that are already weak and diseased before the change is made we find that they are unable to stand such strain as is put on their dilated walls. Thus occur the murmurs, syncope, and dyspnoea which are so often marked in high altitudes.

Now, what is the physiological effect of the diminution of pressure?

1. There is greater or less dilatation of the great veins, with consequent increased blood-flow from the periphery and a probable increase in the capacity of the right heart.
2. There is a dilatation of the thin-walled pulmonary vein, for there is but little positive pressure within its walls, and want of pressure would immediately be felt.
3. On the other hand, the pulmonary arteries are practically not affected, two factors contributing to this, *viz.*, their comparatively thick, unyielding walls, and the abnormal positive pressure.
4. The left heart is not affected by the diminution of pressure on account of its thicker and stronger walls.

The increased capacity of the right heart, owing to the increase in the blood going to that side, would cause an increase in the capacity of the pulmonary veins, then an increased flow of blood through the lungs and to the left heart, and hence an acceleration of the heart rhythm and an increase in the blood-pressure which would immediately cause dilatation or failure of compensation in a weak heart subjected to a lessened external pressure.—*Monthly Cyclopædia and Medical Bulletin.*

Hemiplegia in Typhoid Fever.

J. M. PRARSON.—Hemiplegia occurring during typhoid fever is a sufficiently rare event to warrant the publication of additional cases when possible. The most exhaustive article on the subject is that by Smithies, published in 1907. He there reports and tabulates forty-three cases reported in the literature to that date. More recently Williams reports four cases in addition.

The main features of my case are as follows: W. P., a Scandinavian, aged thirty, was admitted to the medical service at the Vancouver General Hospital on September 16th, 1911, having been ill for a week. The diagnosis of typhoid fever was confirmed by a Widal reaction. For six days the disease ran a mild course, the temperature gradually declining. On the evening of the twenty-second, he was slightly delirious and had an involuntary action of the bowels. He slept well that night. When roused at six o'clock next morning (fourteenth day of illness) for nourishment, he had difficulty in swallowing, and two hours later the left arm and leg were found to be paralyzed. The patient was conscious, rational, and able to speak. On the twenty-fifth he swallowed his food more easily and there was some evidence of returning function in the leg. During this time the temperature had been rising to a maximum of 104°, pulse 108. On the twenty-eighth he had a large hæmorrhage from the bowel, followed during the next two days by six others. He died on October 3rd, on the twenty-fourth day of illness and the tenth after the onset of paralysis, having been unconscious for some hours.

A complete autopsy was made by Dr. Cumming, assistant pathologist to the hospital. The usual signs of typhoid fever were present in the abdomen, the heart was normal. The brain, after removal, was found somewhat flattened over the right parietal region, in which area there was also slight thickening of the meninges. On section, a softened place was found on the right side involving the greater part of the second and third frontal and the ascending parietal convolutions, part of the supra-marginal and angular gyri and the upper part of the temporo-sphenoidal. In size about that of a small orange, this area was of a dirty yellowish-grey colour and very soft. There was no cavities. The left side of the brain was normal, as were also the basal ganglia and internal capsule on both sides, the cerebellum, pons and medulla.

The right middle cerebral artery was found to be completely blocked for about one inch after entering the sylvian fissure. The artery was thickened and its lumen filled with a firm semi-fibrosed substance

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adherent to the walls. The thrombus began at a point beyond the arterial radicals, going to the anterior perforated spot, and extended a short distance into each of the terminal branches of the artery.—*The Canadian Medical Association.*

Elephantiasis and its Treatment.

Although too lengthy for review here, Daniel's paper and those following it on the discussion of lymphatic diseases in the tropics are worthy of note. There were the usual arguments for and against Manson's view that filariæ are the cause. Daniels, who favours it, points out that we need not assume that all cases of elephantiasis are produced in the same manner by filariæ, and draws attention to subsequent bacterial invasion, which may cause acute lymphangitis, and may even cause the death of the worm. Manson's view that the eggs are really at fault is rejected by Havelock Charles, but it is scarcely necessary to enter here into all the points of the discussion, which can only be profitably studied "in toto." In the light of one of Daniels' hypothesis, a paper by Dufongere is of interest. He, like Le Dantec, found not only fragments of the dead bodies of filariæ in the blood, but also a coccobacillus, the lymphococcus of Le Dantec, which it is believed kills the filaria. It is the dead bodies of the embryos, which, according to Le Dantec, block the lymphatic vessels, and give rise to the symptoms of elephantiasis. The lymphococcus alone cannot produce lymphangitis. Handley has also recorded a case of lymphangitis of the thigh and scrotum in a man who had never been out of England, and in whose blood a dislococcus was found. From this a vaccine was prepared, the administration of which rendered the blood sterile, and possibly contributed to be good results obtained by lymphangioplasty.

Foulerton and Wittingham discuss the significance of coccal infections associated with elephantiasis, and cite the above case, in which they proved the diplococcus to be the *Micrococcus pyogenes albus*. Discussing Dufongere's work (loc. cit.), they think his lympho-coccus may be identified with the *Micrococcus pyogenes albus*, and they are not prepared to accept Le Dantec's view, as above stated. They regard the added coccal infection as merely a casual incident in the course of the disease, even when, as in Handley's case they succeeded in finding it in the deep lymph of a limb affected by elephantiasis, at a time when no cutaneous lymphangitis was in active progress. They rather regard it as a residual infection, after a previous attack of cutaneous lymphangitis. An interesting paper is that of Brochard, who had an opportunity of studying the disease among an isolated island population of

about 4,000 persons. The main facts he adduces are the notable frequency of elephantiasis arabum on the Wallis Islands, the absence of diseases which are certainly filarial in origin, the abundance of cases of superficial abscess, and inguinal adenitis, and the brevity of the attacks of elephantiasis. The author in certain cases found sheathed microfilarizæ in the blood, but neither he nor his predecessor ever encountered adult filariæ in the islands. On this and on the clinical grounds mentioned, he concludes that the elephantiasis of the Wallis Islands, which appears to be quite typical, has nothing to do with filariasis, and inclines to the belief that both it and the suppurative and inflammatory condition occurring along with it are due to some micro-organism which has its habitat in the soil. Low, still continues a supporter of the *Filaria bancrofti* theory. Portions of his paper may be quoted here.

After dealing with some of the apparent fallacies, he says:—

The proof of the pudding lies in the fact that where filariasis is common, elephantiasis is common; where filariasis is rare, elephantiasis is rare; where filariasis is absent, elephantiasis is absent, or at most is represented by a spurious case from time to time, due to chronic erysipelas, tumours, or some other cause than the filaria. Lastly, if filarial lymphangitis is admitted to be due to *F. bancrofti*, then elephantiasis must also be admitted, because one can trace the former step by step by insensible grades into the latter.

Again, speaking about the commencement of the disease, he quotes Corney, of Fiji, who writes:—

Elephantoid fever is, in my experience, an essential condition in the production of true elephantiasis, and it occurs sooner or later in a large majority of cases of varicose groin glands. Daniels refers to cases of elephantiasis without any pain or febrile attacks; these I imagine to be very rare, and may possibly correspond with the cases of elephantiasis occurring in nonfilarial countries. And then continues:—

My experiences are similar; in the vast majority of cases the usual history is for the patient to have suffered previously with attacks of filarial lymphangitis, a little permanent thickening remaining after each, till a stage is reached when one calls the condition elephantiasis. There is no necessity to record such cases, therefore, but those rarer ones, quoted by Daniels and Manson, where the disease goes on after a single attack, or after none at all, without pain, are of extreme interest.

Records of cases of this kind are given, and their pathology is discussed. Amongst other points raised he states that:—In the ordinary

cases of elephantiasis every one is more or less satisfied that the filaria *per se* does not cause the condition; organisms apparently also help, and of these the streptococcus is the one most likely to assist. The absence of embryos from the blood in elephantiasis is easily explained by the pathological lesions found—the adults are dead, and there are no embryos, therefore, to find their way into the blood. In heavily infected countries it is quite feasible that such a case should get reinfected with filaria—the adults inhabiting some of the lymphatics in a different part of the body—and in that case embryos will again appear in the blood. I have noted this in several instances in St. Kitts, a heavily infected area. Post-mortem examinations in many instances do not help one much, as if the case is one of long standing, age will have obliterated many of the characteristic changes that must have been present when the lesion started. Similarly, the dissection of elephantoid limbs, apart from showing the usual pathological lesions of thickening, hypertrophy, and solid œdema, do not reveal the etiology of the production of the condition.

I carefully dissected four elephantiasis legs removed by operation in the West Indies, but found nothing to account satisfactorily for the condition present. In leaving the pathology and etiology of elephantiasis, and some of the other filarial manifestations, then, one must admit that there are many points by no means clear, or definitely settled. Extended work is required for the solution of the different problems presented.

Turning now to the treatment of the condition we find Castellani again expatiating on his very excellent method of fibrolysin injections and bandaging. As this is now to be found in his own and other textbooks, we need not enlarge upon it here. It is a palliative measure, and his conclusions regarding it are:—

(1.) The treatment I have devised for elephantiasis—thiosinamin or fibrolysin injections and methodical bandaging, followed by removal of portions of the redundant skin when most of the fibrous tissue has been absorbed—is of utility in a certain number of cases.

(2.) The treatment has generally only a slight and temporary effect in recent cases, when the disease is in the acute stage, with frequent attacks of filarial fever.

(3.) The treatment gives much better and more lasting results in old-standing cases, especially in those of the verrucose type, characterised by the enormous neoformation of fibrous tissue and absence of fever.

(4.) On the mode of action of the treatment I am not yet in a position to give a definite explanation. A partial explanation may,

perhaps, be found in the well-marked, though transient, leucocytosis which generally follows each thiosinamin injection.

ADDITIONAL NOTES.

Although he admits his personal experience of the disease is somewhat limited, Shattuck has undertaken a review of the literature, and summarises his conclusions regarding the vexed question of etiology as follows:—

(1.) The essential characteristics of typical acquired elephantiasis are lymphangiectasis, hyperplasia of connective tissue, and chronic œdema.

(2.) The relation of these to each other in the production of elephantiasis is not clear.

(3.) It appears that these changes may frequently be attributed to the interaction of stasis and of inflammation.

(4.) Stasis always occurs early and persists.

(5.) Inflammation may precede or follow stasis, or may not be manifest at any stage of the disease.

(6.) Inflammation, when present, may be acute or chronic; and is generally traceable to bacterial infection.

(7.) Either chronic stasis or inflammation from any cause may predispose to elephantiasis, but even when they occur together elephantiasis does not always result.

(8.) There is reason to suppose that congenital weakness or anomalies of lymphatics may play an essential part in the production of some cases of elephantiasis, and that such weakness or anomalies can be inherited.

(9.) The filaria is an important factor in the production of endemic elephantiasis of some regions, but it is not essential to the occurrence of endemic elephantiasis.

(10.) Elephantiasis in filarial regions results indirectly from filariasis through bacterial infection.

(11.) Sporadic lymphatic elephantiasis and endemic elephantiasis are not essentially different.—*The Medical Times*.

Vertigo from the Standpoint of the General Practitioner.

BY

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Vertigo consists in a disturbance of equilibrium together with a complex of some or all of the following symptoms: Tinnitus aurium, obscuration of vision, flicker scotoma, transient hemianopsia, nystagmus,

nausea and vomiting, vaso-motor derangement, numbness and other paresthesiæ. It is called *subjective* when the vertiginous motion seems to belong to the patient, and *objective* when the disturbance appears to depend upon unnatural and contradictory movements of external objects. Either form may occur alone or both at the same time, occasionally accompanied by a feeling of compulsion.

Vertigo must always be regarded as a disturbance of the vestibular nerve as related to the semi-circular canal and as connected with the cerebellum as well as with the centers of consciousness.

Since appreciation of our location in space is so largely dependent upon hearing and seeing, it is no matter for surprise that a consciousness of disruption of equilibrium should be subjectively related to the apparatus either of vision or audition. This impression is not inconsistent, for there can be no doubt of the fact that vertigo is, in the majority of cases, merely a symptom of disease, located primarily in the apparatus of seeing or hearing.

When we recall the complicated arrangement of innervation by means of which we maintain our orientation, it will be understood that derangement of this faculty may depend upon a great variety of factors, varied in kind and in location, the only essential being that untoward impressions must reach some neurone whose concern it is to contribute to our realization of balance and our relation with place. Thus it is that vertigo is a manifestation of central nervous disease; and thus it is that it may owe its inception to intoxications, or to derangements of circulation, abnormalities that start remote from the brain, but which necessarily reach the central nervous system and touch, directly or indirectly, the vestibular nerve.

Circulation.—While not always a consistent part, vertigo may be associated with the symptom complex of syncope or fainting, and apparently depends upon disturbance of circulation in the vessels of the semi-circular canal. As this result may follow an insufficiency of the blood supply, so, conversely, it may depend upon an excessive supply of blood, or congestion of the vessels of the central nervous system. In these facts we have a ready explanation for the appearance of vertigo in patients who suffer from functional or structural disease of the heart, or blood vessels, from aneurism, or other tumors pressing upon the superior vena cava or the great venous branches coming from the head, or from any other disease offering obstruction to the return flow of blood. A similar result may accompany pulmonary emphysema, asthma or other thoracic diseases which impede the flow of blood through the right side of the

heart. The symptoms, with slight or moderate degrees of intensity, follow the relative cerebral ischemia which occurs in victims of aortic insufficiency, advanced aortic stenosis and, especially, degeneration of the myocardium. Sufferers from these conditions become accustomed to giddiness which follows mental or physical activity, and which is occasioned by lack of arterial blood, sometimes coincidently with the excess of venous blood, at the cerebral centers. In such, the disturbance in equilibrium, while greater in some patients than in others, is rarely severe and is obscured by the more striking sensations of weakness and failing consciousness which belong particularly to syncope. When the patient is called upon to analyse his sensations, he will usually admit that giddiness or loss in the sense of equilibrium constitutes a part of the experience.

Vertigo frequently accompanies tachycardia, probably because, with the incomplete systole, the column of arterial blood is poorly sustained, with resulting disturbance in nutrition at the center of balance. A similar experience accompanies certain cases of arrhythmia, whether the latter depends upon auricular fibrillation or upon extra-ventricular systole. It occurs in a pronounced form in the bradycardia of partial or complete heart block. This obstruction to circulation, which sometimes leads to sudden loss of consciousness from syncope, may at other times show itself in marked giddiness, and this may continue until the conductivity through the His bundle is temporarily improved.

There is a severe type, usually seen in young people, which from the manner of its evolution, is called epileptic vertigo, although it is unaccompanied by the ordinary seizures of epilepsy.

Hysteria.—In some instances of hysteria, vertigo appears to result from direct over-sensitiveness of the labyrinth, and in other instances it is induced indirectly through circulatory derangements which the hysteria excites. It may occur with throbbing vessels, flushed face and mental excitement; or with great depression of circulation, an algid surface, and the general appearance that suggests syncope. Very often this is associated with a visceral crisis, hysterical in nature.

Visceral Disease.—Certain abdominal affections, without the intervention of toxemia, and apparently without hysteria, may give rise to disturbance of equilibrium, usually moderate in degree, amounting merely to unsteadiness and sometimes rising in intensity so as to produce intense giddiness. This occurs, for instance, with enteroptosis and, especially, with floating kidney. The symptom is felt when the upright posture is assumed and quickly subsides upon lying down; it is apparently associated with low blood pressure, which becomes yet lower when the patient stands. Irritation of the pneumogastric or the

splanchnics may be in a measure responsible for this. Occasionally it accompanies renal or biliary calculus, but in these instances the element of auto-intoxication cannot be wholly excluded.

Auto-intoxication.—There is a well-fixed doctrine that vertigo is a common symptom of disease of the liver, stomach and intestine. A certain amount of giddiness or unsteadiness is, indeed, frequently experienced by patients suffering from various disorders of these parts, yet, in my experience, it is very unusual to see an attack of true vertigo, fully developed, depending upon such causes. Exceptionally, however, it does occur, and is sometimes violent in character.

Complex Causes.—In all of these cases there is a liability to error in attributing the vertigo solely to the abdominal disturbance, when in point of fact there is at the same time an undiscovered disease, directly or indirectly involving the semicircular canal. Before attributing an attack of vertigo to the liver, a most exhaustive search should be made for cerebral, middle ear, or labyrinthine disease, or some affection of the ocular apparatus. Granting that there is over-sensitiveness of the vestibular nerve, it may require merely an additional disturbance of its nutrition, which may be found in intoxication or in disturbance of the circulation, to lead to a fully developed attack of vertigo,—a vertigo which would not develop from slight sensitiveness at the centers of equilibration, unaided by the extrinsic or abdominal disturbance.

The Liver.—Having thus propitiated the criticism that is likely to follow the ensuing statement, I am now prepared to say that I have seen intense and repeated vertigo which I believe to originate solely in functional disease of the liver. The matter can be best understood from a brief description of a case.

A man of fifty, of excellent habits, leading an active life, suffered from a sudden and severe attack of vertigo which necessitated his lying down and remaining so for several hours. A thorough physical examination revealed a moderately enlarged liver, the lower border of which extended nearly two inches below the free border of the ribs. The eyes and ears were carefully examined, but this contributed no additional cause for the vertigo; an auto-intoxication was supposed to accompany the hepatic derangement. The urine, taken during the attack, was highly acid, but was free from bile-coloring matter and urobilin. Six months later came a second attack, and since then three others, all of them violent, and lasting from five or six to twenty-four hours; occasionally accompanied by vomiting and pallor. There was very little, if any, tinnitus; on one occasion the liver was tender upon pressure. For

the past year he has been exempt from trouble and attributes this relief to the systematic taking of glycocholate of soda.

We often encounter giddiness as an accompaniment of cholemia, yet it may occur, even without jaundice, in temporary congestion of the liver, associated with constipation, especially after indiscretion in eating or drinking. It would seem to be an over-statement to class such symptoms with true vertigo, although doubtless there is a disturbance of the realm in which vertigo dwells. I have seen no vertiginous symptoms more severe than these to result from dilatation of the stomach, or any other gastro-intestinal condition, except in those individuals who have definite local irritation of the labyrinth or eye strain.

Unknown Causes.—A colored woman of 40, referred to me by Dr. Smallman of Ellicottville, has suffered for years from Meniere's syndrome, with the exception that tinnitus is absent. The symptoms never reach the violence of true Meniere's disease. She presented no stigmata of hysteria, and careful examination appeared to exclude disturbances of circulation or the presence of auto-intoxication. The aural examination by Dr. Fairbairn revealed an oversensitive state of the labyrinth, but not enough to demonstrate local disease. Dr. Francis found a moderate degree of uncorrected astigmatism. The case was not satisfactorily explained notwithstanding exhaustive examinations. This illustrates the fact that vertigo may depend upon unknown causes.

Renal Disease.—Giddiness of moderate degree often results from renal inadequacy; fully developed vertigo is an occasional manifestation of uremia, as it may be of other severe intoxications, caused by diseases such as diabetes, cirrhosis of the liver, hyperthyroidism, etc. Vertigo is an occasional symptom in that group of disturbing factors producing high blood pressure. It is rather difficult to say how much of this depends upon an auto-intoxication, how much upon the high blood pressure, and how much upon an accompanying arterial change.

Arteriosclerosis.—Arteriosclerosis alone or associated with senility may produce vertigo, which sometimes is almost continuous. Such states are doubtless the result of interference with circulation in the brain, and, therefore, are outside the privilege of this paper to discuss.

Gastric Vertigo.—I am not convinced of the importance of so-called "gastric vertigo"; at any rate it does not seem to me that it should be described as a special type. Most cases which have been referred to me were ultimately shown to depend, at least in part, upon some other source of disturbance. Less intoxication results from stomach than from intestinal diseases. When vertigo depends upon the stomach, it is

usually because of secondary effect upon the heart and the vasomotor nervous system.

Sénès of Paris, discussing this subject, reports that of 828 patients suffering from stomach trouble, 55 complained of gastric vertigo, but in 30 of these the symptom was traced to aural defect, renal disease, arteriosclerosis, or tabes. In 15 it was dependent upon neurasthenia, intoxication, circulatory disease or gout. In only ten did the dizziness appear to arise from dyspepsia, and possibly in some of these it depended upon the stomach.

Sénès fails to state in what proportion of these cases the vertigo results from eye-strain, which is in accord with the views of most Europeans on this subject. The majority of cases of so-called "gastric vertigo" which I encounter are not completely relieved until ocular errors are corrected.

Cecal Stasis, or "Cecum Mobile."—Cecal stasis even in the absence of enteroptosis, or "cecum mobile" (as demonstrated by radiograms), is sometimes the source of persistent giddiness. This disappears when the cecum regains the proper motor efficiency. Probably coprostasis, with subsequent intoxication, is the source of the vertigo.

Gout.—Gouty patients may suffer from vertigo, representing one of the group of symptoms which precedes or presages an arthritic attack. It is also a familiar symptom in those who escape acute podalgia but suffer from so-called sub-acute gout, or lithemia. More often in those past middle-age who have neglected customary out-door exercise and who have too much indulged the craving for proteid food, the metabolism is overworked and, together with irritability, lassitude, habitude, ocular disturbances and head-ache, there is marked unsteadiness with giddiness, and sometimes marked vertigo.

There is a striking individual difference as to the effects of intoxicants upon equilibration. This is seen in the remarkable susceptibility exhibited by some individuals to the action of alcohol, quinine, the salicylates, etc., a predisposition which seems to be analogous to that exhibited by some people to sea-sickness and car-sickness.

Treatment.—It is expedient to have the eyes carefully refracted, and such relief given as may be possible to any aural defect, before attempting to relieve a vertigo that may in part depend upon an intoxication or circulatory disturbance. Several elements may be simultaneously at work, and we should attempt systematically to remove them one by one. In the treatment of obscure cases, or those which depend upon irritability of the vestibular innervation, I have had most success in following the

advice of Charcot and Giles de la Tourette; that is, the administration of quinine or salicylic acid in sufficient doses to produce tinnitus. At first the symptoms are aggravated. The treatment should be continued for about three days. Following this there is improvement, sometimes the complete disappearance of vertigo, and it may remain absent for a considerable period of time. I have had little success with bromides, as recommended by Gowers, except in large doses and rather continuously. So much for the treatment of vertigo in general. Since there are many factors which may be involved in the etiology of vertigo, it naturally follows that a variety of therapeutic indications present themselves.

To correct faulty digestion, to secure sufficient gastro-intestinal drainage, to relieve, through dietetic reform, the overtaxed metabolism, to improve general elimination and to establish, so far as possible, the normal flow of unirritating blood—these include the ends which we should seek to obtain for the relief of vertigo dependent upon general causes.—*New York State Journal of Medicine.*

Effects of Flying.

An interesting account of the physiological problems connected with the use of the aeroplane has been given by Dr. Von Schrotter to the Medical Society of Vienna, says the Vienna correspondent of the "Lancet." Dr. Von Schrotter says that for the medical man the main point of interest in aeronautics is the production, so to say, of a new climate.

Apart from the strain on the nervous and psychical organs, the sudden change of the atmosphere, and consequently of its oxygen component, affects the circulation and the respiration much more than the gradual ascent in mountain climbing.

The powerful draught causes a keen sensation of cold, which is the first symptom complained of and deafness is very soon experienced in consequence of the altered pressure upon the tympanum; subjective noises, pain in the ears, and diminished activity of hearing are often persistent. Attempts at protection by plugging the ears are insufficient. The reduced supply of oxygen caused by the rapid movement and the fall of the atmospheric pressure give rise to unpleasant symptoms of cerebral origin, such as vertigo, vomiting, and visual hallucinations. A dangerous and frequent symptom, is the desire for sleep, occurring some time during flying, in spite of the aviator's strenuous efforts to keep awake. A very unpleasant sensation is that of dizziness caused by the altitude of the aeroplane, the result being that objects on the ground appear to be distorted, displaced, or in rapid unwonted movement, and that the aviator is often at a loss as to his actual position.

Perhaps this condition is responsible for inexplicable falls of aeroplanes from a moderate height the sequence being dizziness, a wrong manoeuvre, and finally the catastrophe. The sense of orientation in space is also lost, so that the aviator does not know, for instance, whether he is in the horizontal position or not, especially when he is surrounded by clouds. The late M. Latham told Dr. Von Schrotter that on one occasion he was completely bewildered after a few minutes' experience of this kind, and came to ground without his knowledge. Dr. Von Schrotter believes that flying may easily cause a nervous breakdown.—*The M. S. Journal*.

Treatment of Bronchial Asthma.

KAYSER recommends that one table-spoonful of a five per cent. solution of calcium chloride be given in milk every two hours for at least three or four days. This proved effective as a prophylactic measure in cases of bronchial asthma under his care. In a number of instances the paroxysms did not return for several months after the administration of calcium chloride. While the effect of the drug generally became manifest on the third day, Kayser considers it advisable to continue its administration for a week.—*The Canadian Practitioner & Review*.

Too Much Sleep.

A distinguished Swiss physician has come to the conclusion that too much sleep is just as bad as too much food. More than eight hours for healthy people who work with their brains is generally speaking too much, he says, although he, of course, admits that no rule as to the amount of sleep necessary for adults can be laid down. People who work hard physically require much more sleep than mental workers. Many people look forward to a holiday at a time when they can sleep as much as they like; but according to this physician the benefit of a holiday may be spoiled by sleeping too much. Five hours of good, refreshing sleep in holiday time, especially in high altitudes, is quite enough.—*The M. S. Journal*.

Treatment of Pertussis with an Ointment of Quinine Sulphate.

BERLINER reports his experience with quinine sulphate in severe and intractable cases of whooping cough. He found the insufflation of powder quinine merely brought about an attack of coughing; he prefers, therefore, to use an ointment of the following composition:

R—Sulphate of quinine ...	...	...	1 to 2 grams.
Prepared lard ...	...	...	10 to 15 grams.

This is introduced three or four times daily into each nasal aperture with a glass rod, the child's head being thrown back in order to facilitate the penetration of the ointment. The amount applied each time should be about the size of a pea. The efficacy of this method according to the author, is remarkable, relief being afforded after the third or fourth day. The result he found to be the more rapid in proportion to the age of the little patients, the youngest appearing to more rapidly improve by the treatment than those more advanced in years.—*The P. M. Journal*.

Liquid Oxygen.

Liquid oxygen is colorless, has a specific gravity of 1.13, an acid reaction, and a temperature of 312° F. Upon exposure to the air, reversion to gaseous oxygen is very rapid, and, upon application to the skin, freezing results in a few seconds. Results varying from a stimulating chilling and local anæsthesia to a freezing with vesiculation of the surface may be obtained by varying the time of application from three to twenty seconds. Added to this is the germicidal action resulting from the use of pure oxygen in its most concentrated form. It is quicker and more positive in action than the freezing sprays already in use; has a much lower temperature than carbon dioxide snow; is more stable than liquid air, and is a germicide that is non-poisonous.

The author has used liquid oxygen in about 40 cases, and observed its effects in a number of others, including furunculosis, suppurating bubo, epithelioma, lupus, ulcers (varicose, traumatic, syphilitic, and tuberculous), gangrenous ecthyma, chancre, psoriasis, verruca, vascular nevus, and cancer of the tongue. As a local anæsthetic the agent can be used in place of the freezing sprays. It is of decided advantage in removing encapsulated pus, as in suppurating glands or cysts that are breaking down; such pussacs may be frozen after they have been exposed and the sac and contents removed in a solid mass where manipulation without freezing might result in rupture and consequent danger of infection. In a case of furunculosis of the neck which had opened spontaneously, a single application aborted several threatened infections and practically stopped suppuration in the central lesion. Three suppurating buboes healed very rapidly after being swabbed out with the liquid oxygen. In a case of lupus the marginal lesions healed more rapidly than under any treatment previously tried, including the X-ray. An epithelioma of the cheek, upon the point of breaking down, was entirely cured with little resulting scar. In about 15 cases of leg ulcers of various types, applications of liquid oxygen very promptly converted foul, indolent sloughs into clean, granulating surfaces. A

severe case of extensive tuberculous ulceration of the leg made good progress in healing under its use. In a number of instances warts were removed by a single application.

The liquid oxygen is ordinarily applied by wrapping a pledget of cotton around an applicator, making a ball about the size of the thumb, immersing this in the bulb of liquid, and holding it over the surface to be treated for a period of time varying according to the result desired. Healing surfaces should be protected by a layer of gauze, for the cotton will freeze to the surface if it remains in contact more than a very few seconds.—*Monthly Cyclopaedia & Medical Bulletin.*

The Treatment of Acute Coryza.

THE common cold in the head is one of the minor ills of life to which most people are liable. Garel advises that at the commencement such general treatment as is productive of sweating should be employed, as, for example, mustard foot-baths, tincture of aconite, Dover's powder, or Mindererus' spirit; and to arrest its progress he advises inhalations of hot water for five minutes at a time, three or four times a day, after painting the nasal mucous membrane with two or three drops of 1 in 1,000 solution of adrenalin. In the adult, $\frac{1}{200}$ grain of atropine sulphate, morning and evening, will check the excessive nasal secretion. As abortive treatment a nasal douche of lemon juice, repeated twice, usually suffices. Roux prefers Eau-de-Cologne for the purpose. Rubbing of the nose between the thumb and forefinger, by increasing hyperæmia of the mucous membrane, sometimes acts wonderfully. Hayem advises that a few drops of the following mixture be poured on blotting-paper and the vapour inhaled for a few seconds:—

Carbolic acid, pure	...	...	1 part
Liquid ammonia	...	...	1 part
Alcohol	...	...	2 parts
Distilled water	...	...	3 parts

Such inhalations should not be abused, because they may be productive of aurial complications. Equal parts of camphor and bismuth subnitrate are recommended as a snuff. The nasal obstruction may be more advantageously dealt with by the use of cocaine, in such a prescription as follows:

Cocaine hydrochlor	...	...	gr. j.
Menthol	...	...	gr. i.
Roasted and powdered coffee	...	...	3 j
Acid, borie	...	...	3 v

Here the action of the cocaine, which is rapid but of short duration, is prolonged by the addition of menthol, and to render the powder more

palpable so as to permit of its being easily snuffed the powdered coffee is added. A similar snuff, in which salol takes the place of the cocaine, dispenses with the powdered coffee.

In cases where, on account of the nasal obstruction, it is difficult for the patient to insufflate the powder, Garel recommends that a piece of India-rubber tubing about eight inches long should be used: the powder is placed in one end of the tube, which is held at the nasal orifice, whilst the patient blows at the other end and distributes it over the mucous membrane.

But, perhaps, the treatment that gives the most relief is adrenalin. A brush should be dipped in two or three drops of 1 in 2,000 adrenalin solution and the Schneiderian membrane lightly touched with it. With this cocaine may be combined. An agreeable inhalation may be made from decoction of verbena, to which is added a teaspoonful of a solution of menthol in olive oil. The febrile symptoms may temporarily be checked by means of a spray of antipyrin 2 to 4 in 1,000, whilst the previous application of cocaine prevents the tingling and burning of the mucous membrane set up by the antipyrin.

When inflammation arises on the lips or at the nasal orifice the following ointment will be found useful:—

Cocaine hydrochlor	...	...	gr. j.
Tannin	...	...	gr. 10
Cold cream	...	...	gr. 40

—*The Hospital.*

The Use of Shunt Rheostats for Hydro-Electric Baths.

SURELY the danger of giving hydro-electric baths from a shunt rheostat has already been sufficiently emphasised to impress even the most ignorant. That the practice still obtains, however, in certain establishments has once more been brought home to the general public by the recent sad death of a professional man who was literally electrocuted in an electric bath in the West End of London. The dangers of an accident with a shunt rheostat are twofold: The first, and most likely to happen—*vis.* an *earth shock*—was explained at some length in Dr. Norman's article in *The Hospital* for March 9; the second, that of *short-circuit*, will be considered in an article on hydro-electric baths shortly to appear in this journal. The present fatality was caused by an accident of the latter kind. Evidently the filament of the resistance lamp broke, the two pieces falling across each other in such a way that all the resistance of the lamp was short-circuited, the result being that the patient received a fatal amount of current through his body. Thus

we see that in using this type of resistance the patient's life, to quote an apt phrase from the *Standard*, "literally hangs by a thread—the brittle filament of an electric lamp."

A glance at the diagram, which was published in *The Hospital* for March 9, 1912, will explain how such an accident may happen. Two-thirds of the total resistance in the main circuit of the rheostat is situated in the lamp filament, and if this is removed (by *short-circuit*) the voltage in the shunt circuit at once rises to almost that of the street mains, hence it forces a fatal amperage through the patient's body. By taking certain precautions the risk of *earth shock* can be obviated, and by using four resistance lamps (in series) the danger from short-circuit can be considerably diminished, but even then the leading wires to the lamps may become short-circuited by some accident hence we are forced to the conclusion that a shunt rheostat for hydro-electric baths is unjustifiable, if not actually criminal.—*The Hospital*.

SURGERY.

Burns—Tannic Acid in Treatment of.

The efficacy of a solution of tannic acid for the relief of pain in small burns of the first, second, or third degree, *i.e.*, in the presence of erythema, blistering or partial destruction of the skin, is pointed out by the author. A piece of gauze or cotton saturated with a 5 per cent. solution of the acid is applied. In ordinary slight burns such as are often received while working about the range or ironing, such an application will give complete relief from pain in less than a minute. In more severe burns showing a tendency to blister, not only is pain relieved, but blistering is prevented and the accompanying tenderness disappears. In a severe burn of the face, hands, and arms caused by ignition of fats while frying, the relief from pain, after partial removal of the grease from the burns by means of ether and alcohol, was greater in parts to which the tannic acid was applied than where carrou oil had been previously used and allowed to remain. Boric acid, 10 to 20 grains to the ounce, or formaldehyde may be used as preservatives for the tannic acid solution.—*The Monthly Cyclopaedia and Medical Bulletin*.

Cornea, Treatment of Acute Staphyloma of.

Epinephrin has been used for the relief of pain in all forms of keratitis, and in the relief of tension in acute glaucoma has proved very valuable. Experimentally it has been found to reduce the formation of

the aqueous humor in animals. The author was induced to use the drug in acute staphyloma of the cornea, so frequently seen in ulcerative keratitis, instead of puncture and a pressure bandage, or subsequent partial excision of the cornea. He reports 6 cases in which excellent results were obtained.

In a patient with cornea bulging 3 mm. as a result of previous ulcerative keratitis, a 1 to 1000 solution of epinephrin was instilled and marked relief afforded within an hour. The patient was directed to instil such a solution three times a day. Upon his return, two days later, less bulging of the cornea was noted, and at the end of four weeks it had entirely disappeared.

In another case in which the cornea has sloughed away almost to Descemet's membrane as the result of a lime burn, and was beginning to bulge, the instillation of epinephrin three times daily caused the bulging to disappear within two days. Two months later, the cornea was very hazy, but there was no semblance of ectasia.

In a case with corneal perforation accompanied by prolapse of the iris, epinephrin was used in addition to the regular treatment. The iris was freed and no bulging followed.

There were no failures when the epinephrin solution was used as directed. The adrenal active principle has no specific effect upon the corneal tissue, but reduces staphyloma by constricting the arterioles, thus relieving the pressure in the lymph areas, reducing the intraocular tension, and allowing resumption of normal form on the part of the cornea.—*The Monthly Cyclopaedia and Medical Bulletin*.

Gonorrheal Rheumatism, Treatment Of.

The following rules are adhered to by the author in the treatment of this condition: 1. Never put the affected joint in a cast, but encourage the patient to exercise it as much as he can without giving himself pain. 2. Never forcibly bend an inflamed joint, nor have it massaged. 3. Do not allow the patient to keep the affected joint in one position long at a time. 4. Never bruise or tear the urethra in dilating it, but increase the size of the sounds gradually to the desired degree. 5. Give all the mixed gonococcic vaccine the patient can take without exhibiting a negative phase; use large doses. 6. Employ hyperemic treatment twice daily preferably in the form of hot, wet packs together with the Bier bandage. 7. Keep the bowels a little looser than normal, and have the patient drink all the water he can.—E. D. Holland.

Another writer reminds us of the importance of *prophylactic measures* against gonorrheal rheumatism when the treatment of a fresh case of urethritis is begun, especially if the patient has had rheumatism in former affections. To this end it is advisable to order from 5 to 10 grains (0.3 to 0.6 Gm.) of phenyl salicylate four times daily, after meals and at bedtime. If by judicious local treatment, when the case is seen within the first forty-eight hours, one can limit the infection to the anterior urethra, systemic infection giving rise to gonorrheal rheumatism is most unlikely to occur.

The *treatment of gonorrheal tenosynovitis*, or gonorrheal rheumatism in its mildest form, consists in rest of the parts affected. If the pain is intense, local blood letting is often extremely effective. Over the involved tendons the limb should be covered with the following paste, itself retained by a flannel roller bandage:—

- R. Methylis salicylatis, ℥iiss (16 Gm.).
Zinci oxidi, gr. xiv (3 Gm.).
Adipis lane, ℥iiss (50 Gm.).
M. et ft. ung.

Phaenyl salicylate, given subcutaneously, appeared in the author's experience to hasten the cure:—

- R. Phenylis salicylatis, gr. xv (1 Gm.).
Chloroformi, mxx (1 Gm.).
Olei amygdale expressi, f℥j (8 Gm.).
M. Sig.: Ten C.c. four times daily in subcutaneous injection.

When the acute symptoms have subsided, massage will complete the cure, preventing the formation of adhesions.

In *acute gonorrheal arthritis*, if there is fluid in the joint, it should be removed by incision, the joint freely flushed out, the incision closed without drainage, and the limb splinted. Massage and passive motion should be begun very early. Where there is no fluid in the joint, it is more probable that the process is extra-articular, and in this case the treatment described for tenosynovitis is to be employed. Vaccine treatment is of great use in these cases, especially when they run a protracted course.

In *chronic gonorrheal arthritis*, an essential point is to find the primary focus of infection. Thus if the prostate is responsible, the usual treatment of chronic prostatitis is indicated. When the seminal vesicles are involved, massage, or vesiculotomy, if necessary, must be carried out. Vaccine treatment is of greatest use in these cases.—*The Monthly Cyclopaedia and Medical Bulletin*.

OPHTHALMOLOGY.

Aqueous Solution of Iodin in the Treatment of Ulcer of the Cornea.

E. L. Meierhof has found an aqueous solution of iodine (iodine 1 grain, sodium iodid 3 grains and 1 ounce of water) a most effective remedy in the treatment of corneal ulcers. He has this solution instilled into the conjunctival sac three or four times daily, and finds that the pain produced by the instillation is not severe and does not last long. Usually after the remedy has been employed a few days the eye becomes much less painful and sensitive to light and the headache, a common symptom in this trouble, disappears. The drops may be used several weeks, even after the ulcer has healed, causing no unpleasant symptoms unless it be some congestion of the conjunctiva which rapidly subsides when the remedy is discontinued.—*The American Journal of Ophthalmology*.

Treatment of Detachment of Retina.

Schmidt-Rimpler reports the following results obtained from aspiration of the subretinal fluid and injection into the vitreous, in twenty cases of detachment of the retina where other treatment had been of no value. One proved to be a case of sarcoma of the choroid. The other nineteen patients were under subsequent observation for at least a year, and of these eight were treated with injection of subretinal fluid, five with injection of a mixture of subretinal fluid and an eight per cent solution of salt, and six with injection of an eight per cent solution of salt into the vitreous. In eight cases, four of the first, three of the second, and one of the third group, a material and apparently permanent improvement followed, with reattachment of the retina, enlargement of the field and betterment of vision; in four cases there was a slight improvement; in three no improvement; and in four the condition was made worse. In six cases the operation was followed by inflammatory reaction, more or less severe, yet the improvement was marked in five of them.—*Ibid*.

Serum and Vaccine Therapy in connection with Diseases of the Eye.

C. W. G. Bryan believes that chronic inflammation of the lacrimal sac offers a hopeful field for treatment by vaccines. Next in frequency

to pneumococcus comes staphylococcus as infecting organism, and such cases can be treated with success by doses of 100 to 500 million of stock vaccine repeated once a week. *Staphylococcus aureus* is the cause of many varieties of chronic or recurrent disease of the lids, and such disease can be cured by vaccine, in doses of 100 to 1,000 million. Blepharitis is due to such infection, and is usually associated with an error of refraction. Cases may be cured by means of staphylococcus vaccine, and if the refractive error be corrected there is no tendency to relapse. Chalazions and hordeola show great tendency to recur frequently in some patients; cure can be obtained by a three months' course of treatment by staphylococcus vaccine. Many varieties of acute conjunctivitis clear up so rapidly with antiseptics that there is no indication for further treatment. Acute gonococcal conjunctivitis is a disease of grave prognosis, and here vaccine is of great value. Of two severe cases which Bryan treated, in one a cure was obtained in ten days, in the other no apparent benefit resulted. He has treated three cases of gonococcal ophthalmia in new-born infants with doses of one-half to 1 million of vaccine; the disease became cured in each case without infection of the cornea.

In acute gonococcal conjunctivitis, Bryan says that if the treatment be commenced before the internal parts of the eye are affected, good results may be obtained with vaccine, but it is necessary to use very small doses repeated at short intervals, the object being to avoid as far as possible, negative phases and to obtain only rapid and repeated positive phases. Every effort must be made to increase the blood-supply of the cornea and to wash away discharge frequently. Free discharge to be looked on as useful, as it is by this means that opsonins are brought through the diseased tissues. Of the more chronic forms of conjunctivitis, Parinaud's conjunctivitis is probably due to *Staphylococcus albus*. Bryan has treated one case with staphylococcus vaccine for some weeks, but was unable to make out any good effect from the treatment. Cases of conjunctivitis due to the diplobacillus of Morax, and others due to Friedlander's bacillus, have been benefited by vaccine treatment. It is difficult to prepare a vaccine from the diplobacillus, owing to its delicate growth; cultivation on peritonic serum agar has given the best results in his experience.

In staphylococcal ulceration of the cornea vaccine treatment has given good results. In acute ulcer of the cornea, due to pneumococcus, treatment by vaccines has been followed by a fair measure of success, but it is necessary to begin the treatment early, as the disease usually progresses rapidly. Immediately the diagnosis is made 25,000,000 of

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Original Articles.

*THE OPERATION FOR STRANGULATED HERNIA.

BY

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VERY practitioner is liable to be called upon at some time or other to perform this operation, and, although it is usually perfectly simple, there are certain difficulties which he should know how to deal with which are by no means uncommon. We shall assume throughout this article that the operator has not an extensive experience of major surgery, that his outfit is limited, and the assistance none of the best. In spite of this handicap, no one should be allowed to die of strangulated hernia unless he is already pulseless and at the point of death.

In case of need, the antiseptic precautions may be very simple. Instruments and swabs of linen, cotton, muslin or other fabric are sterilized by boiling for 15 minutes and laid on a boiled towel. The surgeon's hands may be sterilized, if he has no antiseptics and no gloves which can be boiled, by methylated spirit or even brandy. The patient's skin should be cleaned by dry friction without soap or water, and painted with tincture of iodine, methylated spirit, or, if nothing better is available, with brandy. The skin around the incision should be kept covered with boiled clothes.

* Specially contributed to *The Antiseptic*.

If there is no one to give a general anæsthetic, intraspinal stovain or novocain would be useful if the solution and syringe are available; if not, a local anæsthetic may be injected into the skin. If nothing is at hand, the operation should be performed without an anæsthetic. The skin incision can be made painless by injecting into its thickness (not into the subcutaneous fat) a hypodermic syringe of boiled water.

Under the anæsthetic a very brief and very gentle attempt at reduction by taxis may be made, but if the rupture does not go back at once the operation should proceed. We will speak first of an inguinal hernia. The pubes should be shaved. Make an incision through the skin parallel to Poupart's ligament, about two inches long, over the neck of the sac and extending half way up Poupart's ligament. On working through the fat, the white shining aponeurosis of the external oblique is seen, with a split above the pubic spine through which the hernia and the cord are coming out. Pass a finger round the bulging sac and enucleate it from its coverings as one would shell out a lipoma from its capsule. Divide the external oblique aponeurosis so as to prolong the external ring up to the point of emergence of the sac from the peritoneal cavity. The spermatic cord should be peeled off the sac, taking care not to injure the vas, which feels like whipcord. Nothing peels off the cord so well as a piece of gauze used to "strip" it.

The operator is often very nervous as to whether the tense bulging which he feels is sac or bowel. If it can be picked up as a thin layer with the forceps, one need have no fear; it is sac. There is almost always a gush of fluid when the sac is opened, which is a most valuable clue to one's whereabouts. If, in attempting to burrow through a doubtful layer, closely striped reddish muscle is seen, it is probably bowel. If there is real doubt, put in a needle; if fluid flows, only sac has been punctured, whereas if the needle enters the bowel, no harm will result.

Having, then, enucleated the sac like a stalked tumour, open it up, but avoid injuring the neck. Draw down the loop of bowel, holding it with gauze. If it will not come without dangerous pulling, it is necessary to cut the constricting ring where it enters the abdomen. For this a hernia director and hernia knife are very desirable; if they are not available blunt-pointed scissors may be used. Pass the director and then the hernia knife through the ring on the flat, then remove the director and turn the cutting edge of the knife so as to saw quietly through the neck in an inward and upward direction. A small nick usually suffices. Then pull down the bowel and examine it, especially at

the constricted portion, for gangrene or perforation. This drawing down before reduction is very important, or perforative peritonitis may ensue.

If the bowel is not dangerously affected, reduce it inside the abdomen. Then gather up the sac, free it right up to the ring, and tie it as high as possible with catgut, or, if that is not available, with silk, linen or even cotton thread. Cut away the sac half an inch beyond the ligature.

Next do something in the way of repairing the inguinal canal so as to provide a radical cure. In the absence of special experience the simplest method will suffice. Display Poupart's ligament by clearing the under surface of the external oblique aponeurosis. Then display the lower border of the internal oblique muscle, which feels thick and fleshy, lying along just above the cord. Sew the internal oblique to Poupart's ligament by about five stitches in front of the cord. Before these are tied, make certain that there are no oozing points in the spermatic vessels, or a troublesome hæmatoma will form. The aponeurosis of the external oblique should be repaired with a few points of suture, and the skin stitched without drainage.

We have spoken so far of a perfectly straightforward case, and the majority of cases are perfectly straightforward. Some deviation from the normal is by no means uncommon, however, and may occur just as well in the practice of the inexperienced as in that of the most capable surgeon.

The sac may contain omentum. It is not safe to return large pieces of omentum which have been bathed in the infected fluid of a hernial sac. It should be tied off by ligatures and cut away. A piece more than an inch wide when spread out ought to be transfixed and tied by interlocking ligatures. This is easily arranged if a needle threaded at the middle of a long piece of silk or catgut is passed, and the loop cut close to the needle. A very large piece of omentum will require several such transfixions.

The bowel may be gangrenous. The gangrene may affect the whole loop, or only a particular area, and perforation may have already occurred. Gangrenous bowel is black, the peritoneal coat is dull instead of shiny, the wall is limp and flabby, and it does not bleed if cut. When there is any doubt it is well to wait a few minutes. If the circulation is intact the bowel rapidly improves in colour and appearance as soon as the constriction is released.

If the condition is merely doubtful, return the loop just inside the abdomen, do not sew up the sac or the canal, but leave in a drain. Of course the hernia will recur should the patient recover, but if the loop perforates the faecal matter will escape along the drain.

If a small perforation or threatened perforation is present in a loop which is otherwise healthy, close it over by making the weak spot the bottom of a longitudinal furrow in the bowel wall, and sew over it with a few sutures passed through the seromuscular coat, not the mucous membrane.

If there is a large area of gangrene, one of two alternatives must be adopted. One is to resect the gangrenous loop and also all the dilated, paralysed coil of bowel lying on the proximal side of it; this may involve the removal of several inches or even a foot or two, but it is useless to leave paralysed gut. The mesentery must be cut and ligatured close to the length of bowel that is taken away, and the two ends of intestine united by a double suture, the inner being continuous through all the coats, and the outer a continuous Lambert stitch through the seromuscular coat only.

This procedure is long and difficult, and in the hands of an unaccustomed surgeon is not likely to prove successful. The alternative is to incise the loop of bowel, leave the sac and skin wound open, and allow the faeces to escape. If this is done, it is very important *not to cut the neck of the sac*, which would expose the peritoneum to infection. The faeces will be fluid and will escape through a narrow opening; a finger or a drainage tube may be passed up inside the bowel to dilate the ring. Of course the patient, if he survives, will require a second deliberate operation to restore the continuity of the gut and close the artificial anus.

The sac may contain bladder. This is not very rare. If one part of the sac wall feels very thick, and especially if interlacing muscular fibres are to be seen in it, bladder is probably present, and must be reduced carefully before the ligature is applied, or a urinary fistula will form and extravasation take place.

The main points may be summed up as follows:—

1. Incise over the neck of the swelling.
2. Enucleate it like a tumour. Strip off the cord.
3. Open the sac, when fluid usually escapes.
4. Pull down and examine bowel. If it will not come, notch the neck of the constriction inwards and upwards.

5. Return bowel, tie off sac, cut it away.

6. Sew internal oblique to Poupart's ligament in front of the cord (under favorable conditions, do Bassini's operation).

7. Suture external oblique and skin.

In the presence of abnormalities:

1. If omentum is present, tie it off with transfixion and interlocking ligatures, and cut it away.

2. If gangrene or perforation is present proceed as follows:—

(a) *Condition doubtful.* Reduce, but do not ligature sac or close canal.

(b) *Small area of gangrene.* Invaginate and sew over longitudinally.

(c) *Extensive gangrene.* Under favorable conditions, resect gangrenous coil and as much bowel above it as is dilated and paralysed; perform end-to-end suture. Under less favorable conditions, incise gangrenous coil and leave wound open; do not cut neck of sac, but put drain up inside upper loop of gut if necessary.

3. If bladder is present, evidenced by sac having on the inner side a thick wall containing muscle, reduce it before ligaturing.

A few remarks may be made with regard to femoral hernia. A vertical incision is made over the swelling, and it is enucleated like a tumour with a stalk upwards. The sac is opened, and the bowel dealt with as already described. If the neck of the sac has to be divided, cut inwards. Not much can be done in the way of radical cure after the sac is ligatured and cut away, but a few sutures may be inserted to fix Poupart's ligament down to the fascia behind the sac. Gangrene is treated on the lines already described.

• THE ORIGIN OF OVARIAN TUMOURS.

BY

J. BERNARD DAWSON, M.D., F.R.C.S.

One of the most puzzling phenomena in human pathology is the origin of tumours of the ovary. The organ in a healthy and active state is no bigger than an almond, yet from it may develop the most massive, the largest and the most formidable of neoplasms.

For many years investigations have been carried out in order to solve the problem of their origin. Great difficulties stand in the way of investigators, for it is not the mature tumour that throws light on the

question but the ovary in an apparently healthy or very early pathological condition that would be expected to assist in the elucidation of this most difficult subject. It will be easily understood that such material is not frequently available, and that necessarily the research must progress slowly.

There are three main groups of ovarian tumours which will be considered. These are:—

1. The cystomata including the glandular cystadenoma and the papillomatous cysts.
2. The cystic and the solid teratomata formerly called dermoids.
3. The malignant tumours, *viz.*, carcinomata and sarcomata.

This classification is, of course, very imperfect omitting cysts of the corpus luteum and of lymphatic spaces; similarly no mention is made of cysts of the parovarium; moreover the distinction between an innocent and a malignant ovarian tumour is often very imperfect and difficult.

The multilocular glandular pseudo-mucinous cystadenoma.

This is the commonest of the ovarian tumours and offers the most fruitful material for research and speculation.

It is the epithelium lining the cysts that is our guide, for the framework is made up of fibrous common to all parts of the body. Before considering this it is necessary to study the varieties of epithelial tissue that are found in the normal ovary.

This is of three kinds and found in three positions:—

1. *The germinal epithelium* which covers the surface of the ovary and from which are developed the primordial ova. This is an offspring from the coelomic endothelium covering the inner surface of the Wolfian body in the embryo. This in the adult is usually represented by a single layer of cubical or columnar epithelium, but under some circumstances there are alterations in its form; thus, in certain changes in the Fallopian Tube, the epithelium lining that structure may extend to the surface of the ovary and there be found as columnar ciliated cells.

2. *The epithelium lining the ovarian follicles* about which there is a considerable difference of opinion. The view of Waldeyer which has received the most support is as follows:—

A mass of germinal epithelium cells grows down into the stroma of the ovary which also grows up to enclose them; one of these cells becomes the ovum whilst the rest are utilised in forming the epithelium of

the Graafian follicle. Kolliker on the other hand regards the follicular epithelium as derived from the lining cells of parovarian tubules which have extended deep into the ovarian stroma.

Against these hypotheses there are to be considered the following points which are the result of careful histological examinations:—

- (a) The resting ova are surrounded by cells resembling those of the ovarian stroma.
- (b) The ova of infants are directly surrounded by the stroma cells and no differentiated cells intervene.

On these grounds Foulis has asserted that the follicular epithelium is derived from the cells of the connective tissue stroma of the ovary.

3. *The epithelium lining the tubes of the parovarium* and the extensions of these tubes into the ovary, which are known as Kolliker's tubes, is derived from the epithelium lining the tubes of the Wolfian Body. These cells are said by Kolliker to become the lining epithelium of the Graafian follicles of the ovary.

It will thus be seen that the consideration of the question of the origin of the epithelium lining the cavities of an ovarian cyst is by no means simple since there is already a diversity of opinion as to the genesis of the endothelium tissue to be found in the normal ovary.

Generally speaking, investigators have considered the cystic epithelium to be derived from the same source as that which they believed to be the origin of the endothelium found in the normal ovary. Thus:—

The pseudo-mucinous cystadenoma is regarded by Alban Doran, who worked extensively at the subject between 1880 and 1890, as developed from the Graafian follicle. Later researches cast grave doubt on this hypothesis and since no one had ever seen a cystadenoma developing from a follicle it was at best mere speculation.

Waldeyer held that structures analogous to the down growths of germinal epithelium which are the forerunners of the primordial ova appear either as foetal remnants or as later growths and that from these the cystadenomata have their origin.

Marchant believed that these tumours may develop from down-growths into the stroma of the ovary of Tubal cells transplanted from the Fallopian tube to the surface of the ovary.

Walthard in his paper "The Ætiology of Ovarian Adenomata" published in Zeitschr. für Geb. und Gyn. Bd 49. contributed a most valuable addition to our knowledge of this subject. He, in examination

of sections of many apparently normal ova, found that there were in many cases aggregations of epithelium cells derived from the germinal epithelium lying free among the ovarian stroma. These he found were in solid masses; sometimes the cells were arranged around a central cavity, and there were signs of branching papillae.

This evidence is strongly in favour of the view that these tumours arise not from epithelium already specialised for functions in connection with the follicles or the tubes of Kolliker, but from segregated masses of epithelium devoted to no other destiny.

The Papillary Ovarian Tumour.

The same kind of speculation has been indulged in about this class of cyst.

Doran held that they were a product of the Wolfian remains in the ovary upon the following grounds:—

1. The epithelia of both are similar.
2. They tend to burrow in the broad ligament, affecting the hilum of the ovary and leaving the glandular portion of the organ unaffected.
3. Their occurrence in the substance of the ovary he explains by the fact that Wolfian remains are undoubtedly found there at times. Whitridge Williams, however, has clearly shown that this class of cyst may arise quite independently of any parovarian tubule.

Glaischen stated that papillary cysts arose from ciliated epithelial lined tubules derived from the germinal layer.

Walther's work, which applies to this class of tumour as well, has already been referred to.

Whitridge Williams contended that papillary cystomata have no common origin but that they may develop from any of the epithelium that occurs in the ovary.

It will therefore be seen that the ætiology of the common cysts of the ovary is in an unsatisfactory state; in fact it is one of the most promising fields for research in as much as everything remains for the future to decide.

The Ovarian Teratomata.

These are of two kinds, cystic and solid, and they differ in the following way:—

The cystic possesses a definite limiting cyst wall, whereas the solid variety does not.

In both derivatives of all the three primitive layers, epiblast, mesoblast and hypoblast, are found, but in the former there are properly organised fully developed fragments of an adult foetus, whilst in the latter, although fully developed tissues are found, there is no order in their arrangement but only a heterogeneous mass of muscle, cartilage, nerve, skin, etc.

Their origin has been the source of much speculation; at one time they were considered the result of impregnation by the devil. Meckel suggested the occurrence of two fertilised ova and the inclusion of one within the other. Shattock points out the possibility of the inclusion of a spermatozoon in the foetal ovary.

Kroemer holds that the cyst wall develops from a Graafian follicle and the embryonic structures from the contained ovum.

Others have pointed out that "dermoids" of the ovary and testicle differ from other dermoids in the fact that they contain rudiments of all three germinal layers, a fact which can only be explained by the fertilisation of a sex cell; how this takes place we know not.

The Malignant Ovarian Tumours.

An ovarian tumour may be malignant from the outset, being either a carcinoma or a sarcoma, or pre-existing simple growths may become malignant. The ætiology of the former class does not differ from that of cancer in general and is a subject outside the scope of this article. Teratomata of the ovary may manifest malignant phenomena and papillary growths also shew a degree of local malignancy.

The cystic varieties of ovarian neoplasms not uncommonly take on a malignant change. The degeneration manifests itself in the lining epithelium which proliferates irregularly, becoming atypical, polymorphous, and many-layered. This at first is confined within the cyst wall but this is soon infiltrated and the cancerous cells invade the peritoneum and neighbouring viscera.

The natural history of ovarian sarcoma, and of the rarer forms of malignant growths known as endothelioma and perithelioma differ not from that usual in other parts of the body.

This survey of the origin of ovarian tumours sums up briefly the present state of our knowledge; little enough is certain but the founda-

tion has been laid upon which future investigators will doubtless build a temple of knowledge sound in construction and design.

*** ALL-INDIA SANITARY CONFERENCE—MADRAS—
NOVEMBER, 1912.**

Observations on Disinfection in Cholera.

BY

MAJOR E. D. W. GREIG, M. D. D. SC., I. M. S.

On Special duty for the Cholera Enquiry.

I have recently had the opportunity in connection with my research work on Cholera of observing two instances of disinfection on a large scale carried out at my suggestion to arrest epidemics of the disease. As the plan of disinfection in both cases was based on the results of scientific research done during the progress of the epidemic of cholera, and as the operations were watched and carefully controlled throughout the observations, I have thought it may not be without interest to place the results on record.

During the recent festival of Nutan Kalebar at Puri this year, a very large number of pilgrims assembled there in July 1912. It was estimated that not less than 300,000 persons were present at the Car pulling. Consequent on this large influx of people the annual epidemic of cholera was much more severe than usual. In the first place there was the epidemic amongst the pilgrims, but later the town of Puri itself became infected and after the pilgrims left the local authorities of Puri had to cope with a second, and in view of the diminished population, a more severe epidemic during the month of August 1912.

Without entering into details of my researches on cholera in Puri, which are dealt with by me in other reports, I may state that, broadly speaking, the factors which operated chiefly in the causation of the outbreak of cholera were: (1) convalescents discharged whilst still infective and closely associated with this; (2) cholera "contacts", that is, healthy persons, who have been in contact with cholera cases, and have acquired the infection without showing any signs of the disease, but they excrete the cholera vibrio in their stools and are capable of infecting others; (3) flies: during the period of the festival enormous numbers of flies were present amounting almost to a plague. I examined a number of flies taken near collections of cholera cases and found that they were

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harbouring the cholera vibrio on their external appendages, and also in their alimentary tract.

In regard to water I repeatedly examined samples from the sacred tanks, wells protected and unprotected, etc., and although vibrios were present in some of the samples, none of these were cholera vibrios; further the other features of the epidemic did not point to a water infection in the present outbreak.

At this point I would like to say that I have almost invariably found that there is a general impression that cholera is entirely a "water-borne" disease; whilst in no way wishing to minimise the great importance of safeguarding water supplies in India, yet it is desirable, if progress is to be made, that a broader conception of the mode of dissemination of cholera be taken. A very similar conception was held at one time regarding the mode of spread of Enteric fever in India, with the result that in spite of "vigorous sanitary measures" the disease increased instead of diminished.

I will proceed to discuss the two observations on disinfection.

(1) During the epidemic in the town, the Jail at Puri became infected by cholera and, as was shown by me, the introduction of the infection was effected by means of a convalescent cholera "carrier" who had been discharged from hospital a short time previously. The investigation of this epidemic has been described by me in another paper. In this communication I shall deal with the question of combating the epidemic by disinfection.

Seventeen cases of cholera with 5 deaths occurred in connection with the jail epidemic. The total strength of the jail at the time of the outbreak was 222.

As the convalescent "carrier" had been in jail a short time before he was isolated, the possibility, almost certainty, of the infection of the latrines, flies, and the production of "contacts" had to be remembered.

Having regard to my investigations during the present epidemic in Puri, I recommended the Superintendent of the Jail to commence at once a thorough disinfection of all fresh night soil in the jail, in order that the specific organism might be destroyed in the stools of all within the jail, as it was impossible to examine bacteriologically all the inmates to determine "contacts," and, secondly to prevent the flies which were

very numerous becoming infected. For this purpose Cyllin was used and each receptacle in the latrine was kept filled with a solution of sufficient strength and, if necessary, the stool was stirred up with the fluid to insure its being completely covered, which was an important point in order to guard against the possibility of fly infection. The systematic cyllination was commenced on the 9th August and no fresh cases of cholera occurred after the 13th August in the jail.

A chart shows the date of entrance of the "carrier" into the jail, the daily number of cases of cholera and the date of commencement of the systematic cyllination in the jail.

Encouraged by this experiment the local authorities on my recommendation extended the disinfection to the whole town of Puri. At the time cholera was present in a severe form. On the 13th August, 49 attacks and 39 deaths occurred. For the purpose of town disinfection I selected Chlorinated Lime because (1) it was cheap, (2) it is a very good bactericide, and, very important, (3) the pungent odour is most effective in keeping away the flies. Systematic chlorination of public and private latrines in Puri was commenced on the 16th August.

The following table shows the daily deaths from cholera in Puri during the month of August 1912.

DATE.	DEATH.	DATE.	DEATH.
1st	34	16th	24
2nd	26	17th	26
3rd	22	18th	24
4th	24	19th	19
5th	1	20th	18
6th	22	21st	15
7th	19	22nd	9
8th	26	23rd	8
9th	32	24th	4
10th	32	25th	5
11th	35	26th	5
12th	35	27th	5
13th	39	28th	4
14th	33	29th	6
15th	34	30th	3
		31st	1

A chart shows the daily mortality from Cholera in Puri during August 1912, in the period before disinfection was commenced, and during the period after disinfection was commenced.

The following table shows the quantity of Chlorinated Lime used for the disinfection of fresh night soil in the town of Puri.

DATE.				QUANTITY.	
August	15th	..	..	1	Cwt.
"	16th	..	..	3 $\frac{1}{2}$	"
"	17th	..	..	16 $\frac{1}{2}$	"
"	18th	..	..	9 $\frac{1}{2}$	"
"	21st	..	..	..	..
"	22nd	..	..	3 $\frac{1}{2}$	Cwt.
"	23rd	..	..	6 $\frac{1}{2}$	"
"	24th	..	..	9 $\frac{1}{2}$	"
"	25th	..	..	9 $\frac{1}{2}$	"
"	26th	..	..	9 $\frac{1}{2}$	"
"	27th	..	..	13	"
"	28th	..	..	6 $\frac{1}{2}$	"
"	29th	..	..	9 $\frac{1}{2}$	"
"	30th	..	..	3 $\frac{1}{2}$	"
"	31st	..	..	3 $\frac{1}{2}$	"
September	1st	..	..	6 $\frac{1}{2}$	"
"	2nd	..	..	6 $\frac{1}{2}$	"
"	3rd	..	..	9 $\frac{1}{2}$	"
"	4th	..	..	6 $\frac{1}{2}$	"

The difficulties in carrying out the systematic disinfection were very great owing to the extremely defective state of the private latrines and the absence of proper access to them. It is to be hoped that this state of affairs will be remedied in the near future in order to facilitate the prevention of epidemics of cholera at Puri. But in spite of these difficulties, the disinfection of fresh night soil of the town was followed by a very gratifying and marked fall in the number of daily attacks and deaths from cholera, and in a fortnight the town became quite free from the disease. During the course of the disinfecting operations I visited the public and private latrines in Puri and was struck by the complete absence of flies round the receptacles although they were still very numerous elsewhere in the town; and this was extremely important having regard to the fact, that flies, as my researches showed, were active agents in the dissemination of the cholera organisms in the present outbreak.

In order to give a more vivid impression of the results of disinfection on a large scale, I have constructed two maps of Puri. In the first the distribution of the fatal cases of cholera in Puri town from the 1st to

15th August 1912 has been marked out by placing a red disc for each death from cholera in the particular Shahi or Division of the town in which the case occurred; in this way every fatal case reported during the period is shown. During this period no chlorination of night soil was taking place. In the second map the deaths from cholera were recorded in the same manner, for the period 16th to 31st during which systematic chlorination was begun and carried on continuously.

By comparing the two maps it will be seen that a very striking diminution in the number of fatal cases of cholera in all the Shahis or Divisions of Puri town has taken place during the period of systematic chlorination of night soil. Even the Shahis—Harchandi Shahi and Basali Shahi—with the most defective latrine arrangements, and in which many fatal cases of cholera occurred, responded to the treatment.

In combating both these epidemics the active factor, and indeed the only one which was brought into operation, was systematic disinfection of fresh night soil; in both instances it was followed by striking results.

The inhabitants of Puri appreciated the value of the operation and were so much impressed by it that the private house-owners proposed to purchase Chlorinated Lime and make use of it in their latrines during future periods of cholera prevalence. At the time the disinfection operations were commenced there was considerable alarm in the town on account of the threatening aspect of the epidemic of cholera; when it was seen that the operations were successful, the inhabitants who had gone away from Puri on account of cholera began to return and complete confidence was established in this way.

The Epidemiology of Cholera.

BY

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1. *Prevalence of Cholera.*—Cholera has been known and dreaded as an acutely infectious and rapidly spreading epidemic disease since the beginning of recorded history, and even now it takes its place as one of the chief causes of death in the returns of vital occurrences in spite of our knowledge of its cause and in spite of the fact that the disease is admittedly preventable.

A reference to the mortality returns for the whole of India shows that during the 34 years from 1877 to 1910 there were nearly 13 million

deaths reported from cholera, and it is interesting to note that while the first 17 years show a total of 6,052,179, the second period of 17 years shows 6,910,990 deaths, or nearly 900,000 more, and the last six years of all—from 1905 to 1910—show a total of 2,816,376. These periods give annual averages of 356,000, 406,000 and 469,000 (omitting odd hundreds) respectively, and appear to show that cholera is becoming progressively more prevalent in spite of civilisation and sanitation.

I am aware that it may be argued that the apparent increase is due to more accurate reporting, but my experience in checking the actual returns of recent years has shown me that even now the returns are considerably below the actuals especially in times and places of acute epidemics. I am unable to speak from experience of the reliability of the earlier returns, but it seems to me probable that the variations are not likely to have been great, because cholera is and always has been a well known disease, with definite characteristics, and the error in reporting by an uneducated agent, such as the village *chowkidar* who has not changed much in his educational or social status in 34 years, is more likely than otherwise to be approximately a constant factor in dealing with large numbers.

The inference, therefore, is that cholera is really becoming progressively more prevalent, and the probable explanation is the improvement in the means of communication and transit, which has taken place during these 34 years, and which makes the distribution of the disease so much more rapid and more easy.

With regard to the localisation of the disease, it is to be noted that Bengal has always been the home of epidemic cholera and claims 5,426,417 out of the total number of 12,963,169 deaths reported during the period.

With regard to the distribution of the disease, it may be noted that it is universal all over India but by no means in proportion to the populations of the various provinces. The provinces which have suffered most from cholera are Bengal, the United Provinces and Madras and these provinces are characterised by two of the conditions to which I shall later refer as being intimately associated with the epidemic occurrence of cholera; *viz.*, crowding or a high rate of density of population, and a favourable climate, which is both warm and moist during a great part of the year.

Whilst discussing the prevalence of cholera we may also with profit compare its prevalence and its mortality with other great epidemic diseases, such as small-pox and plague, and incidentally we may note the

differences in the preventibility of these diseases, and what has actually been done to diminish their prevalence. I do not propose to enter into a detailed and lengthy comparison but merely to compare the general epidemiological characteristics.

The point of importance seems to me to be that cholera occurs and recurs with undiminished virulence, and causes a large number of deaths every year, and frequently causes a very large number. In the 34 years from the records of which I have been quoting, the number of reported deaths has been over half a million in eight separate years and over 400,000 in fourteen years. Now in comparison with small-pox this mortality is much greater, and in comparison with plague it is greater in the aggregate, though it has been surpassed in single years. The important points are the permanence of cholera as compared with plague and its continued and sustained virulence as compared with small-pox which is a decadent disease.

Now these three diseases are all more or less preventible, small-pox altogether so, cholera to a large extent, and plague to some extent, and they should merit the attention and efforts of the sanitarian in direct proportion to their preventibility, with some consideration to their prevalence and mortality.

In the order of known preventibility we have small-pox, cholera, plague. In the consideration of their prevalence and importance as causes of sickness and death, we find them in order: cholera, small-pox, plague.

A general consideration of the importance of applying preventive measures to these diseases on a large and general scale would lead one to deal with cholera and small-pox as the most important, and plague as a disease of secondary importance. Instead of this, however, being the case we find that small-pox receives regular and systematic attention, and plague is the absorbing subject to which excessive importance is attached, and upon which enormous effort is concentrated, whilst cholera is, like Cinderella, ignored and passed by.

This policy appears to me to be an erroneous one, the enormous economic importance of cholera and its persistent and increasing prevalence, combined with the admitted fact that it is largely preventible, demand that it should receive more serious attention and point to the necessity for a systematic policy and a definite organisation for its prevention.

2. *The History of Cholera Investigation.*—Little was really known about cholera until comparatively recent years, except that it was an acutely infectious disease with a very high death-rate.

The previous generation of medical officers in India had a large practical experience of the disease, and elaborated an air-borne theory which survived and held the field until the occurrence of the historic epidemic at Hamburg-Altona, which led to a revision of existing ideas and the adoption of a water-borne theory on a hypothesis which does not logically apply and by a process of argument which is the reverse of logical.

Let us first examine the air-borne theory of the older school, and let us begin by admitting that the men who elaborated it were probably not fools, and that their opinions were founded on observed facts and merit consideration.

Some years ago, I read a paper on the subject by Surgeon-General Cunningham, in which he traced the history of several epidemics and showed that cases occurred in localised areas at first and spread principally in the definite direction of the prevailing wind, which is almost a constant factor in the United Provinces in summer. He further showed that neighbouring houses were usually the first to be infected though the infection frequently jumped over one or more houses, and he laid stress on the fact that the water-supplies were wells which were entirely separate and very unlikely to become contaminated because no one living outside the premises had access to them. He therefore argued that the infection was not water-borne but must be air-borne and he deduced that the easiest way to avoid the infection was to go away and live somewhere else to windward of the epidemic. The argument is apparently a logical one and was justified by the results of the procedure which he recommended for his troops when epidemics occurred. The only factor which Surgeon-General Cunningham omitted from his argument was the fly, and with the assistance of that prevalent and audacious insect, I propose to revive the theory and elaborate the argument—with modifications.

Before leaving the theories of infection and their history I propose first of all to discuss the Hamburg-Altona epidemic, and its influence on the minds and practice of almost a generation of medical men. The circumstances are fairly well known but may be summarily repeated.

Hamburg and Altona are adjoining towns on the banks of the river Elbe, and both took their water supply from the river, but the Altona

supply was well filtered before being distributed, whilst the Hamburg supply was not filtered.

A fulminating epidemic suddenly broke out in Hamburg but Altona remained largely free from the disease. It may be added that cholera was at the time epidemic in Russia and Eastern Germany. The obvious explanation was that the river water had got contaminated, and as the Hamburg supply was taken at a point higher up than the Altona supply it was also obvious that the filtration was the thing that saved Altona.

The matter was clinched by the isolation of the cholera vibrio from the Hamburg water, and river water, and by the fact that it did not occur in the Altona filtered water. So far, so good.

The fact was proved that cholera infection could be conveyed in water; but the fallacy was accepted that cholera is a water-borne disease, which is quite a different proposition.

I maintain that nothing more was actually proved than the possibility of cholera being water-borne: nothing more could be proved from any such single example: and I maintain that the water-borne theory is based on the obsession of an illogical and erroneous idea which has been accepted and raised to the dignity of a theory of transmission because of the clearness and completeness of proof in an isolated case and because of the great publicity which it received.

3. *The Probable Source of Cholera Infection.*—That there is a perennial and persistent source of cholera infection, that survives throughout the centuries under many various circumstances, and at all times, is indisputable, and, in order to arrive at a logical hypothesis with regard to the transmission of the disease, it is obviously necessary to begin with a definite and intelligible theory of its source.

I do not wish to trespass too far into the domains of the bacteriologist, but I must do so to some extent in order to establish and elucidate my argument.

The known facts about the life history of the vibrio are many, but those which are important to my purpose are, that the organism is a delicate one and rapidly dies out when exposed to the sun-light or subjected to dessication, and that it is not capable of maintaining the struggle for existence for any long period against the more robust saprophytic organisms which swarm in all ordinary water-supplies.

It would therefore appear probable that the disease should be a rare one, and should tend to die out altogether. But such is not the case therefore the logical explanation of its persistence must be sought elsewhere. Such an explanation is supplied by the recent work on typhoid fever which has given us the "Human Carrier Theory" to account for the persistence and recrudescence of the disease, and by the observations and experiments of a Russian bacteriologist who isolated the organism from the stools of healthy pilgrims who had returned from Mecca.

In other words, the obvious and satisfactory hypothesis is that cholera is also disseminated by the "Human Carrier", who may or may not have had the disease in a definite form, but who has the organism present and persistent in his intestinal tract for months and perhaps for years.

This theory does not clash with the known facts as to the feeble vitality of the organism outside the human body, but presents a complete and satisfactory explanation of all the known facts as to the outbreak and recurrence of the disease, and is intelligible and reasonable by analogy in comparison with the proved theory of "Human Carriers" in enteric fever, which is in some respects a similar disease, and whose organism is also a delicate one, unable to live long under natural conditions outside the human host.

4. *The Factors of Transmission of Infection.*—If we accept the theory of carriers as the chief source of infection, it is easy to understand the occurrence of sporadic cases of the disease as well as the outbreak of great epidemics. The sporadic case is a constantly and vicariously recurring factor and epidemics occur when the conditions are favourable to transmission, and are therefore generally seasonal in their periodicity.

The means of transmission are probably several, but ultimately resolve themselves into the introduction of infected material into the stomach. This may be done either in food or in water, but probably occurs commonly in food, both because food is more liable to being handled by others than is water, especially in this country, and because in many forms it presents a suitable medium for the multiplication of the vibrio, which ensures that the organism is present in sufficient numbers before being swallowed, to produce an infection in some cases in spite of the bactericidal powers of the stomach.

The manner in which food or water becomes contaminated is comparatively easy to understand when one considers the careless way in which the same water-supply is used for all purposes, and the negligent manner in which food stuffs are exposed to the contact of flies, and

handled by servants and shop-keepers, whose personal cleanliness is a negligible quantity, especially in the bacteriological sense.

5. *The Conditions Favouring Transmission.*—The conditions which favour transmission, and which are required to exist in a complete chain of circumstances if a great epidemic is to occur, are those which facilitate the rapid and frequent infection of food or water, and which provide a sufficient number of human hosts to receive the infection.

They may be summarised in an alliterative series as Carriers, Climate, Crowds, Contact or Contamination of food or water, and bad Conservancy.

(i) *Carriers.*—The necessity for carriers as an original source of infection has been already discussed and it need only be added that the greater the density of population in any area, the greater will be the number of carriers probably present, and the greater will be the probability of an outbreak if the other conditions are favourable.

(ii) *Climate.*—The condition of favourable climate is required for the outbreak of an epidemic in two ways,—partly because a rigorous climate tends to kill off the organism in the excreta too rapidly to allow of frequent infection, but chiefly because a warm and moist climate is the one most suited to the rapid multiplication of flies, which I propose to credit with the chief part in the process of active dissemination of the infection.

(iii) *Crowding.*—Crowds or a condition of crowding or denseness of population are important chiefly from a mathematic point of view. In the first place the larger numbers present the possibility of more numerous sources of infection, and in the second place, the population is composed of units which act and react upon each other, every unit being a potential source of infection to every other unit, a condition which obviously makes the probability of infection proportionate to the square of the population in a crowded area, or rather, to be exact, equal to N^2N , where N is the total number of the population.

There is also a further factor introduced by crowding, which is more difficult to measure, and which consists in the increased nearness produced amongst the units of the crowd, and the consequent increased chance of contact, contamination of hands, clothing, or vessels.

6. *Contact or Contamination.*—The importance of contact is probably small as compared with contamination of food or water by other means, and only assumes dimensions deserving consideration when the crowding is excessive, as happens at some of the great *melas* in India.

The usual means of transmission of the infection are almost certainly through food and drink and the question of interest is,—how does the food or drink become contaminated?

As far as water-supplies are concerned, they may be contaminated in this country with great ease owing to the rarity of filtered and piped supplies; the ordinary use of surface and river waters, and the extraordinary habits of the people who will wash, bathe and drink indiscriminately in the same water.

The logical conclusion would therefore appear to be that the entire population should die of cholera, and as this has not occurred at any time known or recorded, it may reasonably be presumed that the contamination of water is not the usual nor the most important means of infection.

Concerning the contamination of food which I consider to be the common cause of infection, I wish first of all to emphasise its suitability, in many of its form for the purpose, inasmuch as it provides a medium upon which the implanted organism can live and multiply, until it is present in sufficient numbers to be dangerous. Secondly it should be noted that food is usually left lying about uncovered because the ordinary inhabitant of India does not know any better, and in its prepared forms it is exposed in filthy bazaars in the most careless manner. Further it is subject to more frequent handling than is water. It is therefore in every way a more suitable means of transmission and requires only that the infecting agent should be identified in order to prove its probability. That infecting agent is in most cases the fly, whose presence on the scene is due to bad conservancy, and whose history, habits, and importance in this connection will be discussed in a succeeding paragraph.

7. *Conservancy.*—The importance of conservancy in the question is an indirect one, but is nevertheless very real and very great.

The ordinary native of India is possessed of peculiarly promiscuous and primitive habits; and wherever he goes his habits go with him. Conservancy has to deal with and dispose of his excreta, and the goodness of the conservancy is in proportion to the promptness and completeness with which this work is accomplished.

Bad conservancy leaves this work undone—and this is where the fly comes on the scene.

Flies haunt the habitation of man because they most readily find the two essentials of life—a supply of food, and facilities for the reproduction of their species. What is food for man is generally, if not always,

food for flies, and flies always try to take their share of it: further also they feed on substances of a filthy or putrid nature, and they utilise garbage and excreta, and by preference the latter, as a breeding ground in which to lay their eggs.

Bad conservancy therefore leads to the enormous multiplication of flies, and also offers increased facilities for contamination of the feet and intestinal contents of these flies in proportion to the degree of inefficiency of the conservancy.

8. *The Life History of the Fly.*—In order to make my argument more definite and more complete, I propose to submit a short resume of some of the known facts in the anatomy and life history of the common fly, chiefly extracted from a paper by Dr. Graham Smith.

There are several species of fly but their anatomies and life histories are similar, and so they may be all taken together. The adult fly has a hollow proboscis with an oval suctional tip, and this communicates directly with a large crop or stomach. The fly is incapable of swallowing solid food, and when it feeds on any substance which is not sufficiently fluid to be drawn directly into the stomach, it repeatedly regurgitates and reabsorbs the fluid in its stomach, and thus slowly breaks up and absorbs solid matter either in solution or in suspension. This process largely explains the occurrence of contamination of food supplies. There is also, however, another additional explanation, which is that the fly is very greedy and always overloads its stomach whenever opportunity occurs, and it subsequently vomits with considerable frequency in order to relieve the pressure. When one considers the habits of the ordinary fly—how it flies from garbage or excreta to food and back again—how it is exceedingly active and persistent in its progress—and how large and catholic is its appetite, these facts fully explain the great risk and probability of its carrying the infection of cholera, and demonstrate the importance of its function as a transmitting agent in cholera and other allied diseases.

The life history of the fly with special reference to the process and rapidity of reproduction are also very important. The female fly lays its eggs—generally over 100 in number—in garbage or dung, preferably in the latter: these eggs hatch out, and become mature most quickly under favourable conditions as to temperature and moisture, and subsequently develop more rapidly and vigorously when the food supply is plentiful. The eggs will not hatch at all below a certain temperature and hatch in from 8 to 24 hours according to the temperature. The egg hatches into a maggot which is very active and voracious, and feeds on the organic

matter in which the eggs were laid. The maggot has a life of from 5 to 20 days according to the favourableness of the conditions, and then becomes a pupa for 5 to 14 days. From the pupa the adult fly emerges and is at once active, voracious, and sexually mature ready to give rise to another generation. The minimum period of development under favourable conditions is about 11 days and obviously the rate of multiplication of flies, and the occurrence of enormous numbers, will depend upon the existence of favourable conditions and food and will be roughly in proportion to the "R" power of 50 where "R" represents the relative rate of rapidity of reproduction, and has a value ranging from unity—for the maximum period—to nearly three, for the minimum period of reproduction.

These facts explain the numerical prevalence of flies under various conditions, and demonstrate the importance of removing the facilities for their reproduction and nourishment during the process of development.

To complete the evidence against the fly it is only necessary to establish the fact that it can harbour living pathogenic organisms for a definite period. This has been done experimentally. Flies were fed on cultures of typhoid and tubercle bacilli and then removed from the source of infection and killed and examined in a daily series. It was definitely proved by repeated observations that the legs and wings were contaminated for a period of 12–24 hours, and that the stomach and intestines were contaminated for a period of 7 to 14 days, the living organisms were isolated, cultured and demonstrated from the crop and intestinal contents.

9. *The Importance of Separate Factors.*—When the chain of chance is complete, and the required conditions are all presented, a cholera epidemic may be confidently expected, and almost invariably occurs. The best demonstration of this argument, of which I am aware, is the town of Puri, where pilgrims gather at all times of the year, but in particularly large numbers to celebrate the *Rath Yatra*. I quote from my own report on the last great *mela* there.

"My own opinion as to the frequency and regularity of cholera outbreaks in Puri is that the conditions are almost ideally perfect for the occurrence of such epidemics.

"The chain of necessary connecting links is complete: the climate is moist and warm: pilgrims are crowded together in large numbers: indiscriminate defecation is almost universal: carriers of cholera infection are certain to be present in so large a population recruited from so wide

an area: flies are exceedingly prevalent: and lastly, to complete the chain of circumstance, there is the "*Prasad*," the cold cooked food which the pilgrims must eat and which they carry from one temple to another, and through the bazaar, on a simple platter of leaves open to all the flies to feast on and to contaminate. This cold cooked food is an excellent medium for the multiplication of the organisms, and it is probable that many portions of this food contain large numbers of cholera organisms before they are consumed by the pilgrims, many of whom are old and most of whom have their natural resistance diminished by exposure and privation, prolonged travelling, and insufficient food."

"On the other hand when any links are missing from the chain, a great *mela* may assemble and disperse without any fear of an extensive outbreak of cholera.

"This condition is typically exemplified in the Sonapore *mela* at which from 2 to 4 *laks* of people assemble yearly in the month of *Kartik* (October-November). The crowd and the carriers are there, but the climate is not favourable to the reproduction of flies as the nights are too cold, and the conservancy is good—in fact very good—and so the flies do not find the necessary nidus: also the water supply is clean and carefully guarded, the chances of contamination are therefore practically avoided, and the crowd and its carriers cannot alone produce an epidemic."

10. *Why Cholera is preventible in Europe.*—To elaborate the same argument further, we arrive at a working hypothesis as to why cholera is not endemic in the greater part of Europe, and why it is so easily preventible there, because during the greater part of the year the climate is unfavourable, and in most places the conservancy arrangements are really good.

11. *How Cholera is preventible in India.*—In India, on the other hand, the climate is more generally favourable than otherwise, but it is interesting to observe the effect of the rigorous Punjab climate in reducing the prevalence of cholera as compared with the moist and warm climates of Bengal and Madras, where cholera is endemic, whilst in Bihar and the upper Provinces, cholera is typically a seasonal disease, becoming prevalent in the warm weather when flies can breed freely, and dying out in the rigorous cold weather of winter.

As we cannot modify the climate, it is obviously more logical to devote our energies to the improvement of conservancy, and my whole argument leads up to this—that good conservancy is the Alpha and Omega of cholera prevention—as a practical measure, and on a large and general scale.

Crowds and crowding we cannot prevent, and the "carrier" we shall always have with us, though we may hope to decrease his numbers. Water-supplies can and should be improved and made safer, but the essence of my argument is the necessity for breaking the chain of circumstances at its weakest and most accessible link, and fixing a great gap between man and the contamination of his food, by means of good conservancy.

Sanitary Problems In Madras.

By

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The advance of sanitation in the Madras Presidency is necessarily slow owing to many causes, the chief of which are the reluctance of the responsible authorities to provide sufficient funds and the backward condition of the people in understanding sanitary methods.

Despite these adverse conditions we have accomplished in the Presidency a considerable number of works which admittedly have improved the health of the communities affected thereby.

I propose in this paper to refer generally to the different classes of works carried out, mentioning the particular difficulties encountered by us with the object of obtaining the views of delegates thereon.

It may be advisable for me to state here that the works referred to in the paper are more particularly those intended for towns and villages in *mofussil* areas.

Water-supply, Urban.—Of urban water supplies we have in use 19, and 6 are under construction.

Population.—The schemes for water supply projects of late years have been drawn up on the basis of the probable population 30 years hence. This probable population has been obtained from a population curve or diagram which has been prepared from the results of previous decennial censuses. As a rule this gives the probable population as about 30 per cent increase over the existing population.

Rate of supply.—The rate of supply per head is usually taken at 15 gallons for an ordinary *mofussil* town. It is doubtful whether this amount is sufficient, judging from the complaints received from many towns. These complaints are loudest in connection with street fountains which, although numerous, fail to satisfy the people. We must not, how-

ever, lose sight of the fact that during the times of the maximum demand at street fountains the numerous house connections are also being used.

Waste of water.—Owing to want of sufficient provision in the original District Municipalities Act, powers for regulating consumption of water, waste of water and for fixing water meters were absent, and consequently the amount of water drawn off by house connections in towns increased out of all proportion to the quantity desirable. A new Act has been passed which gives sufficient powers for regulating wastage of water and for installing meters and charging for excess.

Attempts in the past have been made to fix the number of taps allowed in a private house in accordance with the rental value of the house and the taxes paid thereon, but practically no serious attempt has been made to fix meters or to make a charge for excess water. Consequently the amount of water wasted is relatively enormous owing to leaky taps and to taps left constantly open. I should prefer to fix a meter on every house connection at the municipal cost and to charge a rent for such meter to the owner or occupier of the house.

The house-holder should have as many taps as he requires. The free quantity of water to be supplied to each house should be fixed by a scale based on the rental value and all water used for domestic purposes above this scale should be charged for per 1,000 gallons, the amount being read from the meter. The following is an example of a scale proposed for a *mofussil* town in this Presidency:—

Houses of the rental value per annum of Rupees.					Daily allowance in gallons.
100 and less	..	..	..	..	.. 80
Above 100 up to 400	..	..	..	..	.. 100
„ 400 „ 700	..	..	..	..	.. 120
„ 700 „ 1,000	..	..	..	..	.. 180
„ 1,000 „ 1,500	..	..	..	..	.. 200
„ 1,500 „ 2,000	..	..	..	..	.. 220
„ 2,000 „ 2,500	..	..	..	..	.. 260
„ 2,500 „ 3,000	..	..	..	..	.. 300
„ 3,000	..	..	..	..	.. 350

The rate fixed for excess water varies from 8 to 12 annas per 1,000 gallons.

If water is required for non-domestic purposes, such as aerated waters manufacture or other trade purposes, the water so used should be

measured by a special meter and charged at a rate approximately double that of the domestic rate.

The introduction of these rules rests with the Chairman and Municipal Councillors, and I regret to say that although their introduction and enforcement would mean a considerable revenue and would solve the problem of how to stop the waste of water, Municipal Councils hesitate in taking necessary action.

The principal sufferers from this inaction of Municipal Councils are the poorer people who use the public fountains and householders who live at higher elevations.

Direct pumping into water mains.—Our experience in Madras has shown that direct pumping into the main at the head-works without the intervention of a service reservoir is bad policy. Owing to the misuse of house connections in the town and the opening and shutting of such and of sluice valves on the distribution mains, it is impossible to maintain the requisite pressure in the main at the head-works pumping station. It is a fact that better results are obtained when the pumping engines pump the water into a service reservoir whence the supply to the town is distributed. When the wastage of water at house connections is stopped the opening of taps on these connections would still result in such a sudden lowering of pressure in the main in the case of direct pumping, that damage to the pumping engines would result. When the first works in Madras were constructed, a service reservoir was omitted for financial reasons, but experience has shown that a service reservoir is absolutely necessary for the maintenance of a steady pressure, for the protection of the pumping plant and for the provision of a small storage. In the case of such a reservoir a capacity of 4 hours supply should suffice.

Water taps.—With regard to water taps for street fountains we have favoured for the last twelve years the type known as Tyler's patent automatic self-closing valve with lever handle. This type, though expensive, is durable. The principal defect is that the automatic self-closing part becomes inoperative after a time. This part consists of a gun metal plug which fits accurately into a casing and is intended to descend by its own weight on to the water orifice, thus closing it. Owing to the accurate fitting necessary for the gun metal plug and the fact that water generally contains a fine sediment, especially after river floods, this plug fails to drop, the mud in the water causing it to stick fast in its casing. When this occurs the tap becomes an ordinary spring loaded self-closing tap. It is true that the drop plug can be removed and washed, but as a rule this duty is not performed promptly so that the

object of the invention is defeated in actual practice. On the whole, however, these taps have been found the most satisfactory of all the taps tried in the Presidency. As the body is made of galvanised cast iron few thefts of the taps have occurred.

Improvement of village water-supply.—The insanitary state of the village water supply in the Madras Presidency has of late been receiving increased attention. Now that a considerable number of towns have received protected water supplies and the benefits derived from such protection in the reduction of cases of cholera and other water-borne diseases have been admitted, it seems necessary to carry this protection further and to improve the sources of water supply of the villages adjacent to these towns, and also of the more important outlying villages.

A village water supply is usually derived from an irrigation channel direct, from a pond or tank, or from wells. Little can be done in improving the quality of direct supply from an irrigation channel. It can be improved by digging a new tank or improving an old tank fed from the channel. This improvement is gained by storing the water so that the mud in it may settle to the bottom of the tank and the sun's rays may kill the germs contained therein. The next step is to conserve the tank by fencing it and by providing other means of drawing water than the present one of wading into it with the object of filling water vessels.

Drawing water from tanks.—The best way of drawing water from tanks is the provision of an engine and pump which can be used to fill a small reservoir, either itself provided with taps or supplying a short length of water main in the principal street with suitably placed public taps.

For the last six years an installation on this principle has been in use for an outlying part of the town of Salem. At this place there was a large square tank adjoining a main road, and the people were accustomed, after walking on this dusty road, to enter the water of the tank in order to fill water vessels. The contamination of the water by this means was very great. It was accordingly decided to erect an oil engine and pump, and to pump the water from the tank into a small masonry reservoir by the roadside. This reservoir was provided with 20 taps and the spill water therefrom was conducted into the roadside drain. Entrance to the tank was prevented by a wall surrounding it. The people who had formerly entered the tank were able more easily to draw water from the taps, this saving of labour being much appreciated and the quality of the water supply was much improved. This improvement in quality was borne out by the results of the cholera visitations. It was

observed that the part of the town which used the water from this oil engine installation did not suffer from cholera, which was prevalent in the remaining parts of the town.

The cost of the 7-Brake Horse Power Oil engine and 3-inch centrifugal pump, masonry reservoir with 20 taps and a capacity of 5,775 gallons, surrounding platform and leading off drain, was Rs. 5,000. The annual cost of working, including repairs of plant, was Rs. 1,050. The quantity of water pumped daily was 56,000 gallons and the average lift was 35 feet.

Somewhat similar installations, if supplied to suitable village tanks, should give equal sanitary efficiency.

Tanks with draw-off wells.—In villages which are unable to provide the cost and upkeep charges of a pumping installation, an arrangement of draw-off wells connected to the tank by means of pipes can be substituted. In this arrangement the tank is fenced with suitable fencing such as 5 lines of barbed wire, and 4 wells are sunk one on each side of the tank but outside the banks and the fencing. The bottom of each well is connected to the tank by means of a pipe, preferably of cast iron. The tank water enters these pipes about a foot above the bottom. The wells are provided either with bucket and pulley arrangement or with hand pumps. The provision of 4 wells to each tank enables one to be used separately by each section of the community. Plans illustrating the arrangement described can be shown:

Village wells.—Village wells are usually deficient in many sanitary requirements. They are generally unprovided with efficient platforms at ground level, and it is rare to find one with a leading-off drain. The inside of the steining is seldom plastered with cement above lowest summer water level. Contamination of the water in the well by soakage from the surrounding ground is usually the case.

The most important requirement of a well is an impervious platform around the parapet with a surrounding drain and a suitable length of leading off drain so that no soakage of surface water can occur within 150 feet of the well, if of the usual depth of 20 to 30 feet.

The second most important requirement of a well is the drawing-off arrangement. This arrangement should, if possible, be either a power-driven or a hand pump.

The third requirement is the covering of the well and the cementing of the steining above summer water level. In the case of wells where the draw-off arrangement can only be the usual bucket and pulley, it is considered that the bucket and rope provided should be the property of

the village authorities and should not be removed from the well. This arrangement should be encouraged instead of the usual arrangement by which each person brings his own bucket and rope thus contaminating the well.

A further improvement that can be effected in village wells is the provision of a power-driven or a hand pump to fill a reservoir provided with taps and located near the well. In lieu of this location the reservoir may be elevated so as to supply a main pipe laid in the village street and provided with suitable public fountains. Plans showing the improvements described can be shown to delegates.

Drainage.—The natural drainage of a village is a roadside ditch into which the sullage from houses is discharged. As the village increases in size and the nuisance from the roadside ditch becomes more evident, the necessity for developing that ditch into a masonry drain becomes apparent.

In a state of perfect repair this masonry drain is fairly satisfactory, but unfortunately such drains are seldom repaired and the task of keeping them daily cleansed and periodically repaired is generally neglected.

When the village becomes a town, under these conditions the nuisance from one street is conveyed by the open drains into the next and the inhabitants of the lower street have good reason to complain of the state of the drain in front of their houses. In order that these open drains may be effectual it is necessary that they should be constructed with good gradients, that they should be regularly and effectually cleansed and flushed, and that the sullage should be properly treated at the outfalls. If there were no silt in the sullage which enters these drains, and if the people did not put in them plantain leaves, straw and other materials which cause stagnation of sullage, such drains would act fairly well.

In actual practice we find that silt has to be removed from the drains daily and that the silt so removed is left on the roadside causing a nuisance. Even with good gradients the presence of plantain leaves and other materials which house-holders ought to burn, causes the sullage in the drains to pond up, thus producing a nuisance. Granting that drains were free from objectionable floating matter such as leaves, road material, sand and earth would be washed into them, causing silting and stagnation.

It is impossible to obtain in actual practice efficient working conditions so that the provision of open drains for a town should be accepted, only if funds are not available for better means of drainage. The

sight of sullage flowing in front of the doors of the inhabitants of a town is demoralising, and at the same time the presence of so much deleterious matter in the open favours the breeding of flies and mosquitoes and pollutes the atmosphere.

In constructing open drains we favour oval shaped masonry drains plastered with cement as this shape can be more easily cleaned than drains of triangular section made of stone slabs. It is difficult to clean the apex of such drains and the joints in the slabs become impregnated with objectionable matter. As an additional argument in favour of oval shaped masonry drains it may be said that masonry drains are cheaper to construct than drains of stone slabs, except in the districts where the slabs are locally obtainable.

The sizes of oval shaped drains constructed by us are based on the amount of rainfall falling on their drainage areas, the amount taken being $\frac{1}{2}$ inch per hour for places where the annual rainfall is 40 inches and 1 inch per hour where the rainfall reaches 80 inches.

The gradients of these drains are fixed by those of the existing roadside drains.

Such open drains will therefore be most successful in towns where good gradients are available.

Closed sewers.—This type of drainage is necessary for towns which owing to their flat location cannot be drained by open drains. In such cases sectional pumping is necessary and a good example of this type may be observed in the city of Madras. By the use of closed sewers all the objections stated against open drains are removed. The disadvantages of closed sewers for *mofussil* towns are the deficiency of water supply for flushing, the difficulty of dealing with the rainfall which falls on roofs and courtyards and which unlike the home country is not distributed over the whole year, and the difficulty of providing satisfactory house connections owing to the peculiar construction of an Indian house and the habits of the people.

Want of water for flushing.—The deficiency in the pipe water supply of *mofussil* towns for flushing sewers can be overcome by the provision of flush tanks filled either from existing wells or from new wells sunk near the tanks. Were municipal bye-laws strictly enforced and wastage of water stopped, there would be more than enough water available for the flushing of drains. Flush tanks can also be provided and filled from the spill water at most street fountains.

Rainfall.—Excess rainfall may be kept out of sewers by excluding all which falls on roads and similar areas and by limiting the amount taken by the house connection, the excess being surplused into the road-side drain. The sewers should be made capacious enough to take a considerable quantity of rainfall at least equal to 6 times the dry weather flow. One advantage of taking this quantity is the periodical flushings obtained and the avoidance of excessive overflow of dilute sullage at house connections.

In order that the sewers may take a large quantity of rainfall, the length of 6-inch sewers should be limited to 300 feet and the usual length of 6-inch sewer beyond the primary length of 300 feet should be designed with 9-inch sewer pipes laid, however, at the gradient necessary for a 6-inch sewer pipe. Similarly the 9-inch sewer pipes should actually be laid as 12 inch pipes at the requisite gradient for 9-inch pipes. The larger sizes of sewer pipes should be similarly increased. The velocity of flow in these increased sizes of pipes is only slightly reduced below that obtainable from the smaller sizes and the increased capacity of the sewers allows a much larger quantity of rainfall to be carried off by the sewerage system and to be surplused at suitable points on the line of sewers, leaving an amount equal to 3 times the dry weather flow to be pumped on to the sewage disposal works. The extra cost of laying larger sewers than are actually required for dealing with the sewage and a smaller quantity of rainfall is reasonable and only a small fraction of the total cost of the scheme.

House connections.—Owing to the peculiar construction of Indian houses with an open courtyard and to the use of sand and ashes for cleansing brass vessels, the amount of silt which is discharged into drains is excessive, necessitating either its removal before it enters the sewers or the laying of the sewers at steeper gradients than is customary in Europe. Judging from experience of the slackness of local authorities regarding cleansing, I doubt whether without immediate and constant European supervision the removal of this silt before it enters the sewers would be effected. I prefer to take all silts into the sewers, to give them suitable gradients and to rely on silt clearance and flushing of the sewers themselves.

With reference to the habits of the people it will be necessary to educate them in the necessity for sanitary improvements so that they may use without abuse the appliances provided. Instances are not unusual in the home country where the people have been familiar with these appliances for many years, of the misuse of closed drains. Besides having few

or more of the disadvantages of open drains, a pipe sewerage system possesses the distinct advantage of permitting the conversion of all latrines into water carriage latrines, thus getting rid of the objectionable conservancy carts and trenches.

Opening up of congested areas.—A considerable sum of money is being expended in the Madras Presidency in opening up congested areas. The method often adopted of acquiring insanitary houses and forming new roads through congested areas in a town before provision has been made for the dispossessed people, is one which should be condemned. A plan of the town should be drawn up showing on it the proposed new roads and open spaces and the new roads and house sites in the area to be occupied by the dispossessed people. The new roads being made and houses erected, the people should only then be transferred from the congested areas. As the erection of the new houses by private owners is a slow process, it is advisable for Municipal Councils to erect the houses and to recover the amount from the occupiers. Our standard widths for new roads is, 1st class 40 feet, 2nd class 30 feet and sanitary lanes 10 feet wide. All houses should face one or other of the roads, and the sanitary lanes should divide the one house site from the other thus preventing back to back house sites.

In the sanitary lanes there should be either open drains, one on each side, or a closed pipe sewer, leaving a passage for a conservancy cart.

A type design showing the laying out of new house sites can be shown.

Markets.—While the grain, condiment and fruit stalls of markets in this Presidency are fairly satisfactory the construction and upkeep of the meat and fish stalls cannot be considered in any other way than very bad.

The first essential of a good market, *viz.*, cleanliness, is not aided by the class of people who deal in meat and fish nor by the public opinion of the more respectable classes who usually avoid these sections of a general market.

Municipal authorities, probably for similar reasons, are not sufficiently attentive to the cleansing of these meat and fish stalls and this remark also applies to important cities in India.

The only market in this Presidency which could be shown to visitors from the home country without preparation, is that at Ootacamund and the good state of this market is due not only to European supervision but to the fact that so many Europeans do their own shopping at it instead of leaving this important duty to inferior servants.

The difficulty of designing a good stall for the sale of meat is complicated by the custom of the butchers who insist on sitting while serving a customer instead of standing as at home. Besides the usual provision of hooks for the meat, a chopping block is necessary and a platform for display. It is thought that instead of having this platform of masonry lined with white tiles, it would be better to provide an ordinary butcher's table with a thick wooden top. This table would be moveable so that it could be scraped, washed and placed in the sun daily. The stall would contain nothing but a seat, the wooden table and sufficient fixed hooks fastened either to a fixed stand or hung from the roof timbers, so that the stall could be easily cleared of furniture daily and sluiced out by a hose from the water main.

Such an arrangement would be satisfactory if the rules for cleanliness were strictly carried out, but as these rules would certainly be laxly observed, the problem is what is the best arrangement of a meat stall which will demand the minimum of attention to cleanliness.

In the case of a fish stall the requirements are an impervious platform for display of fresh fish and a sink for washing and gutting fish, the whole capable of being sluiced by a hose before and after the day's operations. The platforms recommended are masonry ones lined with white tiles or wooden frames lined with zinc sheet.

In the case of both meat and fish stalls it should be the invariable rule that no storage over night in any lock up place or box in the stall should be permitted. Markets for meat and fresh fish should therefore, in the plains of India, be built open, the roof being supported on pillars and the open spaces enclosed with wire netting.

Public latrines.—A design for a public latrine which can be accepted as really satisfactory in actual practice, is one of the most important problems in sanitation. Such a design is only apparently possible where a sewerage system exists or where a system of automatic flushing for the latrine with septic tank and land treatment for the effluent can be arranged.

Large sums of money are annually expended in constructing public latrines, but it can be safely stated that excepting the two classes of water carriage latrines referred to above, no European would voluntarily use any of the dry class.

The question therefore is what is the least unsatisfactory of this type, and should any be constructed? Should not all important public latrines in places where no sewerage system exists, be constructed of

the second type as recommended by Major Clemensha at the First Sanitary Conference in Bombay?

Education of the people in the necessity for sanitary improvements.—In the home country the success of sanitary methods could not be expected if the co-operation of the people had not been secured, and this has been brought about by the aid of articles in newspapers, lectures and instruction in schools, which have kept pace with or preceded the execution of sanitary schemes.

Simple health lectures should be given in schools in towns to both boys and girls on the necessity for cleanliness in the home and surroundings. These lectures should emphasise the need for pure water and warn against waste, protection of food from dust and flies, ventilation of the house, cleanliness of house drains and surroundings, destruction of refuse and cleanliness of clothing and the person.

In addition to this, municipal officials should interest themselves in the instruction of householders, especially the women, in similar subjects, this instruction serving a more important object than the prosecution of offenders. As a matter of fact prosecution of offenders against bye-laws is almost non-existent.

Our Contemporaries.

MEDICINE.

Pathology and Treatment of Cardiac Asthma.

ROSEN speaks of the nocturnal onset, the mechanical oppression which serves as a sort of aura to the paroxysm, the high degree of orthopnoea, the fact that the case seldom comes to physical examination on account of the labored breathing and restlessness. The exact mechanism of the attacks is not known. The condition is symptomatic of many affections—arteriosclerosis, especially of the coronary arteries, embolism in the same and in the pulmonary vessels, myocarditis, aneurysm, nicotineism. It is likely to be confounded with spastic bronchial asthma and in extreme degrees of the latter diagnosis may be all but impossible at first. The history of the attacks and the exclusion of certain causal factors in cardiac asthma, with the presence or absence of emphysema, will make for a proper differential diagnosis. Renal asthma may require differentiation although both forms may occur under identical circumstances. The two conditions, however, are radically distinct for uremic asthma is due to circulating toxins while cardiac asthma is the result largely of mechanical conditions. There should be no confusion with nervous asthma. The

best remedies for the attacks appear to be camphor and caffeine, given by intramuscular injection. If the emergency is sufficiently acute some digitalis derivative should be injected intravenously. Morphine injection is often used as a synergist. An ice-bag should be placed over the heart as a physical stimulant and venesection will at the same time relieve the strain on the organ. The patient should be propped upright and inhale oxygen.—*The Canadian Practitioner and Review*.

Treatment of Migraine.

LEOPOLD LEVI, in a paper read before the Societe de Therapeutique, Paris, stated that he considered migraine to be due in many instances to disturbed function of the thyroid gland. Where the thyroid activity is deficient, the attacks appear at the time of the menses, in the presence of excessive thyroid function; on the other hand, they may occur at any time. A third, intermediate type, in which there is merely some perversion of the glandular secretion, partaken of the characteristics of both the others. In the first type mentioned, thyroïdin may be given in an initial dose of 0.1 gramme; in the second, 0.005 gramme, and in the third, 0.025 gramme. The treatment should be kept up for twelve to eighteen months. The author presents numerous corroborative cases in which migraine had been absent for two or three years as a result of thyroid treatment.

There is also an ovarian form of migraine. This should be treated with ovarin in doses of 0.2 gramme twice a day, or with corpus luteum in 0.1 gramme doses, but the results are not as striking as with thyroïdin. The latter will often lead to an unexpected recovery in cases where other drugs and correction of digestive disorders by a suitable diet have failed to bring relief.—*Ibid*.

Medicinal Treatment of Adenoids.

Broadly speaking, operation is the only treatment generally adopted in this country for adenoid vegetations, though breathing exercises, cod-liver oil, iron preparations, and climatic treatment are often advised in mild cases. According to the *Medical Review*, Lapeyre, Roose and Lucas-Championniere are all agreed that potassium iodide, or iodine itself, taken internally is capable of causing retrogression of these troublesome growths. The doses recommended are two to four grains (for children) twice or three times a day; and the authorities mentioned are satisfied that the benefit of this medication is not by any means confined to those in whom there is reason to suspect a syphilitic taint. It is

necessary to persevere with the treatment for two or three months at least, and Lucas-Championniere states that even when it does not actually cure, it at least renders operative measures much more satisfactory and successful.—*The Hospital*.

Large Doses of Calomel in Diarrhœa.

W. E. FELLOWES.—The writer has used calomel with uniform success in the treatment of diarrhœa. In mild cases he gives small doses, but in more serious and obstinate cases large doses. When calomel fails to cure diarrhœa the dose is insufficient. He has used heroic doses with untoward results. It is best administered as a powder; pills and tablets are less satisfactory. He had difficulty in its retention until he discovered that an equal quantity of cerium oxalate prevented vomiting. To adults he gives 5 grains of calomel with 5 grains of cerium oxalate every 2 hours until the symptoms subside. Six powders and sometimes less control the attack. To children, no matter how young, he gives 2 grains of each every 2 hours until the symptoms subside.

In the diarrhœa of typhoid fever he has also had good results from 2 grains of calomel night and morning. Given early, it mitigates the disease. One precaution is necessary: never give it if the bowels are confined. Magnesium sulphate should then be first administered; otherwise salivation will occur. He has never known a fatal case in which this treatment was adopted early.

Calomel is of great value in children wasted from gastro-enteritis. One grain given night and morning will succeed when other methods of treatment, including hyd. c. cret. fail.

H. D. McCULLOCH.—In the acute enteritis met with in the tropics in adults, with temperatures ranging between 103° and 106°, and highly offensive coffee-ground evacuations, the writer has given 20 grains of calomel and repeated it twice in the first 12 hours, with the most striking improvement, such as no other drug could have effected in the time. In dysenteric diarrhœa, whether of the bacillary or amœbic type, with or without a rise of temperature 12 grains of calomel repeated twice in the first 12 hours is a common and perfectly safe procedure. But whether constipation be present or absent, 1 grain of calomel given every 3 hours in doses, caused pronounced salivation in adults.—*The Medical Review*.

The Vaccine Treatment of Typhoid Fever.

J. G. CALLISON.—The reaction produced in health by the injection of dead typhoid bacilli, follows the same curve as is produced by any antigen. Antibodies are not produced until about 8 days. Then until the twenty-fifth day they are rapidly produced. In typhoid fever the reaction is more rapid, as it has already been initiated by the disease. Under vaccines the temperature falls, the patient becomes brighter, and the appetite returns sooner than in cases otherwise treated. The number of relapses and complications are also fewer. The earlier the vaccine is administered the better. Therefore the method by which the diagnosis can be made earliest—blood culture—should be used.

The writer collected 323 cases of typhoid fever treated with vaccines with 17 deaths (5.2 per cent.) and 20 relapses (7.2 per cent). Subsequently Meakin and Foster, of Montreal, reported a series of 41 cases and compared them with cases treated by the routine method in the same hospital. The following table shows the results:—

	Vaccines.	Routine Treatment.
Deaths	2.4 per cent.	10 per cent.
Relapses	2.4 "	13 "
Complications	5 "	42 "
Duration of fever	28 days	37 days.

The initial dose was 1,000 million bacilli. Eight days later, if required, 1,500 million were injected and if at the end of a second eight-day period the patient was still febrile, 2,000 million were injected. In many of the cases the temperature fell so rapidly as almost to resemble a crisis. The beneficial influence of the vaccines on the toxic symptoms was almost constant. In some cases the toxæmia diminished out of proportion to drop in temperature, but in the majority these two conditions were parallel. In no case did any increase in the toxic symptoms appear after the administration of the vaccine.—*The Medical Review*.

Diabetes and Pregnancy.

BY

LOUIS FOLLIET.

The word diabetes is used here in the usual clinical sense and does not include temporary glycosuria, which is not infrequently observed during pregnancy or lactation. It is usually stated that pregnancy is rare in diabetic women, but some recent statistics modify this view. Thus Vinay records 63 confinements in 34 diabetics, and Chapiet 103

pregnancies in 73 diabetics. It seems that some diabetics have a high degree of fertility. Lop has recorded the case of one who had 11 children. In considering the number of recorded cases it should be noted that diabetes is less common in women than men and often does not commence till after the child-bearing period. On the other hand, the production of diabetes has been regarded as favoured by repeated pregnancies. It may occur before conception or follow one or more pregnancies. It more commonly supervenes during pregnancy, possibly the first pregnancy, but more frequently a later one. It is most frequently recognised about the fifth month, though cases beginning soon after conception and also near term are not unknown. The onset usually is insidious, and it is therefore difficult to be precise as to its date. Women sent to hospital in labour complicated by diabetic coma have presented less acute symptoms for some time. Diabetes, commencing during pregnancy, usually becomes permanent, and though it may improve after labour, it becomes aggravated by each succeeding pregnancy. Occasionally the symptoms disappear in the non-pregnant state, but some of these cases are probably a form of the physiological glycosuria in pregnancy. In certain rare cases well-marked, old-standing diabetes has been observed to cease during pregnancy.

In about half the total number of cases pregnancy in a diabetic is marked by no untoward incident. The amount of sugar is increased, but is easily controlled by dietetic means, while the pregnancy goes to term and a living child is born.

If complications occur, they may be due to the influence of the diabetes on the pregnancy or *vice versa*. Of the former, interruption of the gestation is observed in about 36 per cent. of the cases. Thus Vinay, in 63 pregnancies in 34 diabetics, observed 22 cases of abortion or premature labour with a dead child. Lepine states that a third of these occur before the fifth month, but the writer's examination of reported cases points to the period between the sixth and eighth month as the more usual time. Hydramnios occurs about once in every 5 pregnancies in the diabetic. Chapiet has recorded 17 cases in 103 pregnancies, excluding the influence of twins, albuminuria, and syphilis. The quantity of fluid is often large; 10 or 12 litres have been observed. The fluid contains sugar in about half the cases. This condition is usually present when premature labour occurs and rarely co-exists with the birth of a living child. Chapiet states that only 56 per cent. of the children are born alive, although in 70 per cent. of the labours the period of gestation is at or sufficiently near term for the child to be viable. The difference between

these figures represents children born macerated, and a smaller number who succumb during difficult labour. Among those born alive, a few die within 3 days of birth, from toxæmic causes. The necropsy shows increase of the subcutaneous and perivisceral fat and enlargement of the suprarenal glands. Including these, it is estimated that about half the total number of children conceived by diabetic mothers succumb at or before birth.

The children are usually larger than normal and frequently attain remarkable proportions, such as from 10 to 14 lbs. Anderodias observed a macerated foetus weighing 7,000 gm., which was 70 cm. in length, while Mathews Duncan described a macerated foetus of 5 months as large as an infant at term. This abnormal size is attributed to the abundance of glycogen in the blood of the mother. It has an important bearing on the difficulty of labour in such cases and is a contributory cause of the high foetal mortality. In a few cases hydrocephalus has been recorded, but its significance is doubtful. In only 2 cases is the presence of sugar in the infant's urine mentioned. Chambrelent observed glycosuria in an infant of 18 days, and its absence 25 days later. Neumann found 25 per cent. of sugar in the first few days after birth; the mother was suffering from severe diabetes.

The influence of pregnancy on diabetes is usually unfavourable, even when the gestation follows its normal course, and in some cases the life of the mother is endangered. In the mildest cases there is usually increased weakness and emaciation and the variable increase in the glycosuria. In many cases the amount of sugar passed increases progressively. Thus Williams has recorded a case in which the amount of sugar in the 5th month was 39 gm.; in the 6th, 50 gm.; and in the 7th, 64 gm. On the other hand Paucot reported a case in which the sugar diminished in the 6th month, and disappeared in the 8th, to return 4½ months after labour. In Eshner's case, a woman with 46 gm. of sugar per litre became pregnant, and the glycosuria ceased a month later. The pregnancy went to term and the sugar reappeared 4 months after delivery.

In the more serious cases the unfavourable influence of pregnancy on the diabetes is marked by increasing weakness and emaciation. About the 6th month the symptoms often become alarming. If hydramnios is present it produces serious compression of the viscera, or the foetus may die, causing premature labour. The mother may die in labour or after a variable interval. When death occurs early it follows delivery immediately or within 5 days. The patient becomes collapsed

with feeble pulse and chilling of the face and extremities, the temperature being subnormal, the respiration disturbed, and the thirst severe. Then follow mental confusion, delirium, more or less prolonged coma, and death, the end being sometimes hastened by syncope. If the patient survives this early period, she may die from coma about 4 to 6 months after labour or from pulmonary tuberculosis, usually within two years. In Chapiet's cases, 16 died soon after delivery and 15 within two years. In 15 fatal cases Duncan found that death occurred in 4 within 3 or 4 days after labour; in 5 in the sixth to the eighth month; in 1 in 15 months, and in 1 in 2 years. The mortality of diabetes complicated by pregnancy has been estimated at from 50 to 55 per cent., but against this must be set the fact that the maximum mortality from diabetes on women coincides with the period of reproductive life being 43 per cent. between 20 and 30 years of age.

Labour in diabetic women is usually longer than normal on account of the less powerful uterine contractions due to the general muscular weakness. There is also frequently dystocia from the abnormal size of the child, even when macerated. The forceps are usually necessary, and delivery of the shoulders is frequently difficult. In the case of the exceptionally large children embryotomy may be required. Uterine hæmorrhage has been stated to be frequent in diabetics, but the writer believes this to be doubtful. Among minor inconveniences may be mentioned, distension of the bladder during labour when polyuria is marked.

Puerperal infection has been observed in diabetics to be both frequent and severe, frequent from the difficulty and length of the labour, and severe from the low resistance of the patient. Many writers have observed the unfavourable influence of suckling on diabetics. Not only does the disease sometimes appear during nursing, but in spite of a temporary improvement, at first due to the transformation of glucose into lactose, the patient rapidly emaciates and the diabetic symptoms increase. On the other hand, insufficiency of lactation is often observed.

Prognosis.—When a woman, who is suffering from diabetes, becomes pregnant, the prognosis depends to some extent on statistics. The mortality in observed cases is 50 per cent. for the mother, during labour or soon afterwards, for the infant 48 per cent., of which 33 per cent. represents the mortality from premature labour, and 15 per cent. that from death in utero or soon after birth from maternal intoxication. It must also be remembered that one or more former pregnancies, well-borne in spite of the diabetes, do not ensure an absence of serious symptoms during a future gestation. It is important to consider whether the

progress of the diabetes is rapid or gradual and how far it has been influenced by treatment. The effect of pregnancy on the glycosuria must be estimated, the gravity of the prognosis increasing with the amount of sugar passed, especially when the patient is under strict regimen. A careful examination for signs of pulmonary tuberculosis is important. The presence of hydramnios indicates a rapid form of the disease and is very unfavourable for the foetus, as is abnormal size in relation to the period of gestation. The urine of pregnant women should be examined for sugar, especially if they have abated without apparent cause. Seegen mentions the case of a woman who aborted 4 times before it was discovered that she suffered from diabetes. The presence of pruritus also indicates examination.

Treatment.—Certain writers have advised against the marriage of diabetics and recommended the avoidance of pregnancy, but each case should be treated on its merits. A pregnant woman suffering from diabetes should without delay be submitted to strict regimen which must be continued till after labour, but it is better to avoid the use of drugs. With regard to obstetrical treatment, there is a sharp division of opinion. Some writers recommend the induction of abortion at the beginning of pregnancy; others are opposed to this as a course which saves neither mother nor child. The number of cases in which abortion has been induced is too small to permit an estimate of its value. If the pregnancy is proceeding normally, the glycosuria but slightly increased, the child alive and not abnormal in size, intervention is not indicated. If, on the contrary, marked aggravation of the diabetes occurs or hydramnios is producing serious symptoms, intervention may be necessary. It may suffice to puncture the membranes to reduce the bulk of the hydramnios, but it appears more rational to empty the uterus. In the cases intermediate between those two classes the difficulty lies. If the foetus is growing at an abnormal rate, suggesting serious difficulty in labour, and if in previous pregnancies the child has been born dead, the induction of premature labour may be indicated to save the life of the infant. In choosing the date for the induction of labour, the size of the child as well as the period of pregnancy, must be taken into account. Whether labour be induced or spontaneous, it should be hastened as much as possible to avoid fatigue to the mother, and early intervention should be practised. The anti-diabetic regimen must be continued after labour. Signs of weakness or coma or pulmonary tuberculosis should be looked for and treated. The mother should not nurse the infant; a wet-nurse should be provided.—*The Medical Review.*

SURGERY.

The Results of Treatment of Syphilis as Shown by the Wassermann Reaction.

BY

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The two greatest difficulties in dealing with cases of syphilis have been, first, to tell whether a patient has syphilis, and, secondly, to tell when a case has been cured by treatment. Continental syphilographers have almost unanimously insisted that three to four years' treatment with mercury is necessary, while the British have held that two years thorough treatment is usually sufficient. In making a diagnosis, secondary signs are comparatively obvious to one skilled in syphilology; the difficulty usually lies in the diagnosis of suspected congenital, tertiary, or latent cases.

In solving these two difficulties, the Wassermann reaction has proved to be a great aid. Not that all cases giving a negative reaction can be considered to be free from infection, but a positive reaction practically proves infection. In the past thirty months, through performing the reaction on about eight hundred sera, we have been able to follow a large number of treated and suspected cases. It is our object in this paper to summarize the results of treatment, and to analyze the cases giving positive reactions without any history of syphilis. In dealing with treatment we shall say very little about the new remedy, salvarsan, as it is of too recent introduction for us to be able to pass judgment upon its efficacy as a complete cure.

Of sixty-one cases, in which we were able to obtain sufficient history of previous treatment and which gave a positive reaction, seven had had three years treatment with mercury, seventeen had had between two and three years, twenty had had between one and two years, and seventeen had had less than a year of treatment. In twenty-two cases which had a history of infection but reacted negatively to the test, four had had three years or more, ten had had between two and three years; seven between one and two years, and one less than a year of treatment. Put in another way, of eleven cases having had three years or more of

treatment, seven were positive, and four negative; of twenty-seven cases on two to three years treatment, seventeen were positive and ten were negative; of those on one to two years of mercury, twenty were positive and seven negative, and of those on less than a year's treatment, seventeen were positive and one negative. In considering treatment we have not taken potassium iodide into account, for, except in one case, we have never found that its administration, even in larger doses, had any tendency to change a positive reaction. It probably has little or no effect in killing the *Treponema pallidum*, but is beneficial through its action in promoting the absorption of the new cells in gummata.

TABLE SHOWING RESULTS OF TREATMENT.

No. of years treatment.	No. of cases.	WASSERMANN REACTION.			
		Positive.		Negative.	
		No.	Per cent.	No.	Per cent.
3 years.....	11	7	63·5	4	36·5
2-3 years	27	17	63	10	37·0
1-2 years	27	20	74·1	7	25·9
Less than a year.....	18	17	94·4	1	5·6

The high percentage of positive reactions in cases on three years or more of treatment may be partly accounted for by the fact that some of these cases had symptoms, while most of the cured cases who had been on three years' treatment, having no symptoms, did not care to have a test made. The method of administration of mercury varied; one patient was given it intramuscularly for five years, and in pill form for three years. In spite of this severe treatment his reaction was positive. On the other hand one must remember that probably thirteen to thirty per cent. of the negative reactions were obtained in persons who were still infected, but in whom the production of antibodies was too small to cause a fixation of complement, or in whom an excessive amount of natural hæmolysin for sheep blood cells made the obtaining of a positive reaction difficult. A negative reaction obtained within six months of treatment by mercury or salvarsan is of little value, for we have found that the same cases tested later sometimes give a positive reaction.

In the cases treated by salvarsan, the majority showed a negative reaction after one administration; but one-third of the number were

positive either one month or six months after treatment. When salvarsan was given during the primary stage, the Wassermann remained negative as long as followed in all cases. Four cases reacted positively after three administrations. One of these developed tabes within a few months. In several cases, where the reaction was positive after long continued mercurial treatment, it became negative after the administration of salvarsan.

Two more points which have proved interesting to us were the large number of patients with syphilis who denied infection, or who, having had treatment years before and having no symptoms at the time of testing, yet gave a positive reaction. Of one hundred and ninety-three patients who reacted positively, and who were questioned regarding infection, forty-three (21·2 per cent.) denied infection and gave no history of it. The nature of these cases was as follows: fourteen, congenital; eight, secondary; thirteen, tertiary; two, latent; and six, paresis or tabes. In the congenital cases the mothers were questioned. In cases remaining latent for a number of years, disease of the aorta (dilatation or aneurysm) and aortic valve were the commonest reminders of the old infection. So commonly is this fact overlooked that we feel too little attention has been drawn to it in this country. How many practitioners realize that over ninety per cent. of leaking aortic valves occurring after thirty-five years of age are syphilitic in origin?

In nineteen cases of congenital syphilis, the mothers gave a history of syphilitic symptoms in five cases, yet the Wassermann reaction was positive in the mother in sixteen out of nineteen tested. The babies were not tested when the mother's blood was positive, but nearly all cases of congenital syphilis gave a positive reaction in the mother or in the child.

The chronicity of syphilis is well shown by one hundred and eleven positive cases in which we were able to get the date of infection. Forty-six were of less than two years standing; twenty-three between two and five years standing; ten between five and ten years; and thirty-two over ten years. The large number of over ten years duration is partly accounted for by fourteen paretics and tabetics, which are included.

CONCLUSIONS. The Wassermann reaction is the most reliable method for the diagnosis of a cure of syphilis, but it is of little value within six months of treatment, and should be repeated six months or a year later. Where symptoms persist and the Wassermann reaction is negative, as occasionally happens, the reaction should be disregarded.

A negative history of infection is of no value in making a diagnosis.

In cases of congenital syphilis the mother is probably always infected, and should be given treatment.

A history of freedom from symptoms for over ten years is not sufficient evidence that a patient is cured.

A person with a history of syphilis is never a good insurance "risk," especially for a "straight life" policy.

When mercurial treatment is adopted, it should be persisted in for at least three years after symptoms have disappeared.

Potassium iodide does not cure syphilis, and is never sufficient treatment for a lesion, whether secondary or tertiary.—*The Canadian Medical Association Journal*.

The Treatment of Simple Fractures.

BY

CHARLES W. CATHCART, F. R. C. S.

Three methods are now employed—the old immobilization, the massage and early movement of Lucas-Championniere, and the immediate operation advocated by Arbuthnot Lane.

1. *The immobilization method* consisted in setting the broken bone and fixing firmly with splints not only the seat of fracture but also the joint above and the joint below it. This immobilization was kept up until the bone was united—a period varying from 3 to 6 or 8 weeks. After that in many cases the limb was enclosed in Plaster of Paris for several weeks to allow the union to solidify. On removal of the plaster the patient was told to use the limb. He generally did so with great difficulty, and a long and tedious convalescence was required to restore more or less completely the functions of the joints and muscles.

The theory was that bony union could not take place if there was the slightest movement at the seat of fracture. This is now known to be erroneous. Broken ribs heal readily in spite of the movements of respiration, and the success of the massage and early movement treatment has removed any doubt on the subject. The rigid fixation impedes circulation and so delays union of the bones, while it permits of adhesions to form in and around joints, also between muscles and around nerves. It is generally difficult and often impossible to get rid of these adhesions.

2. *Massage and early movement* introduced by Lucas-Championniere. Splints are used only to a limited extent, and the object is to prevent displacement, i.e., to obviate mal-union, not non-union. They are not,

however, discarded altogether, as some suppose. Massage is used as soon as possible after the fracture, and is continued daily at first and afterwards at longer intervals. The object at first is to relieve muscular spasm and disperse effusion, afterwards to promote absorption of effused blood and lymph and maintain the nutrition of muscles. Combined with massage, movements of the adjacent joints, both active and passive, are cautiously employed to prevent formation of adhesions in tendon-sheaths and joints, and to maintain the nutrition of the muscles.

The theory of this treatment is that rapid healing of the broken bone is promoted by the free circulation which is encouraged, while adhesions are prevented and the nutrition of the muscles maintained. Exact apposition of the broken ends of the bone is considered in most cases to be less important for future usefulness of the limb than free use of the joints and muscles. This has been proved in many forms of fracture. The bones heal much more rapidly than was believed possible under the older treatment, and the muscles and joints are ready to resume their function when the bones are firm. The objections raised against this method are that it requires too much time and attention, and that it does not give good results in every case. What these cases are will be considered, but in suitable cases the results amply justify the trouble. The manipulations can be learned by any practitioner and under his direction can be carried out in most cases by some sensible friend of the patient. Professional masseurs do not generally treat fractures well, and in any case they require special instruction. They are not sufficiently cautious and gentle. In mining or other industrial centres it ought to be possible to have persons available who have been taught to carry out the treatment under instructions.

3. *Immediate operation*. This is recommended by its advocates in most fractures of long bones in children and adults, especially of the lower limb, and in probably the majority of fractures involving joints. Under a rigid aseptic technique the ends of the bone are exposed, blood clot removed, and the broken fragments adjusted and held in exact position by steel plates fixed into the bone with screw nails.

The theory is that, in the lower limb especially, restoration of function demands mechanical restitution of the shape of the bone, that without this union is delayed, and pain is necessarily caused when the limb is used, by the altered strains in the bones resulting from the change in its shape. It may be granted that exact reposition of the broken ends will hasten reunion, but no account is taken of the additional laceration of the soft parts involved by the operation nor of the delay in obtaining

functional restoration owing to disuse of the muscles and joints during the healing of the wound. Again, the marvellous adjusting power shown in the process of repair in response to functional demands is underestimated. This is especially true in fractures in children. One argument for operation is the bad results of the old immobilization method. But the pain and stiffness is in most cases due not so much to imperfect restitution of the form of the bone as to adhesions and other changes in the soft parts traceable to the prolonged fixation. Another argument is based on skiagrams taken of fractures before they were plated, but these do not always represent the best position attainable without operation, and give a false impression of the mal-position that would have followed non-operative treatment.

Operations on recent fractures require much surgical skill and a thoroughly reliable technique, otherwise bad functional results, amputation or even death may result. This, of course, does not affect the merits of the method in competent hands, but it does make desirable a method which is more widely applicable with safety and gives satisfactory functional results. Such is furnished by Lucas-Championnière's massage and movement treatment.

The writer suggests the following fields of application for the three methods:

1. The rigid immobilization method may now be modified since the massage and movement method has shown that some movement is no obstacle, but rather a help towards union. It is seldom necessary to secure the joint above and the joint below the fracture unless for comfort, and the limb may be massaged and the joints moved as often as convenient. This modified immobilization method gives good functional results in children in most fractures of the shafts and in adults in the same fractures (shaft of femur excepted) if there is no great displacement of the fragments nor severe laceration of soft parts. In fractures of the femur in adults, however, prolonged fixation is apt to lead to trouble in the knee, as will be explained.

2. Massage and early movement give more rapid results than modified immobilization in the classes of case just mentioned, although the final results may not be much better. It is also the method of choice for fractures near or involving joints, such as fractures of the olecranon, and many fractures involving the elbow in children, so long as they do not require immediate operation (see next paragraph), and in fractures of shafts with much laceration of soft parts and irregularity at the seat of fracture, so long as there is not much angular or axial deformity nor

necessity for complete restoration of length of limb as in the lower limb of men in the public services. It is also to be preferred to the modified immobilization method in fractures suitable for operation which is contraindicated by the patient's age or constitution, to local sepsis or other cause.

3. Immediate operation when reliable technique is available is the method of choice in transverse fracture of the patella in healthy adults, in joint fractures when the fragments mechanically hinder movement, when the important muscular attachments are torn off and cannot be approximated, when a nerve is involved or soft parts prevent the fragments from coming into contact, when angular and axial deformity cannot be restored by manipulation or posture, especially in the lower limb, or when the occupation necessitates walking without a limp, as in the army or police force.

Sometimes the swelling after an injury makes it difficult to diagnose the exact seat of the fracture and the position of the fragments. In doubtful cases a skiagram should be taken as soon as possible; failing this a careful examination under chloroform is advisable with accurate comparison of the injured with the sound limb by measurement, after the best possible restitution.

The application of these principles may be illustrated by 3 common fractures.

1. *Colles' Fracture*.—Reduction is advisable not only to minimize deformity, but also to insure movement at the wrist as fully as possible. When the articular surface of the radius remains looking slightly backwards instead of slightly forwards, as it normally does, the wrist in virtue of this alteration acquires an increased range of dorsiflexion and loses some of its range of anteflexion, quite apart from adhesions. In most cases a general anaesthetic should be given. The hand should be extended in the dorsiflexed position and gradually brought forward, while the back of the lower fragment is pressed down and forward by the operator's thumb. A splint is provided for the anterior surface, either Carr's anterior splint or a wooden splint with a pad to fill the palm of the hand, and the hand and forearm are lightly bandaged to it. A posterior splint is optional. During massage the hand and forearm are laid on a pillow. Warm fomentations and gentle massage give relief to pain which is severe at first. Massage to the wrist and forearm applied at the first sitting is repeated daily, the criterion of correct massage being that muscles are soothed, swelling rapidly reduced, and

yet no pain caused. Passive movements following the massage are confined at first to the fingers and carried to the wrist as pain subsides. Active movements of the fingers begin about the third day. The splint is discarded in 10-14 days, and the hand removed from its sling in about 3 weeks.

The chief cause of disability is adhesions in the posterior tendon sheaths and in the wrist joint. They seldom form when the massage and movement treatment is properly carried out. When they occur in spite of massage and movement they are most frequently the result of osteo-arthritis in the injured part. The support of the forearm and wrist are given primarily for comfort and ease, and secondarily to prevent recurrence of deformity which would be apt to result from spasms of the muscles if the injured part were not supported.

Operation is seldom, if ever, called for, and immobilization is likely to do much harm. Massage and movement have given excellent results, and restored to usefulness hands which by the older method would have become permanently stiff.

2. *Pott's fracture* varies much in severity. In most cases it is possible to restore the position of the foot either at once with or without an anæsthetic or within a few days, as the spasm of the muscle subsides under massage. The deformity most apt to be overlooked is backward displacement of the foot. If not remedied it will curtail dorsiflexion at the ankle and leave a permanent limp. Eversion of the foot is more easy to recognize, but if allowed to remain is a source of disability in walking. A strain is put on the ligaments and tendons at the ankle when weight is borne upon the limb, and this besides causing pain excites a chronic inflammation in the neighbourhood, which in turn increases stiffness. While therefore massage and movement is the method of choice, an operation may occasionally be necessary. Prolonged fixation is apt to lead to stiffness of the ankle. The writer generally uses a box splint, but when eversion is troublesome Dupuytren's splint is the best, and every now and then Syme's stirrup splint is required to prevent recurrence of backward displacement of the foot. During massage the splints are removed, and the limb steadied by an assistant.

3. *Fracture of the shaft of the Femur*.—The writer prefers treatment by extension and local splints after reduction under chloroform, combined with massage and early movement. There is a great difference in the results in children and adults. In children perfect recovery of function usually occurs, whatever the method. Operation and plating for a simple fracture are quite unnecessary.

In adults the case is different. The muscles are massive and powerful, and swell rapidly from infiltration with blood and serum. Through this thick covering no one can determine the form of the fracture or accurately adjust the ends into alignment even under the deepest anæsthesia. Accuracy of alignment depends less on the surgeon's skill than on the nature of the fracture. If the fracture is transverse the broken ends will override and be separated by the thickness of the shaft; if the break is oblique the ends although still overriding will lie more nearly in line. In either case some shortening in spite of heavy extension seems inevitable. On the other hand, except in the rare cases of interposition of soft parts we may expect bony union, and, given time, the union will become strong enough to bear not only the man's weight but heavy loads besides. The popular belief that the seat of fracture becomes stronger than the original bone seems to be correct, perhaps even more so when there is deformity than when there is not. The strain is a stimulus to the consolidation of the callus which is affected by it, but the greater the strain owing to altered shape of the bone the longer the delay in solidification, and of course also the more the overriding and angling the greater the amount of shortening and limp.

Besides the causes of disability traceable to altered mechanical conditions in the united bone there are others associated with the muscles. One is the involvement of the quadriceps in the callus—this limits flexion of the knee. Another is atrophy of the muscles, especially of the quadriceps, from disuse. The resulting weakness prevents the patient from bearing his weight on the limb. This cause of disability often escapes observation, and the bone is supposed to be at fault. These muscular changes will improve under massage and exercise, and in many cases disappear unless immobilization has been continued too long, but even under Championniere's regime steady perseverance with massage and voluntary effort is required for some time after union. When the patient refuses to make an effort and shirks treatment, as often occurs in workmen's compensation cases, the disability will drag on indefinitely. —*The Canadian Practitioner & Review*.

Intravenous Ether Anæsthesia.

BURKHARDT's ingenious system of inducing general anæsthesia by the intravenous injection of ether dissolved in normal saline solution, introduced in England with modifications by Rood, has certain manifest advantages. It has also some serious drawbacks and occasionally produces untoward results. Beresnegowsky has been investigating the

action of "intravenous ether" experimentally and arrives at the following conclusions. Ether solution has an irritating effect upon the walls of blood vessels, which is a frequent cause of thrombosis in them. Pulmonary embolism is a further possibility. The solution is also detrimental to the lungs, in which it may produce swelling of the tissues, dilatation or rupture of vessels, and actual hepatisation. The kidneys and heart show changes similar to those set up by inhalation anæsthesia. This author is against intravenous ether except in certain special cases where inhalation anæsthesia is especially risky.—*The Hospital*.

DISEASES OF THROAT, NOSE AND EAR.

BY

W. STUART-LOW, F.R.C.S.

Surgeon to the Central London Throat, Nose and Ear Hospital.

Tertiary Syphilis of the Nose.

THE patient, a man aged 36, first came to Mr. Stuart-Low's clinic complaining of pain, swelling and redness over the nasal bridge, and a purulent discharge. His case exemplified one of the causes of perforation of the nasal septum, *viz.*, tertiary syphilis, the perforation having occurred in the posterior cartilaginous and bony septum, the usual site in syphilis. He brought with him to the hospital in a pill-box a number of small pieces of bone that had come away from his nose, these being exfoliations which had gradually loosened and been discharged from the vomer and ethmoid portions of the septum. What really brought him to the hospital for advice was the unsightly appearance of the nose, which was swollen, red, glossy, and painful to the touch, with a boggy feeling under gentle pressure with the fingers; he said it felt as if it would burst.

These symptoms resulted from a specific periostitis of the nasal and adjacent superior maxillary bones and infiltration of the surrounding tissues with syphilitic inflammatory material.

Mr. Stuart-Low remarked that the condition might easily have been incised. This would have been bad practice, first as unnecessary, and secondly because the incision would have been followed by a conspicuous scar. Under anti-specific remedies, on the other hand, the whole swelling had rapidly subsided.

Other causes of septal perforation were enumerated, such as tuberculosis, septic ulceration, typhoid fever, traumatism, and, unfortunately, sometimes surgical procedure in the course of a resection operation.

The most effective method of treatment for these tertiary syphilitic cases is to push antisyphilitic remedies. Increasing doses of iodide of potassium generally act quite wonderfully, as in this instance; but sometimes Donovan's solution acts better or does well where iodide of potassium alone seems to be insufficient to clear away the trouble. Locally, painting the interior of the nose with a 50 per cent. oily solution of nitrate of mercury ointment B.P. in vaseline or paroline is effective. Very frequently the septal swelling results in ulceration high up and far back, and, if probed, bare bone can be felt. Such a condition is diagnostic of specific trouble. It is often advantageous to apply the ointment warm, as foetid incrustations are thus more quickly got rid of and the ointment penetrates more quickly and is more soothing.

SEROUS NASAL CATARRH.

This was the case of a female, aged 35, who came complaining of recurrent attacks of severe sneezing and a profuse watery discharge from the nose. Two conditions of the atmosphere served to start the attacks of sneezing and watery discharge, *viz.*, changes of temperature—such as going into a hot room and out into the cold air—or dustiness.

It was pointed out that the mucous lining of the nose in such patients in the intervals of the attacks could be seen to be pale, thin, and often dry; but when an attack is going on it would be red and congested and discharging watery fluid, especially in the region of the middle turbinals. The inferior turbinals could be observed in the intervals of attacks to be thin, desiccated, and pale. The most effective treatment for these patients consists in the application, twice daily, of an ointment containing cocaine, menthol, and eucalyptus oil. This acts by protecting the easily congested and irritated mucous lining and by soothing the inflamed patches. In many of these cases there is an anatomical deformity of the nasal interior, such as a deviated septum or a spur; and if so, to effect a cure, it is imperative that such abnormalities in structure should be operated upon, because the deformity keeps up the congestion, which again brings on the increased secretion.

PHARYNGEAL PHLEBITIS.

A patient was shown illustrating this hitherto undescribed but not uncommon condition.

Mr. Stuart-Low remarked that in almost all cases where the veins of the pharynx become inflamed the mouth will be found to be very septic from dental caries, septic gingivitis, or pyorrhœa alveolaris. The tonsils are often enlarged, follicular, and therefore always septic, since the tonsillar crypts constantly contain inspissated and foetid accumulations.

Another condition which greatly favours the origin of pharyngeal phlebitis is hypomyxia—shortage of the protecting mucous secretion, and therefore exposure of the thin-walled veins which are often varicose. Accompanying this paucity of secretion the mucous membrane is often very thin, more like silk than, as normally, comparable to velvet. This natural thinness easily leads to venous distension, from the feeble support that the veins receive from the tissues. This pharyngeal phlebitis gives rise to an aching sensation in the throat, a sense of heat and fullness. The throat is often dry, and there is an unusual susceptibility to irritation on taking seasoned food and such condiments as pepper and mustard.

The treatment consists in rendering the mouth aseptic, enucleating the tonsils, and painting the pharynx with such astringents as a 25 per cent. solution of argyrol in glycerine, or, with weak solutions of chloride of zinc. It is often necessary to obliterate the dilated varicose vessels by means of the galvano-cautery point.

ATROPHIC RHINITIS.

Three patients, all females, were shown suffering from this horrible and pitiable affection. The disease is most frequently seen in young females. One of these girls, however, has a brother suffering from the same trouble, and at present improving under the same treatment. The leading features of the malady were mentioned, viz., a horrible odour from the nose, that the patient soon lost the sense of smell, and therefore did not realize the repulsiveness of the condition, and an accumulation in the nasal passages of dry, foetid, yellow-green crusts. Mr. Stuart-Low said that he had had a large number of such cases under treatment with mucin, and since employing this remedy he had found it most efficacious, not only in relieving the symptoms, but in restoring the mucous membrane to perform its normal functions. The elixoid mucin should be applied to the nasal lining twice daily, being freely rubbed over the surface; in this way the crusts are at once removed and the dryness prevented. The pharynx also is as a rule very dry and covered with inspissated secretion and should therefore be swabbed out with the mucin solution. The patient can best carry on the treatment by spraying the nose and throat with a solution of 50 per cent. elixoid mucin in water by means of a coarse nasal spray.

AURAL DISCHARGE AND POLYPI.

Two patients were shown suffering from chronic aural discharge and with visible aural polypi.

The first step in the treatment of such cases was explained as consisting in snaring away the polypus; but it was pointed out that to do this right away was very dangerous, as septic meningitis had resulted from the polypus having been attached to carious bone in the region of the attic and having an origin also from the juxtaposed dura mater. The better way was repeatedly to cleanse the aural passage with antiseptic solution, and instil five drops of chloride of zinc in alcohol (4 gr. in 50 per cent. of alcohol) into the affected ear twice or thrice a day. This has the effect of hardening and antisepticising the polypus, and so preparing it for removal, and in the course of a few days under this treatment it could be easily and wholly got away by snaring. The drops should then be continued for some weeks so as to contract and antisepticize the granulations still remaining. If the discharge persists, the radical mastoid operation may be necessary.

DEAFNESS IMPROVED BY THE RADICAL MASTOID OPERATION.

Two patients were shown illustrating the restoration of hearing after a radical mastoid operation. They can now hear a whisper at two yards, though before the performance of the operation the deafness was very marked. Defect of hearing after the mastoid operation is largely determined by the presence of scar tissue forming over the inner wall; this is apt to bind down the stapes and to obscure the foramen rotundum, thus preventing the secondary tympanic membrane from vibrating.

It has been an argument used by some against the radical mastoid operation that deafness is likely to result. Against this may be set such cases as the present ones; these are most encouraging and justify the earlier undertaking of the operation. Mr. Stuart-Low said that his results as regards hearing after the mastoid operation had been very good indeed, and he attributed this partly to the use of normal horse serum, which he employs to dress the bony cavity of the middle ear and mastoid antrum immediately after all diseased material has been cleared away, and before applying the dressings.

THE BOXER'S NOSE.

The patient was a man, aged 36, a professional boxer, who came complaining of progressively increasing nasal obstruction. The repeated blows that he had received on the nose while boxing had somewhat flattened the bridge and had caused a symmetrical thickening of the septum due to perichondritis; new cartilage had been formed and thus permanent and progressive narrowing of the nasal passages had been produced. In such cases Killian's resection is not admissible, since depression of the bridge would be more and more marked; the bridge,

too, might collapse, resulting in a tipped and "froggy" nose with hideous deformity. The best procedure in such cases is to perform Mr. Stuart-Low's operation, *viz.*, submucous turbinectomy; this consists in reflecting the mucous membrane of the inferior turbinals and resecting the bone in the centre. By this method the turbinal is so reduced in size that the thickened septum no longer causes any obstruction, there being quite a free passage.

BRANCHIAL FISTULA AND CYST.

Two patients were shown with these congenital conditions. The first, a young man aged 28, had all his life had a weeping point in front of his left ear near the anterior part of the helix; periodically secreted a milky fluid. When the orifice becomes obstructed, the surrounding tissue swells up and causes him pain. The only effective treatment for such a fistula is to expose it in its whole length and to dissect it out.

The patient with the branchial cyst was a young female. She showed an egg-shaped swelling near the edge of the sterno-mastoid in the superior carotid triangle. This had been present for many years, but lately had enlarged and was giving rise to some pain. The proper treatment is to expose the cyst and to excise it thoroughly. One should always be prepared in such a case to dissect out a pedicle leading up to the region of the tonsil in the position of the second branchial cleft.

CHRONIC SEPTIC MAXILLARY ANTRITIS.

This case illustrated the danger of infection of the maxillary antrum as a result of repeated attacks of "cold in the head."

The only effective treatment in such cases is the performance of the radical antral operation and the removal of all the diseased pus-secreting antral lining. Preliminary treatment, such as washing out the antrum with antiseptics, may be tried for a time; but when the case is chronic, and polypi or a thickened pus-secreting lining are present, thorough and complete riddance by curetting is essential to a radical cure. It was explained that the discharge from a diseased maxillary antrum was one of the commonest factors in maintaining a chronic nasal catarrh.—*The Polyclinic*.

OBSTETRICS AND GYNÆCOLOGY.

Experiences with Pituitary-Gland Extract in Obstetrics.

M. EISENBACH.—The variance in effect of pituitary extract as reported by different observers is due to the inexactness of the dosage and the inequality of the gland substance employed in the experiments

or in therapy. That this animal medicament is of distinct value in obstetrics is maintained by the author. His conclusions are as follows:

1. Hypophysis extract is not an absolutely reliable and certain uterine tonic, but it is at present the only means at hand that may be employed to stimulate uterine contractions. It can influence beneficially all cases of uterine atony provided sufficient doses are used and the proper cases chosen. Through its administration we may in certain cases avoid the forceps or the metreurynter.

2. The induction of abortion cannot be accomplished by the pituitary extract.

3. It is especially to be recommended in cases of atonic hemorrhages.

4. There are no untoward effects following its use.—*American Journal of Surgery*.

Pre-Eclamptic Coma; Death; Post Mortem Cæsarean Section; Living Child.

V. B. Green-Armytage, M.B., Capt. I. M. S.—A Bengali, primipara, at term, aged 20, was admitted into the Eden Hospital, Calcutta, at 2 P. M., on December 3, 1911, in a state of semi-unconsciousness. She had been quite well up till 10 days before, when she complained of giddiness, pain in her back, and dysuria. She was constipated and had slight fever. The day before admission the pains and headache and drowsiness became more marked.

She looked ill and emaciated and in a toxic condition. The pupils were medium and reacted to light; the breathing was laboured. She could swallow and ask for what she wanted, but lay otherwise in a condition of stupor. There was œdema of both feet. The liver and spleen appeared normal. The aortic second sound was accentuated. The uterus was of the size of full term. The foetal heart sounds were audible on the left. The temperature was 97° and the pulse 72. Three oz. of urine were drawn off by catheter. It was of s. g. 1014 and contained 1.5 per cent. of albumin and granular and epithelial casts in abundance. The stomach and bowels were washed out and a saline purgative given, and 2 pints of normal saline were injected into the breast.

At 8 A. M. the next morning the house surgeon sent a message that the patient was dying. She was quite unconscious. The pupillary reflex was absent, the respiration deep and sighing, about 4 to the minute, and the pulse imperceptible. At 8-40 the writer saw her and hurried

her to the operation theatre, some 100 feet away, with a view to Cæsarean section. The respirations, which up to then had been deep, slow and hissing in character, about 4 to the minute, had then ceased altogether; but with a stethoscope the heart sounds could still be faintly heard. After $7\frac{1}{2}$ minutes they ceased. Post mortem Cæsarean section was performed and a healthy male child, weighing 5 lbs. 12 oz. was removed. He slowly revived after the usual artificial methods had been carried out. He eventually did well.

The writer computes that it was not less than 2 minutes after the heart sounds had ceased and 9 minutes after cessation of all respiratory movement that the child was removed.

NECROPSY.—The kidneys were red and swollen, the cortex and pyramids congested. Microscopic examination showed much swelling and granular degeneration of the epithelium of the tubes amounting to parenchymatous nephritis, with considerable congestion of the vessels. The liver showed cloudy swelling of the cells and slight fatty degeneration.—*The Medical Review*.

Bougie Removed from the Abdomen Ten Weeks after Introduction per Vaginum.

J. DOUGLAS, M. D.—A 3-para, aged 26, was admitted to hospital complaining of a tender, painful mass in the abdominal wall. This had been present for a week and was gradually increasing in size. She said that she had fallen and struck herself on a chair over this area about 2 months previously. One year ago she became pregnant and a midwife induced abortion by introducing a lisle thread bougie. She then presented the patient with the bougie for personal use if necessary at a future time. Ten weeks before admission, when 2 weeks over her time for menstruation, she attempted to induce abortion by introducing the bougie into the uterus. After passing the bougie, which did not cause much pain, she inserted a tampon of cotton in the vagina to keep it in place. Some hours later on going to stool the cotton came out, and she thought the bougie came with it.

There was an indurated, red, œdematous, slightly-tender area about 8 cm. in diameter in the abdominal wall over the outer edge of the right rectus muscle, its centre being slightly above the level of the umbilicus. There were all the signs of a 3-months' pregnancy. The temperature was 99.6° , the pulse 104, respiration 22. The leucocyte count was 14,800, with 78 per cent. of polynuclears. The urine was normal.

A vertical incision was made over the indurated area, and after passing through the abdominal wall an abscess cavity, well walled off by adhesions, apparently just underneath the peritoneum, was opened and about 2 oz. of pus, smelling strongly of colon bacillus infection were evacuated. On introducing the fingers, a lisle thread bougie 30 cm. long was found curled up in the cavity and removed. The abscess cavity was drained. Next day there was a little bleeding from the vagina, but this stopped in 24 hours, and vaginal examination next day showed no softening of the cervix or signs of impending abortion, but 11 days after the operation there were bloody discharge from the vagina and pain over the lower abdomen. On the following day a 3-months' foetus came away. Recovery followed.

It is noteworthy that the bougie was passed either through the uterine wall, or perhaps the vaginal vault, without causing general peritonitis and caused a local peritonitis 9 weeks later. If the bougie passed through the uterus it did not cause abortion at the time.—*The Medical Review*.

DRUG REVIEW.

'Tabloid' Bismuth Gauze.

The use as a surgical dressing of gauze impregnated with bismuth salts in place of iodoform is a practice with much to commend it, both from the practitioner's and from the patient's point of view. Such a dressing was introduced some time ago by Messrs. Burroughs Wellcome & Co., as one of the well-known 'Tabloid' series of dressings, and has met with considerable success. As compared with the older iodoform gauze it has the advantages of being quite odourless and nontoxic, while an antiseptic power it is in no way inferior. When used for packing cavities 'Tabloid' Bismuth Gauze remains fresh and free from offensive odour for much longer periods than unmedicated gauze or iodoform gauze.

'Tabloid' Bismuth Gauze is issued in various sizes and packings, the latest of these being that now under notice. It consists of a carton containing six yards of gauze, half-an-inch wide and with selvedge edges. The gauze is sterilized and each carton is enclosed in a special covering which keeps it sterile. This size of 'Tabloid' Bismuth Gauze will be of particular value in ear, throat and nose work.

THE ANTISEPTIC.

MARCH, 1913.

Science and the Madras University.

HE scientific spirit is abroad. There is no civilised country in the world, which has not begun to realise that its future progress depends, to a great extent, upon its cultivation of that spirit. In India, too, the importance of the study of science, in all its branches, is being widely recognised. If its economic condition is to be improved and its industrial resources developed, science must be called to its aid. Of course the new ideas the country has come by may be traced to the Universities which are now the seats and centres of all kinds of useful knowledge. But the fact remains that the Indian Universities have done comparatively little to stimulate the study of science, and the Madras University has perhaps done the least in this respect. In other Provinces, in Bombay for instance, there are educational institutions imparting instruction in some useful branch of science. In Calcutta, apart from what the University has done, there has been an association of which one of the objects has been to enable aspiring students to explore the secrets of applied science; and before long a tropical school of medicine will be brought into existence in that city, the potentialities of which are said to be numerous. But in Madras, with its orthodox ways of looking at things, little or nothing has been done to give science its proper place in the University and among the subjects to be studied by the coming generation. We are aware of the existence in Bangalore of an organisation which bears the late Mr. Tata's name. But that has an All-India character about it, and Madras may claim it as its own as much or as little as Calcutta or Bombay. Taking the advanced Provinces of India we may say nowhere has science been receiving less attention than in Madras. Not long ago the courses of study were revised and modified by the University, and science was supposed to have been given a place of prominence. But neither the number of colleges that have made provision for the advanced study of science nor the arrangements made could be said to be satisfactory; and it was, therefore, with

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anxious interest that we looked forward to the way in which the University would dispose of the money which the Government gave it. But the results of the deliberations of the Senate have disappointed us.

The Madras University Senate is a composite body. It is not quite right to call it a learned body, just as one would designate the British Association, or the Royal Society, or even other organisations of less importance. It consists of a number of educationists to be sure. But the lawyer dominates it. There are, of course, others who could not be properly labelled with a description. The Madras University Senate is a miscellaneous assembly, and sometimes some of the Fellows seem to talk from a mere love of talking, with apparently no definite object before them. Of late there has been a wave of spirituality passing over the land. The revival movement has affected the Madras University and has some representatives on it. The cry has also been raised that the vernaculars and the classical languages of the East have been neglected and without enquiry into the truth of the assertions made, controversialists of every variety repeat the cry. On the University Senate there are some gentlemen who, if they could, would make it almost an exclusive organisation for promoting the study of Sanskrit and the Vernaculars of the Presidency. Had Madras a net-work of Universities each University might have done well to make some branch of study especially its own. In Great Britain the older Universities have been noted for certain features of their work, especially for the attention bestowed by them on the ancient literature of Greece and Rome. Even among them each has acquired a name for imparting instruction in some particular subject or subjects. The Universities which have recently come into existence pursue a different ideal in the light of the insistent needs of the present. But such a division of functions is inadvisable in this country where each University has to answer the varying and multiplying needs of a population larger than that of the United Kingdom, and surely the Madras University cannot afford to neglect any subject without serious detriment to the interests of the people, and least of all science. But the one subject to which it has been comparatively in-different has been science. At some of the recent meetings of the Senate the question of the appropriation of the funds placed at its disposal by the Government was discussed at some length; and though the classical languages and the vernaculars of this Presidency and what were vaguely called Economics and History found advocates enough, there were only a few to plead the cause of science, and their voice was but a cry in the wilderness. They were so small in number that they were given short shrift. Lawyer after lawyer held forth on subjects, some of

which at all events he had but an imperfect conception of. But where were the advocates of science?

The Madras University disposed of about five lakhs, but not a pie of it is to be devoted to the advancement of the study of what may properly be called science. It has sanctioned the institution of a Temporary Professorship in Indian Economics and the establishment of a University Professorship of Indian History and Archaeology; and a sum of Rs. 36,000 a year has been set apart to encourage the study of the Dravidian and Classical Languages of the East. But the advocates of science got not a pie. It was not expected that a University guided by lawyers and the advocates of the Dravidian languages, who apparently take no interest in science, should bestow any thought on the suggestion to devote part at least of the money to scientific research and to the advancement of the study of science. There was one proposal in which we were in a special sense interested. The Senate was asked to set apart a small portion of its recurring grant for conducting researches into pharmacology of Indian drugs. From the point of view of pure science and common utility the proposal had everything to recommend it. But that too shared the fate of similar proposals which have had but few to back them up. The Senate has indeed missed a great opportunity. It has practically diverted the course of its own future development. The one subject upon which modern Universities have been concentrating themselves has been science, and it is admitted that, in future, Universities in all enlightened countries should pursue the cause of science with ever-increasing vigour of application. But almost alone among modern educational aspirations, the Madras University has chosen a different course. It is regrettable indeed that even European educationists, some of whom are keen students of science, and one of them an eminent scientist himself, should make common cause with the blind champions of the vernaculars and the classical languages of India. Perhaps they would like to go back to the state of things which Macaulay found on his arrival in this country. From their point of view they may be right. But is it wise on the part of thoughtful Indians gradually to undo the work of Macaulay and his successors? Is it to the good of India that its Universities should be nothing more than so many Parishads of orthodox Pundits or their more modern variants? We ask the question and, *unlike* jesting Pilate, stay for an answer.

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Original Articles.

* INJURIES OF AND INVOLVING THE EYE.

BY

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(Continued from page 69, Vol. X, No. 2, "The Antiseptic".)

PART II.

IT is said that at least one-fourth of all eye affections, apart from errors of refraction, etc., arise from some kind or other of traumatism, but the statement depends largely for its truth upon several modifying factors, such as sex, locality, occupation, etc. Men are more liable than women because of their more dangerous occupations and some cities or localities much more frequently have accidents to the eyes than others. The character also of the traumatism varies greatly according to locality. The ferule of a man's umbrella is more likely to be thrust into an eye in a crowded city than it is in the country fields, whereas the horn of a bull is more likely in the country fields, than in the town. Particles of iron are more likely to get into a man's eye in an iron foundry and splinters of wood in a carpenter's workshop. In forests, woods, gardens, etc., the injury is more likely to be due to broken branches of trees, brambles, thorns, the invasion of insects, etc. Our fundamental axiom must be, therefore, to always keep in mind that the nature of the injury greatly depends upon the place where, and the circumstances under which, the injury to the eye was received. Another self-evident truth, and closely allied to the foregoing, is the fact that the

* Specially contributed to *The Antiseptic*.

nature of the traumatism depends greatly upon the patient's condition when the accident or injury to his eye occurred. I remember, as a student, being very much surprised and incredulous when reading what I thought to be an exceedingly far-fetched yarn in Sir Frederick Treves' little book on Surgical Anatomy, drawing the long bow, I thought, with a vengeance. He mentioned the case of a hat peg being found inside a man's orbit. Now, on mature consideration of Treves' little anecdote I can quite conceive that the accident which gave rise to this enormous foreign body becoming enclosed in the posterior part of the orbit was probably the fact that the man was very drunk; he fell against or was pushed against the hat peg, the knob of which would forcibly enter far back externally and behind the eye ball, the great violence breaking off the brittle iron stem which would probably lie along the external wall of the orbit where there would be the greater amount of room for it. On careful reflection and with more knowledge the story is not so preposterous; of course it would only be a small hat peg, and persons in a state of intoxication very frequently receive serious injury to the eye, the precise nature of which may not be known until long afterwards. In my previous article I mentioned that Professor Elschnig divided all eye injuries into those (1) of the orbital walls, fracture etc., (2) of the orbital contents excluding the globe, (3) of the globe or eye-ball itself. Tindell Lister divides the latter into injuries of the eye ball with perforation and injuries without perforation, by far the more important of these being the former.

We will for the present concern ourselves principally with those injuries in which the eye-ball itself escapes, reserving our remarks upon the injuries involving the globe for a future occasion. Gun shot wounds, punctured wounds and the impaction of foreign bodies are given as the three chief classes of injuries. To these may be added the inflammation and laceration caused by the presence of smaller or larger foreign bodies, also burns, corrosions, the irritation of insects, chemical and other irritants, etc. Taking first of all punctured wounds: these vary in character according to their size and the nature of the implement inflicting the wound. Perhaps it is the spear of a hostile savage in Africa, or may be the walking stick or umbrella of a careless fool in London, who walks along the street carrying his property in such a manner as to be highly dangerous to the public, and who needs to be spoken to on the subject by a policeman; perhaps it is the hat pin of an equally foolish and careless fashionable lady in church or at a theatre that penetrates the victim's eye. The implement may be a knitting needle or the sharp point of a pair of scissors, these smaller and sharper

agents generally giving a wound that involves the eye ball, the globe escaping the larger and blunter ones.

I remember both in Vienna and in the London hospitals there were frequently these "scissor accidents," and nearly always the globe was injured. Little children playing about would rush up against the points of their busy and preoccupied sisters' scissors. Injuries from the impaction of foreign bodies on the soft parts within the orbit are common enough in towns and cities. The foreign bodies may be stones or other missiles such as glass bottles, etc., thrown by mischievous boys or in street riots. This common occurrence of stone throwing, etc., has resulted in the loss of many an eye. Injuries of this nature may be accidentally received by children playing together. Then there are the injuries that occur to the eye of men at timber-cutting from splinters of wood and from branches of falling trees, etc.—a common injury to the mahogany and logwood cutters of this colony. All these injuries need very careful handling. Careless probing and other manipulations may add to the injury and danger. If in any way available, the apparatus and instruments for making a precise diagnosis should be employed; these are for instance the X-rays for detecting certain foreign bodies in the orbit, and in cases of fragments of iron the sideroscope and the giant magnet. By carefully pressing upon the bulb or the lids we may sometimes detect localized tenderness right in the depths of the orbit and there may be localized pain with certain movements of the eyeball; the patient has more or less the feeling of something there and this all may serve to establish the presence of a deeply situated foreign body in the orbit. Proptosis may or may not be present, according to the size of the foreign body and its situation. This is detected by having the patient seated in a chair; standing behind him, and looking over his head, you carefully compare the prominence of his two eyes. If the injured eye comes forward more than the other, even if this be only slight, the foreign body is no doubt behind the globe and displacing it forwards. By careful examination we may also detect any impairment of function in oculo-motor optic and general sensory nerves. It is very important also to make a careful examination of the eye ground, visual acuity, and the fields if possible with the perimeter, especially in deep orbital injuries, thus determining whether the optic nerve or any part of the eye-ball itself is injured. A careful general examination of the patient should be made, bradycardia noted, etc., the pitfall of too concentrated attention to the one organ alone, common to specializing, being avoided. The fellow eye should be examined with special reference to ophthalmoscopic findings

and later on to nystagmus. Carefully examine also the sensation of the eye. Anæsthesia of the cornea and eye-ball generally can be demonstrated by stroking the part with a small wisp of cotton or a feather.

Injuries with fire arms generally occur in one of two ways; either the bullet has struck the temple obliquely, or it may be directly at right angles. In would-be suicides there is far more danger of the person blowing his eye out than his brains; more danger to his vision than his life. It sometimes happens that the bullet is deviated by the contour of the orbital margin. This bears out my remarks in Part I of these articles concerning the wonderful anatomical arrangement and provision of Nature for the protection of the visual apparatus. Everything is arranged that can possibly be for the deviation of a missile and for the protection of the valuable contents of the orbit.

If the bullet is lodged in the orbit or its bony walls, there is likely to be, because of the tremendous force of the blow, extensive comminution of bony fragments, which are impacted, *i. e.*, one fragment driven firmly into another, so that in all such cases it is always wise to wait until immediate inflammatory changes have subsided, before undertaking the operative interference of removing the fragments or indeed the projectile itself—a difficult and hazardous procedure. The position of the projectile and also of the fragments of bone can be easily detected if we have at our disposal the X-rays, but if these are not available, it is best to examine very cautiously, with very strict aseptic precautions and to be content to patiently remain for a time in ignorance of their exact position rather than do further harm through incautious manipulations.

Sometimes both optic nerves have been shot through and, except for the absolute blindness, there possibly may be no other very serious permanent lesions. Sometimes the globe is driven forwards so as to be almost out of the orbit by the force of the explosion, in cases where the muzzle of the revolver had been applied directly to the temple. In such a case it would be most unwise to attempt re-position, as there are sure to develop in the eye-ball severe inflammatory changes, and the optic nerve, anyhow, is far too injured to hope for any useful vision. In all such cases immediate enucleation should be performed. If the optic nerve, has not been shot through, it will be certainly stretched, dislocated, and otherwise injured; so I believe it is wise to remove a considerable part of it along with the eye-ball.

Injuries limited to the conjunctiva consist chiefly of (a) burns, scalds, corrosions; (b) wounds, either incised, punctured or contused.

Burns and scalds are best treated by hot moist cataplasm of boric acid or bicarbonate of soda. A pad consisting of a piece of Bardella bandage soaked in warm oil (sterilised) laid over the eye with cotton wool, and then an ordinary bandage is, I think, a good method of treating these cases. Corrosions vary, as to treatment, according to what is known concerning the character of the injurious substance that has entered the eye. Thorough removal of the foreign substance should, of course, be immediately undertaken. An acid should be neutralized by bathing the eye thoroughly with some alkaline solution, such as bicarbonate of soda, borax or even very weak ammonia. Milk is soothing and alkaline and is generally at hand; this can be used especially if warm and sterilised. Boracic acid is soothing after the acid has been thoroughly neutralized, especially if a little laudanum or vin opii is added. If the substance is an alkali, oil is the best application to promote saponification; either olive oil, linseed oil, or castor oil sterilised if possible.

Splashes of lime may be treated by copious effusions of water, washing away every particle of the lime. Warm boric acid lint fomentation or constant bathing in warm boric acid solution afterwards will allay the pain and irritation. A drop or two of 4% cocain solution or cocain ointment often gives immediate relief. Milky opacities of the cornea following corrosions are evidence, as a rule, of deep-seated injury to the corneal tissue, even though we may find no loss of the epithelial surface. This is not so much so with burns as with scalds and corrosions. With burns the epithelium may be quite white and yet the depth of the injury may be limited to the surface, Bowman's capsule being uninjured. Even with corrosive substances much depends on not only the amount, but also on the degree of concentration of the corrosive liquid. A very highly concentrated substance, such as for instance strong carbolic acid or perchloride of mercury, if of small amount, will do great injury to a limited area and also to a superficial depth, the capsule of Bowman saving the *substantia propria* of the cornea, whereas a less concentrated liquid would have set up an acute destructive inflammation of the entire cornea. This fact was well illustrated in a case I heard cited some years ago by Mr. Holmes Spicer at Moorfields Hospital, London, in one of his lectures I attended, on the cornea. "I remember," he said, "it is wonderful what the cornea will stand." The story was that of a medical man who lived near Mr. Spicer accidentally mistaking a small bottle of very strong carbolic acid for cocain solution and applying a drop of it to his patient's eye. He was horrified to see the whole cornea turn white and rushed off with his patient to Mr. Spicer. I do not

know whether he applied anything before hand. A solution of Epsom salts or Glauber's salts at once dropped into the eye, white of egg and copious washing would, I think, have been the best practice in the emergency. The soluble sulphates would form the harmless sulphocarbates and the white of egg an albuminate. Mr. Spicer did not say, as far as I can remember, what he did, but the outcome of it was the dense white epithelium of the cornea that appeared at first completely ruined, all peeled off, new epithelium healthy and transparent came in its place, and the eye made a good recovery. It was lucky for the medical man and it shows how careful one ought to be with dangerous and poisonous solutions and drugs of a harmful character, keeping them in special bottles, out of harm's way when not being used, and always having them properly labelled. To apply water or oil to carbolic acid in the eye, without first rendering it harmless by means of the sulphate salts solution will, I think, do more harm than good. A drop of the cocaine that the doctor had meant to use would allay the pain, but even that would come in better either with or after the salts had been applied.

When the ocular and palpebral conjunctiva are extensively injured, total symblepharon nearly always follows: the lids adhere to the cornea; the eyeball is fixed by cicatricial tissue, and sometimes the whole contents of the orbit are fixed firmly including muscles, ocular conjunctiva, etc., by the action of a strongly acting corrosive substance. One can readily imagine the unhappy state of affairs under such conditions. Removal of the eschar is followed by perforation of the globe and prolapse of iris, ciliary body, choroid, etc. For corrosions Professor Elschnig recommends cold compresses besides unguents and cocaine, for burns heat in the form of hot moist cataplasms. The best method of preventing symblepharon is the repeated breaking down of the adhesions. The very severe condition of fixation of the orbital contents mentioned above would be the result possibly of vitriol throwing, etc. Symblepharon has to be treated by operation later when healing is complete.

As regards the treatment of wounds of the conjunctiva they should be sutured very carefully, taking care, as in all eye injuries, to bring the parts in as accurate apposition as possible. Solutions of continuity in muscles and sclerotic should be accurately sutured. Bruised portions of conjunctiva should be cut away and the cut edges secured without tension by freeing the neighbouring parts from their attachments. In all injuries of the conjunctiva and its folds the possible presence of a foreign body should be borne in mind. Also a possible implication of

the ocular muscle and sclerotic may have occurred, the wound of the conjunctiva not being so simple as it at first sight appears. Injury to the levator palpebræ superior resulting in very troublesome ptosis, may have occurred. A large hæmatoma beneath the conjunctiva is very likely to be the result of a subjacent rupture of the sclerotic. *Oxy-cyanate of mercury lotion* 1 in 5000 and also *asterol* 1 in 2000 are recommended as useful lotions for washing out the conjunctival sac.

(To be continued.)

*ENTERITIS IN CHILDREN.

BY

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Pathogenesis.—Enteritis means an inflammation of the small intestines due to bacterial infection. It always arises from improper bottle feeding, as the digestive canal of a baby can only digest breast milk perfectly. When sufficient interval between two feeds is not observed the milk, howsoever good, produces irritation. Acute gastro-enteritis in infants is due to the multiplication of microbes of fermentation in the milk and the poisons which they excrete. In the tropics microbes commence to grow very quickly in milk. Boiling the milk will certainly kill the microbes, but it will not destroy the toxins already poured in the milk. Besides the more the milk is boiled to sterilise it, the more indigestible we make it, in as much as it becomes thicker, richer in casein and salts. The clot of overboiled milk is firmer and more resistant to the digestive juices while the sugar also is converted into an unpleasant substance—caramel. Thus it will be seen that the very remedy we use to safeguard a child itself brings on the disease, especially if the baby is predisposed to it. It all depends upon the resisting power of the child: an older child can bear fermented milk to a certain extent; but in a very young baby even one bottle of such a milk is sufficient to produce enteritis.

Occurrence.—Enteritis occurs mostly in bottle-fed babies of four to five months old. It occurs in grown up children after they are weaned but not so frequently. It occurs secondarily during the course of, or after eruptive fevers, such as measles and small pox. The disease is prevalent during hot months or when the climate undergoes sudden

* Specially contributed to *The Antiseptic*.

changes, particularly during those months when the southern winds blow over the peninsula. It is very prevalent during the days when mangoes are in season and when there are dust storms. The disease occurs amongst the children of all grades of society, rich and poor alike.

Bacteriology:—If a stool of enteritis be examined under a microscope streptococci, staphylococci, bacillus coli, bacillus proteus, and the Shiga bacillus are constantly found; still it may be mentioned that no particular specific organism has been isolated. The bacillus coli predominates; it is in almost pure culture and it shows exalted, virulent destructive power.

Morbid anatomy:—The bacillus coli penetrates into the lumen of the intestinal glands and produces destruction of the epithelium. The train of symptoms is due to the toxin absorption. In the majority there is a general infection also as evidenced clinically by the presence of broncho-pneumonia, meningitis and scanty secretion of urine (Nephritis). When the bacillus coli is associated with certain microbes it acquires a terribly virulent power and hence cases of mixed infection, for example, those after eruptive fevers, are especially very grave.

Contagion:—Enteritis in children is so highly infectious that if a case is admitted into a ward of children an outbreak of the dreadful disease always followed amongst the occupants. If one nurse attending on an enteritis case attends upon another child the latter as a rule develops it, and hence the necessity of isolating enteritis cases in a contagion ward. Even in the same case, one nurse should look after the feeding only, while there should be another attendant to do the toilet, because, however scrupulous the nurse may be about cleanliness, there is every possibility of her infecting the child with its own excreta again and again.

Symptoms:—The baby vomits milk after each feed, the vomiting is without nausea and without effort; it is a mere regurgitation. The diarrhoea ensues; at first the motions are faecal, liquid yellow green, and passed often. They then lose the faecal character and contain mucus and blood and become sticky. Note, bile is absent in them. The number of motions is quite alarming, often exceeding thirty in twenty four hours. Later on, straining becomes marked, prolapse of the rectal mucosa takes place and the skin around the anus becomes excoriated. The child cries every time it passes a motion. Owing to the loss of so much fluid the mouth gets parched; so the baby wants to keep on drinking milk; it wants more and more, but later on it goes off his food. The abdomen is bloated with gas and it is tender. Gas is passed with every motion.

Fever is always present rising to 102 to 103°F. In some cases it is high, in others it is low. The skin becomes dry and inelastic later in the disease. The child is restless and cries constantly and wastes with terrible rapidity. It looks prostrated and its face is pale. Later on it ceases to cry, becomes very restless and does not take into notice its surroundings.

As the disease progresses, the abdomen becomes hollowed out, the skin hangs in folds and the respirations become so weak that they are barely perceptible. Towards the close of the scene convulsions occur, the temperature goes up to 108° to 110° F. and the child dies.

Diagnosis:—Enteritis has to be diagnosed from diarrhoea and dysentery. Diarrhoea is a symptom of some irritation in the gastro-intestinal canal and the motions, although frequent, are quite different from those of enteritis, which is an inflammation of the bowels. The motions of the latter disease are small, slimy, sticky, containing blood and having a disagreeable smell. Dysentery is rare as a rule in young children.

Mortality:—The outlook in the majority of cases is bad, particularly in children artificially fed. In cold countries about 75% prove fatal but in India the death-rate is unfortunately over 90%. The mortality during cold months is rather low, but during summer epidemics almost every child dies.

Prognosis:—The younger the patient the less is the chance of recovery. Persistent vomiting, blood in the motions, high fever and rapid emaciation are unfavourable signs. The outlook is always grave in secondary enteritis following upon eruptive fevers and in weak children.

Treatment:—In tropics every single case of enteritis stands on perilous quicksands and a few hours alone may separate life from death. Emaciation sets in very rapidly and hence the nutrition of the baby is the most anxious problem for the physician. He is on the horns of a dilemma—he must maintain the strength and at the same time avoid provoking further intestinal irritation.

All food should be withheld rigidly during the first 24 hours, and boiled water, an ounce every two hours at the temperature of 100°F., should alone be administered. During this fast, as no food enters the stomach and intestines, the bacteria do not find any pabulum to thrive and so they get weakened. The large quantity of sterilised water given by the mouth washes down the whole canal and flushes the bacteria as well. The practice of partial fast and drinking boiled water is based on scientific principles and is an old Hindoo method of treatment. One

need not be afraid of the baby being collapsed by the fast, but on the contrary vomiting, which causes exhaustion, stops.

After 24 hours' rest to the stomach the child should be fed on Albulactin solution, 20 grs. of Albulactin to 1½ oz. of boiling water to be given every two hours. Lactalbumen is so soluble that it is quickly absorbed in the stomach and very little passes down into the intestines where acute enteritis is located, thereby the bacterial processes taking place therein are not fostered and encouraged.

No other food such as albumen water, or cow's milk should be given, because they are very liable to putrefactive processes in the bowel which still further increase the already existing irritation.

The Albulactin on the market has certain drawbacks, viz.; it is too costly to suit the Indian poor and children do not like its taste. To disguise its taste I mix it with condensed milk diluted 1 to 10 with boiling water and the results are as equally good if not better. Formerly I used only condensed milk and I have nothing to say against it.

Immediately the diagnosis is settled the stomach should be washed with saline solution (1 dr. of table-salt to 1 pint of boiling water). The temperature of the fluid should be 100° F. and about 5 ozs. are allowed to run in the stomach. The apparatus to be used is a Jaques Rubber Catheter, size 14, to which a little funnel is attached. After the fluid is poured into the stomach the funnel is lowered below the level of the cot and the contents of the stomach will trickle back through it. The process is repeated until the returning fluid is quite clear. The result of this is that vomiting stops almost completely.

The rectum should be washed with saline solution slowly and carefully once every day. Ordinary cane sugar should be added to the solution with much benefit (2 dr. to 5 ozs).

Grey powder in ½ gr. doses with soda bicarb. should be given every 2 hours. It acts as a cholagogue antiseptic. Castor oil, 2 or 3 drops in an emulsion, acts as a soothing and binding remedy. To check bleeding Calcium Chloride and Hazeline should be given and the latter can be injected per rectum as well.

The abdomen should have a continuous hot wet pack which keeps the pain under control. If signs of exhaustion are likely to appear, small doses of brandy in boiled water should be given every hour. In severe cases, subcutaneous injections of normal saline containing cane sugar, 1 oz. to 1 pint should be used. Flanks is the best position to inject and the solution should be delivered under the skin.

The golden rule to be observed in all gastro-intestinal diseases in children is to feed them, give them medicine only from 7 A.M. to 9 P.M., and at night give rest to the digestive organs. If the child is restless, give it a little boiled water.

When the tide is turned over one should very carefully give little milk to restore patient's metabolism and vigour. There is a period during convalescence when digestion is unable to deal with food unless predigested which is wonderfully shortened in children who are fed on Lactalbumen and condensed milk. Such children make a rapid return to health.

Prevention.—This dreadful disease can only be prevented by feeding the baby exclusively on the breast and not weaning it during hot months or when sudden changes occur in the air, or when the baby is cutting teeth.

One should study Enteritis very carefully because of its frequency and gravity. In young children indigestion should not be treated with light heart because, owing to the tender age, what looks simple to-day may develop into enteritis the next day.

This disease can only be stamped out by the State. In Paris Baron de Rothschild supplies pure milk at the market rate and the percentage of enteritis there is very low. In America the State buys the surplus milk of mothers and gives it gratis to sick children. In England there are Municipal depôts to supply pure milk to the poor. The infantile mortality can be lowered to a great extent if the Government of India would pass a Food Act.

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Further observations on the Development of *Herpetomonas*
Donovani in *Cimex rotundatus* and *Cimex lectularius*.

BY

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In my last memoir on the development of *Herpetomonas donovani* in *Cimex rotundatus* and *Cimex lectularius*, I outlined several experiments, which I stated would be carried out at the first opportunity; these experiments were devised with the object of finding out the exact factors which govern the development of the parasite in the bug. One

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factor of considerable importance has already been discovered, namely that the parasites can only complete their development, when a sufficient interval is allowed for them to multiply, and pass on to their post-flagellate stage, and that, if the bug takes a feed of blood before this has been accomplished, the flagellates are destroyed. But before describing the present experiments, I think it will be useful to again draw attention to some points connected with this problem.

In the first place it is necessary to state, that the observations which have already been recorded by me, are based on the assumption that the parasite of Indian Kala Azar passes out of man's body by way of the peripheral blood, that it is ingested by some blood-sucking insect, in which it becomes a flagellate, and that the insect transmits it to a healthy person, when it sucks his blood. I have never attempted to prove any other transmission hypothesis. In order to discover in which particular insect the parasite of Kala Azar undergoes its flagellate stage, it is necessary to feed all the likely insects on the peripheral blood of a case of Kala Azar, and then to dissect them, and search for the development of the parasite. What proof have we that a particular herpetomonad found in the midgut of a blood-sucking insect, which has been fed on Kala Azar blood, is the developmental stage of the parasite? In order to answer this question, it is necessary for the observer to have an intimate knowledge of the flagellates of the insect in question. If, however, it is known for certain that the particular insect experimented with, is never infected with a natural herpetomonad, how is it still possible to be sure that a flagellate found in it has developed out of the parasite of Kala Azar? Fortunately in the case of this human parasite we have a variable guide, and one which is not sufficiently realised. The parasite of Kala Azar, when ingested by an insect, is always in a white blood cell, and if a number of insects are examined at regular intervals after they have fed, the parasite should be found, first, lying unchanged in a leucocyte, and then, later, when the leucocyte degenerates it is seen to be free, and then all its developmental changes can be observed. Here then we have an accurate guide, for there can be no possible doubt as to the origin of the herpetomonads encountered in the insect. This is a point of some importance, for even though the observer may not be acquainted with the herpetomonads of insects, if he pays particular attention to the fact mentioned above, he cannot possibly make a mistake regarding the true nature of such a parasite, found in an insect which has fed on the peripheral blood of a case of Kala Azar. Now in all my papers on the development of the parasite in the bed bug, I have carefully described it, first in its unchanged condition in a leucocyte, its

becoming free as the leucocyte is digested, and its subsequent development into a flagellate. Were the bug or any other insect, fed on cultures of the parasite, it would *not* be possible to distinguish between a natural herpetomonad of the insects, and the flagellate stage of the parasite of Kala Azar.

Having found that the parasite *only* develops into a flagellate in the bug, are we justified in concluding that *this* insect is the true invertebrate host of the parasite, and that it transmits it to man? In order to answer the above question it is necessary to consider some points in connection with the development of the parasite in the bed bug. There can be no doubt that there always is some relation between the digestion of the blood in an insect, and the various stages in the life history of a parasite it may ingest in the blood. I believe that herein lies the clue to some of the mysteries surrounding the transmission of protozoa by blood-sucking insects. In considering the extra-corporeal life history of the parasite of Kala Azar, it should be remembered that we are dealing with a protozoon, which can only enter the midgut of its invertebrate host in a non-motile stage, and its power to maintain itself, depends on whether it is able to pass on to its motile form; further when this stage is reached, it is necessary that it should be able to multiply. In the case of a protozoon like *Trypanosoma gambiense*, on the other hand, we are dealing with a flagellate, which when it enters the midgut of its invertebrate host, *Glossina palpalis*, is already motile, yet we know that it can only maintain itself and multiply in about 5 per cent. of the flies which ingest it. Why is it that in only about five per cent. of every hundred, this parasite can live, multiply, and complete its development, and render the fly infective? The answer to this question will, I believe, be found by studying the digestive processes in the fly, and their relation to the life history of *T. gambiense*. It will be of interest to consider some of the factors which might bear on this point.

Sterility of the alimentary tract of the invertebrate host of a flagellate is of the first importance, for it is well known that these parasites cannot live in any medium, which is infected with bacteria. The bacteria themselves require food, and their presence must reduce the amount available for the flagellates. Further, it is very probable they produce toxic substances, which affect not only the blood as it is being digested, but destroy the flagellates. It is true, certain insect herpetomonads may be found associated with bacteria, for instance *Herpetomonas muscae domesticae* in *Musca nebulo*. In this case, however, I have found

when dealing with flies bred and infected in the laboratory that those which swarm with bacteria never contained flagellates, but when they were rich in flagellates there were never many bacteria. In flies caught at large, however, there were often some bacteria as well as the flagellates in the midgut of the fly, but, as a rule, they never appeared to completely invade its alimentary tract. The post-flagellate stage of *Herpetomonas muscae domesticae* in the hindgut of the fly is frequently associated with bacteria; here, however, we are dealing with a stage on which bacteria can have little or no injurious effect. In most blood-sucking insects under natural conditions, bacteria are rarely found; they are not common in the bed bug. In the case of the parasite of Kala Azar, bacteria are very injurious, for when they are present it not only fails to develop into a flagellate, but the flagellates readily die out. The presence or absence of bacteria in the alimentary tract of the invertebrate host of this parasite must then have a direct bearing on its life history. In addition to bacteria, fungi and yeasts may also invade the alimentary tracts of blood-sucking insects, and we know that they destroy these parasites. Miss Porter has very clearly shewn the effect of a fungus on *Crithidia melophagia*, Flu; she points out that fungus infected keds (*Melophagus ovinus*) are widely distributed, and that this organism is most usually found in the malpighian tubes of the ked. When infected with the fungus, keds, rarely if ever, contained *Crithidia melophagia*, the fungus having a distinct pathogenic action on the flagellate. In order therefore for the parasite of Kala Azar to pass from its pre-flagellate to its flagellate stage, it is essential for the alimentary tract of its invertebrate host to be sterile.

The factor which has the most important bearing on the life processes of the parasite of Kala Azar is the temperature at which its insect host is, at the time the parasite is ingested; this of course assumes that all insects are always the same temperature as their surroundings. On examining bugs which have been kept at a high temperature, and on comparing the digestion of blood in them, with that in bugs kept at a relatively low temperature, it will be found that digestion is markedly retarded in the latter. The blood ingested by bugs kept at a temperature varying from 80°F. to 90°F. is broken up in from six to eight hours, the red cells becoming unrecognisable as such, while the leucocytes have become disintegrated. The blood in bugs kept at a temperature varying from 60°F. to 80°F. remains more or less unchanged, for from twentyfour to ninety-six hours or longer: the lower the temperature the longer the red cells and leucocytes remain unchanged. In bugs kept from 50°F. to 60°F. the leucocytes can be recognised even on

the tenth day after they were ingested. In this connection it should be remembered that the parasite of Kala Azar can only develop into a flagellate, when it has been completely freed from the leucocyte in which it lies; it is, however, true that development always begins before the leucocyte has changed much. It will then be understood that the longer the leucocyte remains intact, the longer must the parasite remain a pre-flagellate.

I have now described some of the main points connected with this problem, and it will be seen that I have confined my observations to the discovery of the invertebrate host of the parasite, and as to how it then transmits it to man. I have so far been successful, in that I have found that the parasite only flagellates in the bed bug, and that it does not undergo this change in any other insect I have experimented with. I have further found that the development in the bug depends on two very definite factors. One I have already recorded, namely, that the flagellate stage of the parasite is destroyed in the bug if that insect takes a feed of blood while the parasite is still in that stage. The other factor is the temperature at which the bug is at the time the parasite is ingested. I have now been able to carry out a series of experiments in order to find out the exact range of temperature best suited for the development, and I propose describing these observations in the present paper. These observations have clearly shewn that there is a very narrow limit of temperature in which the parasite can multiply in the bug. In my opinion this factor is of the first importance in explaining some of the peculiarities connected with the geographical distribution and spread of Kala Azar in India. I believe that the discovery of these two factors is sufficient evidence to shew that the development in the bug is not merely accidental, but that this insect is the true invertebrate host of the parasite. The temperature of the bug—which is that of the air surrounding it—affects the life history of the parasite in that it directly acts on the digestion of the blood; this cannot be due to mere accident but has resulted from the altered habits of the bug from once being a plant feeder to its present condition. That the parasite of Kala Azar is closely related to all the species of insect herpetomonads there can be no doubt, and we can only assume that it once lived entirely in the alimentary tract of some insect. A study of these insect herpetomonads reveals the fact that the majority are truly specific in that they only live in one insect, or species closely related to it. It is true there are some who believe this is not the case, but at present there is no proof to support the view that herpetomonads occurring in widely separated insects are one and the same species; this can only be proved by carrying out cross

transmission experiments by trying to infect bred insects with herpetomonads peculiar to others. That a herpetomonad from one insect is very like that from another, is no proof of their identity. Knowing that the parasite of Kala Azar, as far as I have been able to find out, only undergoes its flagellate stage in one blood-sucking insect, and that there are, at least, two very definite factors which govern its development in that insect, I feel justified in concluding that the bed bug is the true invertebrate host of this human parasite, and that it transmits it to man by its bite; and this is in spite of the fact that the parasite has not, up to the present, actually been transmitted to an animal by the bug. The discovery of these two factors further goes to shew that it would be futile to attempt to transmit the parasite by feeding infected bugs on a susceptible animal, until all the points connected with its life history are known. Let us suppose it was found that a certain animal was extremely susceptible to the parasite, and bugs which had previously been fed on a patient with many parasites in his circulating blood, were allowed to feed on it. If it was not known that fresh blood, even from a monkey, destroys the flagellates in the bug the experiments would most certainly fail; exactly the same thing would happen if the bugs were utilised in the hot weather in Madras, as I will point out further on. I therefore do not see any object in carrying out such experiments until everything has been found out in connection with the development and multiplication of the parasite in the bug. In order to finally prove that the bug is the actual transmitter of the parasite to man, I believe it is of the first importance to work out its complete life history, and to ascertain all the factors which effect its life processes. This can only be accomplished by prolonged observations and accurate feeding experiments under all possible conditions. I am convinced this is the shortest way to the solution of this problem, and therefore I do not propose deviating from the course I have followed now for several years. When all the factors have been ascertained, transmission experiments will at once be carried out.

What temperature is best suited for the development of the parasite in the bed bug?

Apart from the scientific interest attached to the result of this experiment, it has a practical bearing in connection with the spread of the disease in India, and the answer to this question will undoubtedly give us a clue to the curious localised distribution of Kala Azar. Much importance has in the past been attached to the idea that this disease clings to low-lying damp localities. I believe it will yet be found that the dampness of an infected locality has little or nothing to do with the

localisation of the disease, but that its peculiar distribution has to do with a totally different set of factors, one of which is just the right temperature for the development of the parasite in the bed bug. I have now carried out a long series of experiments in order to answer the above question. A large number of bugs of both species were fed on a case in the General Hospital, Madras, in a film of whose peripheral blood there were never more than 20 to 30 parasites. Half the bugs were kept at room temperature in my laboratory, and the other half in the cold room of this Institute. The room temperature, while the experiments were being carried out, varied from 86°F. to 90°F.; the temperature in the cold room varied from 55°F. to 65°F., and for very short periods went up to 67°F. In each case the bugs were only fed once on the patient. They were dissected on the seventh, eighth, and ninth days after their single feed. In the majority of those kept at room temperature, not a single parasite could be found on these days, but in a few, one or two unchanged parasites were seen as late as the fifth day. In the bugs which were kept in the cold room, six were found to contain from four to twelve unchanged parasites as late as the ninth day. In the films made from the midgut contents of these bugs it was noted, that even as late as the ninth day, the leucocytes could be recognised, though they had undoubtedly undergone considerable disintegration.

It was also noticed that the leucocytes were packed with granule of blood pigment. This observation is of considerable interest, for it shews that, although the red blood cells had broken up and disappeared, the white cells had remained alive for several days, and during this time were actively ingesting the blood pigment which is commonly found in the stomach of the bug. The fact that the leucocytes, both mononuclear, and polymorphonuclear, remained alive, and active, can only mean that the digestive processes in the bug were partially arrested at the temperature at which they were kept; although the red cells had been digested, the leucocytes were able to carry on their phagocytic activities.

Shortly after the above experiments had been completed, I had the opportunity of carrying out another series on a case of Kala Azar which was remarkable in several ways, so that, before recording the experiment, it will be important to describe this case.

Chinnappa, a cooly boy, aged 12, was admitted for the second time into the General Hospital on March 3rd, 1912, suffering from bronchopneumonia, complicating Kala Azar. His temperature on admission was 104.6°F., and he had all the clinical signs of the above lung condition. His was a typical case of Kala Azar, and according to his own statement

he had been ill for two years with fever and œdema. He was considerably emaciated, his legs were œdematous, his skin harsh and in parts pigmented. His spleen extended four finger breadth below the costal arch, and two fingers from the umbilicus; his liver extended two finger breadths below the costal arch. He had considerable pain on palpation over the ascending colon, suggesting a previous attack of colitis. He was markedly anæmic. Parasites were found in the first blood film I examined, and it was then noted that there was a considerable leucocytosis (polymorphonuclear). He slowly recovered from the attack of pneumonia, and then remained in a stationary condition for about two months. During this time his blood was examined at frequent intervals, and parasites were always found, and the leucocytosis persisted, though to a diminished extent. Bugs and fleas were fed on him on many occasions. On May 23rd it was noticed that the boy's temperature was higher than usual (103° F.), and that he had a cough with some expectoration, and that his respiration was rapid. A blood film was taken, and on examining it, three Kala Azar parasites were found, and in addition many young merozoites of the parasite of benign tertian malaria; in the evening his temperature rose to 104° F., and he appeared to be very ill.

His blood was examined again on the 24th, and in addition to a few malarial parasites, over 500 Kala Azar parasites were counted in one blood film; in a film taken the same evening, 1,043 Kala Azar bodies were counted. Films taken on the 25th each contained over 900 parasites, those taken on the 26th contained between 700 and 800, on the 27th between 500 and 600, on the 28th between 400 and 500, and a film taken just before he died contained between 200 and 300. A careful clinical examination on the 24th and 25th at once revealed the fact that he now had lobar pneumonia, and that the whole of his right lung was solid; his sputum was blood stained and characteristic of the pneumonic condition. Judging from his general condition on the 28th, there appeared to be every hope of his recovery; he, however, suddenly collapsed on the morning of the 29th and died in about an hour. A *post mortem* was immediately carried out and in addition to the solid right lung, a large empyema was found situated on the anterior surface of the upper lobe, six inches in length, and four inches in breadth; the pleura was firmly adherent to the chest wall, and the pus was of a thick glutinous character. There was nothing particular to note about the other organs, except that the large intestine was not at the time ulcerated. This case was remarkable in several ways, for although I have during the last five years seen over a hundred cases of Kala Azar, and

examined several thousands of films of finger blood, I have never seen so many parasites. It will be remembered that I, long ago, pointed out that there are certain occasions in this disease when a large number of parasites can be found in films of finger blood, and that these occasions were chiefly characterised by very severe dysenteric symptoms. I wish, however, to correct the erroneous statement which has been attributed to me, that it is only when a patient is *in articulo mortis* as a result of dysentery, that the parasites become numerous in the peripheral blood; I have nowhere made any such statement. The number of parasites in the circulating blood has nothing to do with the approach of death; on the contrary, they are always fewer at this time. When this condition was first noted, I attributed the great increase in the number of the parasites to a fresh focus of infection in the intestinal tract. In the case described above there was no fresh focus of infection anywhere as far as could be discovered. Careful smears were made from the pneumonic lung, as well as from the pus, but I was unable to find anything to suggest that the parasites found in the lung smears were other than those in the circulating blood. It is therefore clear that the great increase in the number of parasites in the peripheral blood, was in some way connected with the presence of a large cavity containing pus, and which was accompanied with an enormous leucocytosis (polymorphonuclear), and that this reaction had probably caused the parasites to multiply in the spleen, and possibly elsewhere. These parasites on being freed from the large endothelial cells were at once phagocytosed, and then appeared in the circulating blood. In support of this explanation there are the following facts:—A large number of the parasites seen in the films were in polymorphonuclear leucocytes in which they were actively dividing. In many of the leucocytes the parasites were grouped together in a characteristic manner, and they were evidently lying in the remains of the protoplasm of the large endothelial cells, when they were taken up by the leucocytes.

This appearance, I have only seen in the peripheral blood of those cases with severe dysentery, when there is a sudden marked rise in the number of the parasites in the circulating blood. Lastly it was noted in another case which died in the hospital shortly after the above case that about five days before death there was a sudden rise in the number of parasites in films of finger blood. At the time this patient had the early stage of cancrum oris, but although I have had the opportunity of examining the blood of many cases with this complication, I have never noted any marked increase in the number of parasites in the films of finger blood. The patient died somewhat suddenly, but I had notice_d

that he was in a very drowsy, semi-comatose condition; at the *post mortem* Dr. Korke told me he found the right kidney was practically a bag of pus.

It would then appear that the rise in the number of the parasites in the circulating blood in those cases of severe dysentery is not due to a fresh focus of infection but rather to the presence of extensive ulceration and resulting leucocytosis.

Another point of interest attaching to the case of the boy, Chinnappa, was the association of one of the parasites of malaria with that of Kala Azar. This is the first occasion I have found the two parasites together, and Colonel Robertson, I.M.S., informs me he has only seen the two parasites together in a single case; this is certainly very remarkable, for malaria is common enough in Georgetown, the home of Kala Azar. That malaria is on the increase in Madras I have no doubt, for recently I have seen a number of cases of true chronic malaria closely simulating Kala Azar; in former years this was unusual. I can offer no explanation of why the two parasites are not more frequently seen together; it may perhaps be that they are inimical to each other.

As soon as I found that the blood of the boy mentioned above was swarming with *Herpotomonas donovani*, I fed a large number of bugs of both species on him, and hoped to settle all the remaining points connected with the exact method of transmission of the parasite by the bug. It will, however, be seen later, that a new factor in connection with the life history of the parasite was discovered, and though the results were most disappointing, I have been able to still further narrow down the problem. In addition to finding out all the points connected with the life history of the parasite, I aimed at determining as near as possible the temperature conditions connected with its development.

The bugs were therefore divided into batches, and were kept under the following conditions:—

1. A large number were placed in my laboratory in a cupboard, and kept at room temperature. They were not crowded together in small tubes, but were placed on pieces of filter paper in large glass jars. The temperature of the laboratory was recorded on a thermograph, and from May 24th to May the 31st, the average minimum temperature was 85°F., and the average maximum 94°F.; the bugs used for this observation were fed on the 24th and 26th.

2. Another batch were kept in similar jars in a Hearson's cold incubator at a temperature varying from 75°F. to 80°F.

3. A third batch were kept in another cold incubator at a temperature varying from 73°F. to 75°F. I had hoped to maintain the temperature of this incubator from 70°F. to 72°F., but just at this time the temperature of Madras was at its highest, the maximum on several of the days being well over 100°F., and on one day 112°F. Under these conditions it was found impossible to keep the temperature of this incubator lower, although large quantities of ice were used.

4. The fourth batch of bugs was kept in one of the cold rooms of the Institute, the temperature of which varied from 55°F. to 65°F.

It will be seen from the above that range of a very wide temperature was utilised.

Examination of bugs kept at room temperature, 85°F. to 94°F.—The bugs used in this experiment were dissected, as I have already described in a previous report, the midgut and its contents were smeared out on one part of the slide, and the hindgut and its contents on another part.

Bug No. 1.—Dissected 40 hours after being fed on the case, which was on the day when about 500 parasites were seen in films of finger blood. Its midgut contained much digested blood, the red cells and leucocytes had all disappeared. Many parasites were seen free, some were obviously disintegrating as evidenced by the way they stained; it was also clear that many had already disappeared. A few were enlarged and shewed the characteristic blue staining protoplasm, as is seen in young developing forms, but only a few were in the stage preceding the extrusion of the flagellum. Several were elongated and lying in pairs, and had very faintly staining flagella. There were several long thin flagellates, well developed flagella. No parasites of any kind were seen in the smear made from the hindgut.

Bug No. 2.—Fed on the same day as No. 1 and dissected 44 hours after its feed. The midgut film contained fewer parasites than that of No. 1. Most were unchanged, a few shewed the typical appearance of the formation of the flagellum, which I have several times described; several flagellates were seen. Two degenerating leucocytes containing parasites were found.

Bug No. 5.—Fed on the same day as No. 1, dissected 48 hours after its feed; the midgut contained a large amount of digested blood, but no leucocytes were seen. There were a few unchanged parasites lying free, and six degenerating ones were found grouped together. There were no flagellates, and the hindgut smear did not shew a parasite of any kind.

Bug No. 15.—Fed on the same day as No. 1, and dissected 70 hours later. After a long search a few unchanged free parasites were found, two were slightly enlarged. There were no flagellates, and no enlarged parasites shewing the characteristic changes just prior to the extrusion of the flagellum. No parasites were seen in the hindgut smear.

Bug No. 16.—Fed on the 26th at 10 A. M., and dissected 19 hours later. Its midgut contained a fair quantity of digested blood. There were many parasites all free, several were much enlarged and shewed the early and late stage in the formation of the flagellum. Quite a number were elongated and lying in pairs, and had evidently divided without flagellating. A few long thin flagellates and some short forms were found. There were also some degenerating long forms probably flagellates.

Bug No. 29.—Fed at the same time as No. 1, and dissected 34 hours later. The blood was almost all digested and the midgut nearly empty. Not a single parasite was found.

Bug No. 30.—Fed at the same time as No. 1, and dissected 136 hours later. The midgut contained a small quantity of blood, but the smear did not contain any parasites.

The remaining bugs were fed on a white rat, and dissected later but nothing was found in any of them. As a result of these experiments it will be seen that the parasite will flagellate in the bug at a high temperature, confirming the observations made by me in 1906. From a reference to the figures in my first report, it will be observed that I then obtained very similar results, but with this difference that the bugs were fed several times, and I was not then able to say how long the parasite remained alive in its alimentary tract. These recent experiments have, however, conclusively proved that though the parasites will develop into flagellates in the bug during the hot weather in Madras, they disappear by the fifth and sixth days. The bugs used in this last experiment were fed by myself and two assistants, and we sat for nearly an hour till every bug had taken a complete feed, those which had not fed were removed and destroyed. There was then no doubt whatever that all the bugs had ingested several hundred parasites. I therefore consider this experiment conclusive proof that the bug can never transmit the Kala Azar parasite during the hot weather in Madras; this at least is some consolation to those who are in constant dread of contracting this fatal disease.

Examination of bugs kept at a temperature varying from 75° F. to 80° F.

Bug No. 4.—Fed on the 24th at 5 P. M., and dissected 46 hours later. The midgut contained much blood, and the stained smear shewed unchanged red cells and leucocytes. There were numerous parasites in the white cells, and many free, these being in the early stages of development; several shewed the division of the flagellum, and the growth of the flagellar myoneme very clearly. There were also several young flagellates.

Bug No. 8.—Fed on May 25th at 5 P. M., and dissected 39 hours later. The midgut contained a large quantity of partly digested blood, the red cells could still be recognised, and most of the leucocytes were unchanged. The smear shewed many parasites, mostly in the early stages of development while still in the white cells, a fair number were free. There were a few young flagellates.

Bug No. 9.—Fed at the same time as No. 8, and dissected 42 hours later. There were many unchanged red cells and leucocytes, many of the latter had degenerated and the parasites they contained were well advanced towards flagellation. There were many young and mature flagellates. The digestion of the blood in this bug had proceeded more rapidly than in the case of No. 8.

Bug No. 25.—Fed on the 24th at 5 P. M., and dissected 96 hours later. The midgut contained only a small quantity of blood, as digestion had been completed; there were no unchanged leucocytes. Only a few unchanged and degenerating parasites were seen, but there were no flagellates.

Bug No. 26.—Fed at the same time as No. 25, and dissected just after it. The blood was completely digested and there were no parasites.

Bug No. 35.—Fed on the 24th and dissected 149 hours later. The midgut contained much digested blood chiefly regurgitated from the hindgut. No parasites could be found in the smear. I have frequently noticed, while dissecting bugs, when the midgut was dissected out and the hindgut was still in the abdomen, that a large quantity of the contents of the latter was driven into the midgut. I have noticed this happen even before the midgut was dissected out, for it can be seen through the chitinous integument; when a bug's midgut is empty, it always contains air and it can thus be clearly recognised. As the contents of the hind gut are shot into the midgut, active peristalsis can be observed in the latter, and the contained air can be seen moving about.

The remaining bugs which were used for this experiment were dissected on the fifth, sixth and seventh days after their feed, but with negative results. This experiment then clearly shews that a temperature varying from 5°F. to 80°F. is unsuitable for the development and multiplication of the parasite, and that though it flagellates, it never multiplies but dies out about the fifth day.

Examination of bugs kept at a temperature varying from 73°F. to 75°F.

Bug No. 3.—Fed on the 24th, and dissected 45 hours later. The stained smear shewed some red cells and leucocytes, but the digestion of the blood was considerably advanced. Most of the parasites were free, and shewed the early changes towards development; there were also a few young flagellates.

Bug No. 6.—Fed on the 25th and found dead on the 26th, dissected 31 hours after its feed. The midgut smear was found to be swarming with colon-like bacilli; there were a few parasites, and some of these were about to flagellate.

Bug No. 7.—Fed on the 25th and dissected 32 hours later. Digestion was fairly well advanced, most of the leucocytes were degenerating, and the parasites they contained were all shewing the early and late changes preceding flagellation. There were a large number of such forms, but no flagellates.

Bug No. 10.—Fed on the 24th at 5 P.M., and dissected 63 hours later. The blood in the midgut was completely digested, there were many unchanged parasites and some young flagellates. A few shewed the stage preceding the extrusion of the flagellum.

Bug No. 11.—Fed on the 25th at 10 A.M., and dissected 44 hours later. The midgut contained much semi-digested blood. There were many preflagellates in all stages in development lying free, as well as in leucocytes; and there were also some young flagellates.

Bug No. 12.—Fed at the same time as No. 11, and dissected 45 hours later; there was much partially digested blood in the midgut. There were many free parasites shewing the early and late stages preceding the extrusion of the flagellum, and a few young flagellates were seen. It was noted that the digestion of the blood was more advanced than in No. 11.

Bug No. 13.—Fed at the same time as No. 11, and dissected 46 hours after its feed. The midgut was full of semi-digested blood. The parasites were in the same condition as in the two previous bugs.

Bug No. 14.—Fed at the same time as No. 11, and dissected 47 hours after its feed. The blood in the midgut was almost completely digested; there were many unchanged parasites, a few shewing development, but no flagellates. The most striking fact regarding the parasites in these bugs was that they were clearly not developing and multiplying as was the case in the bugs recorded in my last paper. There were no evidences of multiple segmentation either in the pre-flagellate or the flagellate stage; this is a point of considerable importance.

Bug No. 17.—Fed on the 24th at 5 P.M., and dissected 70 hours later. The blood in the midgut was almost completely digested. There were a few unchanged parasites as well as some shewing the early changes towards flagellation; several degenerating parasites were found and the nuclei and blepharoblasts of many were all that was left of them. There were a few a short, and two long flagellates.

Bug No. 18.—Fed on the same day as No. 17, and dissected 71 hours after its feed. The blood in the midgut was completely digested. There were a few unchanged parasites as well as one or two shewing the early appearances of development; two short flagellates were also seen.

Bug No. 19.—Fed on the 25th at 10 A.M., and dissected 72 hours later. The blood in the midgut was completely digested. Four unchanged parasites were seen and several degenerating flagellates and pre-flagellates, but most of the parasites had obviously disappeared.

Bug No. 20.—Fed on the same day as No. 19, and dissected 73 hours after its feed. The midgut contained digested blood exactly similar to what is seen in the hindgut of the bug. Five apparently unchanged parasites were found after a long search; but there were no flagellates or young developing forms.

Bug No. 21.—Fed on the same day as No. 19, and dissected 76 hours after its feed. The midgut contained the same fluid as was seen in No. 20. The smear contained several unchanged parasites, others in various stages of development, and many groups of young flagellates, which were well stained. In addition there were several degenerating and degenerated flagellates. This bug contained the best developed forms, but it was evident from the degeneration taking place in some of the flagellates, that the others would not have lived much longer.

Bug No. 22.—Fed on the same day as No. 19, and dissected 77 hours after its feed. The midgut contained a small quantity of digested blood. There were only a few unchanged parasites, and no flagellates.

Bug No. 27.—Fed on the same day as No. 19, and dissected 101 hours after its feed. The midgut contained much digested blood, and the smear shewed a very few unchanged and degenerating parasites.

Bug No. 28.—Fed on the same day as No. 19, and dissected 102 hours after its feed. The midgut contained some digested blood and many air bubbles and the smear only shewed four unchanged parasites, which were found after a long search.

Bug No. 32.—Fed on the 26th and dissected 100 hours after its feed. The midgut contained much digested blood, similar to that seen in the hindgut. Only a few unchanged parasites could be found.

Bug No. 33.—Fed on the same day as No. 32, and dissected 103 hours after its feed. The midgut contained a lot of digested blood, and in the smear a few unchanged parasites, and some degenerating forms were seen.

Bug No. 34.—Fed on the same day as No. 32, and dissected 104 hours after its feed. The midgut contained much black digested blood, but not a single parasite of any kind could be found.

The remaining bugs, some 20 in number, were dissected from the fifth to the eighth day after their feed, but with negative results. It was therefore clear that the temperature at which the bugs were kept was unsuitable for the development and multiplication of the parasites.

Examination of bugs kept at a temperature varying from 55° F. to 65° F.

Bug No. 23.—Fed on the case on the 24th at 5 P. M., and dissected 93 hours later. The midgut contained a large quantity of reddish blood only partly digested, many leucocytes and red cells being quite unaltered. There were a large number of unchanged parasites still lying in leucocytes (polymorphonuclear), as well as many free forms; many clearly shewed the early changes towards development, but there were no flagellates.

Bug No. 24.—Fed at the same time as No. 23, and dissected 96 hours after its feed. The midgut contained a large quantity of red blood, the same as No. 23, and the parasites were also in the same condition. Twenty-four bugs which had been kept in the cold room were dissected from the fifth to the tenth day after their feed; they contained unchanged parasites, a few developing forms, and in each several flagellates were seen, but it was obvious that the development was so retarded by the low temperature that they failed to develop normally and multiply

after flagellating. Unchanged parasites were seen in several other bugs as late as the twelfth and thirteenth days, but after this, not a single parasite could be found.

The observations recorded above, confirm the previous ones and prove that if the bug is kept at a low temperature the parasite of Indian Kala Azar fails to develop and multiply normally in its alimentary tract, and disappears after the tenth or twelfth day. Knowing that every bug used in these experiments must have ingested at least 100 parasites it is clear that *Herpetomonas donovani* is unable to complete its life-history at the various temperatures utilised. What then is the exact temperature necessary for its complete development? It will be remembered that in my last experiments in which I was able to follow the life-history of the parasite up to its post-flagellate stage, the bugs were kept in a cold incubator; a careful record of the temperature of the incubator was however not kept, but it was then stated to have been about 71° F. to 75° F. (22° C. to 24° C.) These experiments were carried out during the last days of January and the first week of February 1912. The mean temperature of Madras for the 24 hours during this time of the year is about 72° F. to 75° F.; the minimum may go down as low as 62° F. and the maximum as high as 85° F. It will therefore be seen that the temperature the bugs were then kept at, was practically that of the temperature of an inside room in Madras. From this I am led to infer that there is a very narrow limit of temperature within which the parasite can flagellate, multiply, and complete its development in the bug. When is this temperature attained in Madras? In order to answer this question I have collected the temperature records of the City of Madras for the last ten years, and without going into the details, I find that the necessary range of temperature is to be found in the months of December, January, and the first half of February. Here are the figures:—

					Average Maximum	Average Minimum	Average Mean.
1901					86.6	70	77.3
January	...	...	...	...	82.6	68.9	75.6
December	...	...	...	...	83.8	67.5	75.8
1902					82.9	72.1	77.6
January	...	...	...	...	84	69.8	77
December	...	...	...	...	82	69.7	75.9

					Average Maximum.	Average Minimum.	Average Mean.
	January	...	...	...	83.1	69.2	76.2
1904	December	...	...	...	83.7	69.6	76.5
	January	...	...	...	83.2	65.2	74.2
1905	December	...	...	...	83.5	67.8	75.4
	January	...	...	...	83.9	69.6	76.8
1906	December	...	...	...	81.6	71.5	76.6
	January	...	...	...	83.9	66.8	75.4
1907	December	...	...	...	82.9	69.4	76.2
	January	...	...	...	81.4	68.3	76.4
1908	December	...	...	...	82.7	68.6	75.6
	January	...	...	...	83.6	67.9	75.8
1909	December	...	...	...	85.6	71	78.3
	January	...	...	...	86.3	67.6	76.7
1910	December	...	...	...	83.7	66.9	75.7
	January	...	...	...	85.8	67.8	77.1
1911	December	...	...	...	82.5	71.4	77.5

It is interesting to refer to the feeding experiments recorded in my second memoir on the development of the parasite in the bug. The twelve bugs were fed on the case on December 27th, 1906, and the last bug was dissected on January 2nd, 1907, and from the above table of temperatures, it will be seen that the average mean temperatures of the two months was 76.6°F. and 75.4°F. respectively; the bugs in the case were kept in an open verandah on a table. In all these bugs there was a rapid and normal development, suggesting that the life-history of the parasite would have been completed in another five or six days.

From the above more recent observations the following conclusions can be drawn:—

1. The parasite of Indian Kala Azar will flagellate in the bug at a high temperature, but instead of multiplying, it dies out and disappears in about five days after it is ingested.

2. The parasite will also flagellate in the bug at a low temperature and though it persists in the insect for about twelve days after it is ingested, it never multiplies to any extent, but dies out.

3. The parasite flagellates and persists for a few days in bugs kept at a temperature varying from 73°F. to 80°F., but here again it never multiplies but dies out.

4. The temperature corresponding to that of the months of December and January in Madras appears to be the most suitable for its development in the bug; it is then able to pass on to its post-flagellate stage. It is I think a very striking fact to note that the parasite of Oriental Sore in Cambay behaves in a still more peculiar way, in that it will only flagellate in the bug below a temperature of about 75°F. The parasite of Kala Azar on the other hand will flagellate in the bug at a high temperature but fails to multiply, and soon disappears. I am confident that these peculiarities in the life-histories of these two parasites are not accidental but that they give us some insight into their origin, and further explain why the two diseases they produce are never found, so far as we know at present, side by side in India. The temperature and the resulting effect it has on the digestion of the blood in the bug, is the factor of the first importance which governs their life histories, and in each case the range is different and at the same time very limited. I hope in the coming cold weather in Madras to settle the problem regarding the exact temperature, and at the same time to find out the importance or otherwise of one more factor connected with the life-history of the parasite, which I have for some time had in view, and which I will refer to on another occasion. Until all this has been solved by feeding experiments and dissections, I do not propose carrying out any transmission experiments with infected bugs; such experiments would be conducted with imperfect knowledge, and would surely lead to failure.

Our Contemporaries.

MEDICINE.

Experimental Study on the Cause and Nature of the Beri-Beri.

The authors report the numerous results of their experiments conducted for the purpose of solving the question whether one can produce in fowls the well known beri-beri like disease, which are caused by the one sided feeding of fowls with peeled off, polished rice, through the subcutaneous injection of an artificially prepared fermented solution of peeled off, polished and thoroughly washed rice (2 litre of rice + 800. ccm of drink water are put in a shallow porcelain dish and kept by the temperature of 40°C for 48 hours.) The results of the experiments:—

1. The authors produced a typical disease through the subcutaneous injection of a fermented solution of peeled off, polished rice in the fowls which are fed on with not polished rice and water.

2. Only the fowls, which are disposed to the beri-beri like disease caused by the feeding with polished rice, showed the typical changes.

3. In this disease the fowls showed uncertain attitude, powerless reeling gait; they cannot stand upright and lie in sitting position, and tumble down forward; the legs are stretched and the head and neck sink down; there is hoarseness and loss of deglutition and all the signs of the ascending motor paralysis. These changes occur most markedly in cocks. In addition there is cyanosis of the comb, loss of appetite, state of depression and diarrhoeic stools of brownish yellow colour during the course of the disease. The authors could not determine the sensory paralysis and the disturbance of cardiac actions in those fowls with safety.

4. The injection of the fermented solution, which has been fermented for 48 hours, is mostly efficacious, and the symptoms increase with the injection and diminish with its stoppage. The fermented solution which has been fermented for 24 hours is only efficacious in those fowls which are strongly disposed.

5. Usually the unsterilised, but filtered and centrifugarised solution was used. The solution, which is passed through Chamberlain's filter and made sterile, is also efficacious.

6. The subcutaneous infection of the same quantity of a simple infusion of rice in warm water does not disturb the health of fowls.

7. The injection of a dilute solution of acetic acid which has the same acidity as the authors' fermented solution, causes the fowls to fall away very quickly like mummy and to die, but in its whole course there is no sign of paralysis except the loss of power due to a simple weakness.

8. The authors found anatomically and histologically the following changes in 3 autopsied fowls which had typical paralytic symptoms during life; dilatation of right heart, a certain amount of hydropericardium, signs of congestion in all the organs, degeneration of peripheral nerves of light and middle grade, marked fatty degeneration and slight segmentation, disc's formation, homogenisation, waxy degeneration and so many secondary degeneration of the skeletal muscles, slight fatty degeneration of the myocardium, liver, and kidney, deposition of fats in the tunica media of the middle and large sized arterial branches of the heart.

and kidney (in one case), the contraction of the fine and small arterial branches in all the organs and tissues (in one case not strongly marked), moderate catarrhal state of the intestinal mucous membrane.

9. These symptoms and pathological changes correspond exactly with those of the beri-beri like disease which is caused by the feeding of fowls with polished rice.

10. In the injected cases there are diarrhoeic stools during its course while in the cases which are fed with polished rice there is mucous stools from the beginning. This difference is due to the fact that by the injected cases the poison is suddenly introduced into the circulation, while by the fed cases the poison is at first produced in the alimentary canal and gradually resorbed.

11. The severity of the symptoms and the stages of the illness coincide quite well with the pathological changes.

12. The fowls are equally and in the same degree disposed or refractory to the disease either through the injection or feeding.

13. From these facts one can assert that the affinity of the tissues to the poison plays a great part in the predisposition for the feedings as well as injection's disease.

14. The authors always obtained positive results in the predisposed fowls with the subcutaneous injection of the fermented solution of polished rice and consequently the Kohlbrugge's statement can be negated.

15. Lastly the authors observed various degree of "contractionsstreifen" according to the cases in the intestines of the autopsied fowls with the disease. In 2 cases with fowl tuberculosis of the intestinal walls the "contractionsstreifen" was not marked at the diseased spots but in one case which was free from tuberculosis the stripes could be observed all over the duodenum, the rest of small intestine and colon.

The authors think that those stripes of contraction are product of the reaction of still living muscle fibres against the fixing fluid and showed that the muscles are, so long as they are intact, under increased tone just as the contracture of the muscles of blood vessels.

CONCLUSIONS.

1. The disease which we produced through the injection of the fermented solution of polished rice is an intoxication.

2. This intoxication's disease and the beri-beri like disease of fowls caused by the feeding with polished rice are one and the same.

3. As the former disease is absolutely proved to be an intoxication, so the latter must be also a disease caused by poisoning.

4. The beri-beri like disease of fowls caused by the feeding with polished rice is not a so-called "partial inanition."

The reason for these assertions is easily seen in the extracts which we have enumerated in the above lines.—*The Sri-I-K. wai Medical Journal*.

Hyperacidity.

LOCKWOOD suggests the following practical rules for diagnosis :

1. Do not make a diagnosis of hyperacidity until all organic lesions are excluded and even then be prepared, with a free and unbiased mind to change the diagnosis to one that is more definite and distinctive, should other symptoms or physical signs arise.

2. Do not make the diagnosis of hyperacidity without examination of the fasting stomach by a tube. The presence of acid fluid, or of food remains or of any considerable amount of gastric mucus should exclude the diagnosis.

3. Do not make the diagnosis of hyperacidity simple because the patient is nervous and neurasthenic.

4. Do not make the diagnosis of hyperacidity should the previous clinical history suggest attacks that may point to appendicular or gall-bladder disease, or should the physical examination suggest that these lesions are probable.

5. Do not make the diagnosis of hyperacidity accompanied by epigastric pain. Especially should this diagnosis be avoided if the pains occur at a stated and regular time after eating.

6. Do not make the diagnosis of hyperacidity if hemorrhage is present either visible or occult, in vomited matters or in the stools. Examination for occult blood in the stools should never be neglected.

7. Do not make the diagnosis of hyperacidity in cases with repeated vomiting, especially if vomiting be of the abundant acid fluid indicative of hypersecretion.

8. Do not make the diagnosis of hyperacidity if the symptoms occur when the stomach should be empty.

9. Do not make the diagnosis of hyperacidity in the event of the test breakfast settling into two layers, the supernatant fluid layer being twice or more the depth of the underlying sedimentary layer. These are cases of alimentary hypersecretion and not of pure hyperacidity.

10. Do not make the diagnosis of hyperacidity in cases attended by loss of appetite or by nausea or by advancing anemia or by loss of weight especially if the patient be of adult years with or without a previously good digestion.

11. Do not make the diagnosis of hyperacidity without mental reservation in those over 45 who complain of this disorder for the first time—*New York State Journal of Medicine*.

The Significance of Abdominal Pain in Typhoid Fever.

A. KNYVETT GORDON, M.B.—Excluding cases in which pain in the abdomen is due to pneumonia or some other extra-abdominal cause—and these are more frequent than might be supposed—and also those in which the pain results from a lesion of the vermiform appendix, bladder, or female pelvic organs, abdominal pain in typhoid fever is usually due to one of three causes: perforation of the bowel, hæmorrhage from an ulcer, or colic. Perforation of the bowel should be the first thought of the physician, when summoned, as he should be, to a typhoid patient who complains of any kind of pain in the abdomen.

Much of the difficulty in the diagnosis of perforation has arisen from the descriptions in the text books, many of which were either written before, or have persisted since, the practice of opening the abdomen in suspected cases began. They state that the symptoms of perforation are sudden, severe pain, collapse, and sometimes vomiting and rigidity of the abdominal wall. The signs of perforation are thus confused with those of the subsequent peritonitis. For successful treatment, we must attempt to detect perforation in the pre-peritonitic stage, and the first essential is that we should suspect it. The text-book picture of perforation, is a sudden dramatic event, to which the patient, at all events, is certain to draw attention. On the contrary, many patients, found to be suffering from perforation when the abdomen is opened, have had pain neither sudden nor intense, and not associated with any signs of collapse. The following is an example :

A man, in the second week of an attack of typhoid fever, who had never been seriously ill, had a moist tongue, and had been free from diarrhoea or abdominal distention for a week, told the nurse when she came to take his temperature, that he had a little pain in the middle of his stomach, which had begun half an hour previously, but which had not been worth troubling her about. He also said that it seemed to be passing off. As it was the custom to inform the medical officer of any complaint of abdominal pain, he was sent for immediately, and the writer also saw the patient a few minutes later.

There was no sign of collapse. He was lying on his side, with the legs extended; the abdomen was nowhere rigid nor was there any distention; the liver dullness was not diminished. The pulse was 80, and the temperature 101° , these having neither risen nor fallen since the onset of the pain. This latter the patient referred to the umbilical region, and described as a dull aching, varied by occasional twinges, the latter being reflected in his countenance by some twitching of the lips. He was not taking opium or any other drug. The bowels had been slightly constipated, and he had required occasional enemata; they had not acted since the onset of the pain. An ice-bag was applied to the umbilical region.

An hour later his aspect had altered completely, and his expression was distinctly anxious. The pain was less, and the abdominal condition was unchanged; there was certainly no rigidity. The pulse, however, had gone up to 136. The writer opened the abdomen forthwith, about $2\frac{1}{2}$ hours after the onset of the pain. The incision was made over the region of the appendix, and, with little manipulation, two perforations were found side by side in the floor of a large ulcer in the ileum about a foot from the ileo-cæcal valve. There was no gross sign of local peritonitis, and no sign of adhesion either to neighbouring coils of intestine or to the parietal peritoneum, though the affected coil was much inflamed, and a little faeces had escaped. There was a little free fluid, slightly turbid, but not obviously purulent, in the peritoneal cavity. The ulcer was invaginated with a single row of continuous Lembert sutures of fine celluloid thread, and the abdominal cavity drained with a "cigarette" drain through the lower angle of the wound, which was sewn up in layers. There was no mopping or flushing of the peritoneum. As far as the peritoneum was concerned, everything appeared to go well, but the abdominal wall showed no signs of healing, and ultimately sloughed extensively. The patient died 3 weeks after the operation from exhaustion.

Post mortem, the line of suture was found soundly healed and watertight. There was no sign of general peritonitis, and all the ulcers in the ileum (of which there were about 10) showed signs of healing. Cultures from the abdominal wall made during life showed *B. coli*, and some streptococci, with *B. typhosi*.

This case illustrates well the signs of perforation, apart from subsequent peritonitis. Potentially, of course, peritonitis exists from the moment when the contents of the intestine escape; but in a large number of cases, at all events, there is an appreciable interval, between

clinical perforation and clinical peritonitis, and, if we can open the abdomen before the onset of the latter, it is a great advantage.

The signs of perforation are abdominal pain of any kind, followed quickly by a change in the aspect of patient, and a quickening of the pulse. Important confirmatory signs are rigidity of the abdominal wall and diminution of the liver dullness, but neither of these latter is invariably present, and it is certainly not desirable to wait for them. All of the first triad are masked by the administration of opium, which is indefensible in typhoid fever, unless it is certain that there is no perforation. A change in aspect may be a difficult sign to identify, but it is, on the other hand, often well marked, and then it is most useful. But the three signs should be taken in conjunction.

In *hæmorrhage from the bowel*, there is much more frequently collapse and the onset is usually sudden, and the pain severe. Difficulty in diagnosis does not arise, because the blood is soon passed by the rectum, generally within an hour and frequently much sooner. When hæmorrhage occurs, we must give opium freely, and chance the presence of a co-existent perforation. This latter event, however, is so rare that this course is justified. Remedies other than opium in full doses, especially gallic acid, salts of lead, turpentine, and adrenalin, not only fail to check the bleeding, but sometimes apparently increase it. This is not surprising when we consider that they all tend to constrict the capillaries, and whether they narrow the calibre of the bleeding vessel or not, they must act more vigorously on those that are not injured, and so raise the blood pressure and tend to increase the hæmorrhage. But their chief disadvantage is that they are generally used as substitutes for opium. A $\frac{1}{4}$ grain of morphia should be given hypodermically directly the diagnosis of hæmorrhage is made, and repeated until the patient is thoroughly under the influence of the drug.

Colic.—We must distinguish between two classes of patients—those who are suffering from milk dyspepsia, and those who are not. In many text-books we are cautioned against giving anything but milk, not only during the pyrexial stage, but even for some time after the temperature has fallen, and the diarrhoea which results as soon as the patient becomes unable to digest the milk is often described as a characteristic of the disease. It is, moreover, frequently associated with abdominal pain and meteorism which are then described as "typical." In point of fact the so-called "typhoid stool," which consists largely of curds of undigested milk, is not typical of typhoid fever at all, and disappears when the milk is reduced, stopped, or rendered digestible. Moreover,

these stools are sometimes found in patients suffering from other ailments—notably scarlet fever of the septic type—when too much milk has inadvertently been given.

It is not uncommon in a fever hospital to find a ward containing 20 or more patients in the acute stage of typhoid fever, none of whom has passed a single "typhoid" stool since the period after admission—generally about 3 days—during which they are getting rid of their previous super-abundance of milk. Of course, when the ulceration is extensive some diarrhoea may persist after milk has been omitted from the dietary. But the stools are not then of the "pea-soup" variety of the text-book, and usually are not so numerous. With this exception, the majority of patients are usually slightly constipated, and require occasional enemata.

As patients suffering from milk dyspepsia usually have intermittent colic, diagnosis between this and the pain due to perforation arises, especially as perforation is about four times more frequent in patients suffering from diarrhoea than in those with stools partially formed. In the other type of patient, colic is rare. The diagnosis is not very difficult, so long as opium has not been administered. Though this drug affords temporary relief, it has the disadvantage—apart from the fact previously mentioned, of masking the symptoms of perforation—that it subsequently increases the frequency of colic, on account of the intestinal distension which it tends to produce. Consequently it is best to assuage the pain with an ice-bag, or a hot fomentation, preferably the former. The main point in the diagnosis is that, when the attack of colic has passed off, it leaves the aspect and pulse rate unaltered, and if there is any rigidity it is present at the onset of the pain and subsides later. In perforation there is some initial pain, which need not be severe, and may even escape notice; but later, when peritonitis develops, severe pain sets in, accompanied by the signs of collapse.

The essentials for success in operating for a perforation are the avoidance of:—

1. Chloroform—using infiltration of the abdominal wall instead.
2. A prolonged search for a second perforation after one has been found; the writer has never seen more than one perforation at a time.
3. Irrigation of the peritoneal cavity.
4. Elaborate suturing of the abdominal wall.

A perforation is almost always in the ileum, within 2 feet of the ileo-cæcal valve, and most commonly within 6 inches. After the

operation, which should be performed with celerity, the patient should be propped up in a sitting position, and saline solution administered hypodermically, or continuously by the rectum. The writer is disappointed with the results of intravenous injection, and much prefers to give the fluid hypodermically and very slowly.

Difficulty sometimes arises in deciding what to do with the perforated ulcer. Not infrequently there are 1 or 2 ulcers in the vicinity which, though not perforated, cause anxiety. When in doubt the writer invaginates a neighbouring suspicious ulcer also, as the procedure does not appreciably lengthen the operation. A much greater difficulty occurs when the bowel round the ulcer is so inflamed that it will not hold the sutures. In 2 such cases the writer excised about a foot of bowel, and performed an end-to-end anastomosis by continuous suture. The alternative is to make an artificial anus, but this is scarcely ever successful.—*The Medical Review.*

SURGERY.

Ready Diagnosis of Syphilis.

Make a smear upon a glass slide or cover glass of the secretion from the supposed chancre, but do not dry it or pass through flame. Promptly, before the smear dries, drop a little liquid India ink upon it and mix well together. Cover, making a fairly thin film, and examine under dark ground illumination.

The spirochæte is at least twice the length of a red blood corpuscle, is evenly coiled, and tapers at both ends. It is hard to find in late lesions, but is readily found in an initial chancre. This is the method of Gunther and Wagner.—*The P. M. Journal.*

Malignant Disease in a Boy.

A boy was at one time suffering from a new growth in the mastoid region. The growth was removed and proved to be of a very unusual nature, for in the pathological report it was called an endothelioma. Several operations were necessary before the disease in the mastoid region was eradicated, and now the boy has come to the hospital again with this mass of glands in the upper part of the neck. It is not certain yet whether these glands have any definite relation to the original growth, for they are soft and caseating and not adherent to the skin or to the deeper structures. In fact, they look like tuberculous glands.

However, their exact nature will be revealed at the operation which is shortly to be performed. Some glands in the neck have already been removed, and the boy has an interesting reminder of the previous operation in the condition of his tongue, which is directed strongly towards the right side when it is protruded. The whole of the right side of the tongue is wasted and shrunken, and the mucous membrane has as a result fallen into folds. The right hypoglossal nerve has obviously been accidentally divided, and the present condition of the tongue is the result of the paralysis and atrophy of the intrinsic muscles.—*The Polyclinic*.

Foreign Body in Meckel's Diverticulum Simulating Appendicitis.

C. SCHWENK.—Meckel's diverticulum is situated not far from the ileo-cæcal valve. Hence inflammation of this organ may easily simulate appendicitis. Kijewski, in 1910, collected no fewer than 25 cases of "diverticulitis." Muller lost a case on which he operated for peritonitis and supposed appendicitis; post mortem the source was found to be a gangrenous diverticulum. The writer observed the following case:—

A healthy woman, aged 21, was said to have swallowed, on Apr. 1, 2 gramophone needles with particularly sharp points. On the following morning while walking she experienced sharp stabbing pains in the cæcal region. The pain was paroxysmal and not constant, but later it involved the entire abdomen though more on the right side. Vomiting occurred repeatedly. The bowels were confined and there was strangury.

Thirty-six hours later the condition exactly resembled appendicitis. The temperature was 101.1° and the pulse was 100. The abdomen was tender and rigid, more on the right side than the left, and on the right side was tympanitic to percussion. Per rectum Douglas's pouch was tender. The woman was not pregnant. She was clearly hysterical and was said to have previously swallowed pins without ill-effect. But hysterical fever was negated by the physical signs and the demonstration by the X-rays of one needle (a second was not found) in the cæcal region. It was thought probable that the needle had become impacted in the appendix, and had caused appendicitis and secondary peritonitis.

The writer proceeded to operate. The appendix though slightly reddened contained no foreign body; it was excised. Palpation of the presenting coils of intestine, especially in the ileo-cæcal region, gave negative results. Owing to the vesical symptoms and the presence of a

vaginal discharge the pelvic organs were then examined with the patient in Trendelenburg's posture. A sausage-shaped structure, resembling a recent hydrosalpinx, was thus exposed. It was covered with peritoneum and at its blind end, which was wide and saccular, was provided with fringe-like structures (the remains of the omphalo-mesenteric duct). At its attachment to the ileum it was contracted and provided with a sphincter. It was about 3 in. in length. The needle lay at right angles to its long axis and had perforated its walls both with the sharp and blunt ends. The needle was extracted and the perforations were closed with several Lembert's sutures. The diverticulum was not excised. The woman had completely recovered in a week.—*The Medical Review*.

The Treatment of Umbilical Hernia in Children by Subcutaneous Elastic Ligature.

V. BRUN.—A certain proportion of cases of infantile umbilical hernia resists the simpler methods of treatment and require surgical intervention. Of the many operations recommended for this condition that introduced by Nota of Turin in 1890 deserves special notice because of its simplicity and the excellence of the results.

The technique is simple. A large fully curved needle is threaded with a rubber cord about 2 mm. in diameter and a foot long. This is previously sterilised by immersion for at least an hour in a solution of 15 parts glacial acetic acid in 1,000 parts of alcohol. The needle is inserted under the skin below the umbilicus and is passed half round the hernia at a distance of about 2 cm. from the opening in the abdominal wall. The needle is brought out above the umbilicus and re-inserted at its point of emergence and traverses the tissues on the other side of the middle line, finally emerging at its original point of insertion after carrying the elastic ligature completely round the base of the hernial sac. The operator now reduces the hernia keeping a finger on the opening in the abdominal wall while an assistant makes traction on the ends of the ligature until the orifice is obliterated by the compression of the neck of the sac. The ends of the elastic cord while still on the stretch are then clamped as close to the skin as possible, tied with silk and cut short leaving small portion protruding through the skin. A dry compressive dressing fixed by a starch bandage is applied. The elastic ligature gradually cuts its way through the tissues leaving a dense cicatrix which obliterates the sac. After a period of 10 to 15 days it becomes loose and may be removed entire through the

point at which the needle was first inserted. There should be no fever after the operation, and dressing is not required till the tenth day, when, if the elastic is loose, it is removed and a light, dry dressing applied. The child should wear a simple abdominal binder for 2 or 3 months after operation. It is unnecessary to retain the child in hospital, as the operation takes only a few minutes. It may be performed in infants without an anæsthetic and under ethyl chloride anæsthesia in older children. The stretched portion of skin which covered the sac gradually contracts and the abdominal wall assumes a normal appearance.

The writer has observed 244 cases treated by this method in patients ranging from the ages of 2 months to 9 years, half being under 6 months and three-quarters under one year. Only one case of recurrence was observed; in this an attack of bronchitis occurred a few days after separation of the ligature. The operation was repeated 6 months later with success. In the case of a child who died of broncho-pneumonia 25 days after the operation the cicatrix was so firm that it was found impossible to re-open the neck of the sac with the fingers. This method is the simplest, safest, and most efficient operation from the radical cure of umbilical hernia in children of all ages.—*The Medical Review*.

Enucleation of the Tonsils.

E. BORCHERS.—Tonsillotomy is performed either because the enlarged tonsils are a mechanical obstruction to deglutition or because of recurrent attacks of tonsillitis. Only in the first and smaller class is the operation satisfactory. Unless the stump again hypertrophies, the main obstruction is removed. But in relapsing pharyngitis the attacks usually, sooner or later, recur. As long as a fragment remains septic detritus is present in the lacunæ, which offer an entry to the organisms of diphtheria, epidemic meningitis, scarlet fever, articular rheumatism, nephritis, endocarditis, septicæmia, and quinsy. Hence total enucleation is indicated in these affections as well as in recurrent tonsillitis.

As regards tuberculosis, the cervical lymphatic glands, and also the lymphatics at the pulmonary hilus are usually infected through the lymphatic tissue of the naso-pharynx and tonsils. Colouring matter injected into the tonsillar substance is chiefly deposited in the glands most liable to infection with tubercle bacilli. Sewall treated 68 children with chronic cervical adenitis by tonsillectomy. In 57 the swelling permanently subsided.

Two objections have been advanced. The first is that complete removal of the tonsils may damage the organism by depriving it of their physiological function. But apart from the probability that a hyperplastic and fibrous tonsil is of little or no value, there is the fact that innumerable total tonsillectomies have now been performed with nothing but benefit. A second objection is that tonsillectomy is too difficult to supplant tonsillotomy in out-patient work. In the case of unusually small or soft and deeply fissured tonsils, or in old and tough peritonsillar adhesions, the tonsils can be removed only by dissection, and the operation remains one of the most difficult in surgery. But in the large majority of cases in which the tonsils are enlarged, hard and globular, tonsillectomy is simple, easily and quickly performed, and eminently suitable for out-patient work. The following is the writer's method.

The anæsthetic preferred is ethyl chloride, which is slowly dropped on to about 8 layers of thin gauze placed over the nostrils and mouth. By this open method the patient is ready for the operation in one or two minutes. The operation should be begun just before the abolition of the reflexes to avoid aspiration of blood. The body should be propped in a sitting posture with the head slightly turned to the left or right according to the tonsil to be enucleated. An assistant stands at the side holding the gag in one hand and the tongue forceps in the other.

The first step is the separation of the tonsil from the anterior pillar of the fauces with an ordinary elevator. The curved point is inserted at the upper part of the tonsil and swept forwards and downwards behind the anterior pillar. If, owing to adhesions, this separation is impossible, no further time should be wasted, but dissection with forceps and Cooper's scissors at once begun. In the great majority of cases there is no difficulty whatever. The point of the index finger of the right hand for the right tonsil, and vice versa, is inserted in place of the elevator behind the anterior pillar of the fauces and continues the separation of the tonsil. The finger is carried completely round the tonsil in a direction from before, upwards and backwards and finally downwards, until it is shelled out of its bed and remains connected only by a pedicle attached near the root of the tongue. A few seconds usually suffice. This pedicle is seized between the thumb and forefinger and, in the case of children, torn through, or of adults divided with scissors. There is no need to control the operation by the eye as the sense of touch suffices. After one tonsil is enucleated the patient should be allowed to regain consciousness and to rinse the mouth with a solution of peroxide of hydrogen. A few more drops of ethyl

chloride are administered, and the opposite tonsil enucleated. Hæmorrhage is usually negligible and ceases after rinsing the mouth. The writer in 30 cases has never experienced secondary hæmorrhage though parenchymatous bleeding difficult of arrest has been reported after tonsillectomy as after tonsillotomy. The advantages claimed for the writer's method are:—

- (1) No special instruments are required.
- (2) The technique is simplified, the danger of hæmorrhage is minimized, and the duration of the operation greatly reduced by the use of the finger, guided by tactile impressions.
- (3) The soft palate and the carotid artery, even with an abnormal course, cannot be wounded.
- (4) The operation can be performed under ethyl-chloride, and is therefore possible in out-patient practice.—*The Medical Review*.

Chancre Developing Four Days after Injection of Salvarsan.

M. ROSENTHAL.—In February, 1905, a man was seen with an indurated sore on the penis of 3 weeks' duration, buboes, macular eruption and patches in the mouth and on the tonsils. For 3 years he was given mercurial treatment.

In March, 1910, he was seen again. He was in good health and free from symptoms. He had heard of the Wassermann reaction, and was anxious to have it performed. It proved negative.

In December, 1910, he insisted on a second test, as he had read that a negative reaction may be accidental or transient. This was also negative.

In November, 1911, he was again seen. For several months he had suffered from lightning pains. The right knee-jerk was lost, and the left diminished.

On January, 8, 1912, an intravenous injection of 0.6 gm. of salvarsan was given. Slight discomfort, headache, and dizziness followed for several hours. On January, 12, he showed a small erosion on the glans penis, which looked not unlike an abraded surface after a vesicle has ruptured. Having on a number of occasions seen herpes follow the administration of salvarsan the writer concluded that the sore was herpetic. On January 18 the sore was distinctly indurated, and there was some inguinal adenitis, although spirochætes were not found. On January

22 the edges of the sore were markedly indurated, the inguinal glands were large, and a decided macular eruption was present. Serum from the sore showed undoubted spirochætes, and a Wassermann on the following day was positive. There has been no change in the tabetic symptoms.

It is remarkable that a man suffering from the effects of syphilis should contract a chancre and that this should develop 4 days after an injection of salvarsan.—*The Medical Review*.

Notes on Local Anæsthesia.

F. A. PARKER, M. D., BROOKLYN, N. Y.

Schleich's infiltration, Cushing's nerve blocking, and slight additions in technic, have made local anesthesia safe and reliable. Its field has been extended from minor cases to a great variety of major operations. The very young and the highly nervous are usually unfavourable patients for local anæsthesia.

In those dreading a general anæsthetic, in the aged, in cardiac, diabetic, nephritic, septic and other cases, in whom general anæsthesia may be contraindicated, spinal and local anæsthesia have their greatest field.

Spinal anæsthesia, with its mortality, its dangers of introducing sepsis into the cord and the prospects of later cord lesions, has never appealed to me. Nothing can be done under spinal anæsthesia that cannot be done with local alone or combined with a few whiffs of a general anæsthetic.

I have performed under local anæsthesia the following: removal of cysts, fingers, toes, ingrowing toe-nail; cerebral decompression; thyroidectomy, tracheotomy; excision of ribs and drainage of the pleura; amputation of the breast; for cholelithiasis; gastro-jejunostomy; appendicectomy, intestinal obstruction; drainage of the pancreas; hernia—inguinal, femoral, ventral and umbilical, reducible and strangulated; nephrectomy, suprapubic cystostomy for stone and papilloma; also for drainage of the bladder preliminary to suprapubic prostatectomy with reopening of the bladder in a week or ten days and removal of the prostate—nitrous oxide being given for one and a half or two minutes while the prostate is being enucleated; hydrocele; varicocele; circumcision; hemorrhoids; fistula; perineorrhaphy, trachelorrhaphy; external urethrotomy; amputation of the leg and at the shoulder joint.

The technic of local anæsthesia may be carried out by any surgeon. To operate successfully requires the confidence of the patient, time, gentleness and thorough infiltration of the tissues. Local anæsthesia is effective for three or four hours, but as the area infiltrated is limited, forcible tearing or separation of structures is to be avoided. Cutting should be with gentle stroking of the knife, not pressure. Pain is elicited when inflamed structures are pressed upon by the finger or knife.

A hypodermic injection of morphine, $\frac{1}{4}$ grain, is given fifteen minutes before operation. Morphine and cocaine are systemically antagonistic, locally synergistic. The solution, freshly prepared and sterilized for each operation, consists of cocaine one grain, adrenalin chloride, ten minims, sodium chloride $8\frac{1}{2}$ grains, water two ounces—a quantity more than sufficient for any operation. Considering the systemic antagonism of morphine and cocaine, the weakness of the solution employed, less than 1/10 of 1 percent and the amount lost upon incising the infiltrated tissues, cocaine poisoning would not be expected. I have not seen a case.

In skull cases the tissues down to and including the periosteum require infiltration, the bone may be trephined, the dura opened and sutured, and the brain explored without pain.

In goiter infiltrate thoroughly, and encourage talking when in the region of the recurrent laryngeal nerve. For abdominal operations infiltrate thoroughly to and including the parietal peritoneum. The viscera are lacking in sensation. Dragging on the mesentery causes pain upon the omentum nausea. When dragging must be done, as in appendicectomy, or lifting up the kidney or gall-bladder, a few whiffs of a general anæsthetic are given during the dragging stage and the operation is completed under local anesthesia.

In hernia the nerves are blocked. When the testicle requires much handling, infiltrate the genital branch of the genito-crural. Hours may be spent in giving the strangulated viscus a chance to have its circulation restored.

In amputations of a limb infiltrate the tissues layer by layer as the incision is made, block the nerves and periosteum. The bone has no sensation. Blocking of the nerves prevents pain and shock. A tourniquet is not required, blood vessels are clamped and cut when seen, clots or deposits may be cleared out of the vessels in gangrenous cases before applying ligatures.—*American Journal of Surgery.*

Successful Treatment of Gonorrhœal Chorioiditis by Vaccines.

GEORGE W. VANDERGRIFF reports a case of metastatic gonorrhœal choroiditis which recovered under vaccine treatment. When first seen by the author the vision of the right eye had fallen to 10/200, while that of the left eye was 20/20. The vitreous of the right eye was heavily clouded with opacities. After these had cleared sufficiently the optic nerve was found to be normal, but a yellowish mass could be seen in the lower nasal quadrant of the choroid, projecting into the vitreous. He gave a negative history as to syphilis, tuberculosis and rheumatism and tests for the first two named diseases were negative. He gave a history of having had three attacks of gonorrhœal urethritis, however, the first ten years ago, the second six years ago, and the third one year ago. The complement fixation test for gonorrhœal infection was strongly positive. Accordingly he was treated with mixed vaccines (gonococci and staphylococci). After three injections, at several days intervals, massage of the prostate, which previously had shown large numbers of gonococci, now showed none. After several weeks treatment the vitreous began clearing and in about three months' time the exudate was entirely absorbed and the vision of the affected eye was 20/20. No other treatment than the vaccines was employed except the use of atropin locally.—*The American Journal of Ophthalmology.*

OBSTETRICS AND GYNÆCOLOGY.

Rupture of the Vagina during Coitus.

VICTOR BONNEY, M.S., M.D., B.S.O., F.R.C.S., M.R.C.P.—Rupture of the vagina during coitus is extremely rare.

A multipara, aged 40, of somewhat alcoholic appearance, was admitted with symptoms of peritonitis and a bloody vaginal discharge. A hole which would have admitted a man's thumb was found in the posterior vaginal vault, leading direct into the peritoneal cavity. The edges were remarkably sharp and thin, and by passing a finger through it coils of intestine and the lower edge of the omentum could be felt. The tissues were generally attenuated, the vaginal walls in particular appearing unusually thin and fragile. The canal was not, however, shorter than normal.

The writer first suspected that the injury was due to an attempt to pass a foreign body into the uterus with the object of criminal abortion, although there were no signs of pregnancy. On questioning, the patient

admitted that the night before, while in liquor, coitus took place in the upright posture. Severe pain and considerable bleeding immediately followed. She returned home in great agony, and remained in that condition until admission.

The writer opened the abdomen and found a clean tear through the anterior wall of Douglas's pouch about an inch from its floor. In the pelvis was a considerable quantity of blood and blood clot. Early generalized peritonitis was present. The blood was removed, the rent sewn up with interrupted sutures, a large-sized drainage tube inserted through the lower end of the abdominal wound, and the rest closed by the usual three-layer method. Rapid recovery followed.

Ruptures of the vagina during coitus may be divided into two groups. In the first group the injury is in the nature of a *laceration*, and affects chiefly the lower end of the canal. It is usually the result of rape. Muller, for instance, records 2 cases—one in a woman of 24 and the other in one of 72. In both the laceration affected the posterior vaginal wall without perforation into the peritoneum. The lower end of the vagina is much narrower than the upper end, and hence is the part most likely to give way when acutely stretched by insertion of a disproportionate body. The tear is usually situated either posteriorly or laterally, and opens up the para-vaginal cellular tissue. Exceptionally, it may penetrate into the peritoneal cavity. This type of injury is not uncommon in the lower animals, especially mares.

In the second group, to which the case now recorded belongs, the injury is of the nature of a *perforation*, and is evidently produced not by stretching but by the direct impact of the penis. In the museum of St. George's Hospital is a specimen of this type, which is thus described:—

There is a rent passing along the upper 2 inches of the vagina and dividing the mucous membrane and the underlying fibres of the muscular coat. The rent deepens as it ascends, and on a level with the os uteri has broken through into the peritoneal cavity. The hole in the peritoneum is not quite large enough to admit the little finger. The preparation was taken from a woman of 70, who had recently married a lifeguardsman. The injury was done during coitus. Probably death soon followed, for there was no trace of lymph in the neighbourhood, and the edges of the wound were sharp and distinct, and free from any reparative or morbid action.—*The Medical Review*.

BACTERIOLOGY.

The Action of Bacteria in the Intestine.

Ever since bacteriologists have recognized that some of the food products are broken up in the intestine by bacteria, the question has been raised whether or not this kind of digestion was beneficent. As long ago as 1895, Nuttall and Thierfelder fed two guinea pigs, kept sterile from birth, with food in which all bacterial life had been destroyed. The animals lived and grew, much as ordinary guinea pigs. This was in line with an important observation by Levin, in Sweden, that Arctic animals often had sterile intestinal contents. Another experimenter (Schottelius), however, found that sterile chickens lost steadily in weight when kept on sterile food, but picked up again when given ordinary rations.

These two sets of experiments show how the physiological world is divided. On the one hand we have those who hold that bacteria are absolutely necessary for healthy, human life; on the other, we have Metchnikoff and his school who say that bacterial putrefaction is the occasion for constant danger to the organization. One English surgeon would go so far as to cut out the colon by a surgical operation, and an American surgeon sees in the colon bacillus Nature's method of regulating the population. Metchnikoff recommends sour milk to prolong life, because the ordinary intestinal flora do not flourish in the presence of lactic acid. The truth, as usual, probably lies between the two extremes. While the presence of bacteria confers no positive benefit upon the animal economy, the organism has adapted itself, under usual conditions, to minimize their pernicious influence.—*The Canadian Practitioner and Review*.

OPHTHALMOLOGY.

The Cause of Myopia.

W. H. BATES says: Functional myopia is an early stage of myopia with elongation of the eyeball. It is produced by muscular action, which alters the curvature of the crystalline lens, modifies the convexity of the cornea, or produces an elongation of the eyeball. Voluntary functional myopia may be produced by efforts to see distant objects, in children, elderly people, cases in which accommodation is apparently paralyzed by atropin, and in aphakia after cataract extraction. That muscular action can produce functional myopia is shown by the fact that many cases of voluntary functional myopia manifest a convergent, divergent, or vertical squint. Also, operations on the eye muscles have

benefited functional myopia. His experience leads him to believe that atropin does not always relax the near focus nor relieve functional myopia. Studying a large number of eyes, he found that "an unsuccessful effort of the normal eye to see accurately new, strange, or unfamiliar distant objects was always followed either by myopic astigmatism, usually,—compound myopic astigmatism, occasionally—or simple myopia, infrequently. Mixed astigmatism was not observed." Some of the symptoms of efforts to see distant objects clearly, are—partly closing the eyelids, or the reverse; staring; wrinkling of the skin of the forehead and eyelids; contortions of the facial muscles; inclinations of the head in various directions; tremor of the head; and movements of the eyeballs resembling nystagmus. The efforts are often so marked that one can generally tell from this alone that the vision is defective. Reference is made to the fact that wild birds have unusually good vision, while in captivity they acquire myopia; also that uncivilized people usually have good sight, but acquire myopia after living in civilized communities a while; and the further fact that children in the first year of school have normal vision while later they acquire myopia. In explanation Bates says: "The cause of myopia is the same in birds, the lower animals, uncivilized man, and school children. The uncivilized man is compelled to adjust his eyes for accurate distant vision, for protection against enemies, and in obtaining food. But, when living in civilized communities he is protected from enemies, his food is supplied, accurate distant vision is no longer necessary, he neglects to practise it, naturally loses it, and become myopic. Wild birds are compelled to adjust their eyes accurately for distant vision; but in captivity the necessity ceases, and because accurate distant vision is no longer required they neglect it and become myopic. School children do not need accurate adjustment of their eyes for distant vision. When they neglect to practise it they become myopic. To make the matter clearer: When the eyes are not accurately adjusted for distant vision they must obviously be adjusted for a near point and be functionally myopic." His conclusions are:

1. Myopia is not caused by efforts to read by a bad light.
2. The cause of myopia is an effort, usually unconscious, to see distant objects.—*The American Journal of Ophthalmology.*

Cases of Night-Blindness with peculiar Conjunctival Changes in Children.

S. STEPHENSON having examined 6,209 healthy children's eyes several years ago, found night-blindness present in 1.87 per cent. of that

number. The condition is seldom found in winter but occurs most frequently during the summer and autumn months. "Bitot's syndrome" is a term sometimes applied to the fully developed symptom-complex which includes first, changes in the ocular conjunctiva, and secondly, night-blindness. The conjunctival changes are, as a rule, found only in the inter-palpebral zone and generally occur in both eyes, although sometimes to an unequal extent. The affected areas are more or less triangular and have the appearance as if covered with tiny particles of white foam. If this be wiped away it always reforms within twenty-four to thirty-six hours. The glistening plaques are very characteristic and the term epithelial xerosis is usually applied to the condition. The relationship between the conjunctival changes and night-blindness is not constant as either one may be present without the other. In 1895 Stephenson saw eighteen cases of xerosis of which 61 per cent. were more or less blind at night while during 1896 and 1897, where nine cases of xerosis were respectively found definite night-blindness was not found in any of the cases. He believes, however, that the relationship is much closer than is generally supposed.—*The American Journal of Ophthalmology.*

DERMATOLOGY.

Sycosis of the Beard.

This case is one of sycosis of the beard in a man who contracted the affection at a barber's shop. There are two main types of sycosis of the beard—one which is due to the inoculation of staphylococci, and is generally known as coccogenetic sycosis, and another, for which the ring-worm fungus is responsible, known as hyphomycetic sycosis. Both are included under the heading of barbers' rash, and of the two, the former, of which the present case is an example, is far the more common.

Coccogenetic sycosis would appear in many cases to be contracted at the barber's shop, and possibly through an infected shaving brush, sponge, razor, or a dirty towel; or it may happen in another way, namely, by subsequent inoculation through an abrasion of the surface caused in shaving.

The affection manifests itself in the form of pustules irregularly distributed about the beard region. It is distinguished from the hyphomycetic type by the lesions being more widely distributed and discrete, whereas in the case of ring-worm the disease shows itself either

in the form of scaly patches or, more usually, of angry lumpy lesion dotted over with minute pustules, aggregated together. In doubtful cases a microscopical examination should be made to confirm the diagnosis. The staphylococci affection is most intractable, and no more easily cured than the variety due to ring-worm. The staphylococci which are responsible for it grow deeply into the hair follicle and about the sebaceous glands, and local remedies in the way of antiseptic ointments or very strong lotions are unable, as a rule, to penetrate sufficiently to reach them. Hence it is better to employ milder application such as dilute ammoniated mercury ointment, hydrogen peroxide, or boric acid compresses which will not reduce the vitality of the skin but will to some extent sterilize the surface, and allow Nature, by means of phagocytes, &c., to do the rest. But the condition may continue and even spread, in spite of this treatment. Then it is best to resort to the X-rays, and give a "pustille" dose to bring the hairs out.—*The Polyclinic.*

THE DRAFT-BILL FOR THE REGISTRATION OF MEDICAL PRACTITIONERS.

TO BE INTRODUCED BY

THE HON'BLE DR. T. M. NAIR, M. D.

Legislative Council of the Government of Fort St. George.

WHEREAS it is expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners; and whereas it is expedient to provide for the registration of medical practitioners in the Presidency of Madras; it is hereby enacted as follows:—

Short title,
extent and
definition.

I. (1) This act may be called the Madras Medical Act.

(2) It extends to the whole of the Madras Presidency.

(3) In this act the expression 'the Medical Act' means the Medical Act, 1858, and any acts amending the same.

II. (1) A council which shall be styled 'The General Council of Medical Registration of the Madras Presidency' 'hereinafter referred to as 'The General Medical Council' shall be established.

(2) The General Medical Council shall consist of twelve members and a President appointed in the following manner:—

(a) the President nominated by the Governor-in-Council;

(b) one member elected by the medical faculty of the Senate of the University of Madras;

(c) one member elected by the professors of the Madras Medical College;

(d) two members elected by the medical practitioners registered under this Act in virtue of their having been registered under the Medical Act of 1858;

(e) two members elected by the medical practitioners registered under this Act in virtue of their being graduates in medicine of the University of Madras;

(f) two members elected by all medical practitioners registered under this Act other than those who are entitled to elect members of the General Medical Council under (b), (c), (d) and (e) preceding;

(g) four members to be nominated by the Governor-in-Council.

(3) No person shall be eligible to be a member of the General Medical Council unless he is registered under this Act, or in the case of the first election or nomination, is qualified to be registered under this Act.

III. The first elections and nominations under this Act shall be held at such time (as soon as may be after the commencement of this Act) and at such place, and in such manner as the Governor-in-Council shall appoint by notification in the *Fort St. George Gazette*; and all elections and nominations of members subsequent to such first election shall be held at such time, and place and in such manner as the General Medical Council shall prescribe by rules or regulations made from time to time in this behalf.

IV. (1) The members of the General Medical Council shall hold office for a term of five years and shall be capable of re-appointment.

Tenure of office.

(2) Any member may, at any time, resign his appointment by letter addressed to the President of the General Medical Council.

(3) Upon the death or resignation of any member of the General Medical Council, some other eligible person shall be appointed a member of the General Medical Council in his place by election or nomination as the case may be in accordance with the provisions of section II and sub-section (2), and such person shall hold office for the remainder of the period for which the member in whose place he is appointed was nominated or elected.

(4) If any member of the General Medical Council shall absent himself from three consecutive meetings of the General Medical Council, the General Medical Council may forthwith declare his seat vacant; and the seat thus vacant shall be filled up by nomination or election as the case may be as if the member concerned had resigned his seat.

(5) Leave of absence out of India may be granted by the General Medical Council to any member thereof for a period not exceeding six months.

V. The General Medical Council shall hold their first meeting with-
Time and place of meeting of council. in three months from the commencement of this act, in such place and at such time as the Governor-in-Council shall appoint, and shall make such rules and regulations as may be necessary with respect to the time and place of the meeting of the General Medical Council, and the mode of summoning the same. In the absence of any rule or regulation as to the summoning of a meeting of the General Medical Council, it shall be lawful for the President to summon a meeting at such time and place as to him shall seem expedient, by letter addressed to each member. At every meeting the President shall preside or in the absence of the President some other member chosen from the members present shall act as President; and all acts of the General Medical Council shall be decided by the votes of the majority of the members present at any meeting. In the case of any equality of votes, the President for the time being shall have a casting vote in addition to his vote as a member of the General Medical Council.

VI. (1) The General Medical Council shall appoint a Registrar who
Registrar and officers. shall act as Secretary of the council and who may also act as Treasurer unless the council shall appoint another person or other persons as Treasurer or Treasurers. And every person so appointed shall be removable at the pleasure of that council subject to an appeal to the Governor-in-Council. The Registrar shall be paid such salary as the General Medical Council shall decide with the sanction of the Governor-in-Council.

(2) In addition to the Registrar the General Medical Council may appoint such other officers or clerks as may be necessary for the purposes of this act.

(3) The Registrar or any other officer or clerk appointed under this section shall be deemed to be a public servant within the meaning of section 21 of the Indian Penal Code.

VII. (1) It shall be the duty of the Registrar to keep a register of medical practitioners in accordance with the provisions of this act. The register shall be kept in such form as the Governor-in-Council from time to time directs. The name, residence and qualifications of every person who is registered under this act shall be entered in the register with the date on which each qualification was granted. The Registrar shall, under the orders of the General Medical Council, keep the registers correct and, from time to time, enter any necessary alterations in the address of persons registered or to enter any additional qualifications which any registered person may have obtained subsequent to his registration and to erase the names of all registered persons who have died. To enable the Registrar duly to fulfil the duties imposed upon him it shall be lawful for him to address a registered letter to any registered person according to his address on the register to inquire whether he has ceased to practise or has changed his residence and if no answer is returned to such a letter within a period of six months from the sending of the letter it shall be lawful to erase the name of such person from the register, provided that the same may be restored by direction of the General Medical Council, if they think fit to make an order to that effect, on payment of a fee of five rupees.

(2) Every practitioner who applies to be registered under this act shall pay a registration fee of fifteen rupees, and for the registration of any additional qualifications obtained subsequent to the registration under this act a fee of five rupees shall be payable. The candidate for registration shall give evidence to the satisfaction of the Registrar of his qualification or qualifications in respect of which he desires to be registered.

VIII. Every person who

Persons entitled to be registered. (a) is for the time being registered under the Medical Acts;

(b) or is possessed of any of the qualifications described in the schedule of this act,

shall be entitled to be registered, subject to the provision of the preceding section and to the rules and regulations framed by the General Medical Council with the sanction of the Governor-in-Council to carry out the provisions of this act.

Provided that the General Medical Council may refuse to permit the registration of any person who has been convicted of a cognizable offence as defined in the Code of Criminal Procedure, 1898 or who, after due

inquiry at which opportunity has been given to the candidate to be heard in person or by counsel and has been held by the General Medical Council to be guilty of infamous conduct in any professional respect. The President of the General Medical Council may at his discretion hold such inquiry *in camera*.

IX. (1) Any appeal against the decision of the Registrar respecting a first registration or any subsequent alteration shall be heard and decided by the General Medical Council under regulations, which shall be made by the General Medical Council in this behalf.

(2) Any entry in the register which shall be proved to the satisfaction of the General Medical Council to have been fraudulently or incorrectly made may be erased from the register under the orders of the General Medical Council.

X. The General Medical Council may direct that the name of any medical practitioner who is registered under this Act and who has been convicted of a cognizable offence as defined in the Code of Criminal Procedure, 1898, and who after due notice is given to him and an inquiry held at which opportunity has been given for him to be heard in person or by counsel has been held guilty by the General Medical Council of infamous conduct in any professional respect shall be removed from the register; provided that the President of the General Medical Council may at his discretion hold such inquiry *in camera*.

XI. (1) After the commencement of this Act the expression 'legally qualified medical practitioner', or 'duly qualified medical practitioner,' or any words importing a person recognized by law as a medical practitioner or member of the medical profession shall, in all Acts of the Governor-of-Madras-in-Council and in all Acts of the Governor-General in Council in their application to the Madras Presidency, mean a medical practitioner registered either under the Medical Acts or under this Act.

(2) After the commencement of this Act no certificate required under any Act from any medical practitioner or medical officer shall be valid unless the person signing the same shall have been registered under the Medical Acts or under this Act.

XII. On the expiry of three months from the commencement of this Act no person shall hold any appointment as a physician, surgeon or other medical officer in any dispensary, hospital, infirmary or lying-in-hospital not supported entirely by voluntary contributions or in any public establishments,

body or institutions, or as a medical officer of health unless he be registered under the Medical Acts or under this Act.

XIII. Every Registrar of Deaths on receiving notice of the death of a medical practitioner registered under this Act shall forthwith transmit by post to the Registrar appointed under this Act a certificate under his own hand of such death with the particulars of time and place of death and may charge the cost of such certificate and transmission as an expense of his office.

XIV. The General Medical Council shall have authority to call on the governing body or authorities of any Medical college or school and on any examining body included in or desirous of being included in the schedule—

(a) to furnish such particulars as the Medical Council shall require of any course of study prescribed or examination held by such body or authority in such school or college with reference to the grant of any medical or surgical qualification; and

(b) to permit any member of the General Medical Council deputed by the General Medical Council in this behalf to attend and be present at any such examination.

XV. Notwithstanding anything in any other law for the time being in force, every person who shall be registered under this Act shall be exempt, if he so desires, from serving on any inquest or on any jury.

XVI. There shall be paid to the members of the General Medical Council such fees for attendance and such reasonable travelling expenses as shall, from time to time, be allowed by the General Medical Council and approved by the Governor-in-Council.

XVII. All monies received by the General Medical Council as fees under this Act shall be applied for the purposes of this Act in accordance with such rules as may be made in this behalf by the Governor-in-Council.

XVIII. The Registrar shall, in every year on or before a date to be fixed by the General Medical Council, cause to be printed and published a correct list of the names and qualifications of all persons for the time being entered in the register, and the dates when such qualifications were granted, in alphabetical order according to the surnames of the persons registered. Every Court shall presume that any person entered in such list is duly registered under this Act and that any person who is not so entered is not registered.

XIX. Whoever falsely pretends to be registered under this Act or not being registered under this Act uses in connection with his name or title any words or letters representing that he is so registered shall, whether any person is actually deceived by such pretence or representation or not, be punished on conviction by a Presidency Magistrate or a Magistrate of the First Class with fine that may extend to three hundred rupees.

XX. (1) Subject to the provisions of this Act, the General Medical Council may, from time to time, make rules and regulations generally to carry out the provisions of this Act;

Provided that no rules or regulations made by the General Medical Council whether under this or under any of the foregoing sections of this Act shall have any force or effect unless the same shall have received the previous approval of the Governor-in-Council.

(2) All rules and regulations made by the General Medical Council under this Act shall, when the same have received the approval of the Governor-in-Council, be published in the *Fort St. George Gazette*.

(3) It shall be lawful for the Governor-in-Council, by notification in the *Fort St. George Gazette*, to cancel any rule or regulation made under this Act.

XXI. If it shall appear to the Governor-in-Council, on the report of the General Medical Council or otherwise that the course of study and examinations prescribed by any of the colleges or bodies conferring the qualifications described in the schedule are not such as to secure the possession by persons obtaining such qualification of the requisite knowledge and skill for the efficient practice of their profession, or if it shall appear to the Governor-in-Council, on the report of the General Medical Council or otherwise, that the course of study and examinations prescribed by any college or body conferring a qualification not entered in the schedule are such as to secure the possession by persons obtaining such qualification of the requisite knowledge and skill for the efficient practice of their profession, it shall be lawful for the Governor-in-Council from time to time by notification in the *Fort St. George Gazette* to direct that the possession of any qualification entered in the schedule shall not entitle any person to registration under this Act or to direct that the possession of any qualification not entered in the schedule shall, subject to the provisions of this Act, entitle a person to be so registered, as the case may be, and the schedule shall thereupon be deemed for all purposes to be altered accordingly.

THE SCHEDULE.

(1) Doctor, Bachelor and Licentiate of Medicine, and Master, Bachelor and Licentiate of Surgery of the Universities of Madras, Bombay, Calcutta, Allahabad and Lahore.

(2) Any person trained in a Government Medical College or School who holds a diploma or certificate granted by Government declaring him to be qualified to practise Medicine, Surgery and Midwifery, or to be qualified for the duties of a Military Assistant Surgeon, Hospital Assistant or Sub-Assistant Surgeon.

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Original Articles.

* MALIGNANT SYPHILIS.

BY

C. F. MARSHALL, M. D., F. R. C. S. (LOND.) (ENG.)



SOON after the introduction of Salvarsan into the therapeutics of syphilis, this preparation was said to be especially useful in cases of "malignant syphilis." However, the cases reported probably included several varieties of syphilis, for malignant syphilis, strictly defined, is rare now-a-days, in Europe at any rate. It is, therefore, necessary to define what is meant by malignant syphilis, and to determine, as far as possible, its etiology, prognosis and treatment.

Definition.—The term 'malignant syphilis' is best limited to cases where ulceration characterised by rapid destruction of tissue, tendency to recur, and resistance to antisymphilitic remedies occurs during the first few months after infection. The ulceration attacks chiefly the scalp, face and limbs, and sometimes leads to necrosis of bone. It may also affect the mouth and throat. The internal organs are probably not often affected to any serious degree.

Malignant syphilis must be distinguished from syphilis which is severe owing to the nature of the organs attacked; to such cases the term *syphilis gravis* is more suitable. It must also be distinguished from cases of early tertiary ulceration occurring within the first year, which may be designated as *syphilis tertiaria praeci*; for, although such cases may be malignant, they are not so necessarily.

* Specially contributed to *The Antiseptic*.

Ætiology.—The cause of malignant syphilis must lie in the soil or the seed, or both; that is, in the constitution of the patient or in the nature of the virus.

As regards the constitution of the patient, the idea that syphilis only becomes malignant in persons of broken-down constitution must be abandoned, for many cases occur in persons who are apparently healthy and of good family history. Indeed, this fact may offer a partial solution of the problem, for it is well known that when a disease attacks a virgin soil it is usually more severe than when it attacks a soil more or less immunised by antecedent disease of the same kind in the ancestors. It is, therefore, possible that the subjects of malignant syphilis are those whose ancestors have been most free from the disease. This view is supported (1) by the fact that outbreaks of malignant syphilis have occurred among the Jews, a race who, at any rate in the past, have been said to be peculiarly free from syphilis; (2) by the malignant type which the disease apparently assumed in the great outbreak in Europe at the end of the 15th century; (3) by the malignant form occurring among the natives of Africa, where syphilis has been introduced by the whites. The late Colonel Lambkin gave a vivid account of the devastation caused by syphilis among the natives of Uganda, which he said was far worse than that caused by sleeping sickness. Dr. McArthur has also drawn attention to the prevalence of syphilis (of a malignant type) among the natives of other parts of Africa. Virginity of soil is, therefore, one explanation, but an incomplete one, for many cases of benign syphilis occur in soil which is more or less virgin.

The next factor in the ætiology of malignant syphilis concerns the virus. It has been suggested that there may be different varieties of the micro-organism of syphilis, the *spirochæta pallida*. Dr. F. W. Mott thinks it possible that a special variety of this organism may cause general paralysis of the insane, and the question arises whether malignant syphilis may not be due to another variety of the spirochæte. But the evidence on this point is contradictory. On the one hand, Major French has reported the cases of three soldiers with phagedenic chancres and malignant syphilis who probably were infected from the same source. On the other hand, it is known that malignant syphilis may be contracted from a benign case, and inversely. Also, Buschke found that the virus of malignant syphilis when inoculated into monkeys only produced ordinary syphilitic chancres.

It, therefore, appears that the ætiology of malignant syphilis requires further investigation. How far it is due to peculiarity in soil

and how far to a special form or condition of the virus is impossible to determine at present. Possibly both factors are concerned, and malignant syphilis may be due to infection of a comparatively virgin soil with a particular form of virus. As this form of syphilis is rare in Europe we must look elsewhere for a solution of the problem, chiefly among the native races of tropical regions who have been recently infected.

Prognosis.—The prognosis of malignant syphilis is fairly good, although the disease may cause considerable destruction of tissue before it is cured. In fact, it appears to have a greater tendency to spontaneous recovery than the usual form of syphilis. It is possible that the virulence of the disease is exhausted in the early stages, and that such cases are less liable to affections of the internal organs and after effects such as parasyphilis.

Treatment.—The chief characteristic of malignant syphilis is its resistance to mercurial treatment. Indeed mercury appears to be contra-indicated during the active stage and should be withheld till convalescence. Iodide of potassium is useful, but the chief treatment should be tonic. Sarsaparilla, iron and quinine are useful and sometimes opium. Sea-air and sea-bathing are good and the diet should be stimulating and nourishing.

Local treatment is of great importance. The ulcers should be treated by disinfectant and baths dressings. If there are many ulcers the patient should be immersed in a warm bath containing some non-toxic disinfectant such as permanganate of potassium, creolin, or a weak solution of tincture of iodine. The bath should be given twice daily for half an hour at a time till the ulcers have become clean. After this, moist dressings soaked in the same solutions, but made stronger, should be applied till healing takes place.

*CHRONIC INTESTINAL PAIN.

BY,

V. G. DESAI, M. B. (LOND.).

Narmadabai Hospital, Bandra (Bombay).

Chronic intestinal pain means a pain of indefinite character recurring at indefinite intervals and not necessarily traceable to a definite disease. Often these pains are sufficiently localised to indicate the possible source and nature of the affection. As a rule a pain that is felt deeply upon firm pressure is indicative of some mischief at that spot. They vary in character and little reliance should be placed on the descriptive terms

* Specially contributed to *The Antiseptic*.

used by patients; still the character of the pain is of some diagnostic significance. Thus when the colon is at fault this pain is of a dragging character and it is often aggravated by the act of defecation.

In the majority of cases these pains are due to some impediment to the normal muscular action of the intestines; in other words, from some cause either within or without the intestinal canal, the muscular coat produces an abnormal peristalsis. An increased effort is made by that segment of the gut which is involved to expel some irritating material or to overcome some obstruction and such an increased effort is manifested by pain. It may be some food which the bowel resents and seeks to expel it by violent peristalsis. In other class of cases the mucous membrane may be inflamed which creates an abnormal stimulus to the muscular coat. Most often such cases are due to ulceration in the intestines.

In stricture, either simple or malignant, the pain complained of is of a screwing character and the patient is aware that it works up to the seat of the obstruction where it stops suddenly.

In adhesions the interference with the normal peristalsis is obvious. The segments proximal to the constricted portions make violent efforts to push the contents through the narrowed calibre. In the large intestine the hepatic and splenic flexures are the favourite anatomical places for an obstruction, which may be congenital or may be acquired. At these two places usually kinking occurs. Note these pains make their appearance when the patient defecates.

As in the case of acute intestinal pain the examiner should follow the same definite plan.

1. The age and sex will indicate certain diseases. In women perityphilitis and periduodinitis are common owing to an inflammation of the neighbouring reproductive organs in the former and to an irritation by gall stones in the latter case. In women obstinate constipation is more common than in men. They complain of pain in the side more often than men. The colon drags upon the meso-colon and hence the pain in the side. Broadly speaking, women are more prone to chronic disorders of the colon. In children chronic pains are due mostly to gastro-intestinal irritation. There may be worms or tubercular ulceration or incomplete obstruction from chronic intussusception. Note they rarely complain of pain in the side. In the aged, malignant disease of the colon should not be forgotten. In the young of both sexes chronic pain is most often due to tubercle; it may be ulceration or stricture or matting. In adult males one should bear in mind the possibility of internal hernia, and

the occupation risks in some of which the bowels may be contused or the mesentery may be torn. Chronic appendicular pain is sometimes felt in the central abdomen. It occurs at any age and in both sexes about equally. Note that appendicular pain is not necessarily limited to the right iliac fossa.

2. Previous history may give an important clue to the possible nature of the cause of pain. A history of inflammation in the abdomen should make one suspicious of the possibility of adhesions. A history of gall-stones such as biliary colic, fever, and tenderness over the gall bladder region should make one think of a possibility of obstruction at the duodenum or the colon. Recurrent diarrhoea accompanied with fever and loss of flesh may suggest tubercular matting of the intestines, as and loss of flesh may suggest tubercular matting of the intestines, as tubercular peritonitis always leads to adhesions. Tubercular mesenteric glands sometimes contract adhesions and these adhesions subsequently become firm bands underneath which the small intestine is likely to be kinked. A history of pelvic inflammation in women should lead one to think of the obstruction symptoms due to adhesions. A history of gradually increasing difficulty in passing motions indicates a stricture; and in the case of an old patient the probability is of its being of a malignant nature. A history of passage of blood is indicative of ulceration somewhere in the intestines.

3. The question of food is one which should always be inquired into. In children as well as in adults certain foods may not be tolerated and may cause recurrent pain without any organic disease.

4. *Examination of the patient.*—On inspection some irregularity of the surface of the abdomen may be noticed, particularly in cases of volvulus due to bands. In chronic intestinal obstruction one will often see clearly defined waves of peristalsis. In the case of small intestines the waves radiate in any direction.

The patient should be palpated in the recumbent dorsal position, recumbent ventral position and the knee-elbow position. In cases of adhesions, if pressure at a particular spot causes pain, it does not necessarily mean that the mischief is located there but because the adhesions when put under tension by the examining finger indirectly pull upon the seat of the disease and the pain results.

One should remember that this leads to a fallacy in locating the lesion. Sometimes a faecal mass is mistaken for a tumour. In the case of faecal mass it changes its shape upon firm pressure and besides it cannot be noticed at the same place day after day. In a doubtful case it is advisable to administer chloroform.

Light percussion will help in mapping out tumours and old thickened bands.

Digital examination of the rectum and vagina should never be omitted. *Per rectum* the finger may feel a stricture which may be simple or malignant, or a ballooning which is indicative of a stricture higher up in the sigmoid. In children an intussusception may be detected. Note, in children the whole abdomen could be felt very clearly with one finger in the rectum and the other hand on the abdomen.

Motions should be examined for blood, mucous or pus, and the character of the faecal mass should be noticed. The effect of a copious enema should be noticed.

Temperature is a good guide in chronic cases. It indicates whether the pathological process is inflammatory or non-inflammatory.

Pulse is not so important a guide in chronic cases as it is in the acute one.

The doctrine of probability will be of use in differentiating cases into groups; for example, a pain in the loin may be due to liver, kidney or intestine. Further corroboration is done by leading symptoms peculiar to each organ. Thus the pain due to an overloaded colon is often referred to the lower dorsal or renal region. Here examination of the urine will exclude the kidney. Pain due to hæmorrhoids is referred to the lumbar region. The appendicular pain and pain due to typhilitis are sometimes referred to the right loin. In cancer of the rectum the pain is referred to the sacrum and it shoots down the back and thigh. Now every one knows that the organs referred to are not situated in the back and still the pain is pointed out there whenever they are diseased. The pains in the back due to chronic intestinal diseases are *referred*; they are simply corroborative of the suspected disease.

Certain diseases by choice involve only particular portions of the same organ; for example, cancer affects the splenic flexure more than the hepatic flexure and the descending colon more than the ascending colon.

Lastly one should remember that obscure chronic pains, especially if colicky in nature, are due to the hampering effects of internal adhesions.

Our Contemporaries.

MEDICINE.

Unusual Case of Epilepsy.

BY

JAMES TAYLOR, M.D., F.R.C.P.

This patient was a man, aged 31, with a most curious history. At the age of 7 he began to suffer from "fits," and was a patient at Great Ormond Street. He used to have as many as seventy in a day, and was an in-patient for some time. He then remained free from fits for six-and-a-half years. He attended school, and in physical and mental development was quite up to the average. At 14 he began to have attacks again, and he remained an out-patient at Queen Square during several years, having attacks at varying intervals, sometimes being quite free even for many months. At 21 he was again an in-patient, having numerous fits, and was discharged apparently well. When 22 he enlisted; he served for eight years and had no attack during this time. When he left the Army he was employed as a postman, but on one occasion had a fit on a railway line as a train was approaching. This was in 1912, and he came into hospital. He had several fits daily, but under treatment they gradually ceased and he left the hospital. He obtained employment as a butler and was free from fits for a time, but they recurred and he was readmitted a few weeks ago; they are now gradually diminishing in frequency.

The fits are described by the patient as preceded by a curious feeling which he cannot describe. He then falls down, the legs twitch, and the attack ends in laughter. In only one attack has he passed water, and he has never bitten his tongue. Three points deserved to be noticed:—

- (1) The attacks began in early life.
- (2) In one of them he passed water, and
- (3) That they are always cured in hospital by large doses of bromide.

Dr. Taylor expressed the opinion that the attacks were probably attacks of momentary *petit mal*, followed, as is so frequently the case, by so-called functional disturbance. The case he considered of great impor-

tance because the attacks could easily be mistaken for purely functional ones, yet the points above mentioned practically precluded such a view.—*The Polyclinic*.

SURGERY.

Note on the Wassermann Reaction in Lead Poisoning.

BY

J. LOCKHART GIBSON, M.D. (EDIN.), BRISBANE.

In June, 1912, a girl of seven years was admitted to the Brisbane Hospital for Sick Children suffering from a typical attack of "plumbic ocular neuritis," which had unfortunately existed for at least two-and-a-half months, and which had resulted in inability to count fingers for some weeks or more before admission. The attack was, however, still acute, with marked choked discs, and increased tension of intra-spinal fluid. There was a history of a previous attack of lead poisoning, affecting the arms and legs.

A lumbar puncture drew off nine drachms of fluid under greatly increased pressure, on admission. Prognosis regarding sight was bad, because the attack had lasted so long before the child was removed from its surroundings and treated. There did, however, appear to be some signs of improvement in sight at the end of a week. Five days after admission the child's blood, kindly examined by Dr. Sydney Page, gave a positive Wassermann reaction. I was reluctant to accept this as evidence of syphilis, although I did not then know that lead poisoning cases were said to return a positive Wassermann.

I have always been particularly careful in cases attributable to lead to avoid mercury until the possibility of plumbism has been excluded, in case a second metal may intensify the toxic effects of the first. I delayed, therefore, for a week in following up the Wassermann by putting the child on mercury, and I did this in spite of the fact that cases of gummatous meningitis in children are the cases I have found to be most easily mistaken for cases of plumbic ocular neuritis. She was then put under injunction for five weeks, when it was stopped, as she had lost both flesh and colour, and it became certain that any signs of regaining sight had quite disappeared. Soon after this I noted, in the *Journal of Laryngology*, an abstract of a paper read at the American Laryngological Society by Joseph C. Beck, of Chicago, on the "Wassermann Reaction and Salvarsan," in which it is stated that a positive Wassermann occurs in lead-poisoning (as well as in "recurrent fever, leprosy, measles, Scarlet fever, pneumonia, framboesia, malaria, tumours, and cachexia!").

I was ashamed of myself for having failed to previously note this possible fallacy, but was unable to find any Brisbane colleague who knew of it. Lead-poisoning is so common amongst children below the age of eight years in Queensland, on account of the fact that the lead paint used for painting verandah rails comes off so easily when it becomes old and powdery, and is carried to the children's mouths when they bite their nails or suck their fingers. The fact, therefore, if substantiated, that lead-poisoning cases give a positive Wassermann would greatly diminish the value of this reaction.

About this time a child admitted under the care of my colleague, Dr. Croll, with a typical acute attack of lead-poisoning (wrist and foot drop) gave a markedly positive Wassermann. There were no manifestations of syphilis. Two other positive Wassermans have since then been obtained in ordinary lead cases, and a very markedly positive one in a child with lobar pneumonia, and possessing a very marked blue line on her gums. I have previously pointed out that many children, especially amongst the families of those exhibiting symptoms of lead-poisoning, show distinctive blue lines on their gums. Evidently this child had been ingesting lead, but the pneumonia alone would apparently have led the blood to give a positive reaction.—*The Australasian Medical Gazette*.

Vaccine Treatment of Gonorrhœa in the Female.

SLINGENBERG has employed this method of treatment in a series of cases of vulvo-vaginitis in adults and children, and also in a number of cases of chronic adnexal tumours. In children, the dose varied from half a million to two and a half million organisms at intervals of from five to nine days. In addition, protargol bougies were introduced into the vagina two or three times weekly. Local treatment was used, because it was believed that the antibacterial substances are unable to reach the gonococci present on the surface of the mucous membrane. To avoid confusion, a number of cases were also treated without any local measures, with the result that any purulent discharge present, disappeared for the time being. In those cases treated locally without results, the addition of vaccine treatment was found most effective. As regards vaccination in the vulvo-vaginitis of adults, no definite conclusions were reached, although in one chronic case a definite improvement was obtained. In those with chronic inflammatory lesions in the adnexa, the results were good, both objectively and subjectively. A great advantage of the treatment is that most of the cases can be treated without rest in bed. The author emphasises the care necessary in giving the first injection, as the negative phase may be very unpleasant. The

initial dose should not exceed ten million micro-organisms. The injections are also of diagnostic value, for if increasing doses do not produce any rise in the temperature, or the subjective or objective symptoms, the diagnosis of gonorrhœa may be eliminated.—*The Australasian Medical Gazette*.

Sponge Compression in the Treatment of Mammary Abscess.

BY

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In the days now happily passed when woman in her maternity was considered to have passed through the valley of the shadow of death, when puerperal fever, etc., were considered to be natural concomitants of her condition, when physicians were spoken of as lucky or unlucky in their obstetrical cases, even then, when she arose unscathed from her lying-in-bed, she frequently had to suffer the painful, mutilating and long drawn out complication of acute mammary abscess, which was attributed to an accumulation of milk in the gland.

The influence which the milk was believed to exert over the puerperal condition was shown in the terms milk-leg applied to iliac phlebitis, mania lactea to puerperal insanity, and milk fever to puerperal septicæmia.

The havoc wrought by the mammary abscess of former times is now rarely seen, for with our knowledge of the cause of this complication came better methods of treatment. But even to-day the results obtained under ordinary methods are far from satisfactory.

Three forms of abscess are generally spoken of: subcutaneous, submammary and parenchymatous. The subcutaneous abscess is an inflammation of the cellular tissue covering the gland, and it is due to suppuration of the sebaceous glands in that locality, and it can be treated in much the same manner as we treat furuncle in other parts of the body.

The submammary abscess is a very rare condition and probably does not occur except in connection with caries of rib or empyema. It is an inflammation of the pad of connective tissue lying between the mammary gland and the pectoral muscle. When abscess forms there is but little redness of the breast, but the breast is raised from the thorax, and there is considerable fluctuation from the large amount of pus present. The treatment is by incision beneath the breast and drainage; spontaneous opening leaves a sinus.

The third, or parenchymatous, variety of mammary abscess is the subject proper of this paper. A study of acute mammary abscess shows its close relation to lactation, 672 out of 813 published cases being due directly to lactation. It is caused by a micro-organism (the staphylococcus aureus) which gains entrance to the gland by way of the milk ducts and not through the lymphatics in the area of the nipple since the latter are superficial and empty directly into the axillary glands. The vascularity of the gland during lactation and the presence of an animal fluid make an ideal field for germ development; also the branching character of the abscess along the milk ducts must influence one in favour of the theory of an infection by way of the milk ducts. Experiments have produced mammary abscess in lactating goats by injecting tuberculous virus directly into the milk ducts, thus proving that infection can and probably does take place this way.

In mastitis complicating lactation the infection may take place at any time. One-half the cases occur during the first month and a majority of these during the first week. Cases are reported as late as the fourteenth month.

As infection is almost always from the nipple, attention should be directed to the nipples some time before parturition. Small or depressed nipples should be drawn out and gently manipulated daily with lanolin or cocoa butter, which accustoms them to mechanical irritation, when the period of lactation arrives. The nipples are to be washed before and after nursing with a two or three per cent. solution of boracic acid. We recognize the importance of this when we consider the moisture and colostrum about the nipple and the proximity to the warm moist axilla—good conditions for the development of the organisms always to be found in the mouth of a child. If erosions or fissures appear the nipple must be protected by a shield during nursing and covered with a pad of moist boracic and gauze between feedings. Each day the nipples are to be carefully dried and the fissures touched with a finely pointed stick of silver nitrate and painted with compound tincture of benzoin. If notwithstanding our careful prophylactic treatment infection of the gland should occur, it is ushered in with symptoms so well known that it would be idle for me to dwell upon them here. If our patient be seen sufficiently early, prompt attention may avert a catastrophe. Nursing from the inflamed breast is to be stopped absolutely; tension being relieved by means of the breast pump. The breast is to be supported by a sling and comfortable binder, and the arm is bound to the affected side. An ice bag is placed over the seat of inflammation, to remain until all

signs of inflammation disappear, or until we are satisfied that pus is present.

As soon as mastitis and fluctuation are evident the abscess should be opened and treated in the following manner, known as Munde's sponge compress method. A large, flat, coarse bathing sponge is hollowed to admit the mamma, it is freed from foreign matter and treated to a hot carbolic acid bath. The abscess is opened over the seat of fluctuation by an incision radiating from the nipple, the pus is evacuated and the abscess cavity is washed out with a mild antiseptic solution or saline solution. The sponge is dipped in sterile or carbolized water, as hot as the hand can bear, and wrung out in a towel. It is now placed over the breast, the walls of the cavity being held in apposition, is covered with oiled silk and is evenly and firmly compressed against the thorax with wide rubber bandages. This dressing is changed daily, the sponge being cleaned, but the abscess cavity is not interfered with.

This treatment is based on the fact with which the mamma can be compressed against the flat underlying surface of the thorax, and by means of steady, uniform and gentle pressure, the abscess cavity can be kept free from pus and serous accumulations, and the walls of the cavity held in apposition, inducing fresh granulations to unite and thus close the cavity. It is indispensable that there should be uniform, even compression of the breast from the periphery towards the center and from the surface towards the thoracic wall.

A breast treated in this manner will be ready to resume its function in from seven to ten days. This treatment is, however, applicable only to fresh abscesses with healthy granulating walls. Where the abscess has persisted for weeks or months and the interlobular, cellular tissue has been destroyed and requires removal, it is not applicable. Here the method of Shields is to be recommended.

An incision is made over the seat of the abscess large enough to admit the index finger of the operator and this is deepened until pus flows; the finger is now passed into the cavity and it will be found that the finger may be brought fairly near the surface in a dependent position. In this situation a free opening is made large enough to well evacuate the pus. In the finger being now introduced it will be found that the pus has barrowed about and is contained in areas bounded by fibrous septa. A large drainage tube is passed through the large opening, the anterior opening is closed and primed over with collodion. The tube is left as long as needful, and is subsequently slowly shortened; the scar is hidden by position and volume of gland which makes it a desirable operation in any case where for cosmetic reasons a scar on the

anterior surface of the breast is objectionable.—*American Journal of Surgery.*

Notes on Surgical Shock.

BY

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It is safe to say that the possibility of death from shock, or from the action of the anæsthetic upon the cardiac and respiratory centers is the principal element in the sense of responsibility which every surgeon feels as he stands knife in hand over his patient ready for the performance of an operation. All operators will agree with me that the most harrowing experiences of their careers have been the instances in which the patient has died or even apparently died upon the operating table. Cases of death from shock occurring shortly after operation are second only to the foregoing in imposing a tremendous weight of responsibility upon the surgeon.

I believe that I can say without fear of contradiction that a large majority of operators do comparatively little in the way of prophylaxis of shock and untoward results of anæsthetics. The operating room in which little or nothing is done in the way of prophylaxis of shock or anæsthesia accidents is, however, always the scene of great activity after an accident has happened. Cardiac stimulants are often given that should have been given before the operation was begun. Narcotics are administered in some cases which could more logically have been used prior to the operation.

There is no question that the fear and anxiety which the patient experiences prior to the operation are often responsible for untoward results apparently due to the operation itself. Too little attention is paid to this psychic factor in shock and anæsthesia accidents. Nervous, excitable and cowardly patients are usually handled in precisely the same manner as are those who calmly approach the surgeon and philosophically await his verdict and such subsequent operative procedures as he may decide upon.

Unless there is some positive contra-indication, I believe that it is wise in the majority of cases to administer *morphia* hypodermatically a short time prior to the operation. Cardiac stimulants, especially strychnia, may be indicated for the relief of psychic shock which already exists prior to the operation, or for the prevention of shock which is

likely to come later. Alcoholic stimulants have a certain limited range of application here. It would be out of place for me to discuss here the dosage of narcotics or stimulants to be used prophylactically. Obviously this will vary with the individual case and must be left to the judgment of the operator.

One of the important cardinal points in the treatment of shock or suspended animation from anesthetics is not to rely upon any one method of resuscitation. Artificial respiration should be conjoined with the hypodermatic administration of stimulants and the application of heat to the extremities and to the precordia. The hot water bottle applied to the precordia has seemed to me to be of especial service. Digitalis and strychnia injected hypodermatically are, as every surgeon is aware, of greater or less service. I would suggest, however, that where strychnia is given in cases of severe shock or suspended animation, the dose should be a large one. One-fifteenth to one-tenth of a grain may logically be expected to be of much more service in an emergency than the smaller doses usually given. Single doses of one-sixtieth or even one-thirtieth of a grain are unreliable. Obviously, repetition of the larger doses is not to be thought of. I have seen apparently good results, both in anesthesia accidents and in surgical shock, from so-called massage of the heart. I have seen other cases, however, in which I am confident that the so-called "massage of the heart" was disastrous, merely because it consisted essentially of more or less severe and rapid concussion of the epigastrium, *i.e.*, concussion of the solar plexus. The effect of half a dozen relatively light blows planted by Mr. Corlett upon John L. Sullivan's epigastrium will be recalled as a pertinent illustration of the untoward effects of concussion in this region.

Rapid divulsion of the anus sometimes stimulates primarily the respiration and secondarily the heart's action in a most effective way. Transfusion of saline solution or the direct transfusion of blood is unquestionably of great value in the treatment of surgical shock. I believe that the former should be more often administered prophylactically during the operation than is the usual custom.

The most powerful stimulant of the heart's action, so far as my observation goes, is the intravenous injection of pure aqua ammonia. This can be used in doses of from twenty minims upward by means of the ordinary hypodermatic syringe in cases in which the veins are sufficiently prominent to be accessible. If an incision is necessary to expose the vein, it should be made. I learned the value of this method of administering ammonia at the New York Charity Hospital many

years ago in the case of a woman who apparently suddenly expired as a result of a mitral heart lesion. It so happened that the senior surgeon and myself were in the ward at the time. The hypodermatic syringe and the ammonia being immediately accessible, the idea flashed upon us that the injection of the ammonia into the veins would do no harm under existing conditions, even though we obtained no benefit. The woman revived and lived for some months afterwards with an arm which woefully betrayed a lack of technic exhibited by the two young surgeons.

In a recent case of my own of post-operative shock in a patient whose condition prior to operation was such that it required considerable assurance to operate upon him at all, the operation being a very difficult prostatectomy, the respiration had ceased; the pulse was imperceptible and the cardiac action almost so, and the reflexes were completely abolished. Nitrite of amyl, the application of heat and strychnia had been tried without avail. Although the case seemed hopeless, I resolved to give it the benefit of a doubt and injected twenty minims of pure aqua ammonia into the median basilic vein. The patient slowly revived and is now rapidly recovering from the effects of his operation.

With reference to the danger of injecting aqua ammonia, I will state that unless the technic is at fault, accidents will not occur. If the needle is fairly within the lumen of the vein, if the vein is of good size and if the contents of the syringe be injected slowly, no local reaction whatever need be apprehended.—*American Journal of Surgery*.

The Use and Abuse of Certain Drugs in the Treatment of Shock, in its relation to Emergency Surgery.

BY

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In discussing the treatment of shock in its relation to emergency surgery, no attempt will be made in this paper to deal with theoretical considerations. Nor is there a desire to bring before you original suggestions in the form of surgical therapeutics. The following remarks are simply intended to record some of the observations made during a somewhat active surgical service, based upon a series of cases occurring principally among injured railroad employes. In a group such as the latter, emergency surgery finds one of its widest fields of usefulness. In

this class of work the surgeon is frequently called upon to think quickly and to execute his plans with despatch. A prearranged and definite routine fitting groups of cases is a necessity if the greatest amount of help is to be brought to bear upon the largest number of individuals who have been stricken.

General precautions, such as efficient first aid to the injured, rapid transportation to a hospital and temporary treatment on the part of house officers and nurses until the arrival of the surgeon in charge, are of course essential to the proper management of a case. These matters will not be taken up in detail, as it is the object of this paper to deal more particularly with conditions that confront the surgeon in his personal care of the case prior to, during the course of, and subsequent to the operative attack, although many of the ideas expressed are applicable to non-operative cases as well.

In dealing with this subject, we have limited ourselves at this time specifically to a consideration of certain drugs that have been found of value in combating shock, with a brief review of the methods of administration, as gained from personal experience. For purposes of convenience, we have roughly divided the subject into two parts. First, shock, due primarily to loss of blood, as in crushing injuries of legs and arms, where, through rupture of large vessels, the patient becomes exsanguinated. Second, cases of severe trauma without great loss of blood, producing a condition of shock *per se* with lowering of vasomotor tone.

In all cases of shock, either brought about directly through loss of blood or in any way aided by the latter, the administration of normal salt solution is a matter of routine. This procedure, of course, is well nigh universal, and although its practice is common, yet, like all surgical therapeutic measures, there are certain points in connection with its use that will bear discussion.

The heart normally pumps against a definite resisting force, the blood-filled vessels. If in the peripheral circulation, the vascular walls are suddenly ruptured, with a consequent loss of content, there is produced a condition whereby normal cardiac resistance is lessened. Hence the heart, with its muscular contractions, still goes on with its share of the work, but having a decreased amount of force to pump against, slowly but surely wears itself out by expending its force unopposed. Thus the normal physiological state changes to a pathological condition.

Under such circumstances, the addition of a substance to the organism most nearly approaching the normal blood stream furnishes Nature with an artificial, but nevertheless an efficient, means of restoring the

disturbed equilibrium. Given, however, a condition of surgical shock, with loss of vasomotor tone not dependent upon vascular depletion, and the addition of fluid to a body containing an already crippled heart may work havoc. The indiscriminate use of normal salt solution in conditions such as the above, not dependent upon actual loss of blood, is unnecessary and contra-indicated. It is a matter of necessity to administer saline solution under certain circumstances, but in others it is an act to be condemned.

Our routine method consists in the injection, subcutaneously, of 750 c.c. of saline solution as an initial dose, given slowly and continued as necessary.

Although it is a somewhat general practice to insert the needle in the subpectoral area, a more convenient and safer location is found at the junction of the second right costal cartilage with the rib, having the needle point slightly downward toward the axilla. The lymph channels in the latter area readily absorb the fluid as it enters underneath the integument. The solution should not be cooler than body temperature, and it should be allowed to run out of the needle, before the latter is inserted, a sufficient length of time so that it becomes heated to the proper degree to enter the body, in most cases the interior of the connecting rubber tube having chilled the solution during its course.

As a matter of routine the above method is used, although under certain conditions the solution may properly be administered in the form of continuous proctolysis, drop by drop, after the method of Murphy, or intravenously.

In the treatment of shock by means of drugs (exclusive of normal salt solution), in common with the majority of surgeons, we have abandoned most, if not all, of the one-time honored remedies. This especially holds true of strychnia, in years gone by the *sine qua non* in the field of stimulants for surgical shock. The experiments of Crile, supplemented by the clinical findings of numerous of our best known men, we have found to be in keeping with our own personal experience. At the present time, considering shock as a condition of diminution of vasomotor tone, we have found strychnia of little avail as a rapid and efficient means of producing increased blood pressure. Consequently it has been cast aside from our surgical armamentarium.

Each and every preparation of digitalis has met the same fate. The length of time required for the drug to act, together with the uncertainty of power of the individual preparations, in our own experience has rendered it well-nigh useless in conditions where formerly it may have

been indicated. The sheet anchors, so to speak, that we have come to depend upon in the way of drugs are three in number: Camphor, adrenalin chloride, and morphine. The first, as it is a rapidly diffusible cardiac stimulant, is used rather frequently where danger signals in the form of suddenly impending collapse are encountered. For example, either before, during the course of, or subsequent to an operation the patient suddenly blanches, the pulse weakens quickly or stops entirely and the respirations cease. Such a syndrome as the above is best combated by the hypodermatic administration of camphor in the form of sterilized camphorated oil, given in doses of 15 or 20 minims and repeated if necessary. In this connection, however, a note of warning is to be sounded. The use of camphorated oil as a routine and continuous form of medication is to be condemned from two standpoints. First, camphor, from a pharmacological point of view, when used over a considerable period of time, acts as a distinct renal irritant. Second, from time to time, even under conditions that so far as could be judged were aseptic, the only constituents of the preparation failed to absorb properly, with a consequent abscess formation that required incision and drainage at some future date. These facts it is well to impress upon surgical house officers of hospitals, in order to obviate embarrassing post-operative conditions. Nevertheless, in an emergency the use of camphor as outlined above is, in the great majority of cases, not only extremely satisfactory, but without any great element of danger.

In the second drug mentioned namely, adrenalin chloride, the surgeon has at his command a means to raise vascular tone almost equal to the use of morphine as an anodyne. The long continued injection of adrenalin on certain of the lower animals, notably rabbits, has been shown, experimentally, to produce conditions of arterio-sclerosis. Furthermore, in certain conditions predisposing to pulmonary oedema in man its administration over relatively long periods of time has proven dangerous. Be that as it may, in the vast majority of instances adrenalin, when properly indicated, serves as a veritable sheet anchor to the surgeon. It has been found to be of distinct value in those cases requiring a prop to failing blood pressure both before and after operation. The picture of the railroad employee mangled and requiring an amputation high up through the thigh, whose condition of extreme shock prohibits immediate surgical intervention because of fear of death on the table, is familiar to all. The use of adrenalin chloride, given subcutaneously in doses of fifteen minims every fifteen minutes for four or five doses, has been of no small benefit in these cases. In fact, time and again it has been given in this way for an hour or more and continued

over a period of several hours after the first four or five initial administrations, in doses of ten or fifteen minims every hour or two. The heightened blood pressure evinced, not only by the sphygmomanometer but by the general subjective and objective symptoms as well, following such a course of procedure has been shown on many occasions. As before mentioned, those subjects in whom a pneumonia, complicated by pulmonary oedema, is to be feared should be watched with especial care whenever adrenalin is used over any long period of time, for its administration under these circumstances can only be fraught with danger. It has been a source of surprise and wonderment that the emergency kit of the general practitioner so seldom contains either camphorated oil or adrenalin. The use of both is so obvious in certain states of emergency surgery that the absence of them from the equipment of many is hard to understand. How common the spectacle of the practitioner suddenly summoned to the scene of an accident, well supplied with strychnia and nitroglycerin, and not hesitating to use either or both at a moment's notice; sometimes, and very properly, an injection of morphine as well.

We say sometimes, for even the use of morphine (the third drug mentioned), with its rapid and wonderful power as an anodyne is not nearly as frequent as it should be. Doubtless many a life has been saved and many a one lost just because the physician either did or did not administer morphine in sufficient dosage to tide his patient over the shock and nervous excitement. The use of morphine, however, we are glad to say, is more general than the abuse of strychnia and nitroglycerin although the custom of giving a "hypo" of either or both of the latter two is far more universal than wise. As a general proposition, *strychnia* as commonly employed does no definite good, while nitroglycerin may work positive harm because of its vasodilator qualities.

So, then, like the trinity of faith, hope and charity, "we have these three"—first, *morphine*, the use of which is obvious and needs no further comment; second, *camphorated oil*, for immediate and imperative cardiac collapse; third, *adrenalin* for administration over comparatively long periods of time as an efficient aid in the production of heightened blood pressure.—*American Journal of Surgery*.

How Diphtheria Antitoxin is made.

IN initiating the immunizing treatment of the horse, a first dose of about 1,000 units of diphtheria antitoxin is injected subcutaneously, this being followed by a relatively small dose of the specific toxin.

After several days, when the reaction and fever have abated, a still larger dose of toxin is injected; and the treatment is continued in this manner for at least two months. At the end of this period the horse in all probability will be conditioned to produce a considerable amount of antitoxin, although in a large percentage only a very small quantity is yielded, such horses proving utterly worthless for this purpose. A well-adapted horse will show from 300 to 900 units per c.c.

When the animal under treatment shows a sufficient number of units per c.c. to warrant bleeding, its blood is drawn off through a cannula inserted into the jugular vein. By means of a rubber tube attached to the cannula the fluid is conducted into bottles containing a solution of sodium citrate, which prevents clotting. As much as 12 litres at a time may be drawn without weakening a horse to any extent.

The bottles containing the blood are allowed to stand for about twenty-four hours, during which time the red and the white cells and all floating material, because of slightly greater specific gravity, gradually settle to the bottom, leaving the plasma with its contained antitoxic bodies at the top, whence they may be decanted off.

THE REFINING AND CONCENTRATING OF THE SERUM.

In the early days of antitoxin therapy the crude plasma, containing all of the irritating and rash producing properties of horse serum was injected. A comparatively large volume was required for a dose, as at that time it was not often that a serum containing as high as 500 units per cubic centimeter was procured from a horse. Even at this rate 2 c.c. of fluid often was required for an ordinary immunizing dose, while in a curative dose often as much as 20 c.c., or even more, was necessary. Hence, the infection of antitoxic serum was really nothing less than heroic treatment.

No great improvement was made upon this state of affairs until the year 1904, when a doctor of the New York Department of Health announced his method of concentrating and refining the antitoxic serum by precipitating out the antitoxic globulin. As a result of his experiments, he was able to remove from the serum a large percentage of the non-antitoxic bodies. Hence, the volume being greatly diminished and most of the irritating properties removed, the severity of the injection was greatly reduced. The method of 1904 has since been markedly improved upon by Dr. Bauzhauf, of the same laboratories.

The dread of rashes, serum sickness, and so on, is gone for ever. Nor is this the only improvement, for the volume (now tremendously reduced)

is of the greatest importance. Where previously 10 c.c. or more was required for a dose of 5,000 units, to-day the physician needs to inject only 2 c.c. or even less; while the danger from ill effects is reduced to practically nothing.—*The Dietetic & Hygienic Gazette*.

The Intravenous Administration of Neo-Salvarsan in Syphilis.

BY

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NEO-SALVARSAN is a new derivative of Salvarsan, obtained by Professor Ehrlich by the action of Formaldehyde-sulphoxylate upon Salvarsan (Dioxydiamidoarsenobenzol). The resultant compound contains as its active constituent Dioxydiamidoarsenobenzol-monomethanesulphinate of sodium and bears the number "914" in Ehrlich's series.

The first great advantage of Neo-Salvarsan over Salvarsan is the ease with which it dissolves in water. Unfortunately, like many other organic arsenical compounds, it is unstable, and readily oxidises, giving rise to products which are exceedingly toxic.

My experience with this drug is short, but I am convinced that it possesses many advantages over the original Salvarsan in the treatment of syphilis. The technique of administration is comparatively simple, but it demands close attention to detail.

Neo-Salvarsan may be given intramuscularly or intravenously; but the latter is the method with which I propose to deal.

McDonagh's method of using a syringe for intravenous administration is excellent, and with slight modifications Messrs. Ferris & Co. have made for me a compact injection apparatus, which fits on to an ordinary 20 c.c. Ehrlich-Hata "Record" Syringe. To the nozzle of the syringe a three way stop-cock is screwed on, the needle of the syringe is connected with one branch of the stop-cock by a piece of rubber tubing about eight inches long, into which a "window" of glass tube is inserted two inches from the needle. To the third branch of the stop-cock a piece of rubber tubing twelve inches long is attached, through which the syringe can be filled from the solution of Neo-Salvarsan. A turn of the tap enables the contents of the syringe to be injected through the needle into the vein.

The preparation of the solution of Neo-Salvarsan is carried out as follows. Into a sterilised beaker is poured, with aseptic precautions, a sufficient quantity of the twice-distilled sterilised water to allow 25 c.c. of water for every 0.1 gramme of Neo-Salvarsan. The twice-distilled water is absolutely essential to avoid a febrile reaction after the injection; and it is advisable to sterilise in an autoclave the water in a flask after re-distillation. The re-distillation and autoclaving should be done not longer than the day before injection. The phial of Neo-Salvarsan is then opened. The neck of the phial is rendered aseptic by wiping with a cotton-wool swab soaked in absolute alcohol, and filed off with a small file sterilised in the flame of a spirit lamp. Heat must not be applied to the phial itself. The contents of the phial, consisting of a finely-divided yellow powder, is shaken on to the surface of the water, and allowed to dissolve spontaneously without shaking or stirring. If the solution is not perfectly clear at the end of ten minutes, it should not be stirred or filtered; more distilled water should be added. If the water was perfectly clear of all solid particles, there will be no need of filtering: Neo-Salvarsan will dissolve completely, provided sufficient water is added. A turbid solution indicates an insufficiency of water.

A second beaker should be prepared, containing sterilised normal saline solution, made from twice-distilled water. A vein at the bend of the elbow is meanwhile made to distend by placing a rubber tourniquet, secured by artery forceps, round the upper arm, taking care that the radial pulse is not obliterated.

The skin over a wide area is disinfected by swabbing once with *Liquor Iodi Fortis* (B.P.). The syringe and needle are completely filled with normal saline solution through the spare end of rubber-tubing and all air bubbles carefully got rid of. The needle is introduced into a conveniently distended vein. It is better to ascertain the whereabouts of the needle's point by gently injecting a little saline solution rather than by attempting to suck up blood into the syringe. If the point is not in the vein, subcutaneous infiltration will immediately be visible as a slight swelling. Provided no such swelling appears, a few c.c. of saline solution should be injected into the vein, and the plunger withdrawn until pure blood is seen in the glass window-tube. This must be immediately re-injected, or clotting may occur in the needle.

Having made sure that the needle is properly introduced into the lumen of the vein, the needle can be kept in position by tying a piece of

gauze round the tubing just above the junction with the needle (if gauze is used instead of tape or a bandage a single knot suffices, and will not slip). The tourniquet is then relaxed: a most important preliminary, and one sometimes forgotten. By a turn of the stop-cock the saline solution is emptied out of the syringe, the spare end of tubing placed in the Neo-Salvarsan, and the syringe filled with Neo-Salvarsan solution. The stop-cock is turned over to the needle, and the solution injected into the vein. This alternate filling with the Neo-Salvarsan and injection into the vein is continued by appropriate reversing of the stop-cock until the whole of the solution is injected. A final syringe-ful of saline solution should be injected to wash through the whole of the Neo-Salvarsan into the vein, and avoid the possibility of infiltration of the subcutaneous tissues with Neo-Salvarsan on withdrawing the needle.

If the subcutaneous swelling appears during injection, either the needle has become dislodged or the vein has been transfixed. A little saline solution should be injected to dilute the Neo-Salvarsan in the tissues, and a fresh vein must be taken for the remainder of the injection. The pain of subcutaneous injection of Neo-Salvarsan is intense and must be avoided.

At the end of the injection a pad of sterilised gauze is bandaged over the spot, as bleeding sometimes takes place. Carried out in this way, the operation should be followed by no reaction and no rise of temperature. Patients prefer the actual injection to be performed as quickly as possible. Using 0.9 grammes of Neo-Salvarsan in 250 c.c. of water, I find the injection may be made in just over five minutes. The solution is injected at room-temperature about 55°–60° F. On a very cold day the flask of water may be warmed by standing in hot water prior to making the solution; but the solution must on no account be warmed after the Neo-Salvarsan has been added. The solution must be freshly prepared at the time of injection, and it must not be carried about or agitated. With these precautions the danger of toxic decomposition products being formed from the Neo-Salvarsan is averted.

Every instrument, towel, swab, etc., to be used at the operation is sterilised by boiling or super-heated steam. Sterilised towels are clipped round the patient's arm, leaving only the iodine-painted area exposed. Sterilised towels are placed under the arm and over a sufficient surface of the table or bed on which the arm rests to ensure that the syringe and its various attachments may be safely laid down if necessary upon a sterilised surface.

I find it convenient to stand the two beakers of Neo-Salvarsan and saline solution in a double pickle jar stand, so that both may be carried about and handed to me simultaneously. Solid particles or air-bubbles might prove fatal if injected into the vein. Should an air bubble by chance appear at the glass window tube, it must be at once drawn back again into the syringe and allowed to float up to the top. The injection may then be continued. An air bubble of considerable size in the syringe does no harm if held perpendicularly, and the plunger is not pushed home at each thrust so as to empty the syringe. Personally, I prefer to keep a fairly large air bubble at the top of the syringe, as small bubbles, if they occur in the solution, can be more easily dislodged from the sides of the syringe and made to incorporate themselves in the larger bubble, which I watch constantly.

The patients do not, as a rule, experience any unpleasant effects either during or after the injection. Some complain of a slight metallic taste at the end of the injection, but it is quite transitory. Occasionally a slight headache comes on two or three hours afterwards, and I find a cup of tea is the best remedy.

It is advisable to prepare the patients as if for an anæsthetic by administering an aperient on the previous night, and giving a very light breakfast on the morning of the injection. Ordinary meals may be taken after the injection. The patients should remain at rest, preferably in bed, for two hours; if at the end of that time no unpleasant symptoms have occurred, I allow them to get up provided they remain quiet. The first injection requires greater caution than subsequent ones so far as after treatment is concerned. If the patients stand the first injection well I allow them to get up and go out and about within a few hours after subsequent injections.

The dosage I employ is 0.75 gramme (No. V) for a first injection in a healthy man, with subsequent injections of 0.9 gramme (No. VI), at intervals of three days (in practice two injections per week), until four or five injections have been given. The Wassermann reaction in an early case of syphilis is usually positive up to four injections; if it is negative a week after the fifth injection I do not repeat the injection unless a later test shows a positive reaction again. If after the fifth injection the reaction is not negative, I give a sixth or seventh injection, with intervals of a week, taking a Wassermann test a week after each injection, and being guided as to a repetition of the dose by its results. I discontinue mercury for at least a fortnight before the first Wassermann test is made, but afterwards combine the

treatments. Before finally deciding that no further Neo-Salvarsan is necessary I make a final Wassermann test, preceded by a fortnight without mercury.

Neo-Salvarsan is apparently contra-indicated in alcoholic debilitated subjects, or in those suffering from cirrhosis of the liver. I make it a rule to examine the urine beforehand, ascertaining with particular care that the quantity secreted is normal, that the specific gravity is within healthy limit, and above all that the excretion of urea is sufficient.

A trace of albumen may depend upon the syphilitic infection, but the presence of casts or sugar should in the present state of our knowledge deter us from administering any of the arsenic compounds intravenously. In cases showing signs of any syphilitic involvement of the central nervous system, especially meningitis, spinal symptoms, psychoses, or optic neuritis, great caution should be exercised, and if Neo-Salvarsan is administered at all, the dosage should be very small at the outset.

Observing these precautions, Neo-Salvarsan offers a very valuable adjunct to the mercurial treatment of syphilis. The patient's infectivity is quickly minimised if not abolished, the visible signs of syphilis are speedily dispersed, *e.g.*, the chancre, roseola and condylomata may disappear after the second injection. The symptoms are alleviated, and the Wassermann reaction changed from positive to negative, whatever this may really mean.

Time alone can demonstrate whether more solid advantages accrue, but alleviation to this extent is a gain not lightly to be disregarded. At least, Neo-Salvarsan offers the advantages aforesaid, as well as marked benefits in later manifestations, particularly tertiary lesions of the skin and mucous membranes. Some cases of locomotor ataxy and late nervous disorders have been improved.

In addition to these considerations it may be observed that Neo-Salvarsan if cautiously prepared and administered shows little or no toxicity, that it is easily dissolved, requires no elaborate apparatus and is injected at room temperature, while the use of re-distilled water has proved the "reaction" after intravenous injections to depend more upon some ill-understood quality of the water than upon the drug employed.—*The Bristol Medico-Chirurgical Journal*.

Anuria due to Salvarsan.

G. R. LIVERMORE.—A youth, aged 19, had a chancre in May, 1911. Mucous patches appeared in the month one month later. He was treated for 6 months, with protoiodide of mercury pills, and then had no treatment for a month, and no further symptoms.

Examination showed no evidence of syphilis, except general adenopathy. The heart, eyes, lungs and kidneys were normal. An intravenous injection of 0.55 gm. salvarsan was given in a hospital at 9 A.M., July 2, 1912. The temperature was 98.6°; the pulse 60, and the respiration 20. At 10 he complained of headache and vomited 8 oz. of yellow fluid. He slept for an hour and then passed a large soft motion. The temperature was 105°; the pulse 106, and the respiration 34. The temperature gradually fell to 101° at 6 P.M. The bowels acted at 6 P.M., and again at midnight. He passed urine both times, but only a small amount at midnight. The bowels acted again at 6 A.M. next day, but no urine was passed. At 9 A.M. the temperature was 101.4°; the pulse 100 and the respiration 34. The patient seemed drowsy and said he felt sick all over. He was given 8 oz. of saline solution per rectum and nitroglycerin, $\frac{1}{16}$ grain hypodermically. A hot-water bottle was applied over the kidneys, and plenty of hot water was given by the mouth. At 2.30 the temperature was 102°, the pulse 108, and the respiration 30, and he had passed no urine. A hot pack was applied and a pint of saline solution was injected hypodermically. At 4 P.M. he vomited a large amount of dark green fluid. The hot pack was repeated at 6 P.M., and potassium bicarbonate (30 grains in one-half glass of water) was given. At 9 P.M. he vomited 10 oz. of greenish fluid. Saline solution by the Murphy method was begun at 9 P.M., and continued through the night. At 9 A.M. next day, $\frac{1}{2}$ grains of calomel were given and repeated every half hour, for 6 doses. At 9.30 he vomited 12 oz. of greenish fluid. The bowels moved. At 11 A.M. and again at 12 A.M. the bowels acted. At 2 P.M. the patient was catheterised, and 5 oz. of urine were obtained. At 8 P.M. 6 oz. of urine were obtained by catheter. He vomited several times during the night, and the bowels acted 3 times. After this urine was passed in sufficient quantity, and recovery followed. The first urine contained a large amount of albumin, and all kinds of casts. Subsequent specimens improved till they contained no albumin and few hyaline casts.

The only explanation for the suppression of urine is an idiosyncrasy to arsenic. The technique was the one the writer always uses. The solutions were made with pure distilled, sterile water, and the urine was normal before the Salvarsan was given.—*The Medical Review.*

OPHTHALMOLOGY.**Injuries to the Eyes from Exposure to the Sun.**

Judging by the number of articles on this subject which have appeared since the partial solar eclipse in April last, more or less serious injuries to the eyes from sun-gazing have been common in those localities where a cloudless sky enabled the curious to indulge in an uninterrupted stare. In Berlin alone, many hundreds of people suffered much discomfort for several days, and owing to the misguided advice of the lay press, much harm was done by looking at the sun through a small hole in a sheet of paper. This contrivance, it is true, enables the spectator to gaze uninterruptedly at the sun, and cuts off much light from the eye: but it also floods the most sensitive portion of the retina with the direct rays of the sun. It is scarcely possible, through a pin hole, to limit the field of vision to the area darkened by the eclipse.

According to Dr. Feilchenfeld the symptoms commonly complained of immediately after exposure to the sun consist of pain and burning in the eyes, with mists and red or lilac colours floating before them. Sometimes these symptoms disappear in a few hours, but many patients suffer from them for several days. Most of the symptoms are evidently due to retinal changes, but this was not the case in a patient seen by Dr. Isakowitz. A woman, aged 44, looked at the sun repeatedly before the eclipse occurred. Next day she noticed curious spots like particles of soot which moved with the eye and remained stationary when the eye was at rest. Her sight had previously been good. No scotoma was demonstrable, and no abnormality of the retina could be detected. But a number of fine specks were seen in the substance of both lenses, and immediately underneath the capsules. There was no opacity in the vitreous humour. Early senile, subcapsular cataract is characterised by drop-like opacities mainly in the peripheral portion of the lens. Here the diffuse and innumerable dust-like opacities were most obvious in the pupillary region of the lens. In some points the condition resembled congenital, punctate cataract. But in its causation it resembled glass blowers' cataract which is due to ultra-violet rays measuring 300 to 400. As has been experimentally shown in rabbits, the ultra-violet rays are absorbed by the cornea and the lens. The injuries, therefore, which the retina suffers from exposure to sunlight must be traced to the visible rays of the spectrum. How those injuries are caused is not clear. Czeruy concludes from experiments on animals that the process is one of cauterisation.

The retinal changes caused by direct exposure to sunlight are almost limited to the macula lutea. The fovea centralis is reddened at its circumference and exhibits at its centre a pale area which is probably the image formed on the retina by the sun. This retinal defect is evidently the cause of the scotoma frequently observed. Patients exhibiting bilateral scotomata also suffered invariably from day-blindness, their acuity of vision being greatest in the dusk. This is due to the injury to the retinal cones, the function of which is reduced, while that of the retinal rods is practically unimpaired.

While central scotomata seem to constitute the commonest result of exposure to sunlight, several other symptoms are recorded. Dr. G. Ischreyt observed two cases of disturbances of colour sensation. One of his patients developed acute supraorbital pain, and another suffered from an acute exacerbation of a pre-existing conjunctivitis.

As the symptoms diminish the retina usually regains its normal appearance, but may become slightly pigmented, and the redness of the fovea may persist for a long time. The prognosis is good, although the literature contains a few cases of permanent blindness. But though recovery is the rule, it is also often tedious, and after other symptoms have disappeared, the patient may be troubled by scotomata or by flickering lights. It is difficult to estimate the time required to cause serious symptoms by exposure of the retina to the sun. On this point patients' accounts are usually vague and misleading, and while some admit having repeatedly stared at the sun for over a minute at a time, others confess to only a momentary glance. Judging by the extreme discomfort which a momentary glance at the sun can produce, it is probable that but little more is required to induce serious symptoms. The prophylaxis is obvious. Treatment consists in protecting the eyes from bright light by confining the patient to a darkened room, or by smoked glasses.—*The Medical Review*.

OBSTETRICS AND GYNÆCOLOGY.

Fatal Air Embolism due to Attempts to Induce Abortion.

J. ESPIE DODS, M. B., M. Ch. —A married woman, aged 23, rose at 5 A. M., in apparently perfect health. She prepared her husband's breakfast, saw him off to his work, and visited several neighbours, to none of whom did she complain of feeling ill. Her sister came to see her at 9 A. M., and was sent on an errand. Upon her return—about 30 minutes later—she found the woman lying upon the bedroom floor,

dead. Beside her were two basins (one containing a fluid) and a Higginson syringe.

The necropsy was held at 8 P. M. The body was well nourished. There were no marks of violence. There were too small clots of blood lying in the vulva. The heart was healthy. The right side was distended with fluid blood, which was frothy. The inferior vena cava and the two iliac veins contained air. The uterus was of the size of a 4 months' pregnancy, and was emphysematous. The placenta was attached above and anteriorly, and had separated a little at its lower margin. The foetus was healthy and was in the sac, which had not ruptured. There was a little blood at the external os, but no sign of putrefaction. All the other organs appeared perfectly normal.

Death was evidently due to air embolism, following the partial separation of the placenta and accidental injection of air into the uterus.

Six months later the writer examined a woman who died suddenly in her own home. She was apparently in good health till the middle of the day, when she called to a neighbour, who rushed in and found her lying upon the floor. She died soon afterwards. Beyond a little bloody discharge at the vulva there were no external signs of importance. The right side of the heart was distended with frothy fluid blood. The inferior cava and common iliac veins contained air bubbles. The uterus was of the size of a 3 months' pregnancy, and there was a little bloody mucus at the external os. Upon opening the uterus there were distinct signs of the passage of an "instrument." The ovum was not ruptured, but there were small hæmorrhages along the course of the instrument. The ovum and uterus were healthy. The writer reported this case to the authorities as one of air embolism, following the passage of an instrument. It was found that the previous evening the deceased had visited a woman who has the reputation of being an abortionist. Sufficient evidence to warrant a prosecution was not procurable.

The writer thinks that death was due to air gaining admission owing to the loosening of a blood clot, which occurred presumably 18 hours after the passage of an instrument.—*The Medical Review*.

THERAPEUTICS.

The Treatment of Angina Pectoris.

CH. FIESSINGER—The prognosis of angina pectoris is not so grave as is generally supposed. Many patients recover, and the chances of this vary in different forms. Of these 6 may be distinguished and thus ar-

ranged in order of decreasing gravity: (1) angina due to disease of the coronary artery; (2 and 3) the angina of aortic disease and myocarditis; (4) the angina of interstitial nephritis; (5 and 6) the angina of aerophagia and of obesity. In all these forms there is the primordial characteristic of angina pectoris—provocation of the pain by walking or effort—which shows that the left ventricle is overtaxed. At the moment when fatigue reduces the power to overcome the peripheral resistance the crisis occurs. However, in many patients in whom the myocardium tends to fail angina does not occur. Hence there must be some other factor—a nervous element. Probably there is neuralgia of the peri-aortic nerve fibres, for according to physiologists the cardiac muscle is insensible. This neuralgia may be due to toxic, infectious, reflex, or simply mental causes. The treatment may be considered under the heads of general and special.

General Treatment.

There are three elements, but only the first is well-known. (1) Inhalation of amyl nitrite or administration of nitro glycerine (3 or 4 drops of a 1 per cent. solution thrice daily) or morphine injections (1 mgm. every 3 hours during the crisis). (2) Prolonged rest in bed. (3) Small meals of one dish every 2 hours, so that 7 are taken in the 24 hours. This avoids distension of the stomach, which has such a manifest effect on angina. Usually immediate improvement follows. There is only one form in which some benefit is not derived from the treatment—angina due to syphilitic disease of the coronary arteries. In this specific treatment is indicated.

Special Treatment.

1. The coronary disease which causes angina is usually syphilis. In atheroma complete obstruction of the coronary arteries seldom occurs. Many old men have considerable atheromatous narrowing of the coronary arteries without ever suffering from angina. In young subjects angina is usually due to syphilitic disease of the coronary arteries and timely specific treatment will usually cure it. During the attacks theobromine and trinitrin are the best remedies.

2. Angina due to aortic insufficiency may, like the preceding, be due to syphilis, and then the treatment is the same. The pain may be due to excess of intracardiac pressure which follows the regurgitation. If the patient is syphilitic it will be relieved by specific treatment. Whatever the cause, iodide of potassium in gramme doses is useful. Sometimes it will be necessary to reduce the dose to 30 or even 20 centigrammes, especially if the kidney is affected. The remedy should usually

be given for 20 days a month. Sufficient rest in bed, prolonged, if necessary, for 6 weeks to 2 months, will reduce the myocardial irritability.

3. Angina due to myocarditis usually ceases with dilatation of the heart. Digitalin in small doses, about $\frac{1}{10}$ of a milligramme, for 3 or 4 days a week with theobromine may produce amelioration. Rest in bed for a month is the best method of relieving the pain.

4. In interstitial nephritis the angina may be spontaneously cured by dilatation of the auricle after an effort. Thus two patients had high arterial tension and after an effort (in one case running, in the other carrying a travelling-bag) a regurgitant mitral murmur appeared, and orthodiagraphy showed considerable dilatation of the auricle. Eight and 14 months respectively have elapsed. The nephritis and high arterial tension persist, but the action of the heart is regular, and there are no more crises. The improvement is due to the diminution in intraventricular pressure. If relief is not given in this way, a lacto-vegetarian diet, small meals, purgatives, theobromine, and digitalin usually give relief.

5 and 6. In the angina of the obese and of those addicted to aerophagia recovery is the rule. It is remarkable how rapidly angina disappears in the obese when the weight is reduced. The system of small meals will do this. Every person suffering from angina whose weight exceeds the normal should be dieted. The effect is immediate. If there is interstitial nephritis as well as obesity amelioration is also produced but recovery is much rarer. Obese persons who have been cured of angina should exercise great prudence in diet. The angina of those addicted to aerophagia appears to be due to elevation of the diaphragm by the distended stomach interfering with the work of the heart. Small meals, followed by bicarbonate of sodium and absorbent powders, should be taken.—*The Medical Review.*

Hexamethylenetetramine in Systemic Infections.

By

S. J. CROWE.

Bulletin of the Johns Hopkins Hospital.

Hexamethylenetetramine is well known as a genito-urinary antiseptic. It is sold under various proprietary names, such as urotropine, helmitol, cystogen, formin, uratone, etc. It is prepared by the action of formaldehyde on ammonia, and owes its therapeutic value to the fact that it is decomposed in the body, liberating free formaldehyde. After

administration in doses of 3 to 6 grams a day Nicolaier found that the drug itself or formaldehyde, appears in the urine in amounts which markedly inhibit the growth of organisms—even when a specimen of urine is inoculated (with streptococcus) and kept under favourable cultural conditions. In 1898, Richardson called attention to the fact that post-typhoid bacilluria may be prevented by the daily administration of small amounts throughout the course of typhoid fever.

In 1908, experimental studies in the pharmacological laboratory of the Johns Hopkins University by the writer, showed that this drug is not excreted by the kidneys alone, but that soon after administration by mouth it may be demonstrated in practically all the body fluids. It is invariably excreted into the bile, pancreatic juice, cerebro-spinal fluid, saliva, and milk. It may also be demonstrated in synovial, pleural and peritoneal effusions, and in the circulating blood. It finds its way into the bile both through the liver and through the wall of the gall-bladder, as may be shown by administering it to an animal after preliminary ligation of the cystic duct, and testing separately the bile escaping through the common duct and that in the gall-bladder.

Clinical investigations were then made in cases of post-operative biliary fistulae. They showed that:

1. Hexamethylenetetramine, given either by mouth or rectum, appears in the bile and in the urine almost simultaneously.
2. Provided large doses are given (at least 75 grains a day), the drug appears in the gall-bladder in a concentration which suffices to render the bile an unsuitable medium for the growth of bacteria. In cases of infection with the typhoid bacillus, it was possible to render the interior of the gall-bladder sterile—at least so long as active therapy was continued. It was therefore concluded that hexamethylenetetramine would be valuable in the prevention and treatment of acute infections of the bile passages, and that it should always be given as a protective measure before operations on the gall-bladder or bile ducts.

As the spread of typhoid fever is largely due to infected excretions, and relapses are due to some locally persisting infection, not infrequently in the gall-bladder, large doses of hexamethylenetetramine should be given throughout the course of typhoid fever as a prophylactic measure. The drug has, in the majority of cases, no untoward effects if given in small doses at frequent intervals and sufficiently diluted.

During the past 4 years the value of hexamethylenetetramine in threatened or actual cerebrospinal infections has been investigated at the

Johns Hopkins Hospital. A variety of conditions, such as compound fracture of the skull (especially through the middle ear or cribriform plate), infections of the scalp, acute infections of the ear or accessory nasal sinuses, and certain operations may be followed by infection of the cranial cavity. Some measure for combating a secondary infection of the meninges is desirable. Also intra-cranial complications—meningitis, abscess and sinus thrombosis—secondary to inflammation in the nasal cavities or sinuses are common. The writer's experiments show that:

1. Hexamethylenetetramine, given either by mouth or rectum, invariably appears in the cerebro-spinal fluid, both in man and in animals. The amount in the cerebro-spinal fluid reaches its height from 30 to 60 minutes after administration. This point is of practical importance in determining the frequency with which this drug should be given in meningeal infection.
2. After doses, within therapeutic limits, a sufficient amount appears in the cerebro-spinal fluid to have a marked inhibiting effect on the growth of organisms (streptococcus) inoculated into this fluid after its removal from the body.
3. Following a subdural inoculation of dogs and rabbits with a virulent culture of streptococcus, 60 to 80 gr. of hexamethylenetetramine a day, given under conditions which insure absorption, will markedly defer, and in some cases prevent, fatal meningitis. In many cases the progress of the infection was held in abeyance during active therapy, but as soon as the drug was withdrawn the organisms immediately began to multiply, with a return of symptoms.

CLINICAL EXPERIENCES.

Since 1908, it has been a routine measure in the Johns Hopkins Hospital to administer hexamethylenetetramine to all cases in which meningeal infection was a possible or threatened complication. An extensive series of such cases establishes the therapeutic and prophylactic of this measure. This series includes:

- Compound fracture of the skull.
- Tumours of the hypophysis with neighbourhood symptoms necessitating operations through the nose.
- Post-operative cerebro-spinal fistulae.
- Infections of the ear and nasal sinuses.
- Acute poliomyelitis.

FRACTURES OF THE SKULL.

The gravity of compound fractures of the skull lies not only in the possibility of intracranial bleeding, but of meningitis or cerebral abscess, due to inoculation of septic material. As a rule, fractures of the base are attended with a higher mortality than are those of the vault, since an insignificant fissure which passes across the ethmoid plate may open a pathway of infection from the nasal cavity. Not infrequently rapidly fatal pneumococcal meningitis begins on the third or fourth day after what appears to be a simple uncomplicated basal fracture. To prevent these complications about 100 grains of hexamethylentetramine are given daily as a routine measure in all cases of injury of the head. There have been 35 consecutive cases of undoubted basal fracture, with bleeding, or escape of cerebro-spinal fluid from the nostrils or ears, without a single case of a secondary meningeal infection. Many of the patients were unconscious when brought in, others had nausea and vomiting to such a degree that it was inadvisable to give liquids by mouth. In these cases the drug was administered per rectum, from 30 to 60 grains being dissolved in 300 c.c. of salt solution, or plain tap water, and allowed to slowly flow into the bowel. In 35 earlier cases of basal fracture in which the drug was not given there were 9 deaths from meningeal infection or brain abscess. During the past 5 years there have been 20 cases of compound fracture of the vault, with laceration of the meninges and underlying cortex. In 8 of the earlier cases hexamethylentetramine was not given and the mortality from infection was 50 per cent. In the remaining 12 cases, the drug was given immediately after the injury, and at frequent intervals until all danger of infection was past; 10 of these patients recovered, while 2 succumbed to pneumococcal meningitis.

HYPOPHYSIS CASES.

In 40 cases of hypophysis tumour the symptoms were sufficiently marked to warrant the operation described by Cushing—removal of the floor of the sella turcica, by an approach through the nose and sphenoid sinus, and incision of the dural covering of the gland, in order to relieve pressure. Hexamethylentetramine from 40 to 60 grains were given as a prophylactic measure during the 24 hours preceding the operation, and even larger amounts for several days after the operation. In 31 cases there were no post-operative complications; in 9 cases cerebro-spinal fluid escaped through the nose for several days after the operation, with elevation of temperature, headache, slight stiffness of the neck and other symptoms suggesting a meningeal infection. Three of these patients

succumbed to meningitis; the other six cases, however, recovered. The necropsies in the fatal cases showed that the operation had been misdirected and the cranial cavity entered anterior to the chiasm, directly inoculating the cortex with organisms from the mouth and nose.

CEREBRO-SPINAL FISTULAE.

The constant discharge of cerebro-spinal fluid into the nasal cavity, or middle ear, is not an infrequent complication of a cranial fracture, and usually leads to fatal meningitis. Also, after operations for the relief of increased intracranial pressure, the fluid may find its way out, even through the most carefully closed wound, and form a fistula, which is a great source of danger and is often extremely difficult to remedy. Frequent renewal of dressing is necessary, and though every precaution may be taken, the cerebro-spinal space ultimately becomes infected.

In such conditions hexamethylentetramine has proved a protection against meningeal infection. In one case a fistula developed after an operation for a cerebellar tumour. There were pyrexia, rigidity of the neck and many pus cells and bacteria of various kinds in the escaping fluid. Yet as soon as the drug was given the patient began to improve and ultimately completely recovered. In 6 subsequent similar cases all the patients escaped fatal meningeal infection.

As a specimen of the spinal fluid can be collected for chemical and bacteriological tests, the size and frequency of the dose necessary to render this fluid an unsuitable culture medium can be determined. The drug was given in small doses at intervals of 30 to 60 minutes instead of the larger doses at intervals of 4 or 6 hours usually recommended. In this way the drug was well diluted and toxic symptoms were less likely to be produced. When given at frequent intervals the drug is constantly present in the cerebro-spinal fluid, and the concentration at all times is sufficient to inhibit the growth of organisms.

POLIOMYELITIS.

Observations on the transmission of poliomyelitis to monkeys have demonstrated that leptomeningitis precedes involvement of the central nervous system proper. This suggests that hexamethylentetramine may be of value. Flexner and Clark found that the virus of poliomyelitis is injected intracerebrally into monkeys, when hexamethylentetramine is already present in the spinal fluid, and the drug is then administered by mouth daily, the incubation period of the disease is prolonged (from 6 to 8 to 24 days), and paralysis is prevented. These experiments indicate that protection may be afforded during the prevalence of an epidemic by the

administration of the drug and that paralysis may be prevented during the earliest stages of the disease. For two years the Massachusetts State Board of Health has recommended that the drug be given, both as a therapeutic and as a prophylactic measure, during an epidemic. Numerous cases have been reported in which recovery without paralysis was ascribed to the treatment.

EAR INFECTIONS.

Barton, in 1910, experimentally demonstrated that hexamethylenetetramine is excreted by the mucous membrane of the middle ear. In 7 cases of suppurative otitis media he found that administration of this drug was promptly followed by disappearance of the infecting organisms and cessation of the discharge. In a long series of scarlet-fever cases in which the drug was given as a prophylactic measure, absence of middle ear infections was notable. The drug should, therefore, be given as a prophylactic measure in every case in which middle ear infection is possible or threatened.

NOSE INFECTIONS.

Barton, Brown and others, in 1910, called attention to the fact that hexamethylenetetramine is also eliminated by the mucous membrane of the nasal sinuses. They found it of value in the treatment of acute and chronic sinus infections. Dr. Brown himself had chronic suppuration of the right antrum for many years. Within 48 hours after he began taking hexamethylenetetramine there was marked improvement, and 6 days later the discharge had practically ceased.

RESPIRATORY INFECTIONS.

Armstrong and Goodman found that hexamethylenetetramine is eliminated by diseased bronchial or pulmonary tissue. In 12 cases in which it was given, including pulmonary tuberculosis, pneumonia, bronchitis and asthma, the sputum was found to contain formaldehyde. Vanderhoof has recently reported a series of cases of bronchitis in which the drug apparently was of decided value. Numerous publications have appeared during the past two years recommending large doses in the treatment of ordinary colds, tonsillitis and other nose and throat infections. The writer's experience is that the drug is often of great value in aborting an acute coryza, provided it be given in large doses and during the earlier stages.

EYE INFECTIONS.

Gradle, in 1911, and more recently Ziegler and others have found that hexamethylenetetramine is excreted into the anterior chamber of the eye, and is of value in various ophthalmic infections.

MENINGITIS.

Stockmeyer, in 1911, reported two cases of epidemic cerebro-spinal meningitis, which are of exceptional interest in this connection. The onset occurred practically simultaneously and the meningococcus was demonstrated in smears and cultures. In one case large doses of hexamethylenetetramine were given as soon as the disease was diagnosed; in the other none was given, but otherwise the treatment was identical. When first seen both patients were unconscious, temperature 39.8° and 40.4° C., with Cheyne-Stokes respiration and retraction of the neck. The patient receiving hexamethylenetetramine immediately improved; the other steadily grew worse and succumbed on the fifth day. Owing to the appearance of a few red blood cells in the urine, the drug was discontinued, with an immediate return of coma, rigidity and irregular respiration. Large doses were again administered at 2-hour intervals, and again the improvement immediately began. Six weeks after the onset of the disease the patient had recovered except for "a slight weakness of the feet."

The writer has had similar experiences in the treatment of experimental meningitis in animals, and in 2 cases of meningeal infection. It is well known that chronic infections of the bladder or kidneys may temporarily subside under hexamethylenetetramine, but tend to reappear as soon as the drug is withdrawn.

Hald, in 1911, made a series of estimations to determine the concentration of hexamethylenetetramine in the cerebro-spinal fluid and blood-serum. In the fluid removed by lumbar puncture from 43 minutes to 1 hour after giving the usual dose (1 gram to adults, 0.5 gram to children) this varied from 1 in 16,000 to 1 in 20,000. The concentration in the blood-serum was from 2 to 4 times greater than this.

Fiaschi, in 1908, made the interesting observation that if hexamethylenetetramine is given by mouth formaldehyde may soon afterwards be demonstrated in the fluid contents of hydatid cysts. No mention is made of the effect of the drug on the parasite.

Riddle found that when hexamethylenetetramine is given to laying hens, it passes through the follicular and vitelline membranes and is deposited in the egg, where it undergoes decomposition, liberating free formaldehyde. Such eggs remain fresh and palatable for a much longer period than do control eggs.

TOXIC SYMPTOMS.

Although hexamethylenetetramine has been in common use for 15 years, few cases of serious toxic symptoms have been reported. In 1894,

Nicolaier called attention to the fact that some persons are susceptible to the drug; even small amounts (5 to 7½ grains) cause painful micturition and hæmaturia. In the experimental production of hæmaturia, however, he found it necessary to give as much as 230 grains a day, for several days, to a dog weighing 20 kilos. After the subsidence of the acute symptoms, microscopic examination of the kidneys failed to show any evidence of permanent damage. He has also given patients with acute infections of the genito-urinary tract as much as 150 grains at a single dose without ill effect.

In Dr. Crowe's experience toxic symptoms seldom resulted from administration of large doses of hexamethylenetetramine, although he has repeatedly given from 200 to 300 grains daily for 4 or 5 days. Even in children, doses of 100 or 125 grains a day produced no irritative symptoms, provided the drug was given sufficiently diluted. He has abandoned giving it in doses of 10 or 15 grains at stated intervals, since it is often difficult to induce the patient to take, at one time, the 250 or 300 c.c. of water in which this amount should be dissolved. If the patient is very ill, the drug is usually administered per rectum, from 50 to 100 grains being dissolved in a litre of salt solution and allowed to slowly flow into the bowel. In no case has there been evidence of undue irritation of the intestinal mucosa, and as a rule the salt solutions are well absorbed, even after 1 or 2 weeks of almost continuous administration. If the patient is able to take nourishment by mouth, from 2 to 3 grains of hexamethylenetetramine are added to every ounce of liquid. As the drug is practically tasteless, it is often possible, in this way, to give from 60 to 100 grains a day without the patient's knowledge and without producing gastric or renal irritation. Of 95 cases in which the average dose was 75 grains a day for 30 days, painful micturition and hæmaturia occurred in 7. In 2 there was fatal meningeal infections of otitic origin; the patients were desperately ill, and the drug was given in unusually large amounts to check the infection. The necropsy showed that the hæmaturia originated in the mucous membrane of the bladder and was not due to renal irritation.—*The Medical Review*.

BACTERIOLOGY.

The Occurrence of the Colon Bacillus in the Blood.

P. N. Panton, M. B., B.C., M.R.C.S., L.R.C.P., and H. L. Tidy, M.R.C.P.—While infections of the body tissues by the bacillus coli are common, and while there is reason to believe that spread of infection in no inconsiderable number of cases takes place by way of the blood stream,

it is remarkable how rarely direct proof of blood infection can be obtained during life. Blood cultures made from persons suffering from undoubted coli infections are almost invariably sterile. During the last nine months the writers obtained from the blood a pure growth of the colon bacillus in three cases. In two the blood was withdrawn at the commencement of a rigor. In the third case it was obtained 3½ hours after a rigor. In subsequent cases of similar infections blood taken a few hours after a rigor proved sterile.

CASE 1.—A man, aged 28, was admitted to the London Hospital. Four weeks previously he was seized with acute abdominal pain and vomiting. The pain had been present at intervals since the onset. On admission his general condition and aspect suggested the third or fourth week of typhoid fever. There were indefinite signs of fluid at the base of the right lung. The Widal reaction was negative and the blood count was that of acute inflammation. A blood culture was sterile. The temperature was high and intermittent with 5 rigors later in the disease. A second blood culture was made a fortnight later during the early part of a rigor; 10 c.c. of blood were taken and divided among four broth tubes. Three tubes remained sterile. The fourth tube yielded a growth of the bacillus coli. The patient died 12 days later, and post mortem were found a purulent appendix, peritonitis, a subphrenic abscess, pyelphlebitis, and a large abscess in the liver.

CASE 2.—A man, aged 55, was admitted with a history of difficult micturition for 18 months. He was suffering from acute retention of urine and an enlarged prostate. The bladder was washed out and a rigor occurred during the process. Subsequently suprapubic cystotomy had to be performed for secondary hæmorrhage, and blood and pus were present in the urine throughout. About seven weeks later 6 c.c. of blood were withdrawn from a vein 3½ hours after a rigor and divided among four broth tubes. Three tubes yielded a growth of the bacillus coli. The patient died three weeks later from sepsis and a secondary hæmorrhage, which post mortem was found to have been due to ulceration into the deep epigastric artery.

CASE 3.—A married woman, aged 40, was admitted. She had been confined 5 weeks previously, and had been quite well until the eleventh day, when she got up, but had a shivering fit and returned to bed. She had been in bed since and had had several shivering attacks. On admission she looked extremely ill, and was found to be suffering from a high intermittent temperature with occasional rigors. There was no abnormal vaginal discharge and the pelvic organs were healthy. Five

c.c. of blood were obtained during a rigor and divided among four broth tubes. All yielded a profuse growth of a colon bacillus. A catheter specimen of urine contained pus and gave a pure culture of a colon bacillus.

These cases afford direct evidence that the bacilli are spread by the blood stream. They suggest a relation between a rigor and their entry into the blood in considerable numbers.—*The Medical Review*.

The Treatment of Puerperal Septicæmia by Bacterial Vaccines.

WESTERN comes to the following conclusions based on a hundred cases of puerperal septic disease fifty-six of which were treated by vaccines:—1. The mortality amongst those cases of puerperal septicaemia in which there is definite bacteriological evidence of bacteria in the blood-stream is from 85 to 95 per cent. 2. This mortality may by inoculation with autogenous vaccines be reduced to about 55 per cent. 3. The mortality amongst notified cases of puerperal fever is about 60 per cent. 4. This mortality may by inoculation with appropriate vaccines be reduced to about 33 per cent. 5. In cases of puerperal sepsis, if it is decided to explore the uterine cavity the opportunity of obtaining a culture at the same time should not be lost. 6. In the treatment of puerperal sepsis "stock" vaccines give inferior results and should only be used when an autogenous vaccine cannot be obtained.—*The Australasian Medical Gazette*.

OTOLOGY.

A Case of Severe Vertigo-Operation—Destruction of the Labyrinth—Cure.

In the *Lancet*, February 17th, 1912, p. 428 is an account, by DR. MACLEOD YEARSLEY, of the above case. The patient had a discharge from the right ear of 18 months' duration when 18 years old. Then followed vertigo for a period of 11 years, followed by vomiting. Both these symptoms grew worse and worse until she was unable to do her work as a cook. The radical mastoid operation was done. The external semicircular canal opened, and followed up to the vestibule, which was curetted, and the stapes removed from the aural window. Eighteen months later her condition was as follows: Slight occasional giddiness, never vomiting. No tinnitus and general health excellent. There was

slight tendency to lean to the right on walking. A curious state, also noticed by the author in another case of destruction of the labyrinth, existed, in which the patient would lose control of herself in the dark, and was "not able to imagine a clear space in front" of her. The author has not found this condition (or loss of function) present in congenital deaf mutes, who had no vestibular function, and Yearsley suggests that this latter defect is compensated for by a development of the muscular sense, which in his two adult cases had not yet had time to occur.—*The Australasian Medical Gazette*.

TOXICOLOGY.

Potassium Chlorate Poisoning.

HUBER.—Blood poisons act in various ways: some dissolve the red cells without altering their stroma; examples are hydrocyanic acid and the serum of animals of a different species; others produce morphological changes such as basophile granules; others alter the properties of hæmoglobin by the production of methæmoglobin so that it becomes physiologically inert. Chlorate of potassium and carbonic oxide are typical examples of this last group.

A man swallowed a teaspoonful of KClO_3 and also respired illuminating gas. When seen 2 hours later there were slight impairment of consciousness and vomiting of bile. After irrigation of the stomach and the administration of oxygen he appeared to recover. But 12 hours later there were extreme dyspnoea and cyanosis. He was treated with intravenous injections of normal saline solution, hypodermic injections of camphor, and venesection. Next morning he had a greyish-black appearance, and soon afterwards he died. No urine was obtainable but the blood serum contained hæmoglobin.

The effect of the poisons continued after death. On the following day the blood was of a dark brown colour and for the first time gave the typical spectrum of methæmoglobin. The red corpuscles were pale with glistening highly refractile bodies. They at first gave the staining reactions of hæmoglobin but later stained readily with basophile dyes. The number of these basophile erythrocytes increased during 5 or 6 days post mortem. There was also marked leucocytosis, especially of polynuclear leucocytes. The methæmoglobin appeared to be derived from hæmoglobin after its escape from the cells and not to be formed in the erythrocytes themselves.—*The Medical Review*.

Fatal Nicotine Poisoning.

H. BURNROOTH.—A woman in Helsingfors was advised by a midwife to give her six-year-old daughter an enema of tobacco to expel worms. An infusion was made from 4 to 5 grammes of green tobacco leaf in about one litre of water. Soon after the injection of half a litre the child became very restless, a cold sweat broke out, and within half an hour of the injection she died. The necropsy showed that the child was well nourished, and that no status thymico-lymphaticus existed. The bronchial glands were enlarged and caseous. The capsules of the kidneys were stripped readily, but the surfaces of the kidneys on section showed slight inflammatory changes, and the mucous membrane of the renal pelves was somewhat injected with blood. The mucous membrane of the stomach was grey and swollen and showed some punctate hæmorrhages. The upper portion of the small intestine contained yellowish-grey mucous fluid, and the lower portion loose, greyish-brown fæces. About 150 c.c. of fæces were found in the large intestine. Throughout the intestine, particularly in the lower portion of the small and the upper portion of the large, the mucous membrane was swollen and congested. A quantity of small, brown particles suspended in the intestinal contents were found under the microscope to consist of tobacco leaf. Analysis of the contents of the large intestine showed nicotine.

Considering the great toxicity of nicotine which is easily extracted both from the green and the prepared tobacco leaf, it is surprising that serious cases of nicotine poisoning are so rare. One cigar may contain sufficient nicotine to kill an adult, but ignorance of toxicity of the nicotine probably accounts for the paucity of murders and suicides traceable to it. Yet there are some interesting records of the use, both of pure nicotine and of tobacco, for these purposes. The best known is the trial of Count Bocarmé, who in 1850 was convicted of poisoning his brother-in-law. This case is further notable as being the first in which a medico-legal analysis of a dead body revealed the presence of a vegetable poison.

The toxic effects of nicotine may be produced in several ways. Smugglers who have secreted tobacco between their clothes and their skin have suffered severely. A convict who attempted to smuggle tobacco into his cell by hiding it in his rectum developed serious symptoms of nicotine poisoning. Several cases of nicotine poisoning in tobacco curing houses have been recorded. Many deaths occurred when infusions of tobacco were given by the mouth or rectum for such objects as

the induction of abortion, the expulsion of worms, and the cure of intestinal obstruction and incarcerated hernia. The application of wet compresses containing tobacco leaves to cutaneous eruptions has also been followed by disasters.

Nicotine acts both on the central and the peripheral nervous system, causing spasm followed by paralysis of striated and smooth muscle fibres as well as of the muscles of the heart. Only 0.003 gramme is sufficient to cause severe symptoms, while 0.006 may be lethal.

As the green tobacco leaf contains 0.5 to 1 per cent. of nicotine, and the dried leaf twice as much, and as tobacco ready for smoking contains 1 to 3 per cent., it is clear that most homes contain large quantities of the poison. A characteristic feature of nicotine poisoning, when the drug is given by the rectum, is its rapid action. Cases of suicide have been recorded in which the rectal injection of nicotine caused death in 2 to 5 minutes. In the writer's case it is impossible to say how much nicotine was absorbed. Probably a large amount remained in the leaves, the bulk of which was not included in the enema. The post-mortem changes due to nicotine poisoning appear to vary in different cases. Some observers have detected an odour of tobacco when the body was opened.—*The Medical Review*.

DRUG REVIEW.**'Enule Epinine' Suppositories.**

An 'Enule' suppository containing 1/6th grain of 'Epinine' has been added to their list by Messrs. Burroughs Wellcome & Co.

The use of this synthetic hæmostatic, which resembles in its action the active principle of supra-renal gland, has been suggested as a suitable procedure, pending operative interference, in cases of hæmorrhoids, cancer of the rectum accompanied by hæmorrhage, and similar conditions.

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Like all 'Enule' Suppositories this product is of a special shape with a bulbous end which renders its administration and retention *in situ* easy and certain.

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THE ANTISEPTIC.

MAY, 1913.

Therapeutic Progress for 1912.



THE most important therapeutic advance in the year 1912 has been the introduction of Neo-salvarsan. Many of the difficulties associated with the administration of salvarsan have been removed by the introduction of a soluble salvarsan compound, which forms neutral solutions. Neo-salvarsan is a condensation of acid sodium formaldehyde sulphonylate with salvarsan which seems to possess the therapeutic activity of salvarsan, while certain advantages are gained, such as solubility in water, with the formation of a neutral solution. In preparing this soluble salt, Ehrlich has taken advantage of the fact that by condensation of acid sodium formaldehyde sulphonylate with benzene compounds, soluble products are in many cases obtained. It occurs as a yellowish powder, rather coarser than salvarsan. The preparation oxidizes rapidly, forming toxic products. Oxidation takes place more rapidly if the solution is heated; therefore in the preparation of solutions of neo-salvarsan for injection, distilled water is used at not much more than room temperature. To prevent any "water-error" risk, the water should be freshly distilled, sterilized, and then allowed to cool. It is essential that the solution of the drug should be prepared immediately before use. Owing to the presence of the sulphonylate group, the new preparation contains less salvarsan than the old form; consequently the dose is rather larger. About 9 gram of neo-salvarsan is equivalent to 6 gram. salvarsan. If 20 c.c. of water are used for each 0.15 gram. of the drug, a slightly hypotonic solution is formed, which can be injected intravenously. It is inadvisable to dissolve the drug in saline solution, as it is apt to become turbid or form precipitates. The advantages of neo-salvarsan are (1) ready solubility; (2) neutral reaction; (3) avoidance of the use of saline solution and neutralization; and (4) a smaller volume to be injected.

The experiments of McIntosh, Fildes and Parker show that neo-salvarsan in watery solution acts much more powerfully on

trypanosomes than alkaline solutions of salvarsan. It was also found that although the new preparation had less tendency than salvarsan to produce headache, gastro-intestinal irritation and rigors, its use was more frequently followed by medicinal rashes, which in some cases were accompanied by severe toxic symptoms. Neosalvarsan has not prevented the occurrence of fever after the first injection; but the temperature rises somewhat slowly. The febrile reaction is at its height about six hours after the injection, and has almost invariably passed off by the next day. It is therefore suggested that this febrile reaction is due to the liberation of endotoxins from killed spirochaetes. Usually fever was noted only with the first and not with the succeeding injections. All observers agree that neo-salvarsan is more likely to produce a toxic rash than salvarsan. Ehrlich holds that the intramuscular application of salvarsan gives a more powerful therapeutic action than intravenous administration. Owing to the difficulty of overcoming the pain and the local toxic action salvarsan cannot easily be given intramuscularly. Neo-salvarsan forms with water a neutral solution, which, though it causes less pain, can be administered intramuscularly. It has less tendency to produce local tissue necrosis than salvarsan and is more rapidly absorbed, but Schreiber and others who have used both intravenous and intramuscular injections, have practically abandoned the latter for the former. Rytin states that intramuscular injections are invariably followed by pain which ordinarily lasts several hours. The more dilute the solution, the greater the pain. Wolbarst, after many experiments, finds that by suspending the drug in glycerin and then dissolving this suspension in a few drops of 1 per cent. B-eucaine solution, the intramuscular injection is painless except for a slight stiffness lasting for a few hours. He suspends 0.9 gram neosalvarsan in 4 c.c. glycerin, in a mortar, and then adds a few drops of 1 percent B-eucaine solution in distilled water till an almost clear watery solution is obtained. This is divided into four portions and injected in four places.

The next in importance to 'Neo-salvarsan,' is Pituitrin, which is likely to prove of real use in obstetric practice. It is universally agreed that in later stages of labour, it exerts a powerful effect in producing strong uterine contractions, and is already hailed by many obstetricians as a sovereign remedy for secondary inertia of the uterus. It does not seem to be of much use to attempt to bring on labour; but when labour has commenced Pituitrin injections (1 c.c.) usually act well. The action of the drug begins to disappear after about an hour; but can usually be re-established by second injection. The nearer

the rupture of the membrane, the greater the effect of Pituitrin. It is chiefly in the second stage of expulsion that the action is best seen. Pituitrin does not produce uterine contractions except when parturition has commenced. So, it is of no use in the treatment of abortion. It is also inferior to ergot in controlling post-partum hæmorrhage.

Of the drugs introduced during the past year, the most promising seems to be Luminal, phenyle thylbarbituric acid, which has a powerful hypnotic and sedative action. It can be given by the mouth, subcutaneously, or as an enema or suppository. Lœwe states that it acts as a sedative and hypnotic in all forms of excitement of mental cases, and in the sleeplessness of degenerates and neurasthenics. It has a favourable action in some forms of bodily pain. Sleep of normal length is induced by doses of 0.2 to 0.4 gram in non-excited patients, and in excited mental cases 0.6 to 0.8 gram. at any rate at first, are certain in action. Side actions are seen only after prolonged use and correspond to those seen after Veronal, *e.g.*, confusion, slight intoxication, lowering of blood pressure. Occasionally skin rashes appear. Contrasted with veronal, 0.2 to 0.3 gram are as active as 0.5 gram veronal. In combination with small doses of morphia, Luminal can be used instead of hyoscine except when an immediate action is desired. Luminal is no anodyne and is not indicated when there is coughing, asthma, frequent desire to micturate, sweating or in the lancinating pain of tabes. It is a very satisfactory hypnotic in arterio-sclerosis and advanced age. In small doses the action begins to show itself in fifteen minutes and gradually increases, so that sleep comes on in about an hour. It acts as a good sedative in cases of comparatively slight excitement only. If the excitement is marked, its action as a sedative is uncertain when given alone, but if combined with a subcutaneous injection of hyoscine it proves very potent. The drug does not seem to lose its action even if frequently administered.

The other drugs which have advanced in therapeutic value are the following :

Agar, owing to its property of retaining fluid and so increasing the bulk of and softening feces, makes it valuable in constipation. *Alcohol* has been found the best antiseptic for the hand of the surgeon. To obtain a good disinfection of the hands it is necessary to scrub them with sterile gauze impregnated with alcohol for six to ten times. *Berberine* given in small doses for a prolonged period has the property of inducing contraction of relaxed connective tissue and so is useful in malarial

enlarged spleen; and also in gastropexy, displaced kidney, prolapsed uterus and dilatation of the stomach and bowels, along with mechanical support. *Camphor* dissolved in oil is very valuable in the treatment of pneumonia. Hypodermic injection of 10 cc. of a 30 per cent solution of camphor in sesame oil every 8 to 12 hours is said to produce very good results. *Oxygen* may be injected subcutaneously into the connective tissue to relieve cyanosis, in cases where it is impossible to administer the gas by inhalation. *Thymus gland*. An interesting case of improvement following administration of thymus gland, gr. 15 thrice daily, to a boy suffering from arrested sexual development and deficient growth is reported. The patient, aged sixteen and a quarter years, had made no perceptible growth for two years. His genitals were small and undeveloped, the testicles resting in the canal. There was no pubic or axillary hair. During the first six months of thymus treatment the genital organs perceptibly enlarged, and after nine months the first erection occurred. In twelve months hair appeared in the axilla and on the pubis. He had grown one inch, and had gained eleven pounds in weight. During the next six months he grew another two inches and gained another eight pounds, and the sexual organs became apparently normal. *Urethane* is a certain and safe hypnotic for young children. It is useful in whooping cough, and enables the child to get an hour or two of undisturbed sleep. It is especially valuable in overcoming the spasmodic attacks which sometimes persist for months after the disease has run its course. It is also of great value in quieting convulsions and spasmodic conditions arising from toxic causes.

CORRESPONDENCE.

THE MEDICAL REGISTRATION BILL.

SIR,

It seems that many vague ideas are being held by many people with regard to the science and art of medicine. In the *Hindu* of the 10th ultimo in a letter signed by Mr. H. Subba Rao, on the Medical Registration Bill, I find that he has manufactured many imaginary difficulties. The word quack is misapplied. A quack is not one who does not know the properties of the medicines which he uses but is one who has no knowledge of the constitution and condition of the man upon whom he experiments his medicine. The man who has taken a degree or diploma or even to some extent men who have taken a course in the Medical College in all the subjects, must certainly be considered to know the constitution better as they have undergone a course of anatomy, physiology and pathology. If, as Mr. Subba Rao points out,

great men like Prof. Evans, Prof. Gregory and Mr. Richmond Douglas Powell were to say that they have not yet learned much in medicine, does it mean, therefore, that those who do not know anything about the constitution of the man should be encouraged to administer poisonous medicines ignorantly till it ultimately ends in the death of the man? I have had to take up several cases in which the men had been poisoned by some mercurial salts and I had to refuse to treat them because they had almost come to the dying point when they applied to me. Several of the deaths that occur among the natives are due to their entrusting themselves to the treatment of people who do not know the human constitution. The writer refers to some diplomaed people using medicines prepared in a German Laboratory, whose formulae are not known. Such cases must be very rare. If any man who has taken a degree is not able to do all that is wanted and all that can be done with the pharmaceutical preparations or with the patent medicines whose formulae are known but tries to use medicines whose formulae are not known without experimenting those medicines upon himself, then he must certainly be said to abuse his profession.

The correspondent says that he knows many allopathic quacks who are all marked with medical degrees, give reckless prescriptions a single dose of which will be enough to upset the poor patient. We want to know with what authority the correspondent is enabled to say that the prescription of a degreed man was reckless and that a single dose of it will be enough to upset the poor patient. He further prides in the statements of Prof. Evans, Prof. Gregory and Mr. Richmond Douglas Powell. No man can misunderstand these statements worse than the correspondent. Supposing we say that considering the possibilities of the infinite inventions that are likely to be made in the future, that our present Telegraphs, Telephones, Aeroplanes, Zeppe lines, Steam Engines and all inventions that are at present invented are nothing, it does not mean actually nothing, it means only that the field in the future is much more infinite. It is only the modesty of the scientific man expressed in an exaggerated form. If such great men were to express the present advancement of the science in such a way, it must not be taken advantage of to defend the position of a quack and to say all are quacks in some degree. So it must not be stated that all are quacks. Every man knows that there is a difference in degree of knowledge. No science or art can be perfect at any time of the creation so long as the progress of creation consists in Evolution. The science of law is not perfect. We see that many applications of

the law are being changed from time to time so as to suit the advanced condition of the society. The decisions of judges are taken to be law and they in many instances set aside the existing law. Because there is the possibility of such an expansion in law, are we to say, that the present lawyers are all quacks because the Judge differs from them in judgment and decision and therefore they are in no way superior to our vakil gumastahs and ordinary petition writers? So it is plain that we ought not to extend our vagaries in any manner we like and see first of all whether what we say has got good sense.

The word quack generally means any man who supposes to know something which he does not really know. In medicine we have to define it as "a quack is one, who has no knowledge of the human constitution with regard to its structure and function."

So with regard to the medical registration, where the Bill says "A man can be permitted to practise any system of medicine only if he gets a diploma from any recognised institution." I am inclined to add a meaning to the words 'Recognised Institutions' so that it may not be misunderstood. A recognised institution in this Bill means any Medical College or School in which an advanced course of Physiology, Anatomy, Pathology and Bacteriology will be taught and in which there will be a body of at least five examiners, to whom another set of five examiners will be added in the final examinations from other similar recognised institutions. To the five riddles suggested by the correspondent in the *Hindu* of the 10th ultimo, I have to give an emphatic negative reply to the first four and to the fifth my answer is in the affirmative, provided a man obtains a medical diploma from any of the chartered colleges of any of the States of America, Germany or France, if completing a practical course and passing a practical examination is necessary for gaining such a diploma.

It is the duty of the State to protect all men who are dying under the hands of ignorant physicians who administer poisonous drugs at random. So in addition to the medical registration, it is incumbent on the State to exercise a good control upon the sale of all poisons, especially compounds of mercury, arsenic, opium, etc. It is not with regard to the giving medicines alone by native physicians that we have to urgently bring out the Medical Registration Bill, but, on the other hand, good many people, who have been ward-boys, attenders and peons in hospitals and dispensaries, or compounders under private practitioners or medical shops, are all professing to know medicine and surgery and impose upon the lay public. The ordinary mass takes any druggist or a

chemist for a physician and he is taken to treat cases, and if he does not know to diagnose the disease he learns at least to administer opium or morphia so as to produce an absence of the pain temporarily and the present innumerable votaries to the shrine of morphia have been generated by the ignorance and sometimes willful introduction on the part of the various druggists.

There must be a penal clause attached to the Bill, that he who is the cause of the death of a man by administering any poisonous medicine will be liable to . . . the proof of which will be from the evidence of the allopathic doctor who treats the patient lastly and who can find out such a case.

There is too much to be said about this subject but I will close it for the present as the article is sufficiently long.

R. C. K.

The Summer Enteritis of Children.

SIR,

In a recent issue of *The Antiseptic* I saw a learned article concerning the ravaging gastro-enteritis of children occurring in the summer months. In connection with this subject I wish to publish some of my own experiences.

The group of symptoms described is exactly similar to those cases which came under my notice, especially during the last few weeks. The disease is most common in babies below one year and begins with diarrhoea, refusal to take nourishment, sudden and frequent squalls, probably owing to colic, and a rise of temperature, which is most perceptible to the hand on the abdomen. Within twenty four hours, the motions become greenish-black in colour, and more frequent. A day later the mixture becomes white in colour and some mucus comes out with every motion—the frequency remaining the same. About this time a vomiting without nausea sets in immediately after the ingestion of food. The rapid thinning of the child, which is noticeable from the beginning and which is apparently disproportionate to the duration of the disease, is well pronounced. As the hours pass the child gets weaker and weaker, and within four days from the onset, sinks into a comatose condition, which in a few hours leads to death.

The rapid progress, the rise of temperature and the disproportionate wasting are very suggestive of the bacterial element in the causa-

tion of the disease. Of predisposing causes, weaning and long railway journeys are most common.

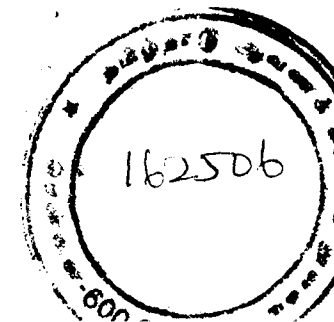
In the article above referred to it is recommended to put the patient on "boiled water diet" alone, for at least twenty-four hours, in order to starve out the bacteria. I do not know how this advice is followed elsewhere. But in my experience, such a suggestion frightens the parent and tends to drive him to another practitioner, most often to the quack with his croton oil panacea. Horlick's milk food made as watery as possible in front of the physician will appease the parent's fears and answer our purposes also.

In my experience the onset of the vomiting is the dangerous sign in the disease. Every case that came for treatment before this stage or while this stage was just commencing recovered within a day, while of four cases which came with the persistent vomiting two died.

The line of treatment that I followed was: First to give the child—in many cases under one year— $\frac{1}{2}$ drachm doses of Mag. Sulph. (which gently stimulates the liver also), every hour, until the bowels are clear and the motions healthy in colour. This hopeful sign usually occurred within twelve hours. After this the children were given Bismuth Salicylate, Salol and Calomel, mixed in honey, thrice a day for about two days. The diet consisted of very watery Horlick's food and simple boiled water—to replace the water lost and to dilute the toxins. Under this treatment every case out of about a dozen—among which my own child was one—recovered, chiefly because, I think, owing to their being taken in hand early, that is before the onset of the obstinate vomiting.

I may add that I have also seen two adults having the same group of symptoms who recovered under much the same treatment. I have no doubt that a rational and effective line of treatment based on the isolation and identification of the particular micro-organism will do much to decrease the infant mortality of summer months.

T. V. SWAMINATHA SASTRY, L. M. S.



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Original Articles.

* ACUTE OSTEO-MYELITIS IN CHILDREN.

BY

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HIS disease, though not of very great frequency, is yet of sufficiently common occurrence to justify careful study. There are many points of interest in connection with it, and an examination of some of these will repay the trouble expended.

Ætiology.—PREDISPOSING CAUSES.—The age of those affected is generally from seven to seventeen, though cases occur in quite early childhood. It is more frequently found in boys than in girls, especially after the age of ten. A very large percentage—something like two-thirds of the cases—give a history of injury, and that this is really a predisposing cause is borne out by the relative sex incidence at different ages. In very young children both sexes are equally liable to injury, and the cases are about equally divided between them. As the children grow older, boys become more exposed to accident and the male sex is far more frequently affected. The incidence of the disease in the two limbs also bears out the theory of traumatism as a predisposing cause, for in infancy when the child crawls about and exposes all its limbs more or less equally to injury, the disease attacks the upper and lower extremities in about equal proportion. In later life it is the lower extremities which are much more open to blows and falls, and then the chief incidence of the disease is in these limbs. The essential cause is

* Specially contributed to *The Antiseptic*.

a pyogenic micro-organism, a Staphylococcus in about 80 %, sometimes a Streptococcus or a Diplococcus. The variety of Staphylococcus varies. It may be Aureus (much the most common), Albus or Citreus. This is important from the point of view of vaccine treatment. The organisms are carried to the bone by means of the circulation, the source being most frequently from a septic cutaneous sore such as a boil, a whitlow or a septic burn. Other modes of entry are from the tonsils or an infected intestinal mucous membrane.

Symptoms.—The onset of the disease is sudden, with a considerable rise of temperature, even up to 105° , with its accompaniments of headache, loss of appetite and thirst. There is great pain and tenderness in the bone affected. This is most commonly the lower end of the femur, the upper end of the tibia, the lower end of the radius or the upper end of the humerus. Other bones such as the os calcis, the ilium, the scapula or the phalanges are occasionally attacked. If the bone be superficial, there is swelling over it, the skin becomes red and cedematous, and fluctuation can be obtained. On incising, pus escapes and the bone is felt to be bare, or the periosteum is readily detached. If the bone is deep-seated or the main disease is in the medulla, the local symptoms are at first not so marked, except the pain which is usually severe. The joint in the neighbourhood may be complicated with fluid, not necessarily pus. The affection may be complicated with septicaemia, pyaemia, ulcerative endocarditis, pericarditis or pleurisy. If the patient escapes these dangers, the bone necroses and the sequestrum must be removed before healing can occur.

Diagnosis.—The presence of a painful, fluctuating, inflammatory swelling near a joint may indicate a suppurating osteo-myelitis. If there have been delirium and rigors, and the patient is very ill, or if there is fluid in the joint adjoining, it is almost certain the condition is present. But in their absence the swelling may be due to cellulitis or it may be a simple abscess. The diagnosis can then only be made with certainty by incising the swelling. If osteo-myelitis is present, bare bone will be felt.

If the local symptoms due to an inflammatory swelling near a joint are absent, as they sometimes are, the diagnosis may be difficult. It is easily mistaken for the onset of one of the acute specific fevers, and it is always well to remember that one of the causes of pyrexia in children is acute epiphysitis, and to carefully examine the limbs accordingly. I have seen the femur bathed in pus only discovered post-mortem.

Acute rheumatism is sometimes diagnosed, but here it is definitely the joint itself that is attacked, not the lower end of a bone, and the swelling and pain fly about from joint to joint and are not located in one place, as they usually are in epiphysitis. Generally a scrutiny of the history, together with a very careful examination of the patient, will enable a correct diagnosis to be made.

Prognosis.—This is always grave. The patient is bound to have a long illness of many months' duration, and after recovery there is a good deal of deformity with lessened growth of the limb, the amount depending on the age of the child, and the particular bone affected. The mortality of all cases is about 35 per cent. of those attacked, pyaemia being the chief cause of death. The younger the child, the greater the danger. The death rate in children under one year is 70 %; of those over 10, 30 %.

Treatment.—The swelling should be at once freely incised down to the bone, and in all cases the compact tissue should be removed freely, and in sufficient amount to well expose the medulla. This may be done either by chiseling away the bone, or by making two or more trephine holes in it and then, if necessary, joining the openings thus made. If the medulla is not obviously affected it is better to leave it, but if diseased, the medullary cavity should be well painted with pure carbolic acid, drainage tubes put in, and iodoform gauze packed between the edges of the skin incision to keep the superficial portion of the wound open. The gauze should not be packed in tightly or deeply as it will then interfere with adequate drainage. The limb should be fixed on a splint but not kept rigid too long. As soon as the acute stage has passed, the joint should be passively moved to prevent the formation of troublesome adhesions and subsequent stiffness.

If the general condition of the patient is very bad, primary amputation will be the best treatment, but this is not often the case in children, and it is seldom that removal of the limb has to be carried out unless a large joint is at the same time suppurating. Up to the present vaccines have proved of very little, if any, use. If it is found that the periosteum of the whole shaft is separated from the bone, the whole diaphysis will of course necrose. It will be better then, especially if the patient's condition is bad, to perform a primary diaphysectomy rather than the operation of opening up the medulla and scraping the cavity. But if any portion of the periosteum is still adherent to the bone, it should not be peeled off, but small portions of the bone removed by the chisel and hammer and left.

Treatment of complications.—If pyæmia ensues, amputation should be at once performed unless, as occasionally happens, the main vein of the limb is found to be thrombosed. If this can be ligatured and cut off from the circulation, it should be done as it may save the limb. If symptoms do not improve at once, amputation must be immediately carried out.

When the bone inflammation is accompanied by suppuration in the neighbouring joint, amputation is the only treatment likely to be of avail. Even in these cases, symptoms are not always desperate, and then a free opening up of the bone, with incisions into the joint, may be sufficient. If the patient does not quickly improve under this treatment, amputation must be resorted to.

The resulting arrest of development of the limb may be a general shortening, or in addition a deformity of the limb due to the affection of one only of two parallel bones. The procedure here is either to destroy the neighbouring healthy epiphysis, or to resect portions of the unaffected bone. The objection to the former is due to the fact that it is difficult to be sure at first whether the epiphysis of the affected bone is really totally destroyed. It cannot, therefore, be carried out until some years have elapsed and it is obvious that no growth is taking place. The latter procedure—resection of a portion of the unaffected bone—may have to be repeated, if the deformity is reproduced by the continued growth of the healthy epiphysis.

* THE TREATMENT OF ECLAMPSIA.

BY

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MR. CHAIRMAN AND GENTLEMEN :—

The choice of my subject to-day is one on which every medical man, irrespective of his rank or station, can claim to have some experience, and is one liable to be followed by considerable discussion. I am therefore fully alive to the difficulty in handling the subject effectively and efficiently, and the difficulty is enhanced by the fact that there is no unanimous view or opinion as to the procedure to be adopted in these cases, even in hospitals where facilities for treating such cases are available. Different hospitals may adopt different views, and the practice

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of one hospital may not coincide with that of a neighbouring hospital. Under these circumstances we can easily gauge the difficulty that we may experience in the treatment of private cases in their houses. My sole object in reading this paper before this association is to handle the subject from the point of view of treating private cases in their homes where we will be handicapped in various ways to carry out a fairly satisfactory line of treatment.

In considering the subject of the treatment of eclampsia I am not going to discuss here the various ætiological factors that produce eclampsia nor about the theories concerning the same. Modern observation and experience have shown that the affection is due solely to a toxin which is circulating in the maternal blood although the question of the source of the toxin is not quite settled. The treatment of eclampsia is of overwhelming importance both to the practitioner and the patient; it is one which will tax his resources and patience to the utmost, and it should be regarded as an obstetrical emergency.

Every medical man, wherever he may be stationed, is sure to be called upon to attend on cases of eclampsia at any moment, and it is therefore imperative that he should have definite outlines of treatment before him so that he may confront the situation boldly and successfully without any risk to his reputation.

Gentlemen! Before laying before you the lines of treatment to be adopted in private practice, I shall point out various facts in connection with eclampsia which may be of considerable importance, either directly or indirectly, in guiding us towards the adoption of a correct treatment.

It is a well-known fact that eclampsia occurs in primi-paræ invariably, although cases are not infrequent in multi-paræ. Generally it occurs in the second pregnancy in multi-paræ and very rarely in later pregnancies. One peculiar feature is that patients who, so to say, missed the attack in the first pregnancy developed it in the second.

I have had occasion to treat a case of eclampsia in a village called Karungulam where the family history disclosed that the patient's elder sister had a similar complication in her pregnancy. Both these sisters developed eclampsia only in their second pregnancies. This is rather suggestive probably of some remote hereditary influence and I am loath to express anything definite on this point at present, but I fancy that the disease may occur as a complication of pregnancy in certain families and the fact that it is so is not forthcoming for failure to elicit the

family history under the circumstances when nothing but chaos prevails in the house of the patient. I leave this part of the subject thus far, so that better and abler authorities may enlighten us more on this.

I can recognise in some of the eclamptic patients, even long before they develop the fits, an expression which can be characterised as eclamptic facies. I am not in a position to describe it fairly clearly, but I am sure a close observation of the majority of these cases will lead us to conclude that this is so. It is more by seeing such cases that one forms a picture in one's mind as to the nature of eclamptic physiognomy. With the exception of a few, a bloated face with œdematous legs, thick lips and heavy slow speech with complaints of frequent headaches and disturbances of sight and dry skin are enough to suggest to one the latent condition of the eclampsia in the patient. These are more positive and sure signs than the presence of albumin in the urine that eclampsia is threatening. An unway and juvenile practitioner is likely to be misled by the absence of albumin in the urine. I don't attach so much importance to the examination of the urine as to the above signs in pregnancy, for at times we miss it in the urine although it is examined once a week in the later months of pregnancy. The case I referred to in Karungulam belonged to this type in which albumin was not found in the urine a week before she actually developed the fit, but the other signs enumerated as eclamptic physiognomy were prominent. As regards the examination of urine in pregnancy it is very difficult to convince people here of its importance, and further we are seldom called in to treat cases before they actually develop the fits, and even after the development of the fits very few people realise the importance of the presence of a qualified medical man till a very late stage. Ignorance and poverty in a certain class and love of money more than for life in another are held responsible for the delay. Examination of urine, therefore, is mostly out of question here, unlike in better civilized countries, and our reliance should be placed on the signs I have already enumerated, so much so that when any person comes to your dispensary for medicine, pleading that his or her daughter is pregnant for the first or second time and that she complains of a headache, it is your bounden duty to investigate more about the case to detect the latency of eclampsia in her and to adopt prophylactic treatment rather than ask for a sample of urine which may be seldom brought or not at all, and even if brought, albumin might be missed.

It is said that eclampsia more often occurs in twin pregnancy, but my experience in hospital and outside does not quite justify that statement.

The occurrence of eclampsia, it is said by some authorities, bears a relation to the coldness and dampness of the weather, and I fully agree with this view although this is said to be totally improbable by a German doctor who has taken a critical statistical review of the cases of eclampsia treated in the hospital from 1904 to 1909. The recognition of the relation of the weather to the onset of eclampsia in a pregnant woman is of considerable moment as by its means we are given a clue as to carrying out those measures calculated to prevent injurious effects resulting from exposure to the changes of the weather.

The birth or the death of the child *in utero* greatly improves the condition of the mother. This is not quite true in all cases, for we have seen many eclamptic patients die even after the birth of the child, whether dead or alive. However, one fact remains more noticeable, that is, the fits cease on delivery in the majority of the cases.

There will be no gainsaying the fact that the greater the number of fits that the mother is subject to the greater the danger to both the mother and the child. One need not, however, be disheartened by the number of fits and give way to despair because the number of fits that his patient had had was very large, for recovery is known to take place even after thirty fits; nor need one be confident of success because she has had only a few fits, as cases are known to die after the second and third fits. The medical man is therefore requested to do his duty without any prejudice irrespective of the result, adopting the maxim of Lord Tennyson: "The path of duty is the way to glory." and sure, in the end, he will reap the fruit of his labour in one form or other.

Gentlemen, I need not describe here the symptoms and signs of threatening or actual eclampsia, for it does not come within the field of my subject to-day, but I beg to draw your attention to some of the salient points which may be of immense help to us in deciding that the case we are called in to see is one of real eclampsia and not one due to fits arising from other causes which sometimes complicate pregnancy. The chief factors to be taken into consideration are: (i) the previous history of the patient as elicited from the parents or friends; (ii) a general and close examination of the patient; (iii) a minute observation of the fits, and (iv) examination of the urine, and it is here that I consider the examination of the urine as important since it enables us to differentiate this condition from other similar conditions. The fits so closely resemble epilepsy that, practically speaking, this is the only condition that has to be differentiated from true eclampsia. If we remember

three main facts—the absence of the cry, the short unnoticeable tonic stage, and the recurrence of fits in eclampsia—we are very rarely misled as to our diagnosis of the case in hand.

With these preliminary facts, I shall now enter into the subject proper and deal with it as far as it lies within my experience and observation. The treatment of a pregnant woman with signs of threatening eclampsia varies to some extent from that of one actually in a fit or in a condition the result of a fit, that the subject can be best considered under two headings: (1) prophylaxis; (2) actual treatment of the eclamptic fits and the sequelæ.

I need not dwell much on prophylaxis, for we are seldom called to treat such cases, and even if called to do so, we can take our own time in refreshing our knowledge by a reference to recent works on the subject, and further, the treatment is more or less routine and every medical man, I daresay, will be able to do the needful under the circumstances. However, a casual mention of the principles of treatment, such as proper attention to bowels and kidneys by purgatives and diuretics, a restricted diet such as milk or some non-nitrogenous food, full doses of Bromide and Chloral if any signs of impending fit, Thyroid Extract if pulse tension is high, induction of abortion or labour if the signs are very severe, will not be out of place here. I have not seen any occasion arise in hospital to see induction of abortion adopted, nor had I any occasion in my private practice.

The part of the treatment that requires our attention most is the fits and their consequences. Treatment here is founded on the following facts:—

1. An unusual delay in labour is highly detrimental to the mother, and hence labour should be facilitated with least possible risk to the mother; *i.e.*, when the os is fairly well dilated or when it is open slightly and further opening manually will not be injurious or injudicious. A German doctor advocates prompt evacuation of the womb as the best treatment of eclampsia and goes to prove that, when such interference is not delayed more than 6 hours after the first attack of convulsion, that the mortality of the mother is considerably lessened to a small figure, 3·8 per cent., and that of children by one-half. This cannot be accepted without criticism; for although she has tided over the immediate crisis of the fits and their consequences she may subsequently fall a victim to some of the puerperal complications which may arise as the result of hastening delivery by mechanical means.

2. Eclampsia, it must be understood, is the result of an intoxication arising from poisons which have accumulated in the blood brought on by the increased metabolism of pregnancy or by some inexplicable way. The means by which these poisons are eliminated from the body are highly defective.

It will be a clear expression if I say unhesitatingly that our choice in treatment lies upon the immediate and rapid evacuation of the uterus and what has been ignorantly termed expectant treatment. Diverse views and opinions may be forthcoming as to the propriety or otherwise of adopting these lines of treatment, and although there is a class of medical men who may advocate the former, or at least who attach more importance to it, and another class who show a great tendency to limit themselves to the expectant line of treatment, still there is a third class who do not accept either view in its entirety, and I am one of those who belong to this class. In general practice it is of the utmost importance that any method adopted should satisfy the following conditions: (1) it should not make a demand on assistance and appliances which are not easily and readily available; (2) any special skill which the operation of rapid emptying of the uterus necessitates is out of question as most of the practitioners who have to deal with these cases will be sadly lacking in the skill and dexterity which can be expected only of specialists; (3) the results that will accrue from the method we are going to adopt must not be open to criticism and should be on a par with those obtained by other methods.

I am quite sanguine that the method I am going to advocate will meet with the approval of most, if not all of you, and it is one that can be easily carried out in the absence of proper assistance and appliances.

To begin with, we must have a succinct understanding of the condition we have to treat. The view held universally at the present day is that we have to deal with the toxæmia. I have already pointed out in the beginning that it is an unsettled fact as to the precise origin of the toxin, whether in the foetus placenta or mother. At all events, whatever may be the source of the ferments or other poisons which lead up to eclampsia, we get, as a result of their action, well marked degenerative changes in the liver and kidneys. In this way metabolism is considerably affected and excretion interfered with to a dangerous extent, and we therefore reach the culminating point of excretory inefficiency and insufficiency which is the potent factor in producing convulsions either by directly influencing the nervous system or indirectly through spasm of blood vessels. The affection can, therefore, be best combated by

attacking it in three different aspects—the fits, the toxæmia, and lastly the pregnant uterus.

Fits:—Various are the drugs employed in this direction. Different medical men may have different views about each, and I, for my part, would place Morphia as the first in the list. Its action is quicker when it is administered hypodermically than Bromide and Chloral, however administered, and is less dangerous than Chloroform which may be quicker in stopping the fit. It decreases the metabolism and partially prevents further metabolic sources and does not interfere with the kidneys. Views may differ again as to the interval and quantity to be administered hypodermically. Provided the pulse is good and the fits are frequent, I shall first give two-thirds of a grain of Morphia combined with one-hundredth grain of Atropine which has an advantage of neutralising any untoward effect of the former. I am not in favour of giving small doses like quarter, one-third or even half, as in such cases I have found it, in my experience, less effective to stop a second fit after my visit, and I am of opinion that much harm is done by giving too little rather than a little too much, and the idea of waiting for another fit to give a subsequent injection is, I dare say, criminal, for this fit is likely to do considerable damage to the heart which is already much exhausted by the previous fits and it can be given with impunity as an initial dose of two-thirds of a grain without the least fear of depressing the heart. The other drugs—Chloral, Bromide and Chloroform—are mentioned here by me only to be condemned. I am quite confident that cases of eclampsia can be managed without Chloroform. Any obstetrical interference, I am going to suggest, could be successfully done without the fear of exciting another spasm if your patient is well morphinised. I can quite assure you that, in my practice, I seldom had to repeat Morphia whenever I gave it as an initial large dose mentioned above, and if necessity was found to repeat it, it need only be done in a very small dose of one-sixth of a grain. Gentlemen! I therefore attach considerable importance to this initial large dose upon which alone most, if not all our success of treating eclampsia depends.

Toxæmia.—Granting we have stopped the fits or that the fits have already ceased themselves and we are called in to see the case subsequent to the cessation of the fits we are now to deal with the important and grave complication, toxæmia, that is, accumulation of poisons in the system. There are various means at our disposal by which we are able to eliminate or otherwise mitigate the effect of the poisons, and I shall enumerate them below.

In most cases of intense toxæmia urine is suppressed and bowels absolutely constipated. I am sure you will be surprised to hear that a case of eclampsia proved fatal because the providential diarrhœa the patient had was unwisely checked. Our success of treatment in this direction depends upon how far we can influence the organs of elimination to work vigorously. The function of the kidneys, as we all know, is very much interfered with, and so we have to stir the other two organs of elimination, bowels and skin, to relieve the kidneys for the time being. To make the bowels move in an unconscious patient is a great desideratum, for we have to select a drug which is easy of administration, producing our desired effect. In a completely comatose patient there are two courses open. Either we can give the drastic drug of repute and of easy administration, Oleum Crotonis, or we have the alternative of introducing a larger dose of a purgative drug into the stomach which may be either Mag. Sulph. to which I give preference or Pulvis Jalap Co. which is regarded by me as next to Mag. Sulph. There are some disadvantages in giving Croton Oil, for the oil does not preserve its strength for long and very often we have to use an oil of old supply and the two minims of Croton Oil twice the maximum dose, do not very often produce any effect at all, and we are tempted to give some more after some hours' interval which may even produce either no effect or a most undesirable effect on the bowels later on. Further the croton oil placed on the back of the tongue of a comatose patient is frothed up in the mouth and pushed out, much of it being lost in this way and some of it perchance going into the lungs may set up a serious and even fatal form of pneumonia. I therefore prefer to give Mag. Sulph. and that in solution through a stomach tube. This has another advantage: that the introduction of the tube allows of a preliminary washing of the stomach by which a certain portion of the poison may be eliminated from the system. After satisfying that the washings of the stomach are clear you introduce into the stomach a pint of Saline with not 1 ounce of Mag. Sulph. salt in solution but two ounces of the same, for in my experience I have invariably found one ounce of the salt seldom makes the bowels move in a well morphinised patient and once again I hate the idea of waiting after giving one ounce salt and if the bowels do not move after some hours to repeat some more Mag. Sulph. for by this means we are delayed in eliminating the poison if the bowels do not move with the first dose, and secondly, the process of introducing the stomach tube has to be repeated, which of course is troublesome and entails some difficulty in inexperienced hands. Every medical man should be familiar with the procedure of easily introducing the stomach tube in a completely comatose patient. After passing the tube he must

satisfy himself that the tube is in the stomach and not in the lungs before he commences to introduce anything into the tube. The next method by which the bowels may be made to move is within the reach of all, by enemata. The enema given should be of the high variety; by this I mean that a long tube, example, a soft rubber catheter attached to the ordinary enema tube, should be introduced as high up as it will go and bowels washed either with plain water, soap and water, or with turpentine added if there is any distension of the abdomen. I am quite against the introduction of purgative drugs by mouth in a semi-conscious patient, for although I have seen invariably no ill-effects follow, I felt myself to be in a sad and strange predicament in a village called Padmanabamangalam where, with the enthusiasm that the patient is conscious and will be able to swallow, I gave one dram of Pulvis Jalap Co. in two ounces of water, and hardly had she swallowed half of it, she got a violent fit and I am sure you will realise my position then. I thought I had lost my patient and the loss would be attributed to insufflation pneumonia by the drug going into the lungs. Fortunately for me, providence gave me a helping hand and in the movement of the fit the rest of the fluid was ejected out as her head was lowered immediately and turned to one side. I regained all my lost hopes and vigour with which I commenced the treatment. This is quite illustrative of the danger and risk attendant on giving purgative drugs by mouth even in a fairly conscious eclamptic patient, for nobody can fore see or foretell when a fit will be coming.

The practice of introducing purgative drugs by stomach tube is not quite necessary if you loyally follow the plan of washing out the bowels frequently and the former can be postponed till you think that it can be fearlessly done when you can give Mag. Sulph. or Pulvis Jalap Co. and I do not think the success will in any way be less discouraging.

The bowels having been dealt with in this way we have the skin to be stimulated. This can be done by hot bath, hot wet packs or hot air baths. These are not of easy practice for various reasons in the villages to which we are very often called to treat such cases. The first and foremost is the parental objection, and secondly, if any untoward result happen by chance, our reputation will be at stake, for they will be too ready to attribute the ill-results to our wet packing and so on. My experience of cases in private practice does not quite justify that is a necessary measure, for I have seen in some of the villages the practice of making the room hot by closing all the doors and keeping a hot charcoal stove inside. Although scientific objection may be taken to this

plan I have seen good results follow the procedure, for none of my eclamptic patients in whose rooms the principle of making the room hot was followed, in conjunction with the other measure was lost. For the time being it is productive of a salutary effect and I see no reason why that plan which has found favour among the illiterate villagers should not be advocated. The patient begins to perspire fairly freely under this method and all good effects of hot wet pack and the like are obtainable in a degree in this method. As an alternative to our hot wet pack we can easily convince them of the use of hot linseed poultices to the loins, to the application of which they will readily accede. This has a three-fold effect: (1) the friends and relations are not in the way; (2) they act on the skin, (3) they act on the kidneys.

Venesection.—This is an antiquated remedy for eclampsia which is seldom practised now-a-days. In my nearly three years' experience in the Government Maternity Hospital I have seen it practised in one or two cases if I remember correct. It may be no doubt a remedy *par excellence* in some of the eclamptics who are plethoric and whose pulse is of considerably high tension and who exhibit cyanosis of an intense nature. It has also been advocated in cases in which the fits commence after delivery and here I prefer the method of allowing the woman to bleed after the birth of the child to the extent required, that is, to allow her to lose nearly a pint of blood rather than adopting the old method of bleeding her from a superficial vein on the bend of the elbow which necessitates a minor operation, thought it may be, but attended with the gravest objection from the parents.

The third method by which the effects of toxæmia can be counteracted is by neutralising the toxins in the system and we have in the introduction of fluid into the system a ready means at our disposal of accomplishing this object. Question may arise as to the nature of the fluid to be introduced. Some prefer plain sterilised water, some normal Saline, some with Soda Bicarb. added to Saline, some Soda Bicarb. in sterilised water and some with Acetate of Soda added to Saline. I am not very particular as to the nature of the salt introduced provided you are able to introduce a large amount of fluid into the system. However, if the question of choice comes in, I will give preference to the last. Again one may ask where the fluid is to be given? The two most easily accessible means to a general practitioner are through the rectum and intracellularly. These two paths of introducing the fluid into the system are more than enough for our success in treating eclampsia if they are only properly and systematically carried out. Of course, I need

hardly tell you that the fluid can be introduced intravenously although such a method is not necessary and cannot be carried out in private houses here without the strongest and gravest objection from the parents and friends who will be only too ready to blame us in the end if it is unfavourable. A pint of the fluid into the rectum, a pint under each breast, if necessary, are all that is required. This can be repeated after a few hours if the patient does not wake up from her comatose condition. I can assure you that following on the above line of treatment depicted by me, a patient may be made to go through her labour without any further trouble or complication, no matter when it sets in.

There is yet another important factor that I would emphatically lay stress upon and this is starvation. The patient need not be fed as long as she is unconscious orally or rectally and I have seen considerable harm done by feeding rather than by starving and one need not be anxious at all because his patient is starved, for you seldom will have occasion to starve her for two days or at most three days. Within these first three days either she has to evolve herself out of that unconscious condition or she must join the majority. That there is a great danger in feeding a semi-comatose patient by mouth, you will all realise; for some of the food might get into the lungs unknowingly and set up a fatal pneumonia to which your patient who had been tilted over from the quite unconscious to the semi-conscious condition may succumb with much disappointment and disrepute to you. I would therefore crave pardon to advise you, if I may so use the term, not to give any food in any form till she completely regains her original consciousness.

After having detailed above the important points which require our urgent attention, I will proceed to the all-important question of the uterus and its contents. The literature on the method of treatment relating to the uterus and its contents has reached unprecedented proportions. Many contributions both here and elsewhere have been to a large extent controversial in character and it is believed that an unbiassed review of the situation at the present time may not prove inopportune. Whenever any novel method with claims to importance appears on the horizon of the obstetric world it invariably secures within a short time advocates and detractors equally dogmatic. Consciously or unconsciously many writers have laid stress on the favourable results which they observed or achieved. The nature of the problem to be solved is whether to empty the uterus rapidly or not. It is very difficult to adopt a completely judicious view of the usefulness of either methods amid the chaos of opinion that prevails, varying from enthusiastic acceptance of their almost infallible success to utter scepticism of

their possessing very little value at all. I would gravely question the propriety and safety of delivering by rapid means when the uterus is inert and os quite undilated, those who staunchly and firmly advocate this method, and to those who sit by the patient with open hands if it is not criminal to wait till the os is completely dilated when at a much earlier stage the os can be easily dilated manually to the full size when it is partially dilated.

As I have already told you, I am rather one of those who adopt a medium course between the two schools of extremes, and I have got a firm conviction that in the near future, if not now, I believe there are many even now, who will fully endorse my view.

I would therefore lay before you what I would do in a case of eclampsia in this direction. Whether the uterus should be emptied or not depends to some extent upon the time in relation to labour at which the fits appear. The fits may occur before labour has begun or during labour, and the question of those cases in which fits occur after delivery is not within our problem to be solved. Cases vary in their intensity and danger according to the time of onset in relation to labour; those occurring before are regarded as most dangerous, and after labour the least dangerous. The fact that the uterus is empty is no guarantee for the prevention of future fits. If the patient is in labour one need not be afraid of the critics as to the propriety and advisability of terminating it by forceps or other means as may be found necessary when the cervix is fully dilated or is fairly dilated and further complete dilatation can be harmlessly managed. If the patient is not in labour or if so in the early stages, I have seen much good results follow by merely puncturing the membranes and if means are feasible to introduce an aqueous dilator. I condemn the view of the operative procedure of rapid emptying the uterus as being pregnant with risk to the pregnant uterus and I therefore withhold myself from describing those operating measures of instrumental dilatation and Caesarian section (abdominal or vaginal) the latter of which is hardly within the reach of many of us stationed in ill-equipped hospitals with proper assistants sadly lacking. I am not going to weigh the evidence in favour of or against each method by quoting statistics as the advocate of each method will show cases some-how or other to satisfy or prove the success of his method. If you look back to the question of treatment in private practice we can see what our alternatives are. We have the non-operative method in which we depend largely on the control of fits by Morphia and elimination of toxins by all available means, leaving labour to nature, and secondly, the method in

which we supplement the first by hastening labour whenever it can be done with the least injurious result ensuing. I have already told you that I belong to the second method and I shall now summarise briefly the method of treatment according to my practice, mentioning the minor yet important points which I might have omitted before.

When you are taken to see an eclamptic patient, the first thing is to keep her where she developed the fit or where she is lying, as shifting her would involve some degree of danger to the damaged heart. It is on account of the neglect of this rule by the parents and relations of the eclamptic patients who can ill-afford to have private treatment, that by taking the patient in a fit or in a series of fits in a springless bullock cart to the hospital, which they cannot help doing on account of poverty, that mortality in my opinion runs high in hospital, and I am sincerely of the view that the less disturbance, passive or active, we give the eclamptic patient the better the result. In comparing the hospital to the private house we are labouring, no doubt, under very many disadvantages such as want of efficient nursing and proper supervision, proper appliances and the like, but eventually we will be led to perceive that with the treatment suggested above and with proper instruction to our midwife who may attend on her or to some responsible friend or relation of a firm presence of mind, we may ultimately reach an acme of perfection which is calculated to yield as good a result if not better than in a hospital. I have, you will observe, laid stress on the importance of keeping the patient whenever possible where she was first seen. If she is already on a cot it must be provided with side boards or if this is not practicable put her on the floor lest during the fit she may fall. The latter plan will be of much inconvenience to the medical man, but I think he has to forego a little personal inconvenience for the sake of the suffering humanity.

The next thing to be done is to give her Morphia combined with Atropine. It will be nothing but repetition if I say that she should be given a large initial dose if the fits are severe and frequent and a smaller one if they are mild and at long intervals. Gentlemen, you were told that I dislike the system of using the syringe twice on the same day for giving Morphia. You should judge for yourselves and so adjust the dose that the case may require to prevent a second fit and in the majority of cases experience will lead you to a successful issue. The reasons why I do not like the idea of giving Morphia twice are that you may break your valuable syringe in the hurry and confusion arising from the second fit—valuable in its broadest sense as you will have only one with

you—and secondly, you may have to get ready in the syringe any cardiac stimulant to meet any failure of the heart which is likely to intervene at any moment. During a fit the head should be kept to one side and a mouth gag inserted into the mouth.

If she is quite conscious and can swallow, give her Mag. Sulph. or Pulvis Jalap Co. and give her plenty of water to drink.

If unconscious, pass a stomach tube if you have one and, if you can do it without any fear, wash out the stomach put in Saline and Mag. Sulph. and Thyroid Extract 20 or 40 grains if pulse tension is high. If you have no stomach tube or if you are afraid that it cannot be properly managed you can avoid its use.

Put the patient on her side, give her a good soap and water enema and wash out the bowels; after washing introduce an ounce or two of Mag. Sulph. in four ounces of Saline into the bowels.

Relieve the congestion of the kidneys by hot linseed poultices to the loins, and cover her up with blankets.

If she is extremely unconscious, infuse one pint of Saline under one breast, and if after 8 hours she is still unconscious infuse another under the other breast.

Draw her urine and measure it.

Keep her always on her side until she is quite conscious to prevent saliva trickling over the back of the tongue into the lungs. I prefer the right side for there is not the fear of heart's action impeded by the stomach when distended.

Don't give any food or medicine until she is completely conscious.

Attend to the heart. If it shows signs of impending failure give Digitaline in Brandy or give Ether and not Strychnine. The cases of heart failure are very serious and they prove fatal in spite of all our efforts. The room in which she is laid is darkened and made noiseless. Ask the midwife or the nearest relation to wait on her and to put the gag into the mouth if she gets a fit.

If at the end of 8 or 10 hours bowels have not moved and she is still unconscious, infuse Saline and give another enema with Mag. Sulph. You must not be satisfied unless the bowels move 4 to 6 times in 24 hours for the first few days.

In fact our reliance on the treatment of eclampsia is placed on Morphia and a thorough emptying of the upper and lower bowels and uterus when occasion requires it.

The treatment of eclamptic patients, when the fits have passed away and the child is not born, and where the fits have passed away and the child is born, are almost identical.

In fine, Gentlemen! I would advise you to apply yourself vigorously to the treatment I have outlined. To my mind it seems to be a sound and rational treatment and it is sure to give better results in the long run. I would like to mention here the words of a famous Guy's Hospital obstetrician, who says: "I would even go so far as to say that no worse treatment than accouchement forcé can be adopted." I have outlined a method of treating eclamptics practically available under all circumstances, a method capable of yielding results but little inferior to any other method as far as we can judge at present, and it is decidedly superior to the older methods in which the child was said to be delivered by hook or by crook through an unopened os. I have not made mention of so many other drugs and methods of which I have no personal experience. I would invite the members here to give their experience of these drugs. These are Nitro-Glycerine, Veratrum Viridee (this drug I have seen used in one case with good result), Pilocarpin, massage of the heart when it is failing, cold baths when the temperature runs high, rectal injection of Glucose, decapsulation of the kidneys and lumbar puncture in comatose patients. The method I adopt when the temperature runs high is to give a rectal injection of cold water.

Gentlemen, I have to conclude my discourse with the remark that in submitting my view of the treatment of eclampsia for professional consideration and judgment, I should prefer, in spite of admirable results obtained, to see it treated rather as an incentive for further investigations by my esteemed friends and brother practitioners than as a presentation of a definitely and finally shaped therapeutical and obstetrical procedure. Finally, I cannot but thank you earnestly and warmly for the patient hearing given me it may be, at great personal inconvenience, and the Secretary for having given me the privilege of reading my paper before this association after repeated requests.

Gentlemen, in closing the subject I can assure you that I feel quite confident and conscious that the subject would have been more ably dealt with had the task been undertaken by abler and broader shoulders of our association than mine.

Our Contemporaries.

MEDICINE.

The Misuse of Enemata.

The routine use of soap and water enemata prior to operations, especially those upon the abdomen, is a procedure sanctioned by custom and authority. Whether such administration be altogether wise has been seriously raised by Mr. Charters Symonds, whose thoughtful remarks upon the question deserve the most careful consideration. The chief objection to the giving of an enema just before a grave operation is the distress and discomfort which are so frequently produced thereby just at a time when the greatest possible repose of mind and body is required. Actual harm from such an accident as the forcible rupture of a pelvic abscess by mechanical violence is, it is acknowledged, rarely a consequence of the administration of a purgative enema by a skilled nurse, but the advisability of injecting fluid against powerful attempts at expulsion is questioned. In cases of rectal stricture, for instance, very little, if any, fluid passes beyond the obstruction, so that the enema can only act by "irritation," leading to an increase of secretion higher up the bowel, whereby further distress is produced. Spontaneous relief may follow, it is true, and a certain advantage is claimed from the absorption of water when the enema is retained. Nevertheless, many cases are met with in which the use of enemata, combined or alternated with aperients, fail to give that relief to the patient which a little timely rest to the overworked bowel would ultimately secure.—*The Canadian Practitioner & Review*.

Treatment of Pernicious Vomiting in Convalescence from Typhoid Fever.

A. KHOURY reports the case of a girl of eighteen years who had suffered from typhoid fever for over ten weeks. Early in the period of convalescence there appeared vomiting, which remained uninfluenced by a large variety of drugs, diet, and saline injections. Gavage gave relief for only twenty four hours. Remembering the persistent vomiting that occurs in adrenal insufficiency, as well as the initial vomiting and evidences of myocarditis, and low arterial tension that had featured in the case under treatment, the author decided to administer epinephrine. Forty drops of the 1 to 1,000 solution daily by mouth proved

useless, but when one milligramme of epinephrine was injected daily in two doses, the vomiting spells soon became less frequent, and in forty-eight hours had entirely ceased. The injections were continued for three days more. The author advises that this measure be tried in all cases similar to that reported.—*The Canadian Practitioner & Review*.

Cutaneous Tuberculin Reaction in Children.

LAPAGE finds that the reaction is specific, and, generally speaking, is given by all patients infected with tuberculosis. The subcutaneous method gives a higher percentage of results than the cutaneous, but for practical purposes the latter is to be preferred. Tuberculin prepared from human tubercle bacilli should be used, since the results obtained from bovine tuberculin are not so satisfactory. A positive reaction gives one no information as to whether the disease is active or passive, and in an apparently healthy person need not bear any sinister interpretation. A negative result may follow the test in children infected with tuberculosis, if the disease is advanced, if there is cachexia, if the disease is very acute, or in cases of mixed infection complicated by acute disease. A single negative result is not of much value, for a repetition of the test was found to increase the positive results by about 28 per cent. The difficulty of making a diagnosis of occult tuberculosis increases after the patient has passed two years of age, but in young children, as a method of indicating tuberculous illness, the test is of the greatest value. As judged by the cutaneous test on children attending at a hospital, tuberculous infection occurs in 32 per cent., up to the age of two years, from two to five years in 51.2 per cent., from five to ten years in 60 per cent., and from ten to fourteen years in 60.8 per cent. Even in cases negative to clinical examination infection occurs in 14.7 per cent. up to the age of two years, in 31.4 per cent. aged from two to five years, in 30.7 per cent. aged from five to ten years, and in 51.2 per cent. aged from ten to fourteen years. In other words, at the end of the school age between 50 and 60 per cent. of children have become infected with tuberculosis, even among those who appear to be healthy on clinical examination.—*Ibid.*

Diabetes Mellitus: Lactic Acid Bacilli in Treatment of.

While all are agreed that in cases of diabetes that come to autopsy there are found changes in the pancreas, especially in the islands of Langerhans, and that these changes are probably present in all cases of diabetes, with perhaps irritation and changes in the suprarenals, thyroid,

nervous system, and hypophysis, still these changes are also caused, according to the author, by an autointoxication. In the majority of cases the indican output is in close relation with that of sugar.

In 13 cases the author administered cultures of the lactic acid bacillus (*B. bulgaricus*) in doses of 4 to 16 c.c. (1 to 4 drams) three times daily, with the idea that, by overcoming putrefaction in the alimentary tract and hence the autointoxication, influences irritating the sugar-regulating apparatus would be removed and the glycosuria therefore reduced. The results obtained seemed to justify the views advanced, the urine showing a marked reduction both in the indican and the sugar as the result of lactic bacillus treatment.

Experiments *in vitro* showed that carbohydrate digestion by pancreatic juice is rendered very much slower by the presence of lactic acid. It seems probable to the author, therefore, that the results produced are due not only to the removal of putrefaction, but also to the fact that owing to lengthening of the period of carbohydrate digestion through the presence of the lactic acid bacilli only small amounts of sugar are formed and absorbed. A further result of this is that the tolerance of the patient for carbohydrates gradually increases.—*Monthly Cyclopaedia & Medical Bulletin*.

Acute Nephritis: Treatment of.

Bodily Rest.—Acute nephritis patients should be kept in bed until the nephritis is completely cured, or until it has entered into a chronic stage, in which rest in bed can no longer be of service. The most important criterion for the time when the patient is permitted to get up is the disappearance of red cells and kidney epithelium from the urine. As long as these elements are present the acute stage of irritation is not over. After their complete disappearance one should wait two weeks and then, despite continuance of albuminuria, the patient should be allowed to get up, provided, of course, that all other symptoms of nephritis have disappeared. It will then frequently be seen that in the first days after giving up complete rest the albuminuria increases somewhat. This lasts only a short time and should not alter one's decision. On the other hand, recurrence of red cells and renal epithelium should be regarded as proof of undue haste, and then it is necessary to order rest in bed again.

Diet.—The kidneys eliminate (1) the metabolic products of the proteids; (2) nearly all salts, especially phosphates, sulphates, chlorides; (3) water.

We limit therefore first of all the proteids or exclude them entirely. By so doing we diminish the amounts of sulphates and phosphates, as these salts are in great part derivatives of the proteids. To make up for resulting deficiencies large amounts of carbohydrates are given. The end-products of the carbohydrates are carbon dioxide and water, and carbon dioxide is excreted by the lungs. At the same time the cleavage of the body proteids is reduced to a minimum under the influence of large amounts of carbohydrates. A regmen is thus achieved which makes practically no demands on the renal functions.

Salt must of course be withheld, as its elimination is a difficult task for the diseased kidneys. The diet is limited therefore to considerable amounts of sugar, to fruit juices and fruits rich in sugar, to gruels of finely ground rice, corn, wheat, or potato starch. Thoroughly washed butter may be added, as pure fat is also oxidized to carbon dioxide and water and does not tax the kidneys. The author has often administered such a diet to his patients with acute nephritis for one or two weeks, and been much more satisfied with the results than before. Formerly he gave nothing but milk, as is still the custom with most physicians. But milk contains large quantities of proteids, with many phosphates and sulphates. Even if poor in sodium chloride and free from extractives, a milk diet burdens the kidneys.

He advises giving milk only after the most dangerous stages of the acute nephritis have been overcome and when the abundant diuresis, the increasing content in sodium chloride and the decrease in albumin show that the kidneys have regained their power of elimination. The time has then come to enlarge the menu gradually. In addition to milk are added preparations of oats, barley, purées of potato or carrots, legumins (peas, lentils, white beans), boiled green vegetables, cocoa, yolk of eggs, light tea, biscuit, etc. Salt should for a long time be excluded carefully. Considerably later may be added white of eggs, river fish, and boiled meat.

If the nephritis is completely cured, an average normal diet may be resumed three or four weeks after the last appearance of albumin, but the patient should for a long time eat meat only once daily, should avoid spices and alcohol, and should take as little salt as possible. If the albuminuria does not fully disappear the patient should be placed upon a diet suitable for chronic nephritis.

As for fluids, fruit juices or thin decoctions of tea (Chinese tea, tea of grass seeds, of dried strawberries, tea of blackberry leaves, etc.), or simple pure water, are best. In the severe stage of an acute nephritis it is

useless to attempt to wash out the kidney by large amounts of liquid, which only serve to increase oedema.

When diuresis shows a tendency to increase, as in convalescence, large amounts of fluids are of service, though the author recommends strongly to avoid the actual mineral waters, which contain too much salt.

Elimination by Other Routes.—This is comparatively easy as regards water, but very difficult when it concerns solid constituents. The elimination of urea by sweating is by no means as great as was formerly supposed. It hardly pays to subject the patient to the debilitating process of the sweat bath in the hope that a part of the retained urea and other products of albuminoid decomposition can thus be eliminated. The elimination of sodium chloride by sweating is a little more important, but the elimination of urea and sodium chloride which can be effected by strong cathartics is decidedly greater.

In acute nephritis *water alone* can be diverted into other channels of elimination. On this account the various diaphoretic measures have really no justification except in cases with oedema.

There are several methods of removing water from the body of the nephritic patient. Of diuretics, the theobromine preparations alone seem often to be of service. They dilate the finer capillaries of the kidneys and favor the blood-supply of the diseased organ. The ingestion of fluid may be limited, but not for any length of time, for the patients are limited to a diet that contains a good deal of water (for example, milk) or that requires water in its preparation.

The amount of salt may be reduced to a minimum. This is valuable, however, only for those cases in which the difficulty of salt elimination (through the kidneys) is the chief cause for the retention of salt in the body and, further, for the development of oedema. In the majority of cases of nephritis, besides other causes for oedema (as damage to the capillary walls by toxic substances), the power of the kidneys to eliminate water is much more limited than the ability to eliminate salt; then forbidding salt simply makes food distasteful to the patient and still further reduces him. Thus, the rule to forbid salt, so beneficial in many cases, can become most harmful if applied universally. In acute nephritis the object of salt deprivation is, above all, to spare the diseased organ the labor of salt elimination.

As for diaphoresis, too much liquid should not be given when diaphoretic cures are ordered. Otherwise a vicious circle is established.

The same effect as from sweat baths may be obtained through residence in a climate that is at once hot and dry. These are the characteristics through which the climate of the Egyptian deserts acquired its reputation.

Puncture of the skin affords another method of getting rid of fluid, but it is to be used only in the worst cases where all other methods have failed.

In threatening uræmia, copious bleeding by venesection is often of the greatest advantage. If it gives no result, one should not delay to split the capsule of the kidneys and so relieve the tremendously swollen organs from pressure. The number of cases is already considerable in which this procedure has led to satisfactory results.—*Monthly Cyclopadia & Medical Bulletin.*

The Use of Emetine Salts in the Treatment of Amœbic Dysentery.

BY

J. PRESTON MAXWELL, M.D., F.R.C.S.

In the *British Medical Journal* of June 22nd, 1912, Rogers of Calcutta recorded some wonderful cures of cases of amœbic dysentery by the injection of emetine salts. Since that date many have been experimenting with these salts, and the paper which follows is the record of some of these experiments carried out on patients in South Fukien.

Briefly it may be stated that the claims which Rogers put forward have been abundantly justified, and that the physician has now a drug which acts more surely on amœbic dysentery, than any drug hitherto in his hands, and that with a minimum of discomfort to the patient. And any one who has had the experience of a large dose of powdered ipecacuanha, will appreciate the possibility of giving the equivalent of a double dose, and that without even nausea.

The best testimony the writer can give to the new drug is this, that whereas he used to dread the arrival of these cases, now he welcomes them.

Case 1.—Female, aged 38. Subacute amœbic dysentery of over a year's duration, and a large carbuncle of the neck. She was passing 10 to 15 stools a day, mostly composed of blood and mucus.

On Sep. 21st an injection of Emetine Hydrochloride .010 gramme was given.
On Sep. 22nd „ „ „ „ .020 „ „ „
On Sep. 25th „ „ „ „ .010 „ „ „

All blood had disappeared by the 23rd, and the mucus for the main part by the 25th, whilst the stools were solid, for the first time since the beginning of the illness, on the 26th. There was no attempt at a relapse, and she left hospital fat and flourishing.

Case 2.—Male, aged 33. Chronic amœbic dysentery of four months' duration, and ascites of unknown nature.

On Sept. 20th an injection of Emetine Hydrochloride .010 gramme was given.
On Sept. 22nd „ „ „ „ .020 „ „ „

In this case blood and mucus were mixed with the stools of which there were 8 or 9 a day. This cleared up at once, the stools became solid, but the general condition of the man did not markedly improve.

Case 3.—Male, aged 42. Subacute amœbic dysentery of over a year's duration. There were 7 or 8 stools a day, and on an average 5 at night.

On Sept. 26th an injection of Emetine Hydrochloride .020 gramme was given in the morning, and at night another .020 gramme.
On Sept. 28th an injection of Emetine Hydrochloride .010 gramme was given.
On Sept. 30th „ „ „ „ .020 „ „ „

The stools were very foul, and there was a great deal of pus and blood. In four days the blood was gone, and the man was so much better that he insisted on leaving on the sixth day. There was still a good deal of pus. There were about 4 stools a day, partially formed, and the man was still improving.

Case 4.—Female, aged 7. Subacute amœbic dysentery of 15 days' standing. About 30 stools a day, composed of blood and mucus and accompanied by a considerable amount of pain.

On Oct. 5th an injection of Emetine Hydrochloride .020 gramme was given.
On Oct. 6th „ „ „ „ .030 „ „ „
On Oct. 7th „ „ „ „ .030 „ „ „
On Oct. 7th (aftn.) „ „ „ „ .030 „ „ „
On Oct. 9th „ „ „ „ .020 „ „ „

The blood immediately disappeared, and by the fifth day of treatment the mucus was also gone. After the last two doses she had slight vomiting but no retching. She was discharged well on the sixth day and has remained well ever since.

Case 5. Male, aged 19. Chronic amœbic dysentery of two years' standing. He was a hospital patient six months back, and left hospital very little improved. He was at that time treated with ipecac. powder and had a time of severe vomiting and retching.

On Oct. 14th an injection of Emetine Hydrochloride .040 gramme was given.
On Oct. 15th „ „ „ „ .040 „ „ „

Immediate improvement began. The stools at the commencement of treatment were foul and contained considerable quantities of mucus and a very little blood. By the tenth day of treatment the mucus was gone, and the stools were solid for the first time in two years. He went out well on the 15th day.

Case 6. Male, aged 49. Subacute amœbic dysentery of three months' duration in a bad malarial cachectic. He was very ill, and depressed, having to go to stool constantly both night and day. The stools were mostly blood and mucus.

On Oct. 19th an injection of Emetine Hydrochloride .050 gramme was given.

On Oct. 20th " " " " " " .050 " " "

On Oct. 22nd " " " " " " .050 " " "

On Oct. 25th " " " " " " .050 " " "

He was so much better that he insisted on leaving hospital next day. There was no blood or mucus in the stool which was semiformed, but the calls to stool were still too frequent, some 3 or 4 in the 24 hours. There has been no relapse, but steady progress up to the date of this paper (December).

Case 7. Male, aged 19. An acute attack on the top of a subacute and probably mixed infection. The patient was one of my own students and had neglected the matter. He had six injections of .050 gramme spread over five days. He was having constant stools of blood and mucus. The second day of treatment, faecal matter reappeared in the stools and I anticipated a rapid recovery. He then got chilled, the faecal matter disappeared again and the patient grew worse. On the sixth day of treatment he was put on Sulphate of Magnesium, and began at once to improve and made a satisfactory and good recovery.

Case 8. Male, aged 31. Subacute amœbic dysentery of two days' duration. This patient was one of my own servants. On the third and fourth days of the disease he had an injection of Emetine Hydrochloride .050 gramme. When first seen he was passing only blood and mucus. Faecal material reappeared in the stools after the first injection, and the stools were solid next day. He was off work six days.

Case 9. Male, aged 18. Subacute amœbic dysentery of three days' duration. The patient was a school-boy, and was passing blood and mucus, with constant calls to stool.

He had two injections on successive days of Emetine Hydrochloride .050 gramme; the condition improved at once, and he left hospital well on the fifth day.

Case 10. Male, aged 13. Acute amœbic dysentery of ten days' duration. The boy was very wretched, hardly able to be off the bedpan, and the stools, mucus and blood, with no faecal material.

On admission, an injection of Emetine Hydrochloride .050 gramme, and on the following day .020 gramme, was given. By the third day the stools were solid, no blood and very little mucus, and he left hospital well on the eighth day, but still very anæmic.

In speaking of these cases leaving hospital well, the writer does not mean it to be inferred that they needed no further treatment. An attack of dysentery nearly always leaves the patient anæmic and in need of tonics.

The drug used in these cases, as has been already stated, was Emetine Hydrochloride. The powder was dropped into the barrel of an all-glass hypodermic syringe, and dissolved in about .75 c.c. freshly boiled and cooled normal saline. It was injected subcutaneously into the back of the forearm or upper arm, and the site of injection gave no trouble.

In every case before treatment the stool was examined and the presence of amœbæ ascertained. In every case except No. 7 the type present was *Amœba histolytica*. In Case 7 there were present amœbæ of both the coli and histolytica types, the former predominating.

The writer also noted that the more active the amœbæ the better the drug seemed to act. In Case 7 it is an interesting question how far the chilling affected the failure of the drug to act.

As to other treatment the patients were also placed on a powder of Bismuth and Soda with in some cases a little Quinine; and in Case 3, where there was almost certainly active ulceration of the bowel, enemata of quinine were also given.

Under the microscope the amœbæ seemed to be rapidly killed by the treatment.

The classification of these cases is somewhat difficult. By "acute" the writer means severe dysentery with severe constitutional symptoms. By "subacute" severe dysentery, the constitutional symptoms being mild. By "chronic" dysentery, but faecal material present and the condition of long duration.—*The China Medical Journal*.

Coli Infection of the Urine.

BY

W. HALE WHITE, M. D., F. R. C. P.

Coli infection of the urine is more common in women than in men in the proportion of 8 to 1, and is especially common in pregnant

women. It is therefore supposed that colon bacilli pass from the anus across the perinæum to the vulva and up through the urethra. But there seems no reason why the organisms should be more prone to pass from anus to vulva in pregnant than in non-pregnant women. Again, if the organism were transmitted direct from anus to vulva one would expect to find urethritis, then cystitis and later pyelitis. But generally pyelitis is the first and only evidence of infection of the urinary tract. Finally, if the organism is transferred in that way, it is difficult to understand why bacillus coli infection of the urine is not universal in female babies, because they are exposed to transference of the bacilli by soiled napkins.

Another suggestion is that the bacilli pass directly from the colon to the kidney. Against this is the fact that there is no association between constipation and the presence of the bacillus coli in the urine.

It has been urged that the bacillus coli is taken up into the blood and is excreted by the urine. Certainly, microbes may reach the kidney by the blood stream. The typhoid bacillus is excreted by the kidney. An objection is that people have frequently looked for the bacillus coli in the blood but failed to find it. Dr. Williamson states that the blood has been found to be sterile in pregnancy when the bacillus coli was found in the urine. But the explanation seems to be found in observations by Panton and Tidy who found the bacillus in the blood during a rigor. It seems that at other times it is not present in sufficient numbers to be detected.

In 80 per cent. of the cases the infection is in the right kidney only. The following explanation has been advanced for this frequent localisation in pregnancy. The uterus as it ascends in the pelvis during pregnancy, presses on the ureters. In necropsies at the 8th month of pregnancy the ureters and the pelves of the kidneys are found somewhat dilated. The right ureter is more pressed on than the left because as the uterus rises out of the pelvis it rotates through part of a circle, and the larger part of the uterus presses on the right ureter. This pressure is mostly felt about the 6th to 8th month, because, before that, the uterus is not big enough, and after that it has risen well out of the pelvis. An objection to this explanation is that in women who are not pregnant the trouble is more common on the right side.

SYMPTOMS.

In the large proportion of cases the patient complains of pain, usually local. The cases which give most difficulty in diagnosis are those where the pain comes on suddenly, simulating that of renal

calculus. A woman, aged 51, had pain in the bladder, pain on micturition, occasional feverish attacks, with pus and blood in the urine, for 4 months. Vesical calculus was diagnosed. X-rays and the sound, however, both failed to find a stone. The urine was found to be swarming with the bacillus coli. Another woman had pain in the right renal region and frequent micturition. Bacillus coli was found in the urine, and she recovered. Some months later she had another attack of pain in the right kidney, like that of renal calculus. But it was found to be due to infection of the urine. A woman was seized with pain, exactly like that of colic due to a calculus in the right renal pelvis. No stone could be found, but the urine contained plenty of the bacillus coli, and under treatment she recovered.

The local symptoms are pain in the loin, back or abdomen, frequent and painful micturition, pyuria, and hæmaturia. There are all grades of pain, from that which is so severe as to double the patient up, to a mere belly-ache. The patients often say they have lumbago, and when the pain is severe there is a good deal of rigidity and tenderness over the kidney; these are the earliest symptoms.

Some cases have been mistaken for appendicitis. A woman, aged 28 was sent to hospital by her doctor with the diagnosis of appendicitis. She complained of pain and tenderness on the right side of the abdomen and had pyrexia. There was a trace of albumin in the urine. Against the diagnosis of appendicitis the pain was a little further up than usual. Although there was a trace of albumin in the urine, and cultures revealed the bacillus coli, the pain, rigidity and tenderness were so near the appendix region on the following day that, remembering the risk of not operating if she had appendicitis, the appendix was removed. But it was found perfectly healthy, even under the microscope. The subsequent history showed that the case was one of coli infection of the urine.

In thin people with coli pyelitis the kidney may sometimes be felt enlarged. Especially remember that they complain of frequent micturition. In a case of frequent micturition, or of frequent wetting of the bed at night by children, always examine for bacillus coli infection of the urine; microbes are a not uncommon cause of incontinence of urine. The swollen kidney, frequent micturition, and incontinence are not so frequent as the pain and tenderness over the kidney.

The urine is slightly turbid, but it may contain only a small quantity of albumin or none. It has a characteristic fishy smell. It is usually pale, acid in reaction, and, if the infection is acute, may contain

blood. A woman who had scarlet fever at 40, came into hospital with thickened arteries and a high-tension pulse, a hypertrophied heart, and albumin in the urine. Several attacks of hæmaturia occurred. The writer had always believed that the cause of hæmaturia in such a condition was that the patients bled from the urinary tract, just as they do into the brain or nose. But the urine contained plenty of bacillus coli. Probably the bleeding had nothing to do with the high pressure, but was due to the bacillus coli. Hæmaturia sometimes occurs in pneumonia. Until the last few months the writer thought it was due to the pneumococcus setting up pneumococcal nephritis. But examination of the urine showed that it was sometimes due to the colon bacillus. In any obscure case of hæmaturia look for bacillus coli in the urine.

The general symptoms are of all degrees. Indeed, some have said that the bacillus coli occurs in the urine in people who have nothing the matter with them. But the writer has always found something in the clinical aspect of the case to direct attention to the possibility of the bacilluria. If the patient is severely ill, the general symptoms are marked; they are high temperature, rapid pulse, rigors, sweats; that is, bacillus coli septicæmia. There may be a considerable temperature due to bacillus coli infection of the urine. Sometimes there is sickness.

There are few complications. Occasionally the inflammation proceeds to the formation of pus, and then very rarely there may be pyonephrosis or purulent cystitis, but they are not severe. Some pleurisy may occur.

The prognosis is usually good.

The diagnosis from stone is sometimes difficult, and hæmaturia may cause trouble. There are other difficulties in diagnosis. Thus a woman was seen who had, the previous year, slight evening rises of temperature, and some sweating. It was thought that she might have phthisis at one apex, so she was sent to winter in Switzerland. While there she was repeatedly examined for tubercle bacilli, but none were found. When she returned she still had slight evening risings of temperature, and sweats, but no signs of phthisis could be found. Her urine was swarming with the bacillus coli, and no doubt the whole illness was due to that. Not infrequently subacute nephritis is diagnosed. A woman had pyrexia, which was attributed to influenza. Then the temperature gradually fell, blood was noticed in the urine, there was some albumen, and it was thought that she had acute nephritis. Blood persisted, and it was thought she had stone, but cystoscopy

and X-rays did not reveal one. At last the urine was found to be swarming with the colon bacillus, and under treatment she recovered.

A child was seen, on and off, for a long while. When 4½ years old she caught a cold, which was said to have affected the kidneys. Since then she had at times hæmaturia. Subacute tubal nephritis, with exacerbations was diagnosed. The urine was found to be swarming with colon bacilli, and all the trouble appeared due to that. To avoid mistakes always bear in mind the possibility of the bacillus coli being in the urine.

In children, the symptoms may be severe. There may be a high temperature, and although rigors are rare in children, they may occur. Meningitis may be suggested. If in a small child there is a temperature, perhaps rigors, perhaps delirium with squinting and many nervous phenomena, examine the urine, for some supposed cases of meningitis are due to coli infection of the urine.

TREATMENT.

Some say the patients will get well if left alone. Whether that is true or not, it seems worth while to try to do something for them. First, flush the kidneys thoroughly. Give plenty of barley water and other bland fluids, so as to get rid of the organisms through the kidney as quickly as possible. Secondly, try to disinfect the urinary tract. The writer gives 10 grains of urotropine every 6 hours, and 10 grains acid sodium phosphate every 2 hours, to keep the urine acid, for urotropine acts best when the urine is thoroughly acid. Washing out the bladder has been recommended. That is distressing to the patient, and involves the risk of introducing fresh organisms. It does no good, for it is rare for the bladder to be infected. Vaccines are generally used. It is difficult to know whether they do good, as the disease tends to get well of its own accord. Sometimes they appear to help. An autogenous vaccine, in doses of 30 to 50 millions at intervals of a week, may be given. Though when they leave the hospital these patients appear well, yet their urine usually still contains some coliform organisms and that is thought to be a proof that they are not cured. But bacteriologists say it means that the colon bacillus is very variable, and that those passed at the close of the illness are not of the same variety as at the beginning, and that a different vaccine should be used according to the stage of the disease: *i.e.*, make a fresh autogenous vaccine about every 3 weeks, and use it. Be this as it may, under treatment patients are usually completely relieved of their symptoms, even if coliform organisms are still present in the urine. Operation is scarcely ever necessary. Forgetfulness of this fact nearly ended in disaster. A young

fellow had typhoid fever, and, a few weeks after, he had pain, a swollen kidney, and pyuria. A surgeon proposed to explore and drain the kidney. It was a case of ordinary colon infection of the urine, and he got well without surgical treatment.

Urine for examination must be collected aseptically into a sterilized bottle by means of a sterilized catheter. Sometimes patients object to the use of the catheter. In male subjects it will sometimes suffice if the orifice of the urethra is cleaned, a few drops of urine passed into the chamber, and the rest of the stream into a sterilized bottle.—*The Medical Review*.

Acute Broncho-Pneumonia after Removal of Tonsils.

R. LABBE.—A healthy child, aged 7 years, had been operated on for adenoids 4 years previously. For about a year he had presented such symptoms as mouth breathing, alteration of voice, and attacks of pharyngitis. On examination the tonsils were found large and incarcerated. It was decided to remove them, and for some time before operation local disinfection was attempted by the application of resorcin dissolved in oil. The evening before operation the tonsils were still large and red, and the rectal temperature was 99.1° . Under kelene anaesthesia a small mass of adenoid tissue was removed from the nasopharynx. Then the tonsils were removed by the morcelleur, their marked incarceration necessitating two applications of the instrument on each side. The right tonsil was purulent. The nose and throat were treated for a few days after the operation with a weak aqueous solution of resorcin.

The patient rapidly became feverish, the temperature being 105.4° four hours after the operation. Progress was otherwise satisfactory, and the temperature was 102.1° in the evening, 100° next morning, and 99.3° on the following day, on which he was allowed to get up for an hour. From this period he began to cough, and the evening temperature ranged from 102° to 104° , and was never below 100.3° during the next 13 days. Signs of broncho-pneumonia were observed, and the fever was uninfluenced by tepid baths, electrargol, and antistreptococcic serum. The cough was accompanied by intense dyspnoea. Signs of capillary bronchitis were present with patches of broncho-pneumonia, especially at the right base and left apex. Some sputum obtained on the 11th day contained the pneumococcus in almost pure culture. On the 16th day he was given two doses of .25 cgm. each of cryogenine and the temperature fell to 100° , and then again rose to range from 102° to 104° . After a few days of marked oscillations an

abscess formed in the buttock, which, when opened on the 24th day, contained the pneumococcus in pure culture. The temperature from this point was more moderate, but it continued high and attained 102° for the last time on the 41st day after operation. After a long convalescence recovery followed.

The writer refers to 8 other published cases in which septic or pneumonic complications developed after removal of tonsils. He thinks that direct infection of the lung results from aspiration of a fragment of tissue, or, as was more probable in his own case, blood or pus from an infected focus in the tonsil into the air passages. This danger might be avoided by postponing operation till the temperature is normal, thus avoiding operating on a suppurating tonsil, and by avoiding general anaesthesia. The writer considers that a favourable influence was exerted by the gluteal abscess, which he regards as a strong argument for the production of Fochier's "abscess of fixation" in similar acute septicæmic conditions.—*The Medical Review*.

Phlebitis in Mumps.

HIRTZ and SALOMON.—In recent years a number of complications of mumps have been described which were little or not at all previously known, for example pancreatitis, meningitis, pericarditis, and endocarditis. The view is now gaining ground that although mumps especially affects the salivary glands, it impregnates all the organism like a septicæmia. Usually this is not revealed clinically. However, in some cases it is shown by multiple localisations such as orchitis, nephritis, etc. In certain cases the cardio-vascular system is affected and endocarditis or pericarditis is produced, though in none of the text-books is a vascular complication described. However, Catrin observes that among 33,445 cases of mumps in the French army 1 of the 3 deaths which followed was due to thrombosis of the pulmonary artery. The writers have not been able to find any record of phlebitis due to mumps, though they observed in one family the following 3 cases.—

A medical man, who was attending a family for mumps was attacked with the disease. His temperature rose to 101.5° on the second day, and then gradually fell to normal. The inflammation was confined to the right parotid gland. On the seventh day he had a rigor and the temperature again rose to 101.5° . On the eighth and ninth day it was 102.5° . On the tenth day it fell to 100.7° , but pain was felt in the right calf. On the eleventh day the temperature was normal, but the pain in the leg persisted and compelled the patient to remain in bed.

becomes circumscribed within 24 hours. Then the slough softens. During the next few days pus is freely discharged, the whole affected area shrinks, and healthy granulation tissue forms, filling up the cavity, and cicatrization soon takes place. The only external application is a dressing of carbolised vaseline (1 in 20).

In streptococcic infections such as those resulting from abrasions, or punctures by bones of high game, or inoculation by decomposing animal matter, the high temperature is quickly reduced and the pain and swelling and malaise gradually subside. Inflamed lymphatic vessels and glands disappear in a few days.

A man, aged 49, developed a small painful spot on the left side of the back of the neck, which was thought to be due to a mosquito bite. It rapidly enlarged during the succeeding 4 days until it resulted in a carbuncle. The patient then came under the writers' care. They administered acid. sulph. dil. in 20-minim doses diluted with a wineglassful of water every 4 hours and dressed the carbuncle with carbolised vaseline (1 in 20). In 19 days the patient was absolutely well.

A woman, aged 29, apparently in a healthy condition, accidentally pricked the right index finger on Oct. 9, 1911, whilst dressing a rabbit. The finger began to throb and grew painful, and was poulticed. The swelling and pain extended to the elbow. On the 11th a severe rigor occurred. The temperature was 104.5°, and she seemed very weak and ill. The whole forearm and hand were extremely swollen and painful, red lines marked the course of the lymphatics as far as the elbow. The axillary glands were inflamed. Twenty-minim doses of acid. sulph. dil. in a wineglassful of water were given every 4 hours throughout that day and the following night. On the morning of the 12th the temperature had fallen to 102°, and the pain was much less. The doses were continued and on the morning of the 13th the temperature had fallen to 100°, the pain was still less, and there was a considerable diminution of the swelling. This treatment was continued, and on the 14th the temperature was normal, the swelling and pain had subsided, and only a little stiffness remained. On the 17th, she was well. As regards outward application, the whole arm and hand were simply wrapped in cotton wool and supported in a broad sling.

A woman, aged 43, pricked the index finger of her right hand while drawing a "high" partridge. Four or 5 days had elapsed before she was seen, when the whole hand and arm up to the shoulder were œdematous, livid and intensely painful. There was a temperature of 104° with great restlessness and depression. The patient was sent to bed,

but could not sleep on account of intense pain. The limb was wrapt in cotton wool and carefully supported on pillows, and acid. sulph. dil. was given in 30-minim doses every 4 hours. Within 20 hours the pain began to subside and the temperature to fall, and at the end of the 4th day of treatment the swelling began to lessen. The patient continued to improve until at the end of 3 weeks she was convalescent as far as the arm was concerned, but the treatment was continued in 20-minim doses with a little quinine sulphate (2 grains) for a further week, when she recovered her normal health.

A short, thick-set, plethoric man, aged 45, a gross eater accustomed to take plenty of beer and stimulants, but who also took plenty of exercise, came under treatment on May 16, for a tense and diffuse red swelling of the left upper lip and left ala of the nose, extending to the left eye, the lids of which were very swollen and quite closed. It was extremely painful. There were 3 small apertures disclosing a hard grey slough, as in a carbuncle. The temperature was high. He was sent to bed and put on the acid. sulph. dil (30 minims in a wineglassful of water every 4 hours). After 24 hours the spread of the inflammation was arrested and the grey slough in each aperture began to soften down into pus which discharged in increasing quantity through the openings. The swelling began to subside; the temperature went steadily down, and on June 10 he was quite well. The only other remedy was carbolised vaseline (1 in 20) on lint as a dressing. For at least the first 10 days he was allowed only light diet, and as an aperient magnesium sulphate was given in drachm doses in 10 oz. of water fasting.

The writers have treated in the same way a large number of similar, as well as of milder, cases, *e.g.*, blind boils which were aborted. Recurrent crops of boils and pimples in different parts of the body and severe cases of acne yielded readily.

This remedy proving so effectual the writers were led to try in it other pyogenic infections. Bronchiectasis and pulmonary tuberculosis, where there is so often a staphylococcic infection, were benefited. The sputum became less in quantity, and in tuberculous cases the fluctuations of temperature were less.—*The Medical Review*.

OBSTETRICS AND GYNÆCOLOGY.

Toxæmia of Pregnancy: Treatment of.

G. P. SHEARS.—In a number of cases of toxæmia of pregnancy, 4 of them severe, free administration of oxygen was tried by the author with

asserted good results. Improvement and eventually recovery were noted in all the patients, and in one the relief afforded was so prompt and complete that it seemed difficult to ascribe it to mere coincidence. The author suggests that oxygen, either by inhalation or subcutaneously, be freely used in these cases. The measure will be found subjectively agreeable to the patient, and does not conflict with milk diet, catharsis, hydrotherapeusis, and other curative agents of proved efficiency in this affection.—*Monthly Cyclopaedia & Medical Bulletin.*

The Significance of the Expulsion of Meconium During Labour.

ALTENBACH.—In breech presentations during the period of expulsion the pressure on the abdomen of the child usually results in the mechanical expulsion of meconium, and the phenomenon by itself is devoid of any sinister significance. In all other presentations the appearance of meconium in the liquor amnii is an indication that the life of the child is in danger. The opinion that the prognosis as regards the life of the child is good so long as the liquor amnii retains its normal opalescent appearance is supported by the records of over 45,000 labours collected at the Clinique Baudelocque during the last 20 years. A study of these shows that in the great majority of cases when the child has died or its life been seriously threatened during labour the meconium was expelled. There was only one exception to this rule: the expulsion of meconium was absent when the death of the child was due to severe hæmorrhage during labour from such causes as retro-placental hæmorrhage or bleeding caused by the abnormal situation of the placenta or its premature detachment. Even this exception is not invariable as in 10 out of 50 cases of placenta prævia, and 3 out of 12 cases of retroplacental hæmorrhage, expulsion of meconium was observed. It is probable that when the child dies without the expulsion of meconium the hæmorrhage is sufficiently severe to cause death rapidly, but observation of the foetal heart sounds prove that rapid death does not always occur in these circumstances, which may account for the apparent exceptions.—*The Medical Review.*

OPHTHALMOLOGY.

Treatment of Interstitial Keratitis by Salvarsan.

GEORGE W. VANDERGRIFF believes that salvarsan is by far our most efficient remedy in the treatment of interstitial keratitis. While the disease may be cured with mercury, it requires a longer time, during which connective tissue is likely to be deposited in the cornea which

affects the ultimate vision. The action of salvarsan is so prompt and efficient that connective tissue is not formed, thus preventing the impairment of vision after the inflammation has subsided. In his experience salvarsan causes the absorption of the corneal infiltrate to a much greater extent than mercury, even after the inflammatory symptoms have subsided. While it will not cause the disappearance of the scars of a past interstitial keratitis, it will, if used when acute symptoms are present, check the inflammation and prevent the further formation of connective tissue.—*The American Journal of Ophthalmology.*

Transplantation of the Human Cornea Previously Preserved in an Antiseptic Fluid.

A. MAGITOT, having successfully transplanted a corneal graft, taken from a lower animal and preserved a number of days in blood serum at a temperature slightly above 0. C., upon the eye of another animal of the same species, determined to try the operation upon a human eye. The opportunity presented itself in the case of a boy 14 years of age, who had a large cicatricial pterygium, the result of a burn from quicklime several years previous. With the exception of a small spot in the upper, inner quadrant the entire cornea was opaque and this spot was nebulous. Several days later a patient with absolute glaucoma in one eye desired to have the eye enucleated for the relief of pain. The cornea was opalescent and insensible, due to the extreme hypertension, but the enucleated globe was carefully placed in a hemolyzed blood-serum taken from a person in whom the Wassermann reaction was negative, after having been washed successfully in ten tubes containing Locke's solution at room temperature. Kept in the blood-serum in a sealed container-tube, the globe was placed in an ice-box at a temperature which was maintained at 5 C. At the end of twenty-four hours the cornea had become quite clear and was kept in this state for a week. After eight days, the pterygium being first carefully dissected away, a piece of the cornea 4 mm. high and 9 mm. long was carefully removed from the center of the opaque cornea, down to Descemet's membrane, but leaving this intact. To this prepared surface a piece of the same size and thickness from the preserved cornea was applied without suturing. When the binocular bandage was removed at the end of the third day the graft was found to be in perfect apposition and entirely transparent. Fluorescein did not stain at any point. Eight days afterward the red fundus reflex could easily be seen through the pupil. While the pterygium returned on the cornea it did not grow over the graft although it completely encircled the edges

of the keratoplasty. Nearly a year after the operation was performed the graft is still perfectly transparent and the visual acuity is 1/7.

The author believes that the result was as good as if fresh material had been used and that for the first time a successful transplantation has been done by the aid of corneal tissue preserved for several days in a state of vitality. The success of his operation shows also that corneal grafts from eyes affected with absolute glaucoma may be used for this operation.—*The American Journal of Ophthalmology*.

DERMATOLOGY.

Eczema and some Eruptions often Mistaken for It.

BY

H. G. ADAMSON, M.D., F.R.C.P.

The term eczema is now used in a more restricted and, therefore, more definite sense. It is generally believed to be of non-microbic origin. For this and other reasons the following eruptions have been separated from it: impetigo contagiosa (of streptococcic origin), staphylococcic impetigo, and many chronic forms of dermatitis, probably due to one or both of these organisms; the so-called seborrhœic dermatitis, which is probably of microbic origin and related to the impetigoes; certain chronic eczematoid eruptions of the fingers and toes due to ring worm fungus. There are also two other eruptions of non-microbic origin, which, although having some characters in common with eczema, are excluded from the group, namely cheiropompholyx and lichen chronicus simplex of Vidal or lichenification.

DEFINITION.

I would define eczema as a *catarrhal inflammation* of the skin of non-microbic origin, resulting from some local external irritation in a predisposed person.

Catarrhal inflammation.—By catarrhal inflammation is meant an inflammation in which serous exudation is the prominent feature rather than cell exudation. Microscopic examination shows congestion and œdema; the blood-vessels in the corium are dilated, and the prickle-cells of the epidermis are swollen and separated by serum in places to form intra-dermic vesicles. Clinically corresponding to these histological features are more or less sharply circumscribed areas of skin which are reddened, swollen, and covered with minute vesicles or weeping points.

The non-microbic origin of eczema.—For many years there have been keen discussions as to whether eczema is or is not of microbic origin. The tendency is more and more to regard eczema as non-microbic. The primary eczema vesicle has been shown to be amicrobic. Cocci are found in later lesions, and there is no doubt that eczema may be complicated by staphylococcic and by streptococcic infections, and perhaps aggravated and kept up by them; but these are secondary infections.

External irritants and predisposing causes.—Local irritation is an important factor in the production and maintenance of the eruption. But some predisposing condition renders the skin susceptible to local irritants.

Trade or occupation eczema is an example. Persons whose hands are exposed to irritating dust or fluids—barmen, washerwomen, photographers, museum attendants who handle formalin specimens, and many others—are liable to eczema. A striking fact is that the patient may have followed the occupation for years without having eczema. Evidently a sensitiveness to local irritants has developed. What the predisposing influence is we do not know; but local irritation must have much to do with the appearance and continuance of the eruption, for it improves on stopping the work and relapses when the work is resumed.

In all cases of eczema there is a great susceptibility to local irritants, so that frequent washing, exposure to heat and cold, slight frictions, etc., which in a normal skin would produce no reaction, produce eczema or aggravate it if already present. It seems probable that these patients are made susceptible by some toxin, the result of some metabolic disturbance. It has long been the custom to speak of gouty eczema, but all we know is that some patients who suffer from eczema belong to what is called a lithæmic type—a predisposition in the individual or his family to gout, gravel, migraine, asthma, bronchitis, diabetes and eczema. The French use the term "arthritic" to express this. But it is by no means clear that all who suffer from eczema are of lithæmic tendency.

CLINICAL FEATURES OF ECZEMA.

It has been customary to classify eczemas according to (1) lesion, and (2) region. Amongst lesional varieties there are *E. erythematosum*, *E. vesiculosum*, *E. pustulosum*, *E. rubrum* or *madidans*, *E. squamosum*, *E. rimosum*. Some of these, such as *E. pustulosum*, are no longer regarded as eczemas. The majority merely describe some one feature which is more prominent in that particular form, but which is common to all eczemas.

The characters already mentioned—redness, swelling, and pin-point vesicles, with the symptoms of burning or itching, and aggravation by local irritation—apply to every case of eczema. One of the most striking of these features is often overlooked—œdema of the affected area. It is apparent to the sight, but is more readily appreciated by pinching up the skin between the finger and thumb, when it will be found twice or thrice as thick as normal. As secondary results of vesication in the œdematous areas we may get crusting (*E. crustosum*); or the minute broken vesicles may be so closely set as to form raw surfaces (*E. madidans*); or parts where there is constant movement the œdematous areas may become deeply fissured (*E. rimosum*).

In regard to the regional varieties, *E. capitis*, *E. faciei*, *E. palmaris*, etc., many of these old terms apply to diseases which are not now regarded as eczema.

For practical purposes it is more convenient to classify eczemas according to certain clinical types, rather than according to the appearance of the lesions or other distribution. The main types are as follows:—

- (1) Trade or occupation eczemas.
- (2) Nummular or patchy eczemas.
- (3) Erythematous eczemas.
- (4) Eczema of the palms and soles.
- (5) Infantile eczema.

Trade or occupation eczemas.—The eruption occurs about the fingers, hands or forearms of those whose occupation involves contact with local irritants. Eczema of this type may vary in severity from a few red, swollen patches covered with pin-point vesicles, to involvement of the greater part of the skin of the hands, fingers and forearms. The groups of minute vesicles are seen. On pinching up the skin it was thickened by œdema. The eruption may eventually spread to other parts of the limbs as nummular eczema, and to the face as erythematous eczema.

Nummular or patchy eczema.—The patches are generally most abundant upon the arms and legs. These may be primary, or they may be, as stated, secondary to trade eczemas. They are more or less circumscribed, they are red, the skin is œdematous, being twice or thrice the normal thickness. They are covered with pin-point vesicles, or small crusts, or the whole surface may be more

or less excoriated and crusted. They itch intensely, and are made worse by scratching or other local irritation, and subside when protected from such irritation.

Erythematous eczema occurs on the face in adults, or on the sacrum and penis. On account of the looseness of the cellular tissue, there is often considerable swelling of the face, especially about the eyelids, and of the scrotum and penis. The redness and swelling may be so marked that the disease is mistaken for erysipelas, though there is generally here and there sufficient evidence of pin-point vesication to point to the nature of the case. Erythematous eczema, generally forms part of a more generalised eczema, which includes the hands, and often there are also nummular patches on the arms and legs.

Chronic eczema.—Essentially the features are the same—in fact, it consists of a series of acute or subacute outbursts. But there may be an œdematous thickening of the skin even between the outbursts.

Palmar eczema is common. It may be confined to the palm, or involve also the backs of the fingers. It is often difficult to distinguish from syphilis or psoriasis of the palms. It is distinguished by the itching, and by the minute vesicles beneath the epidermis at some part of the eruption, and sometimes by the presence of eczema on the backs of the fingers or elsewhere.

Infantile eczema has all the features of eczema in older subjects, but the distribution is characteristic. It occurs commonly between the ages of 6 weeks and 2 years. It is always present upon the face. In mild cases it attacks the cheeks and forehead; in severe cases it extends over the whole face except around the eyes, nose, and mouth. Sometimes the arms and legs are involved, but never without the face. In mild cases the eruption may be little more than a redness of the cheeks with thickness from œdema and pin-point vesication. In more severe cases there may be oozing with heaping up of crusts. It usually disappears before the age of 2 years, but in severe cases, if not efficiently treated, it may go on into childhood. Then it loses its characteristic distribution on the face and becomes a patchy eczema of the limbs and trunk. A not uncommon situation of the patches is behind the knees. It may continue into adult life unless means be taken to prevent the constant scratching which keeps up the eruption.

DIAGNOSIS.

In diagnosing eczema from other eruptions, the most important points are as follows:—Eczema itches, it is made worse by scratching, it

subsides when protected; it is a catarrhal inflammation, so that we find redness, with œdema (which is evident on pinching up the skin); and the red œdematous area is studded with pin-point vesicles, crusts or erosions.

Probably the affection most often mistaken for eczema is scabies. In any case of suspected eczema the possibility of scabies should be considered. The wrists and fingers should be examined for burrows. Scabies is often treated too long with sulphur ointment, with the result that a generalised sulphur dermatitis, simulating eczema, is produced. The only way to avoid falling into the error of mistaking scabies for eczema is to become familiar with the burrow of scabies and with the art of finding the acarus. Most of the other eruptions which present difficulty in diagnosis from eczema, have been separated from it. The diagnosis will be considered with their description.

ERUPTIONS SEPARATED FROM ECZEMA.

The first eruption to be separated from eczema was *impetigo contagiosa*. It is of streptococcic origin. The primary lesion is a vesicle or blister which dries into a superficial crust and there is not œdema, with pin-point vesication, nor the pruritus and sensitiveness to local irritation of eczema. Removal of the crusts and applications of mild antiseptics soon cure. Most cases of so-called eczema capitis and eczema behind the ears are examples of impetigo contagiosa.

Another form of impetigo is due to staphylococcic infection and known as *impetigo of Bozzhart*. It consists of pustules seated around hair follicles. This impetigo includes the common boil, and also sycosis menti and other staphylococcic infections formerly confused with eczema.

Many forms of *chronic dermatitis* of streptococcic or staphylococcic origin are gradually being differentiated from eczema. They are distinguished by the absence of the tendency to exacerbation on irritation, by their sharp spreading margin, and by their clearing up under antiseptic treatment.

Another eruption which includes many types is known as *seborrhœic eczema*. This is now coming to be regarded as more nearly related to the impetigoes than to the eczemas. It is probably the result of infection by a mild strain of staphylococcus (*Staphylococcus epidermidis albus*). The eruption affects particularly certain regions, as the scalp, the labio-nasal fold, the flexures, and the central parts of the chest and back. Its primary lesion is a tiny follicular papule. Large, red, scaly, some-

times oozing and crusted areas are formed by fusion of these primary lesions. It clears up rapidly under antiseptics, especially sulphur.

Eczematoid ringworm of the fingers and toes.—It has been lately discovered that many so-called eczemas between the fingers and toes, especially between the toes, are ringworm infections. The simulation of eczema is often close but the sharp margin of the vesicating, eroded, or scaly area between the toes, is always suggestive of ringworm, and if the patient has or has had, ringworm of the groin, the diagnosis is almost certain. It is to be made certain by finding the fungus in the scales.

Cheirpompholyx is a vesicular, or sometimes bullous, eruption, which affects the fingers in mild cases, and the hand or foot in severe cases. Both hands or both feet or all four may be affected. It is common in persons who sweat much, and is thought to be due to irritation of a toxic sweat. It usually appears at the beginning of hot weather, and often recurs every year or every few years. It differs from eczema in that the vesicles and blisters are larger and in that there is no redness nor deep-seated œdema of the skin. Eventually the vesicles and blisters dry up spontaneously.

Lichenification.—Lichenification is the name given to areas of chronic dermatitis in which the skin is dusky red, thickened, and the normal furrows exaggerated so as to "quadrillate" the surface of the patch. These patches are produced by long-continued scratching, and therefore have always an oval shape. They often occur in neurotic persons, and start with some trifling itching spot, which the patient cannot refrain from scratching for months or years, until the skin becomes infiltrated.

TREATMENT.

The treatment may be summed up in three words: protection from irritation. Although there is some predisposing factor which renders the skin susceptible to local irritation, and a change of diet, a change of climate, or other alteration in the conditions of life may sometimes lead to the spontaneous disappearance of eczema, yet in the large majority of cases no evidence can be found of an internal cause, and dieting is ineffectual. In a few cases, which are sometimes termed "gouty," it is an advantage to restrict meat and alcohol. In many cases, however, the patient has been starving by treating himself on anti-gout lines, and needs feeding up. Occasionally in children eczema alternates with asthma. In most cases we find no definite predisposing cause, and it is

best to concentrate attention upon the removal or prevention of local causes.

Apart from the local irritants of various trades or occupations, eczema may be kept up by strong soaps, the intermittent use of water in the ordinary ablutions, the friction of rough clothing, the irritation of dust from books and papers, and above all by the rubbing and scratching. Generally the last is responsible for the continuance of the eczema, and it is one of the most difficult factors to eliminate.

In acute eczema, it is well if possible, to keep the patient in bed, at any rate until the acute stage has subsided. One of the best and simplest applications is a continuous dressing of butter-muslin folded 4 or 5 times, and soaked in normal saline solution (common salt 3j to one pint of boiling water). If there is difficulty in keeping the dressings moist they must be covered with gutta-percha tissue and lightly bound on. Wet dressings should be used only for a few days, and then an ointment, paste or cream containing zinc oxide should be continuously applied in the manner to be described.

In most cases it is well to forbid the use of water, except in the form of dressing just described. But in acute or chronic eczemas, which are extensive, and when the patient is kept in bed superintended by a nurse, daily bran baths are often beneficial. These are made by soaking in the bath two or three pounds of bran placed in a bag or pillowcase, and swirling it about until the water is thick. The patient is placed in this bath for 10 or 15 minutes. No soap is used, and immediately on coming out the skin is mopped with warm dry towels, and the dressing applied to the eczematous patches, after first dabbing them with lead and calamine lotion.

In subacute eczema we may begin at once with greasy applications. The ordinary zinc ointment of the Pharmacopœia is an excellent application, but its value is much enhanced by the addition of starch powder to form the well-known zinc oxide paste of Lassar: *Zinci oxidi 3ij, pulv. amylic 1i 3ij, vaselin 3ss*. This paste is spread upon butter-muslin and lightly bound on the affected parts. The dressing should be changed once or twice a day, or more often if necessary. At each dressing the old zinc paste should be carefully removed. This should be done, not with water, but by gently wiping it off with a piece of wool soaked in a liquid vaselin (pav. dry, and to prevent it from drying). The dressing should never be allowed to get dry, and to prevent this it may be necessary to occasionally dab the outside with liquid vaseline.

If we can but ensure that the skin is efficiently protected in this way, most eczemas will get well without further treatment. If improvement does not take place, there is some fault in the application of the dressings, or, the patient is rubbing and scratching the patches.

In some cases which hang fire we may hasten the cure by means of drying-up applications. The best ways are:

(1) To mop the eczematous patches with lead and calamine lotion at each change of dressing: *Liq. plumbi subacet 3ss, glycerine 3ss, calaminæ 3j, zinci oxidi 3j, aq. ad 3j*.

(2) To paint the patches every other day with a solution of silver nitrate: *Argenti nitratis gr. x-xx, spirit aetheris nitrosi 3j*.

(3) To add to the zinc oxide paste, lenigallol in the proportion of 3ss—3j to 3j. Lenigallol (a derivative of pyrogallol acid) dries up the wet points, which become covered with little black crusts. These fall off and leave a dry surface.

For patches of eczema in parts where bandaging is difficult, the salve-mull zinci oxide of Beiersdorf and Co., No. 1011, may be employed instead of the zinc paste. This is a paste, spread on muslin, which may be cut into pieces of the desired size and stuck on the patch.

In infants there may be great difficulty in preventing scratching and rubbing, and until this has been overcome no progress will be made. The zinc paste must be applied on a mask of butter-muslin with holes for the eyes, nose, and mouth, and lightly bound on. The arms must be put into splints, made by placing a roll of cardboard round the elbow so as to prevent the arms being flexed. The child can then move its arms, but cannot reach its face.

Most eczemas can be cured by careful attention to the protective measures described, but a few further applications are useful in special circumstances.

In chronic eczema of the palms with much thickening of the epidermis, treatment may be commenced by the addition of salicylic acid gr. xx to 3j of the zinc paste, using the simple paste after the epidermis has been peeled off. In erythematous eczema of the face in adults, the lead and calamine lotion mentioned, may be mopped on several times daily, instead of using ointments. But care must be taken to prevent the powder in the lotion from caking on. This is best done by mopping with oatmeal water before each fresh application of lotion.

For chronic patches of eczema X-ray applications are of great value, and will remove them when all other methods have failed.—*The Medical Review*.

Cases and Comments.

A case of Appendicitis, showing few and mild clinical symptoms, but having grave pathological conditions.

BY

A. BAYLEY-DE CASTRO,

Military Assistant Surgeon.

For a long while now, there having been raised a great controversy in the leading medical papers, about Appendicitis, and its early or late operation, I trust the few notes I append will be of some help to prove to the usefulness of an early operation.

Dr. Charles Barrett Lockwood, remarks in his book "The Pathology and Surgery of the Appendix" that "the rapidity with which pathological changes occur in the appendix is attended with corresponding rapid clinical symptoms. For instance gangrene of the appendix may occur in a few hours and all the clinical phenomena may run their course in a few days." * * * "Ulceration with concretion is usually attended with constant discomfort and occasional severe attacks of pain."

History of the case.

About May or June 1910 I first got a pain in my right iliac region, accompanied with a rise of temperature to 101°F. On this occasion I vomited for a couple of times. Purgatives, low diet, rest in bed, and hot stupes set me right.

I do not remember any other attack of pain or discomfort till about August 1911, which, however, was not accompanied by any very distressing symptoms, but in September of the same year I had a distinct attack of pain in the right iliac region, with malaise and nausea, but no vomiting. I never took my temperature on this occasion. In May 1912 I had a similar attack while at Rangoon. On the 19th July 1912 I suffered the worst attack of all. I was feeling ill, and suddenly while walking across from my hospital to my quarters, was seized with a most acute attack of pain localized around McBurney's point. I used fomentations, purgatives, and light diet, and for the next three evenings my temperature hovered around 99.4° and 99.6°F. After that I had one or two slight attacks of an uncomfortable feeling about the appendicular area. On the 21st of November I noticed another new symptom or rather sign, *i. e.*, when I got up in the morning I had a distinct pain in the

right iliac region not localized, but while emptying my bladder, I distinctly felt that as the distention kept lessening the pain kept on gradually going till it all but disappeared. On the two following mornings I adopted means for having my bladder very full so as to more carefully observe this phenomena; but unfortunately experienced no such pain or sensation again. A few days later I suffered from an attack of pain felt more in the left lobe of the liver than any where else. My bowels have, to the best of my remembrance, always been regular, though on one or two occasions when I had been doing hard riding, as happened between January and March 1910 when I was out with a battery of artillery going from Meerut to Mooltan, my bowels had remained absolutely bound for a week at a time.

On the 5th of December 1912 I was operated upon in the Civil Hospital, Thayetmyo by Capt. R. Kelsall, M. B. (London) I.M.S., assisted by Mr. M. N. S. Chetti, his House Surgeon.

The appendix was found to be remarkably enlarged, being 6½" long and a degree over ¼" in width. The extreme tip was very congested and had an ulcerated focus of small diameter in the centre of the congested area. About ½" below this was a twist with a constriction and below this again after a space of about 2" another twist without a constriction, while between the two twists was a large foecal concretion. There were no adhesions any where. On the 15-12-12 the stitches from the skin wound were removed, beautiful union by first intention having occurred. Recovery was uneventful, and I am most grateful to the operator and his assistant, who was untiring in his efforts for my comfort.

THE ANTISEPTIC.

JUNE, 1913.

The Medical Inspection of School Children.



THE medical inspection of school children is one of the results of modern civilization. The wise men travelled from East to West. But this agency of modern civilization comes from the West to the East. It had its origin in Germany. In 1898 medical inspection of schools was adopted in the towns throughout Germany. In England it was the Education (Administrative Provisions) Bill of 1907 which imposed the duty of medical inspection of all children in English public elementary schools. A recent circular of the Education department of the Government of India has directed attention to the subject in India and local Governments are already considering the most practical methods of introducing the system of medical inspection of schools into this country.

There are two elements involved in the medical inspection of schools, namely, the inspection of the school building and the inspection of the school children. In other words, both the child and his surroundings are to be brought under careful medical inspection with a view to the physical improvement of the future generation and its necessary consequence—their mental and moral improvement.

Dr. Leslie Mackenzie calls the school the "functional environment" of the child, and he explains his meaning in the following eloquent passage:—

"Why functional environment? By this phrase I wish to indicate that the primary thing to consider in the hygiene of a school is the point where the actual structure affects the living, actual child. From nine in the morning to three or four in the afternoon, the child is acting in the school, and the school is reacting on the child. He must breathe. Is the air over-night fresh? He must move about. Have the floors and forms been properly cleared of dust? He must sit down. Are the seats the correct height? He must write. Are the desks the correct height for his size? Are they too near him, or too far from him? He must

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read. Does the light shine from his left side? He must see the black-board or the wall card. Is it placed in the correct light for him to see? He sits for most of an hour. Is the room warm enough? Are the heating appliances in working order? Has he on clothes enough? He reads aloud in his class, or shouts, or sings in concert; he coughs, or sneezes, or otherwise clears his air-passages; in a thousand ways he fills the air with pollutions from his mouth, nose, and lungs. Are the walls cleaned? Are the maps cleaned? He spits on his slate, if he is allowed to use one; he bites his pen; he chews his pencil. Are slates, are pens, are pencils cleaned? At the word of command, he springs to his feet, marches, marks time. Has he wiped his shoes on the mat? Are the floors cleaned? Are the doors and windows opened to keep the beaten room clear of dust? He swings his arms, he creates a thousand currents round his body. Are his clothes clean? Is his head clean? Are his hands clean? So, through the whole day he is in living touch with some part of the school. He is collecting and redistributing dirt and dust all day long. I say nothing of the major matters—lavatories, water supplies, closets, drainage; these are all to be assumed. They need the most stringent supervision, and they do not always get it. What I should wish to paint is the restless, growing, skin-shedding, mucus-shedding, dust-distributing, spitting, coughing, and shouting demon that the school boy, at his worst and best, always is. Where one boy is, it takes a woman to keep the house clean. Where a thousand boys are, it takes a local authority."

We will not deal at length with the medical inspection of school buildings. That is a subject with which our readers are more or less familiar. The sanitary surroundings, the water supply, drainage, lavatories, system of ventilation, the walls, floors, roofs, play grounds, all must come under the rigid scrutiny of the Medical Officer of Health. Even now in municipal towns the school buildings come under the supervision of the Medical Officer of Health. But what is absolutely new to this country is the medical inspection of the school child itself. The child has to be studied and watched as to its nutrition and growth, its height and weight, its sleep and play, the condition of its teeth, the state of the glands, the existence of defects of respiration due to enlarged tonsils and adenoids, the state of its ears and the function of hearing, the eyes and vision, the condition of the skin, the presence of skin diseases, and the presence of infectious diseases and many other conditions. We shall try and put forward some practical suggestions for constructing a scheme of medical inspection of school children in this

Presidency. But before doing that let us carefully study in detail the systems so successfully followed in two of the most advanced towns in the continent of Europe.

The following are the rules for the medical inspection of school children in Wiesbaden :—

“ REGULATIONS FOR THE SCHOOL DOCTORS ATTACHED TO THE MUNICIPAL ELEMENTARY AND MIDDLE SCHOOL OF WIESBADEN.

It is the duty of the School Doctors to supervise the conditions of health of the pupils assigned to them, to co-operate in the medical examination of the rooms and installations belonging to the school, and to execute in this regard all the orders of the Magistracy.

In particular, the following rules must be carried out :—

1. The School Doctors must carefully examine the bodily condition and the health condition of all newly entered pupils, in order to determine whether they require a prolonged medical supervision or special attention during instruction at school, *e. g.*, exclusion from instruction in particular branches, *e. g.*, gymnastics and singing, or limitation in time given to instruction, assigning of a special seat on account of defects in sight or hearing, &c.

Besides this detailed examination, which must be undertaken in the first four to six weeks of the school year, the newly entered pupils must, within the first two to three days, be subjected to an external examination for communicable diseases and vermin.

For each child examined a health schedule must be filled up, and this must accompany the pupil through his whole school period. If a child appears to require constant medical supervision, the entry “ Medical Supervision ” must be made on the top right corner of the first page. The column “ general constitution ” is to be filled up at the entering examination of each child, the categories “ good,” “ middle,” and “ bad,” being used.

Children whose general constitution is entered as “ bad ” are to be treated as under medical supervision until the School Doctor enters them expressly on the health schedule as no longer in need of supervision.

(The term “ good ” is to be used only in perfectly sound health conditions, and “ bad ” only in pronounced dispositions to disease or chronic illness).

The other headings are to be filled up only in case of necessity and that at the entering examination, or in the case of illness supervening

in the course of the later school years. The weighing and measuring are undertaken by the special class teacher in charge, and must be entered for each half year in the appropriate column, correct to half a centimetre (less than a quarter of an inch), and a quarter of a kilogramme (about half a pound). The measurement of the chest is taken by the Doctor, but only in children that are suspected of lung disease or whose general constitution has been entered in the health schedule as “ bad.”

2. In the same way as has been described under section 1 for the detailed examination of new entrants, the School Doctors have to examine the whole children of the third, fifth and eighth school year. These examinations are to be carried through in the month of October or November.

Here it is expressly to be noted and entered in the health schedule whether and in what way diseases noted at an earlier period have altered. The constitution and its alterations are to be given in each case.

It is desirable that, after the examination of the pupils of the eighth year that are ending their term at school, a final opinion on the total development of the child during the school period be entered on his school schedule and, in particular, a reference made to any noteworthy illnesses that have occurred during that time. These are to be noted in the last column by the class teachers.

On these examinations of the later school years a special report must be filled up in the form used at the first examinations and transmitted to the senior School Doctor in terms of section 9.

3. Every fortnight, and more frequently if infectious diseases are prevalent, the School Doctor holds a consultation at the school with the School Director on a day previously arranged ; for example, the first and third Thursday of the month. Time: at ten o'clock in the forenoon, and not later than twelve o'clock. For this purpose, if at all possible, the Doctor should have a special room put at his disposal.

If the Doctor wishes to visit the school on a day other than that previously arranged, he must intimate the fact to the School Director at least three days in advance.

If any unforeseen difficulties occur, the day of visit should be postponed till the following week. The first half of the consultation should consist of a visit of ten to fifteen minutes' duration to classes 2 to 5, while instruction is going on.

Each class must, if possible, be visited twice during the half year. At those visits the whole of the children should be subjected to an external inspection. When any special observations suitable for immediate discussion are made, information is asked from the teacher, and given him, in return, if he wishes.

If, on those occasions, individual children appear to require more precise examination, this is afterwards undertaken in the Doctor's room.

At the same time, those visits serve for the inspection of the school premises and their arrangements, as well as for the supervision of the ventilation, heating, deportment of the children, &c.

In reference to the teaching, the Doctor is warned that he should tactfully avoid all exposure of a teacher before his class.

At the second part of the consultation, any necessary investigations of a more precise kind are to be undertaken.

Further, children from classes other than those visited on the particular day are to be brought to the Doctor, but only in really pressing cases, and especially where there is a suspicion of illness from infectious disease.

The health schedules of all the children to be submitted for examination must be laid before the Doctor or sent to him by the class teacher. The teacher concerned must, if at all possible, be present at the medical examination. For the notification of the other classes and the provision for the care of the children concerned, the School Director is responsible. This is best done by circulating among all the classes, a day in advance, a form on which the individual teachers note whether any children, and how many, require medical examination.

The medical treatment of sick children is not the business of the School Doctor. If such treatment appears necessary, the parents concerned are to be advised of the fact. To them is left the choice of a doctor; but it is recommended that where necessary in special cases (eyes, throat, nose, etc.) any necessary directions to specialists be given. With the older children this can be done verbally.

If an information of this sort is without result, and always in younger children, the printed report forms are to be filled in.

But this is to be done only in serious and important illnesses, where the interest of the child or of the school necessitates energetic measures.

In the filling in of the particular form, all harshness and rudeness of expression are to be avoided.

The School Doctor is responsible for sending the form to the parents concerned.

4. The health schedules for each class are to be preserved in a durable portfolio and remain in the school so long as they are not required by the School Inspector.

The schedules with the entry "Medical Supervision" are to be laid before the Doctor at every visit to the class. If a child passes into another school, his health schedule must be sent thither by the School Director.

5. The School Doctors must, at the request of the School Director, examine individual children in their homes in order to ascertain whether, in cases where the parents bring no other satisfactory medical evidence, absence from school is justified.

6. The School Doctors must, at least once in the summer and once in the winter, inspect all the rooms, lobbies, etc., and their fittings and furnishings. At this, as at other visits, any appropriate observations on the condition of the matters to be supervised, as well as on the maintenance of the cleansing, ventilation, heating and lighting, also any recommendations arising out of these observations, are to be entered by the School Doctors in the book kept by the School Director for the purpose.

7. The School Doctors have no authority to give any direct instructions to the School Directors or Teachers or to the Janitors or other school servants. If they consider that any recommendations made by them in relation to the treatment of the children or the hygiene of the premises have not been satisfactorily carried out, they must report their complaints to their Representative on the Health Committee.

In pressing cases, they may also give intimation to the Town School Inspector, and, as regards measures that require the attention of the Sanitary Police, they give intimation also at the same time to the Imperial District Medical Officer.

8. With a view to regular and rapid procedure, the Representative of the School Doctors on the Health Committee will summon his colleagues to general consultations, to which the Imperial District Medical Officer of Health is to be specially invited if there is any question of the health conditions of the premises. In winter, the School Doctors will at the teachers' meetings, as far as desirable and practicable, give short contributions on the most important questions of school hygiene.

9. The School Doctors must, by the 15th of May at the latest, send to the Senior School Doctor a written report on their work during the

school year just ended. The Senior School Doctor must, by 1st June at the latest, present to the Magistracy these individual reports with a short critical general report. In the preparation of the reports the following seven points are to be attended to:—

(1) Tabular numerical statement of the results of the examinations of the entering classes, and on a special form the examinations of all the later years.

(2) The number of the consultations held or medical visits made to the classes.

(3) The number and nature of the more important cases of illness that have been submitted for examination at the consultations.

(4) Any resulting special medical orders (limitation of hours of instruction, of gymnastics, etc.)

(5) The number of the written reports sent to the parents and the result.

(6) The number of school children remaining under medical supervision.

(7) A summary of the defects recorded in the hygiene book in reference to the rooms, etc.

10. If a School Doctor has to leave the city for more than a week, except during the time of school holidays, he must report the fact at the time to the Magistracy, and provide at his own expense a suitable deputy.

11. The School Doctors, besides a fixed yearly honorarium payable in quarterly instalments, receive from the Town Treasury also an amount calculated according to the number of school children examined in the third, fifth, and eighth years. The account must be presented in the month of December.

12. The Magistracy may at any time, on proof of negligence, dismiss the School Doctor. In other cases, the engagement can be terminated only on the giving of three months' notice by School Doctor or Magistracy.

13. The Magistracy reserve the right to alter or extend this order.

"REGULATIONS FOR THE SCHOOL DOCTORS OF THE
TOWN OF NUREMBURG."

1. It is the duty of the School Doctors, on the order of the Magistracy and the School Authority, to co-operate with the Imperial District Physician in the general health inspection prescribed by the

State for municipal schools as well as for private educational institutions, infant schools, and kindergartens.

2. The School Doctors must visit the public and private schools assigned to them at least three times a year, and particularly before Christmas, before Easter, and before the Summer holidays. On these occasions, they must pay attention to the proper condition of all the arrangements for warming, lighting, ventilating and cleansing of the schools rooms, including the gymnasiums, school-baths and lavatories.

Further, they have to observe the deportment of the children, and to record their observation as to whether each child has had assigned to it the school desk corresponding to its size.

In the schools assigned to them, they must also, on invitation, take part in the regular yearly visitations of the Municipal School Committee.

Of their official actions and their observations at their visits, they must on every occasion make short notes on the prescribed form. These, along with the statistical information, are submitted at Christmas, Easter and the close of the year, for the inspection of the Magistracy, who, as occasion requires, have copies prepared, and send back the originals for preservation in the records of the School Doctor.

3. The School Doctors must visit all the infant schools and kindergartens in their district at least three times a year and at the same intervals as they visit the town schools, and if any neglect is found to exist, they must report it as soon as possible to the Magistracy.

4. The School Doctors must, further, subject all new entrants to a detailed examination in order to ascertain which of them requires special supervision during instruction (assigning of a place in the front benches, relief from instruction in particular branches and the like), or medical supervision during the school period. This examination is divided into three parts:—

The first is undertaken at the beginning of the school year, and must be completed by the end of the month of September. It consists of an external inspection of the children, and its object is to ascertain whether those fit for school—that is, according to their bodily and mental development—can undergo instruction at school without injury and with satisfactory results. If the School Doctor, in agreement of the teacher, finds that, in the interest of the child himself, as well as in the interest of the general school teaching, it is necessary to postpone school attendance for a year, he records this in a certificate, of whose contents the relatives of the particular child are informed through the

Inspectorate, who are responsible for the further measures necessary. The second examination must be completed by the close of the Winter half year—that is, by Easter.

For the carrying out of this examination the children must be presented to the School Doctor with the upper part of the body exposed so that it shall be possible to examine precisely their bodily development, and their health condition.

To this second examination, which may be conducted either in the class-room, or in another special room, and in the case of boys in the presence of the class teacher, in the case of girls in the presence of the class mistress or her representative, the mothers of the children are invited. It is accordingly necessary that a definite day be agreed upon between the teacher and the School Doctor, and that this be intimated to the mothers concerned.

This examination is recorded on the health schedule provided, in the columns of which the teacher has already entered the personal facts concerning the child, and the School Doctor adds in the shortest possible way the condition of each child.

The third examination is to be undertaken in the Summer half year, and must be finished by the beginning of the Summer holidays. The children must have their hearing and eyesight tested. On the defects and diseases found the School Doctor must enter a brief remark in the health schedule.

5. The health schedule is to be attached to the register and preserved with it.

The health schedule of those children that on account of their unhealthy condition require repeated inspection by the School Doctor is to be marked "Medical Supervision" and submitted by the teacher to the School Doctor at the subsequent visits. This is to be continued until the School Doctor relieves the child from his supervision. The note referred to is then scored out.

6. At his visits to the school, the School Doctor, in addition to the children under medical supervision, must also examine those children whose examination appears to him necessary or is proposed by the teacher. The results of the examination are briefly noted in the health schedule. In a given case a new schedule is to be used.

7. Where on examination a child is reported to be suffering from serious disease or defect, the parents are informed by a printed report and requested to put the child under medical treatment. This report is to

be signed by the School Doctor and the School Inspector and sent to the parents by the latter.

8. No examination of the children is made by the School Doctor if an examination by the family physician has been recorded on the proper form and the corresponding certificate produced by the parents.

9. A detailed examination of the girls from the fourth school year onwards can be undertaken by the School Doctor only with the consent of the parents.

On the other hand, the boys in the last quarter before removal from the ordinary school must, if the parents so wish, be subjected to a detailed examination, in order that special advice in relation to the choice of a profession may be given.

10. Besides the provisions contained in sections 4 and 6, examinations are to be undertaken by the School Doctor:—

(a) when it is desired to admit a child to the ordinary school before the end of the sixth year, or when, in the case of boys of the ordinary or preparatory school, and girls of the ordinary or girls' Sunday school, it is proposed on account of their health to set them free before they are of school age;

(b) when, in the case of individual children, it is desired to keep them back from school for a year or to free them from taking part in special branches of study;

(c) when, in the case of children that have contracted infectious disease, it is necessary to bring a certificate that they can be again admitted to school without danger to the other pupils;

(d) when there is a doubt whether absences from school are really due to illness;

(e) When there is reason to suppose that a child, reported by its relatives as ill without a more precise description of the illness, is suffering from an infectious disease.

These investigations take place on the order of the acting School Inspector. They do not, however, take place when medical certificates are produced.

In specially pressing cases, the teachers are authorised to propose to the Inspectorate special examinations of individual children in their classes. These examinations may be undertaken during the consultation hour of the School Doctor attached to that school.

If, notwithstanding the presence of a medical certificate, a request for medical examination of a child is made, this can be undertaken through the Inspectorate only with the sanction of the Magistracy.

The certificate of the examination by the School Doctor is to be preserved with the schedule of the particular child; in the town trade schools it is preserved with the rector's records.

On the occurrence of measles, scarlet fever, diphtheria, and typhoid fever in the municipal and private schools, as well as in the infant schools and kindergarten, a report must be made to the School Doctor by the teacher or the head of the institution, and more especially when only one case of a particular illness has occurred. On receiving such a report the School Doctor must forthwith proceed to make a thorough examination of all the children present in the particular class or institution, and as soon as possible report the result direct to the Imperial District Medical Officer. On receiving this report, the latter will give the necessary instructions to the District Police authority—for example, the temporary closing of particular classes. In these investigations the School Doctor is entitled to send home from school such children as he finds to be suffering from infectious disease or suspicious symptoms.

The occurrence of German measles and whooping cough is to be reported by the teacher and attended to by the School Doctor in the manner given above only when several cases of these illnesses occur in rapid succession or simultaneously.

The occurrence of cerebro-spinal meningitis is to be reported by the teacher in every individual case.

Children that have passed through one of the diseases named in the last three paragraphs may be again admitted to school only when it is certified by medical certificate that the resumption of school work can be undertaken without danger to other children (Ministerial Orders of 15th February 1844, 16th January 1867, and 8th June 1875). According to the local regulation of 22nd March 1903, the certificate in the case of scarlet fever must state that desquamation over the whole body is complete, and in the case of whooping-cough that the convulsive cough has ceased. When no other medical certificate can be produced, the certificate is to be given by the School Doctor.

12. Wholesale examinations of school children for the purpose of settling scientific questions can be undertaken by the School Doctors only when the Magistracy, by agreement with the Imperial District Medical Officer and the Local School Commission, have given permission.

13. The School Doctors have no authority to give independent instructions. At the same time, it is their duty, on discovering any defect in the health conditions and arrangements of schoolrooms, to direct the attention of the inspectors, the senior teachers, the teachers, and the house masters to the conditions discovered. Further, on any requests or complaints that may be made to them in regard to the health conditions, as well as on any defects observed by themselves, they must report forthwith to the Magistracy.

14. The School Doctors must also take a regular part in the conferences summoned by the Imperial District Medical Officer. These are to take place, as a rule, three times a year, and questions affecting the health service of the school, and particularly the observations made at the visits to the schools, come up for discussion.

They must further attend the conferences of the Royal School Inspectorate when summoned. They have a consulting voice in those deliberations.

15. At the end of every school year, and at latest by the 1st of September, the School Doctors must send to the Magistracy a written report on their work. This report must contain—

(1) The number of ordinary and extraordinary visits made to the classes of the schools assigned to them.

(2) A general statement of the number of children examined in the regular way and of the results of the examinations, classified according to the individual years.

(3) A similar statement of the number of children examined for special reasons in the schools named, in institutions and at home, and the results of these.

(4) The number of medical certificates issued.

(5) The number of reports sent to the parents.

(6) The number of school children remaining under medical supervision.

(7) A short statement of proposals made.

(8) Any general remarks.

On the basis of the yearly reports made by the individual School Doctors there is prepared a general report. Of this report a Doctor permanently entrusted with this work prepares the purely medical part, giving in particular a general exposition of the examinations made.

16. Medical treatment of the school children examined constitutes no part of the School Doctor's duty.

17. For their official actions the School Doctors must keep a day-book, which is preserved along with all official documents. The entries made by them are preserved as official minutes, and accordingly are the property of the Magistracy. They are to be preserved by each School Doctor, and in the case of resignation they are transferred to his successor.

18. If, during a school year, a School Doctor is obliged to go off duty, he must receive leave of absence from the Magistrate.

In his application for leave, it must be stated which of the other School Doctors undertakes his duty during the period of his leave.

19. The School Doctors are appointed by the Magistracy for three years, subject on both sides to three months' notice. They may, however, at the end of their term be re-elected.

The above are excellent, practical directions. It may not be possible to adopt them in their entirety to the conditions existing in this country. But it is not impossible or even difficult to modify them to render them suitable for the special circumstances of the country.

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Original Articles.

• THE TRANSMISSION OF SYPHILIS.

BY

C. F. MARSHALL, M. D., F. R. C. S.



SINCE the time of Paracelsus (1529) it has been generally believed that syphilis can be transmitted to the offspring by either parent or by both. In recent years, however, transmission by the father alone has been the subject of controversy. To this we shall refer later on.

Fournier's statistics as to the mortality and morbidity of this transmission are as follows:—

	Mortality.	Morbidity.
Paternal transmission	28 per cent.	37 per cent.
Maternal "	60 "	84 "
Mixed "	68.5 "	92 "

The mortality and morbidity thus vary approximately in the same ratio, but differ according to the origin of the disease, being least in congenital syphilis of paternal origin, greater in that of maternal origin, and greatest when the disease is present in both parents.

Syphilitic transmission may manifest itself in four ways: (1) excessive mortality (foetal, early or late); (2) virulent or active congenital syphilis (early or late); (3) dystrophic or parasymphilitic effects; (4) syphilitic heredity without symptoms. These manifestations differ according to the age of the disease, its parental origin and the effect of treatment.

• Specially contributed to *The Antiseptic*.

As regards the age of the disease, the more recent this is in the parent or parents, the more likely are there to be virulent symptoms in the offspring.

The first born generally suffer from virulent congenital syphilis; later children from late congenital syphilis or parasyphilis. However, there are exceptions to this rule, for healthy or only slightly affected children sometimes alternate with others who are profoundly affected. The possible explanations of this apparent anomaly will be referred to later.

As regards the parental origin of the disease, congenital syphilis of maternal origin is often more virulent than that of paternal origin. Dystrophic or parasyphilitic signs are more common in paternal than maternal transmission, but in both cases virulent and dystrophic symptoms may be present at the same time. The greater virulence of maternal transmission is partly explained by the age of the disease, which is usually more recent in the mother than in the father, and partly by the effect of treatment, for the mother is often not treated owing to ignorance or neglect.

PATERNAL TRANSMISSION.

We may now consider the question of paternal transmission, or transmission to the ovum through the father's semen—a question which has in recent years been much debated.

The point of controversy is whether the mother of a syphilitic child is always infected by direct contagion from the father in the usual way, and is therefore herself always syphilitic, or, whether the *fœtus* may, in some cases, be infected by the sperm of the father without infection of the mother.

The chief clinical arguments in favour of paternal transmission are: (1) that a woman may bear a syphilitic child by her first syphilitic husband, and afterwards healthy children by a non-syphilitic husband; (2) that, after a series of syphilitic children, a healthy child may be born after mercurial treatment of the father alone, the mother receiving no treatment.

The case against paternal transmission assumes that the mother is always infected by her syphilitic husband. The upholders of this doctrine explain the subsequent birth of healthy children by what is termed "alternating transmission." They also mention cases where apparently healthy mothers gave birth to syphilitic children, not only by the first syphilitic husband, but also by a second or third healthy husband.

As regards "alternating transmission," this is merely a name signifying that the transmission of disease is subject to variations—a fact well known. In the case of syphilis, it may be explained either by variations in the virulence of the disease in one of the parents, or by an intervening genitor, which means that the healthy child is procreated by a non-syphilitic father, not by the original syphilitic husband. Obviously this is a difficult matter to prove, but one within the bounds of possibility, if not of probability.

With regard to the instances where an apparently healthy mother gives birth to a syphilitic child by a second healthy husband, it has been suggested that these are examples of "telegony," which means that the first impregnation influences subsequent conceptions by another husband. In any case, such instances are not of much weight against the doctrine of paternal transmission, and may be due to latent syphilis in the mother.

Another argument against paternal transmission was that the semen is not contagious. This has been demolished by the experiments of FINGER and LANDSTEINER, who successfully inoculated two monkeys with semen from syphilitic patients. More recently it has been urged that the spirochæte of syphilis is too large to enter the spermatozoon, and too large to enter the ovum without destroying it. The former of these objections may be disregarded, for the spirochætes may travel in the fluid part of the semen. The second objection requires more consideration. That the spirochæte does actually enter the ovum has been shown by LAVADITI and HOFFMANN, who found them in the ova in cases of congenital syphilis. That the spirochæte having entered the ovum must necessarily destroy it assumes that this microbe is always in the same morphological state. However, recent research tends to show that the spirochætal form is only one phase in the life-history of spirochætes including the micro-organism of syphilis, and that under certain conditions they exist in the form of spores. Now, this spore-formation probably occurs when the spirochæte finds itself in an unsuitable medium for growth, and is an attempt to perpetuate its species by assuming a more resistant form. Now, it has been shown that the spirochæte flourishes more in the lymph spaces of connective tissue than in the cells of the tissues, so that the ovum would not be a suitable medium for it to grow in. Hence, it is possible that the spirochæte after entering the ovum sheds spores, and that these develop into spirochætes when the growth of the embryo provides it with a more suitable medium.

We have next to consider whether the Wassermann reaction throws any light on the problem of the transmission of syphilis, and we will assume that a positive reaction signifies syphilitic infection. It has been found that the majority of the mothers of syphilitic children (about 70 per cent.) give a positive reaction, whether they show signs of syphilis or not. It is also stated by two observers that when the reaction is positive in the father and child it is always also positive in the mother. But this is no argument against paternal transmission, for the mothers may have been infected from the foetus by conceptional syphilis.

CONCEPTIONAL SYPHILIS.

This brings us to the question of conceptional syphilis, which means infection of the mother from a foetus infected by the semen of the father, and is, therefore, dependent on paternal transmission. The occurrence of conceptional syphilis is naturally denied by those who deny the occurrence of paternal transmission.

As I have already pointed out, it is possible for the spirochæte to travel in the semen to the ovum, penetrate the latter and shed spores which develop again into spirochætes as the embryo develops into the foetus. The occurrence of conceptional syphilis depends on the passage of spirochætes, spores or toxins from the foetus to the mother through the placenta. It has been shown that anthrax bacilli can pass the placenta, so there is no reason why spirochætes, or at any rate their spores, may not do the same.

Assuming the truth of conceptional infection we may conceive it as occurring in two forms, or rather two degrees of intensity. In the first form—syphilis by conception—the mother shows signs of secondary syphilis during pregnancy. In the second form—latent conceptional syphilis—the disease remains latent for a time, but may manifest itself in later years by tertiary lesions. The difference between these two forms was explained by Fournier as due to difference in the quantity of virus, a large quantity of virus causing syphilis by conception, and a smaller quantity latent conceptional syphilis with immunity to infection. In the light of modern research we may explain the difference by the proliferation of spirochætes in the first case, and by spore formation in the second case. The passage of toxins alone will not account for the long latent period which generally elapses before the appearance of tertiary lesions in the case of latent conceptional syphilis.

COLLES' LAW OF IMMUNITY.

In 1837 Colles of Dublin pointed out that the mother of a syphilitic infant, procreated by a syphilitic father, was herself immune against

infection and could suckle her child with impunity, while a healthy wet-nurse could contract a chancre of the nipple by suckling such a child. This clinical fact was afterwards explained by the passage of antitoxins from the foetus to the mother, thus rendering her immune to syphilitic infection. More recently it has been found that the majority of such mothers (about 70 per cent.) give a positive Wassermann reaction, whether they show signs of syphilis or not. It has hence been rather illogically assumed that all mothers of syphilitic children are themselves syphilitic, and that this explains Colle's law of immunity. That this is the case in the majority of cases is no doubt perfectly true, but if the Wassermann reaction signifies syphilitic infection it does not explain the 30 per cent. of cases which give a negative reaction. It would appear possible that some of this 30 per cent. may be cases of paternal transmission in which the mother escaped infection, either directly or by conceptional syphilis.

CONCLUSIONS.

1. The clinical evidence in favour of the paternal transmission of syphilis is too strong to be set aside in favour of theoretical considerations based on serological and microbiological evidence of uncertain nature.
2. It is, therefore, probable that syphilis by conception occurs in a certain proportion of cases.
3. It is nevertheless conceivable that in some cases the mother may escape infection with syphilis, but whether this is due to the passage of antitoxins from the foetus through the placenta is problematical.
4. In the majority of cases, however, the mother appears to be infected either with active or latent conceptional syphilis or by direct infection from the father.

INTERMITTENT CLAUDICATION.

BY

J. BERNARD DAWSON, M. D. (LOND.), F.R.C.S. (ENG.).

The term 'intermittent claudication', as its Latin root suggests, indicates an intermittent closure of whatever organ is referred to. It is usually applied to blood-vessels, and in this connection was suggested by ALLAN BURN in 1809 as a possible explanation of that group of clinical phenomena known as angina pectoris.

Both in man and in horses, after the occurrence of thrombosis or other obstruction to the flow of blood through the abdominal aorta or external

iliac arteries, a transient paraplegia may intervene after exercise. This is due to the fact that the collateral circulation which is sufficient to maintain the nutrition of the muscles of the legs during normal activity fails to do so when, because of unusual exertion, a greater supply of blood is required.

Thus is produced a state of relative ischæmia which reveals itself as a temporary failure of the musculature to perform its functions. ALLAN BURN and, later, POTAIN and others applied this suggestion to angina pectoris, not without good reason when it is remembered how frequently this condition is associated with advanced arterial degeneration.

Post-mortem examinations have shewn that in almost all cases of angina there is marked arterio-sclerosis at the root of the aorta and in the coronary arteries. This may be so extreme as to reduce the orifices of these latter vessels to a minute opening or even to obliterate them entirely. This condition is always accompanied by a fibrous myocarditis and possibly leads to actual infarction of the heart muscle. Given these two conditions—obstructed cardiac circulation and damaged muscle—it is easy to see that a slight superimposed interference with the relative nutrition of the heart will cause a serious interruption of its functions.

Thus one sees an attack of angina precipitated by exciting causes which may be so insignificant as to escape notice.

Thus in the case, a summary of which I shall presently give, the onset of the attacks could be traced to a sudden physical exertion, an unusually heavy meal, or to a rapid change from the supine to the erect position in the chill hours of the early morning.

These exciting causes produce a sudden increase in the rapidity or strength of the cardiac systole which demands an increase in the coronary blood supply; this being impossible owing to the diseased state of the vessels, a relative anæmia of the already degenerated heart tissue occurs. This pathological condition is then evidenced by the clinical phenomena of angina pectoris.

The question naturally arises whether other organs of the body may not manifest a disturbance of function of similar causation. I have been quite unable to discover any instance to which this hypothesis could be applied except the case which I am about to relate.

I have for some time past been attending a patient, a woman aged 69, suffering from arterio-sclerosis, fibrous myocarditis, and paroxysms of angina pectoris.

The anginal symptoms are of the usual order and quite characteristic, whilst the exciting cause in the six attacks to which I have been summoned have been as follows:—

In four cases, a sudden rising from bed in the early hours of the morning: it is probable that it was the premonitory symptoms of uneasiness that induced the patient to abruptly get up to light a candle, but certainly these four attacks were preceded by this quick change from the supine to the erect position.

In one case the sudden physical effort of hastening to step into a tram seems to have been the exciting cause, whilst in the sixth case an indigestible and heavy meal was the initial mistake.

The anomalous feature of these attacks was that they were accompanied by clonic contractions of the muscles of the left arm, leg and left side of the face.

These contractions are of an epileptiform type, regular in strength and frequency, more marked in the upper than the lower limb, and accompanied by consciousness and aphasia.

On one or two occasions the attack has passed off without treatment, in which case the convulsions have ceased much more gradually than the anginal pain; indeed they have recurred twice or thrice in a milder form during the 30 or 40 minutes immediately following the attack.

My explanation of these convulsive seizures is that they are due to a relative insufficiency of the blood supply to the motor area of the right cerebral hemisphere.

I believe that the right middle cerebral artery is in a state of advanced arterio-sclerosis which allows the minimum supply of blood to circulate through it that is necessary to maintain the nutrition of the cortex.

Any interference with the cardiac systole, such as accompanies an anginal attack reduces the quantity of blood flowing through the cerebral vessels and especially through the partially stenosed right middle cerebral artery to such a degree that the cerebral functions are disorganised and perverted.

It is possible that in addition the low blood pressure, combined with obstruction to the large venous trunks in the thorax during the anginal spasm, may produce a local and transient cerebral oedema.

There are two phenomena which remain to be mentioned: the occurrence of aphasia, which I attribute rather to the incapacitating distress of the angina than to any central disturbance of function, and

the occurrence, after one particularly severe attack, of melancholia with delusions.

The latter were those of unnatural fear and belief in persecution, which took the form that the patient thought she was not in her own bed and that she was being prevented from returning home.

This distressing sequela passed away after 48 hours.

Of treatment I intend to say very little: it has been my custom to lightly anaesthetise the patient with chloroform, a plan which gives instant relief to the pain and rapidly checks the muscular contraction. As a rule the semi-narcosis is succeeded by a natural sleep from which the patient awakes in her usual health; on two occasions I have had to repeat the inhalation of chloroform to check a return of the convulsions.

As soon as the spasm has been relaxed I inject a 1/100 of a grain of digitalin, which, on one occasion of a severe attack, I combined with 1/4 of a grain of sulphate of morphia.

After each attack the left arm and hand has been weak but has rapidly recovered; there has been, however, a summation of the effects of these symptoms that has produced slight paresis with spasticity.

To my mind this case illustrates the effect of a localised degeneration of the arterial system, producing a temporary and relative condition of anaemia in the tissues supplied by the affected vessels. I do not think that there is any spasm of the arterial muscle, for a sclerosed vessel is too rigid for such a change, but the flow of blood through the artery is reduced to such a degree that any interference with the *vis a tergo* of the blood stream reduces the blood supply below the minimal sufficiency. The name 'intermittent claudication,' so far as it implies a closing of the lumen of the vessel, is a misnomer, but, in so far as it implies a relative occlusion of the artery, is a useful and appropriate expression.

Our Contemporaries.

MEDICINE.

Acidosis and Acetonaemia, with notes of four cases.

BY

H. H. PARKINSON, M.D. (Syd.), Redfern, Sydney.

By the term "acidosis" is meant the reduction of the normal alkalinity of the blood, such reduction being due to the presence of diacetic acid and especially of B.-oxybutyric acid in the plasma.

Our knowledge of the condition has come mainly through a study of that fell condition, diabetic coma. It is in diabetes that by far the greatest accumulation of these acids occurs, but this disease is by no means responsible for all the cases of acidosis.

The acids may appear in the urine—(a) during prolonged starvation, (b) in the toxæmias of pregnancy, (c) in delayed chloroform poisoning, (d) in salicylate poisoning, (e) in periodic (cyclical) vomiting of children.

Experimentally it has been proved that neither acetone, diacetic acid nor B.-oxybutyric acid is poisonous, except in enormous doses. How then do such fatal symptoms occur when they accumulate? They are due to a disturbance of the normal alkalinity of the blood, to which the tissues are accustomed, and without which they cannot perform their proper functions. When the diacetic and B.-oxybutyric acids are first formed they are neutralised, and the blood kept alkaline for a time by the reserves of sodium and potassium. When these fail the protein metabolism supplies carbonate and carbamate of ammonium. These latter salts are, in health, converted into urea by the liver, but in acidosis they form the main line of defence against the poisonous acids. When the production of the latter becomes so great that the supply of ammonium salts from the tissues fails to keep pace with them, then the alkalinity of the blood falls and dyspnoea, collapse and coma begin to appear.

Now, a word as to sugar in pancreatic diabetes. Normally the tissues require sugar which exists in the blood to the extent of 0.1 per cent. The tissues are enabled to take up and make use of the sugar only with the aid of the internal secretion of the pancreas. When this link is missing, as in diabetes, the sugar goes on accumulating in the blood, and runs to waste in the urine. The failure of the tissues to obtain sugar results in severe acidosis; an abnormal decomposition of fats may take place when the amount of glucose supplied to the tissues by the blood is deficient. Hence the frequency of coma in those cases in which a complete deprivation of carbohydrate food fails to abolish glycosuria. In thus recalling to your minds the present-day teachings of physiology, I have made free use of Rendle Short's book, "The New Physiology in Surgical and General Practice." Having thus cleared the ground, I will briefly refer to the clinical tests for acetone, diacetic acid and B.-oxybutyric acid.

1. *Acetone.* To 5 c.c. of urine are added 5 m. glacial acetic acid plus 5 m. of 40 per cent. solution of sodium nitro-prusside. The test tube containing these three ingredients is shaken vigorously, the mouth

of the tube being closed by the tester's thumb. When a good froth is produced by the shaking, about 10-15 m. of liquor ammonia fort. is poured through the froth. If acetone is present the froth turns purple, and a ring of purple forms where the ammonia touches the surface of the urine. The purple colouration gradually deepens to black if acetone be present in quantity. This test is not absolutely reliable, creatinin being a fallacy. The test should form part of our routine analysis of urine.

2. Diacetic acid is detected by adding a few drops of liquor ferri perchlor to 5 c.c. of urine in a test tube. If a deep red colour is produced, which disappears on heating, the test is positive for diacetic acid. The great fallacy is a reddish precipitate of iron phosphate from normal urine. Other fallacies are carbolic, salicylic acid, phenacetin, and other coal-tar derivatives.

3. B.-oxybutyric acid is lævo-rotatory, and its presence is indicated by lævo-rotation in completely fermented urine. Acetone and diacetic acid are both derivatives of B.-oxybutyric acid, and, therefore, if acetone and diacetic acid have been found to be present in a urine, it is clear that B.-oxybutyric acid is being produced in the body.

Cases of acidosis and of acetonæmia are of wide interest to the profession. They concern the physician not merely in diabetes, but in prolonged cases of starvation, which may arise from gastric ulcer, cancer of the œsophagus, typhoid fever, and a host of other causes. Then, again, physicians are interested in the cyclical vomiting of children, and in the toxic phenomena of salicylic acid, and its derivatives. The eye specialist may be the first to recognise a case of diabetes through a diabetic retinitis. The anæsthetist is interested since on no account must chloroform be given to anyone with acetonæmia. The correct anæsthetic, in my opinion, for these patients, is open ether. Lastly, the obstetrician is interested since the toxæmias of pregnancy can be responsible for acetonæmia, and woe to him who gives the pregnant woman chloroform under such circumstances. I might add the surgeon to the list of persons interested in these cases, inasmuch as he does not want to see his patient die of delayed chloroform poisoning.

Having mentioned the conditions favourable to the production of acidosis and acetonæmia, and having shown of what importance such cases are to all sections of the medical profession, I will now briefly relate the four cases which have come under my own notice. It would be out of place and quite unnecessary for me to attempt to lay down lines of treatment to be adopted.

Case 1.—This was a young man of 22 years who was found one morning in the early part of last year lying on the roof of his kitchen. As this building was separate from the rest of the house it was surmised that he had scaled a 12 ft. verandah post to reach the place where he was found. He was a carpenter by trade, and had no history of previous ill-health. He was admitted to a private hospital under my care the same morning about 9 A.M. His condition then was as follows: temperature sub-normal; breathing deep, regular, and stertorous; pulse rapid, thin and irregular; reflexes normally active; pupils equal and moderately dilated. There was no pronounced smell in his breath. He had retention of urine. Widal and Wassermann reactions both negative. Examination of a catheter specimen of urine showed specific gravity 1033, acid, thick and dark in colour, slight cloud of albumen, enormous amount of sugar, great amounts of acetone and diacetic acid. Obviously a case of diabetic coma. Large doses of soda bicarbonate solution were administered per rectum throughout the day. Next morning he was conscious but dazed, with no recollection of recent events. He was put on large doses of citrate of soda, and began to improve. With rest, anti-diabetic treatment and alkalis he was able to leave hospital in 12 days. The urine then contained a lot of sugar, but the acetone and diacetic acid had quite disappeared.

Case 2 was an elderly man working hard and continuously as an engineer at Garden Island. His only symptom was drowsiness while at work. He had not lost flesh, had none of the usual symptoms of diabetes such as thirst, polyuria, etc., and had he not on two or three occasions gone to sleep at his bench, would not have come for advice as soon as he did. His urine was loaded with sugar, and gave a marked reaction for acetone and diacetic acid. Four months of careful dieting, together with large doses of citrate of soda, have greatly improved his condition, though he still has some sugar, if he takes even one slice of white bread. Two months ago he had peripheral neuritis, but this cleared up as his general health improved.

Case 3 was a woman whom I saw about 14 months ago. She was three months pregnant, and had hyperemesis gravidarum. Examination of the urine showed great quantities of acetone. The face was drawn and anxious, the skin had a muddy tinge, and the vomiting was incessant. Nothing stayed down except a little soda water and a mixture containing cerium oxalate. After two or three days we got her on to 1 oz. doses of citrate of soda every four hours. She improved rapidly and I lost sight of her till six months later I was summoned to attend

her during her confinement. I found that she had placenta prævia, so I sent for Dr. Ludowici. I administered open ether, and she delivered rapidly. There was considerable hæmorrhage, and the child was still-born. Examination of the patient's urine the same day revealed the fact that acetone was again present in large quantity. She ran a temperature, and gave us much anxiety for a week. Citrate of soda was given as before, and the patient gradually recovered. I am convinced that in this case the patient would inevitably have died, had she received chloroform instead of ether. Chloroform aggravates the condition, increases the amount of acetone, and the patient dies after relapsing into a comatose state analogous to diabetic coma. This case made such an impression on me that I have examined the urine of every woman since seeking my services for accouchement, not only for albumen and sugar, but also for acetone. I have not, however, seen a similar instance.

Case 4 was that of a young lady suffering from acute gastritis. So severe was her pain after the slightest mouthful of nourishment, that for many days she practically lived on water. On several occasions she vomited bile and mucus. She began to grow wretchedly thin and nervous, and became exceedingly morbid. After washing out the stomach and administering bismuth, I at length allayed the vomiting. An examination of the urine at this time showed the presence of a small quantity of acetone. This was a clear indication that the starvation process had gone too far. The patient gradually recovered, though her diet was a question which filled my mind for over six weeks. I merely mention this case as illustrating starvation as a cause of acetonæmia.

To my mind the most interesting case was that of the pregnant woman with hyperemesis. The great point was the avoidance of chloroform at the time of her delivery. I have not seen a case of cyclical vomiting in children, nor have I seen acidosis produced by excessive administration of salicylates in rheumatism. Doubtless these cases are common enough.

In conclusion, if I have aroused your interest in a subject which to me was a dead letter until 18 months ago, then I feel amply repaid for the slight work involved in writing up these notes.—*The Australasian Medical Gazette*.

Prolonged Intermittent Fever in Mucous Colitis.

M. COUTO.—Chronic catarrh of the intestine is seldom an isolated phenomenon, and is commonly accompanied by catarrh elsewhere. This general distribution of catarrhal conditions throughout the body in one

individual is designated as "polymyxoiditis" by the writer who classes catarrh of the ears, eyes, nose and throat under the heading: "polymyxoiditis superior" and catarrh of the stomach, intestine, bladder, and uterus under the heading: "polymyxoiditis inferior." When catarrh of the intestine is the most prominent feature of this symptom-complex, he has occasionally observed intermittent fever continuing for several months, and giving rise to many a mistaken diagnosis.

During the crises of mucous colitis, rises of temperature may occur which are sometimes transitory, sometimes persistent, and sometimes intermittent. Sometimes, again, after the crisis has passed, fever persists which is of an intermittent, quotidian character. It may cease with or without treatment for 2 or 3 days or more, and then return to its former state. It usually lasts for 4 to 8 hours in the evening, and causes slight discomfort and headache; but it is unaccompanied by rigors or excessive perspiration. Its obstinate persistency is its most characteristic feature, and has earned it the writer's title of "febris intermittens perennis."

Illustrative cases:—A married woman, aged 25, had long suffered from diffuse abdominal pain, and distention accompanied by obstinate constipation. The stools contained much nummular and filamentous mucus, and the urine contained skatol, indican and urobilin. The patient was also subject to tinnitus, follicular pharyngitis, catarrhal endometritis, sneezing and snuffing, and a gritty sensation about the eyes. For 10 months there had been intermittent, quotidian fever, the temperature ranging from 99.3° to 99.7° ; and on rare occasions to 100.4° . During this period there had been 2 acute attacks when the temperature was as high as 100.2° . These were succeeded by intervals of sub-febrile temperature, occasionally varied by periods of subnormal temperatures, with readings as low as 96.40 . Apart from the intestinal disease, nothing abnormal could be found. The examination of the blood was negative, and no signs of latent tuberculosis were demonstrable. The abdomen was tender over the iliac region, and was sometimes soft and flaccid, and at other times hard.

A married woman, aged 38, suffered from tickling in the throat, tinnitus, megrim, dysmenorrhœa, a sense of pressure in the epigastrium after meals, and mucous colitis. Colic and constipation alternated with diarrhœa during which gravel and much mucous escaped with the motions. The temperature, which had been measured thrice daily for 7 months, showed an evening rise from 99.5° to 100.4° , and was

accompanied by the usual symptoms of fever. Malaria had been diagnosed by a homœopath in attendance, but his medicines and the patient's changes of residence had been ineffective. The fever ceased as soon as calomel, followed by a saline purge, was prescribed.

A medical man, aged 40, was subject to attacks of gout, asthma, and renal colic. For 4 months his abdomen had been repeatedly distended, and a cylindrical swelling of variable size could sometimes be detected in the iliac region, extending obliquely from right to left. It caused slight, dull pain which increased on pressure. Constipation was obstinate, and the stools contained much mucus. For the past 5 months there had been daily attacks of fever varying from 99.5° to 100.4° in the evening. The patient thought he was suffering from tuberculosis or a new growth; but the fever disappeared for good as soon as the mucous colitis was treated.

A child, aged 6 years, had suffered from diarrhoea, colic, abdominal distention and the passage of much mucus since artificial feeding had been adopted at an early age. Till the age of 5 years, the crises lasted for only 3 to 5 days, and were separated by intervals in which the child developed satisfactorily. But for the past year there had been intermittent, quotidian fever, ranging from 99.1° to 100° between the crises of colitis.

A man, aged 32, suffered from alternate constipation and diarrhoea during which nummular, membranous and filamentous mucus was expelled in large quantities. The abdomen was sometimes soft, sometimes tympanitic, and often painful. For 6 months the temperature had risen daily to 99.3° to 100° , and on rare occasions to 100.4° . Malaria had been diagnosed, and quinine and its derivatives had been prescribed, as well as change of locality. But the fever did not cease till the colitis had been treated.

It is easy enough when fever occurs during an attack of acute mucous colitis to identify the one with the other; but when the colitis is chronic and unaccompanied by crises, the patient may forget to mention his intestinal symptoms to the physician who is thus deprived of the necessary clue to an intermittent, quotidian fever.—*The Medical Review*.

The Blood-count in the Diagnosis of Varicella in Adults.

C. STÆUBLI.—The majority of cases of varicella occur in the first decade and the frequency in the second decade rapidly declines. After 20 varicella is so rare that many authorities, among them SENATOR, deny

its occurrence. The writer reports several cases and states that in adults the diagnosis from variola is rendered more difficult by a tendency to severe prodromal symptoms, including headache, and infiltration of the bases of the vesicles. One of the most reliable distinctions is leucocytosis. In variola there is constantly leucocytosis (between 10,000 and 20,000), with marked absolute increase of the lymphocytes. This is not due to the secondary septic infection of the pustules but is characteristic of the variolous process itself. In varicella the results of a blood-count are not so constant. The leucocyte count may be normal or even slightly increased. But frequently at the height of the eruption, there is leucopenia. In the writer's cases the leucocytes varied from 4,500 to 6,430, with absolute increase of large mononuclear and transitional forms. Leucopenia absolutely decides the diagnosis in favour of varicella. Marked leucocytosis renders variola probable.—*The Medical Review*.

Flatulence.

PROFESSOR BOAS, of Berlin, an internationally recognized authority, has pointed out that individuals differ markedly with respect to their tolerance and digestion of the various food stuffs, and that while milk, eggs, rare meats and potatoes are perhaps particularly apt to cause fermentation, no definite rules for the dietetic treatment can be laid down.

An absolute requirement and a never varying factor in the treatment of fermentative flatulence, however, is the employment of a desirable anti-fermentative drug, *i. e.*, a drug which can be given in large doses and over long periods without injury to the system, above all without producing constipation.

Magnesium salicylate meets all these requirements, presenting the combination of a high percentage of anti-fermentative principle (92 % salicylic acid) and sufficient laxative principle (8 % magnesium) to counteract the constipating and thereby cumulative effect of salicylic acid.

Magnesium salicylate in the form of 5 grain tablets No. 224 "Frost" may be given in doses as high as 30 grains three times per day.—*The Canadian Practitioner & Review*.

Treatment of Puerperal Septicæmia by Bacterial Vaccines.

A series of one hundred cases, fifty-six of which were treated with vaccines, furnish the basis of G. T. WESTERN'S conclusions, which are that: The mortality among those cases of puerperal septicæmia in

which there is definite bacteriological evidence of bacteria in the blood stream is from 85 to 95 per cent. This mortality may by inoculation with autogenous vaccines be reduced to about 55 per cent. The mortality among officially reported cases of puerperal fever is about 60 percent. This mortality may by inoculation with appropriate vaccines be reduced to about 30 per cent. In cases of puerperal sepsis, if it is decided to explore the uterine cavity the opportunity should not be lost of obtaining a culture at the same time. In the treatment of puerperal sepsis, "stock" vaccines give inferior results and should only be used when an autogenous vaccine cannot be obtained.—*The Canadian Practitioner & Review*.

SURGERY.

Distilled Water *versus* Salvarsan in the Treatment of Syphilis.

By

G. R. ARBOUR STEPHENS, M. D., B. S., B. SC. (LOND.)

Hon. Physician, Royal Cambrian Institution for the Deaf, Appointed Surgeon under the Factory Act.

The simple treatment for syphilis herein recommended consists of the hypodermic injection of 6 to 10 c.cm. of distilled water every 3 days for 2 to 4 weeks. I was induced to give this treatment a trial as the result of some research work I had done on surface tension, the results of which I published privately some fifteen months ago. I had previously published in the "Practitioner" an article on the part played by colloids in Physiology and Pathology in which I drew attention to the value of a consideration of surface tension. An experiment that I carried out to show the effect of calcium salts on surface tension is rather interesting.

When pure water is added to pure mercury in a clean test tube, catalytic action occurs and oxygen is given off, the mercury remaining unaltered. This action is due to an extremely fine film that forms on the surface of mercury, but on account of the tension, breaks almost as soon as formed, the making and breaking being rhythmic. On adding a small quantity of a 10% solution of pure calcium chloride to the mercury, shaking well and draining it off, the mercury itself behaved peculiarly, its surface tension having been modified to such an extent that it could be induced to take up all sorts of shapes instead of the usual globular one. When the H_2O_2 was added the mercury was immediately changed into a grey colour and was then broken up into

minute grey masses, many of which passed as in the colloidal form through filter paper; meanwhile the ebullition of oxygen was exceedingly great and the heat generated sufficient to make the test tube very hot.

This experiment has been given at such length in order to show the marked effect of a slight alteration of "surface tension."

The value of mercury in the colloidal form as an antiseptic is due to its possessing the powers of both classes of antiseptics, *viz.*, the power of the heavy metals to combine with protein matter, and the power of chloroform, tolnol, and the like to interfere with the surface tension of all living cells. It seemed to me, therefore, that it would be of interest to find out the surface tension of individual substances, and with that object I instituted some experiments.

In some of the experiments it was found that colloid mercury as well as mercury perchloride and carbolic acid have a tendency to reduce the surface tension existing between mercury and potassium chloride, and the fall is not complete at once, but is progressive. This fact is important, for with such a varying surface tension around a living cell the latter finds it very difficult to accommodate itself to its surroundings; in fact it fails, and its life ends.

The water soluble contents of coal tar pitch, which no doubt are responsible for pitch workers' cancer, have surface tension that tend to drop considerably, whereas the soluble contents of blast furnace pitch have not this tendency, at least not to the same extent.

In the *Dublin Journal of Medical Science* for June 1911, I gave the result of some experiments in which boiled yeast had been added to living yeast in a suitable growing medium, and I there showed that the effect of this addition was to stimulate the living yeast to marked activity, to a rapid life, and consequently, to an early death.

My experiments on the surface tension of boiled and unboiled yeast, showed that whereas the surface tension of the latter was 70.62 dynes per centimetre, the surface tension of boiled yeast solution fell in 24 minutes from 70.96 dynes per centimetre to 66.31 and in 5 hours to 61.02 dynes per centimetre.

I have previously shown that fertilising with boiled bacteria stimulates the living ones to rapid growth and early death. Boiled bacteria being vaccines, we can conclude that vaccines lower the surface tension and by so doing produce their good results.

This lowering of surface tension is associated with a more rapid production of catalytic products in the cells, but the injections of vaccines is associated with the production of anti-bodies; therefore it seems but right to infer that the production of anti-bodies is closely associated with a lowering of the surface tension.

The addition of distilled water to blood corpuscles so affects the osmotic pressure as to cause a passage of water into the cell, which gets larger and eventually scatters its contents. In distilling the rapid catalytic changes and the rapid production of anti-bodies are interdependent and if one can induce the marked catalytic changes with or without a vaccine, one stands the chance of setting free a number of very useful and remedial anti-bodies.

In such a chronic disease as cancer, it seemed to me that the process was allowed to continue owing to the absence of sufficient anti-bodies, or at least a sufficient number to act together at the same time, and if one could set free any catalytic anti-bodies in sufficient number, one might get a good result.

Knowing of no vaccine to induce this anti-body effect it occurred to me that the injection of distilled water might so alter the surface tension as to bring about the osmotic effects, and with this object I determined to try the effect at the first opportunity which I owe to Dr. Lloyd Edwards, Medical Officer of the Swansea Union, and to whom I desire to express my thanks.

CASE I.

A man (in the infirmary, aged 62) was suffering from immensely enlarged glands of the neck, secondary to an epithelioma of the lip. The glands were suppurating profusely and the smell was so bad that the room had to be fumigated continuously. I injected 8 c.cm. of distilled water into the skin of the back, having previously rubbed it with alcohol to remove the grease (for the introduction of grease has marked effect on surface tension). I did this every other day and after the third injection the smell has disappeared almost entirely and the fumigation discontinued. The surface of the sore seemed to be much cleaner and the suppuration became more profuse but otherwise the disease was not checked.

CASE II.

A man who had been operated on for epithelioma of the lower jaw by Mr. Bilton Pollard and soon after for clearing out of the glands of the neck. This latter was an extensive operation, but the

wound eventually healed up well and firmly. Within three weeks of his discharge from University College Hospital, there was a return of the growth and I thought that if injections of distilled water were started early enough, one might be able to do some good. At this time the wounds were quite sound and firm, but after three injections, to my great surprise, an abscess headed and burst about the middle of the scar. I continued the injection in the hope that this marked activity presaged a favourable catalytic change in the cells, but the growth increased rapidly and the suppuration came to a head in 2 or 3 openings. Closely following the suppuration appeared a mass of granulation tissue arising out of the part where the wound had quite healed, which spread rapidly. During all this time the pus was inoffensive and the nursing of the patient was never objectionable to the least extent.

The marked effect produced by the injections of distilled water made me feel certain that in any similar disease of less malignancy their effect ought to be still better. So with this object, I undertook, with Dr. Lloyd Edwards' permission, the treatment of the syphilitic patients under his charge. Both he and his assistant, Dr. Dunbar, were rather inclined to treat my mission as somewhat harebrained, but at the end of a week's treatment of my first patient I was able to prove to their satisfaction that the effect was excellent. The Wasserman reaction is, in my opinion, nothing but a very roundabout way of determining the surface tension at which haemolysis occurs, and if this view is correct, the time ought not to be far distant when a simpler and more scientific method is introduced, and one that is not open to so many pitfalls.

It is easily understandable from the point of view of surface tension that in several diseases the haemolytic point may be the same although the anti-bodies may be different.

CASE I.

An alcoholic prostitute, aged 26, had been in the infirmary since June 1912 suffering from ulcers on the face and a large ulcer on the left shin. She was first admitted in August 1910 having been injected a few months previously.

The area covered by the inflammation and ulcers was wing-shaped, covering both cheeks, upper lip, and a good part of the nose and over the whole of this area there was considerable thickening. The ulcer on the leg looked indolent and unhealthy. She had not menstruated for two years. I started treatment on October 25th and continued it every other day till November 4th, but discontinued it on November

6th, as she had started to menstruate. I restarted treatment on November 8th, and continued it every third day till November 23rd, when the ulcer on the leg had healed. By November 9th the ulceration on the face had cured, although there was still some thickness, as well as dilated venules to be seen.

Her general health improved greatly, and she looked better and felt in better spirits than she had done for a long time.

The readiness with which the edges of the ulcer took on a healthy appearance was extraordinary, especially as she had ceased to respond to the ordinary method of syphilitic treatment.

After each injection there was a marked reaction, the face becoming very flushed, and the temperature rising in a short time afterwards as indicated by two-hourly chart. The four-hourly chart shows it still better.

Her general improvement was a matter of comment by all the others in the ward and both Dr. Edwards and Dr. Dunbar were surprised.

CASE II.

T. A. aged 35, had been in the navy, but after leaving was employed at some work in the neighbourhood, when he received a blow on the arm, as the result of which there was a thickness which persisted longer than the usual bruise with a history of syphilis. I naturally concluded that this was a syphilitic thickening of the periosteum, and gave him the injection of distilled water every other day. At the end of the fortnight the swelling and the pain had disappeared and he returned to work.

CASE III.

T. J., aged 46, was admitted to the infirmary on March 6th suffering from multiple ulcers of the left leg and foot. There was the brownish taint on the right skin, which confirmed the diagnosis of syphilis. The ulcers on the left leg and foot would nearly heal and then break down, but never assumed a healthy appearance. I started injecting distilled water on October 31st and continued the treatment every other day until November 16th when I did it every 3rd day. By the end of the first week the edges of the ulcers had taken on a very healthy appearance, and the pain from which the man suffered practically disappeared.

There were ten ulcers altogether, and by November 23rd seven of them healed over, and the two largest were two thirds covered with

new tissue. The man appeared healthier and some color had returned to his face. He said he felt much better, and looked forward to the time for each injection.

A reference to his temperature chart shows that there was a reaction after each injection but the temperature did not rise nearly so high as in Case I.

CASE IV.

B. P. aged 24, had a hard chancre half inch in diameter on the dorsum penis which appeared a fortnight before I saw him. I started injecting him with distilled water on November 2nd and injected him every third day and by the 14th it had practically disappeared as well as the enlargement of the glands in the groin. His general health improved rapidly and he looked much better after a fortnight's treatment.

CASE V.

M. S., aged 20, single, was admitted on November 1911 as she was pregnant and infected with syphilis. After confinement and some treatment she was discharged to be readmitted on November 11th, 1912, suffering from tertiary ulcers in different parts of the body. There was a small sore on the right ear and one on the right eye, whilst one seemed to be forming on the forehead.

Treatment was started on November 12th and by November 19th there was a considerable improvement, the ear and eye being practically well and the swelling on the forehead had subsided.

All the other ulcers had taken on a healthy appearance so that by November 25th, they were all covered over.

Her general health improved greatly. She seemed brighter, looked healthier and had colour in her cheeks, whilst the appetite improved. She much appreciated the treatment although she cried on the first occasion.

The temperature reactions in this case were very marked as in case I, rising a few hours after each injection to 100° F.

CASE VI.

W. P., aged 26, admitted October 10th, for sores on the right leg, was infected with syphilis in the army. Treatment was started on November 10th and after injections every 3rd day, the gummata on thigh and leg were all covered over by tissue on November 25th. A sore inside the right cheek also subsided, whilst his general appearance became more healthy.—*The British Medical Journal*.

SIR,

Dr. Arbour Stephen's article on the above subject in your last issue is of much interest. It occurred to me some time ago that the beneficial effect of salvarsan injection might be due in part at any rate to the quantity of water injected. The effect of water on intractable cases of syphilis was pointed out by Mr. A. H. Ward in 1904 in a small book he wrote on syphilis. He mentions the case of a woman with chronic syphilitic ulceration which recurred continually in spite of all kinds of treatment with mercury and iodides but rapidly healed when three pints of hot water containing only 5 grains of iodide to the pint were given daily. Dr. Stephens recommends 6 to 10 c.c.m. of distilled water given hypodermicaily. This is not far remote from the amount given in intramuscular injection of salvarsan but much less than that given for intravenous injections (about 200 c.c.m.) Whether the hypodermic or intravenous injection of water is better than administration by the mouth is open to question, but taking all the evidence into consideration, it would appear that large quantities of water are beneficial in chronic cases of syphilis. This probably has much to do with the effect of the old Litmann's decoction.—C. F. MARSHALL, D. D. in the *British Medical Journal*.

A Contribution to a Discussion on Serum and Vaccine Therapy at the Ninth Australasian Medical Congress, Sydney, September, 1911.

BY

D. A. WELSH, M.D., F.R.C.P. (EDIN.).

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Professor Allen has asked me to reply on his behalf; and my undertaking is made easier by the fact that this great gathering has shown in no uncertain way that it recognises the high place which scientific immunisation has taken in the treatment of bacterial disease. If I now take exception to some points of detail, and even if I ask you to reconsider the statement of certain principles of treatment, I would not have you think that this represents any fundamental divergence. I go as far as those who have already spoken, but I think there are good reasons for venturing further than some of them have done.

Antisera and their administration.—In regard to antisera, I would deprecate any suggestion that "mild" cases of diphtheria may safely be left untreated by antitoxin. No one can predict of diphtheria that a

case will continue "mild" to the end, and the days of grace, within which antitoxin is effective, quickly pass. Careful observation and experiment teach that success in the use of antitoxic sera depends on the *early* introduction of *large* doses. To neglect the use of antitoxin even in "mild" diphtheria is no longer a legitimate form of research. It is not even original, for the disastrous results of such neglect were more than sufficiently illustrated in the pre-antitoxin days. Indeed, it is good practice to give a large dose of antitoxin as soon as there is reason to suspect diphtheria, without waiting for a report on the bacteria found. Much harm may thus be averted, if the suspicion should be confirmed; and no harm is done if it should not.

A large and early dose of antitoxin is still more urgently indicated in tetanus, where not less than 100 c.c. should be given without the loss of a single hour, and followed by other injections. Here again it is good practice to anticipate possible developments by giving 25 c.c. or more of tetanus antitoxin, when wounds have been inflicted by rusty nails or contaminated by earth, before there is any sign of tetanus, and to place the injections so as best to antagonise the local production of the toxin and its absorption by way of the nerves.

The Rationale of Vaccination.—It is in regard to vaccines that I am most interested, and in that modern development of vaccination that we owe to Wright. Vaccination, as I understand it, is the scientific direction of nature's mode of cure. It reproduces and regulates the mechanism by which recovery from infection is naturally brought about. The success of such a method is assured, and it is bound to succeed in even greater measure as we reach a better understanding of its principles. What, then, is nature's method? It may be crudely stated as the formation of antidotes by the interaction between the infecting bacteria and the infected tissue. But most often the attack of the invading bacteria is concentrated in certain tissues; and, whether this concentration be limited to one area or distributed over several areas, the result is the same—that each invaded area is liable to be overwhelmed by the numbers and virulence of the invaders, and its capacity for resistance to become exhausted. At the best, this focal concentration of bacteria tends to derange the local mechanism of resistance, and to make the process of immunisation irregular, uncertain, and protracted. Hence it is necessary to make a counter attack—of the nature of a flank attack—and to bring into action relays of unexhausted tissue.

This is done by injecting a vaccine (usually a sterilised culture of the bacteria concerned) into an area of healthy tissue to provoke an

immunising response there, so that the site of inoculation becomes a local manufactory of the antidotes required. The bacteria are killed before being introduced, so that they cannot multiply and get out of hand, and the dose of bacteria is so regulated that, as Wright puts it, the tissues must win at the site of inoculation. The excess of anti-substances thus generated in healthy tissue is carried in the lymph and blood streams to antagonise the bacteria concerned in the infection, and so to reinforce the other tissues that are being overcome by them. As a matter of fact, the practice of vaccination is far in advance of theory.

Certain principles of treatment obviously follow. It is inadvisable to exhaust the local manufactories of antidote by giving repeated injections of vaccine into the same area. The sites of vaccinating should, if possible, be so chosen as to bring the anti-substances to bear upon the foci of infection in their most concentrated form. Autogenous vaccines should be used to develop the maximum antagonising power in the antidotes. Auto-inoculation should be carefully controlled during the period of immunisation. All other means that may accelerate the immunising response, or combat the infection, should be brought into action. Unkind criticism may then suggest that the patient has got well in spite of vaccination. But it must be admitted that the whole object of treatment in bacterial disease is the establishment of immunity, and even those who believe that this is best done by allowing nature to work out a cure, should bear in mind that vaccination (auto-vaccination) is nature's mode of cure. It surely follows that this very method, scientifically directed, is the best means of treatment, and that all other means are subordinate and ancillary to it.

Vaccine treatment therefore, is applicable to all bacterial infections—localised or generalised—acute or chronic—severe or slight. Acute local infections may respond to one or two injections. Chronic lesions may require prolonged and repeated vaccination. I was led by the work of Wright himself to believe that, even in the most acute and generalised conditions, a vaccine might help, that, indeed, a vaccine is the only thing likely to help. For one does not add to the *toxic* content of the blood by introducing a vaccine into the subcutaneous tissue. What one does is to stimulate the local production of anti-substances which, being absorbed, increase the *immune* content of the blood. In the most acute septicæmia, therefore, a vaccine should be promptly used, and in a number of hospital cases we have had a measure of success.

It is fortunate that the popular prejudice against vaccination for small pox does not extend to vaccine therapy. Most patients are keenly

interested in bacterial vaccines, and are more than willing to try them. I cannot help thinking that "conscientious" objectors would be less in evidence if the true nature of the process were known—if it were realised that vaccination is the adaptation of a natural process—the natural mode of recovery. Medical men should take every chance of impressing their patients with this aspect of the question.

Some Practical Applications and Suggestions for the Use of Vaccines.—I was much impressed by the first case on which I tried a vaccine. It was that of a young woman with early phthisis and with laryngeal tuberculosis so advanced that a snipping from the mucous membrane revealed numerous giant cell systems and tubercle bacilli. Minute doses of tuberculin T.R. were given, as recommended by Wright, and controlled by the opsonic index. Within a year every trace of phthisis had gone, and only some congestion of the mucosa was noticeable in the larynx. Treatment by tuberculin in small doses was continued at intervals for another year, when recovery was complete. It is now more than seven years since I first saw her, and I heard only the other day that she was still in perfect health. In my limited experience of tuberculin, I have continued to recommend minimal doses, and have seen further evidence of their curative value. Active processes have been arrested, in the lungs, in glands, and in foci elsewhere; but masses of tuberculous tissue may not be absorbed, and the immunisation may have to be supplemented by operation. Advanced pulmonary lesions have not been much influenced. In genito-urinary tuberculosis there has been improvement even in advanced cases, and the subjects have repeatedly expressed a sense of well-being during these injections.

In non-tuberculous infections of the respiratory tract, I have known vaccines, prepared from bacteria in the sputum, give relief in asthma, cure a distressing condition of bronchiectasis, and abolish post-nasal and pharyngeal catarrh. Among other conditions I have seen recovery or marked improvement follow the use of autogenous vaccines in the cystitis of children and of adults, in extensive ulceration due to streptococci and otherwise intractable, in chronic rheumatism, and in suppurative processes, including carbuncles, boils, and acne. Failures I have known, and I am prepared to admit that most failures are evidence of faulty vaccination. I cannot agree that they discredit the principles on which vaccine therapy is based. I consider that there should be no failure in treating a bacterial infection with its autogenous vaccine, save in two circumstances: (a) when the immunising response is defective, or (b) when the immune substances cannot reach the bacteria.

Two suggestions, arising out of work in this school, I would make for the further use of vaccines: (1) In treating enteric fever and allied infections; and (2) in disinfecting the carriers of infection. Enteric fever begins as a septicaemia, and Dr. Hamilton Tebbutt, in 1910, working as resident pathologist at the Royal Prince Alfred Hospital, found that in early conditions he could make the diagnosis from cultures of the bacilli in the blood, more certainly than by testing for specific agglutinins in the serum. Autogenous vaccines from such cultures could be used at an early stage of the infection, before the bacilli had had time to settle and damage the tissues. A beginning has been made by Dr. Tebbutt and by Dr. Mary Burfitt, at the hospital, with encouraging results. If it should prove helpful to use vaccines in enteric fever, it should be helpful to use them in other infections which concentrate in the alimentary tract. In the gastro-enteritis of children, Dr. Jean Dalzell is making a special study of the bacteria concerned with the object of applying specific vaccine therapy. In outbreaks of food-poisoning the use of vaccines is also worthy of trial.

That vaccines might be used to disinfect the carriers of infection was brought under my notice some years ago by Dr. Percy Walton Smith, who used small doses of a recent culture from a case in which the bacilli persisted in the fauces after recovery from diphtheria. This persistence of diphtheria bacilli during and after convalescence is by no means uncommon. It is quite unsuspected either by the patient or by his medical adviser, unless a special bacteriological examination is made. It is a menace to the community, against which no precaution is taken excepting by a few more enlightened members of the profession. In all probability, it is the result—and the only bad result—of the use of antitoxin, which may neutralise the poisons of the bacilli before the tissues have been able to elaborate enough antibacterial substances to destroy the bacilli themselves. The use of a vaccine to kill off the bacilli is necessary in such cases, and it would probably be better for all diphtheria patients if the vaccine were administered as regularly and at as early a stage as the antitoxin.

Since a vaccine is effective in clearing the throat of diphtheria carriers, a corresponding vaccine might be able to clear the intestine of typhoid carriers. It is true that the typhoid bacilli in such cases might not be easily reached by the anti-substances produced by vaccination. But, when immunisation is sufficiently advanced, the anti-bacterial substances in the blood might be brought into contact with the bacilli by means of a saline purge.

Vaccines in General Hospital Practice.—In conclusion, I would bring under your notice the vaccine work of the Royal Prince Alfred Hospital as evidence of the appreciation of vaccine therapy by the honorary staff. All the vaccines are prepared at the request of the staff, and I am indebted for the following particulars to Dr. Mary Burfitt, the resident pathologist, who made the vaccines and helped in their administration. Within a period of eight months, February to September, 1911, autogenous vaccines were prepared from, and administered to, 100 patients, and occasionally more than one vaccine was made from the same case. Since the daily average number of in-patients for that period was 357, the proportion of cases receiving treatment by vaccine is higher than it was in some of the British hospitals which I recently visited.

Details of a consecutive series of 100 unselected cases are given in the accompanying table. These results, however, do not give a just estimate of the efficacy of vaccines in the treatment of bacteria infections; for some patients did not come under treatment until late in the disease; others have only recently begun vaccination; and many did not attend long enough to complete the process of immunisation, otherwise more would probably have been "cured."

TABLE GIVING DETAILS OF 100 CONSECUTIVE CASES TREATED BY AUTOGENOUS VACCINES AT R.P.A. HOSPITAL WITHIN A PERIOD OF EIGHT MONTHS.

Conditions in which autogenous vaccines were used.	Number of Cases and Results.				Remarks.
	Cured.	Improved.	Unimproved.	Died.	
Enteric Fever ...	17	—	—	1*	*Admitted in the 5th week and died of hæmorrhage after one dose of vaccine.
Paratyphoid Fever...	2	—	—	—	
Diphtheria Carrier ...	1	—	—	—	Virulent case of "sore throat" in a member of the Resident Staff.
Septicæmia (Streptococcal)	3	1*	—	7	*Under treatment.
Septic endocarditis ...	—	—	—	2	Both very late in coming under treatment.
Osteomyelitis ...	—	1	1	—	
Pneumonia ...	1	—	—	—	
Pneumococcal empyema ...	1	2*	—	—	*Under treatment.
Pulmonary Tuberculosis ...	—	1	—	—	
Abscess of Lung ...	—	—	1	—	Pneumo bacillus, isolated; improved, then relapsed, and piece of hydatid membrane coughed up.
Abscess of Breast ...	1	1	—	—	Both multiple abscesses.
Putrid Condition of Skin	5	15	2	—	More than one vaccine used in some cases.
Septic Wounds, Ulcers, etc.	—	5	1	—	
Cystitis and Pyelitis ...	4	15	3*	—	*Under treatment.
Bacilluria ...	—	1	—	—	
Chronic "Rheumatism" ...	1*	3	1	—	*Streptococci and staphylococci, both isolated, of the remainder two were streptococcal and two staphylococcal.
Totals ...	36	45	9	10	

Per contra, many patients would doubtless have been relieved without the aid of vaccines, though probably not within the same time nor

to the same extent. My object is rather to give some idea of the extent to which vaccines are actually being used in one particular hospital, now that the methods introduced by Wright have been put to the test for several years.

My own conclusion, based on these and on many earlier results, is that vaccines are of great value in the treatment of hospital cases, because some lives are saved in acute cases that would in all probability otherwise have been lost; and because many disabling infections are more quickly arrested, and more often cured, with vaccines than without. It is not often indeed that one can so conclusively justify to the lay mind the expense of a well equipped pathological laboratory; but even the least sympathetic can understand that money is well spent when it enables a hospital to treat more patients in the same time, and to treat them more effectively.—*The Australasian Medical Gazette*.

Dangers of the Adenoid Operation.

W. E. GROVE.—The adenoid operation is regarded by the laity and by many practitioners as quite simple and absolutely harmless. The large number of operations performed, and the meagre statistics of complications, explain this view. There are three reasons for this meagreness.* First, few surgeons enjoy publishing their accidents. Second, the operation is generally performed outside of a hospital and the surgeon does not usually control his patient long enough after the operation. Third, the operation is frequently performed by the general practitioner who is too busy to publish his results.

The most frequent and dangerous complications are hæmorrhage and infections. The hæmorrhage may be severe. BARRELL and ORR, in 1907, reported 7 cases of fatal bleeding.

That infections must occur is apparent when we remember that the operation is done by the sense of touch in an infected field which cannot be surgically cleaned. Indeed, the fever which usually appears after most adenoid operations is an indication of an infection which the organism usually overcomes. BRIEGER found large numbers of microbes on the surface of adenoids in children, in whom the mechanical cleansing of the nose was hindered by a deficient forceful expiration. That infectious processes do not more frequently lead to more serious complications is explained by the fact that the operative field presents a broad surface with excellent free drainage.

Septicæmia is not unknown after the adenoid operation. COLBY observed a case of endocarditis after adenoid removal and found two

other cases recorded. A patient of MONTENGOHL was attacked with chorea and endocarditis after an adenoid operation.

Practically all of the acute infectious diseases of childhood have been observed as post-operative sequelæ. DELSAUX reported one case of a rubeola-like eruption, and four cases of scarlatini-form erythema. BRIEGER operated during the incubation stage of chicken pox and observed after the operation a pseudo-diphtheritic localization of the pox in the pharynx. The cases of scarlet fever and diphtheria can be explained in two ways. Either the operation was performed during the incubation stage or it was performed in patients who were chronic bacillus carriers, in whose throats the bacillus of diphtheria or the virus of scarlet fever was present in latent or non-virulent form. Scarlet fever and diphtheria are reported by several observers.

Acute local post-operative infections are also frequent. It is to be expected that when one removes part of Waldeyer's ring an acute infection of the remaining lymphoid tissue will occasionally occur. Only the fact that both pharyngeal and faucial tonsils are removed so often together can explain the fact that we do not see these post-operative anginas more frequently. DELSAUX saw 5 cases of post-operative angina follicularis in 508 adenoid operations. GERBER observed a peritonsillar abscess develop soon after the removal of an adenoid in an adult.

The local lymphatic glands are at times swollen and sensitive to pressure. REVIERE observed one case of adenitis among 150 cases. GRONBECK described 4 cases of extensive post-operative affection of the cervical lymph glands, which called forth severe and long lasting symptoms.

A complication not infrequently observed, is, torticollis. It generally appears in the first 2 to 5 days after the operation, accompanied by a moderate rise of temperature. In some cases the cervical glands were much swollen and tender. NEUFELD explains this complication as due to an infection of the deep-lying cervical lymph glands. HICQUET, however, is of the opinion that this complication is not always of an infectious nature, but is in some measure due to the force used in operating and to the extent that the anterior bodies of the vertebrae and their ligaments have been injured. Most of the patients improve in a period ranging from 2 days to 2 months.

Pulmonary infections may occur. They are not directly dependent upon post-operative infections, but are rather due to the aspiration of blood or lymphoid tissue during the operation. BRIEGER operated after

a cautery treatment of the nose and before the complete separation of the eschar. Pneumonia developed with large numbers of streptococci in the sputum as well as a streptococcic otitis and mastoiditis. FALLAS reported a case in which a lung abscess developed 4 days after the operation.

Cases of fatal meningitis have been reported.

The nasal sinuses appear to be much less frequently infected after adenotomy than the ear and its appendages. This may be partly explained by the fact that the operative field lies in much closer approximation to the mouth of the Eustachian tube than to the nasal openings of the accessory sinuses. HENKE described the first case of sinus suppuration. There was a severe frontal sinus infection with periostitis, and œdema of the eyelids, 2 weeks after the operation.

The writer has observed the following cases:—

CASE 1.—Oct. 4, 1910. A girl aged 13, had adenoids and tonsils removed. Next day everything looked clean and she was allowed to return home.

Oct. 19. She was again seen. There were fever and pain in the right ear. The mastoid was sensitive. The left upper lid was swollen and there was some ptosis. Severe continuous, frontal headache. Pus in the left side of the nose. X-ray examination showed a shadow over the left frontal sinus.

Oct. 21. Incision through the shaved eyebrow. Exposure of the periosteum. The bone appeared normal. On opening the frontal sinus thin yellow pus under high pressure escaped. Removal of the entire anterior bony wall. The frontal sinus was partially filled with pus and polypoid granulations. Elevation of the periosteum of the orbital roof. Removal of the bony roofs of the orbit. Curettage of the naso-frontal duct. Recovery followed.

CASE 2.—In a girl, aged 20, adenoids and tonsils were removed under local anæsthesia on Nov. 21. On Dec. 7, she returned complaining of a discharge of pus from the left side of the nose. Radiography showed a shadow in the left ethmoid region. Rhinoscopy revealed pus high up in the anterior portion of the middle meatus. The inferior turbinate and the anterior end of the middle turbinate were hyperæmic and swollen. The latter was removed and recovery ensued.

To avoid these complications the operation should not be performed during local epidemics or when any local infectious process is present in the nose, naso-pharynx, or ear. It is also well not to operate during

local epidemics of the acute infectious diseases of childhood, especially if the patient has been in contact with children ill from the disease. After the operation the patient should be kept under observation for 2 or 3 weeks.—*The Medical Review*.

Umbilical Calculi.

R. HERZENBERG.—The term calculus has been applied to a conglomerate mass, consisting of various foreign bodies cemented by secretion from the sebaceous glands, which is occasionally found in the umbilicus. Foreign bodies, such as stones inserted into the umbilicus by children or the insane, are not included in this category which is confined to concretions slowly collected in the umbilicus, and consisting of dust, fragments of clothing, hairs, etc. These accumulate unnoticed in an umbilicus, the structure of which is abnormally favourable to the storage of odd particles. Around a small nucleus of such particles, desquamating epithelial cells and sebaceous matter accumulate till a large body is formed, the presence in which of calcium salts makes it stony. Having attained certain dimensions, the calculus is unable to escape outwards, and therefore grows concentrically larger, and is moulded to the shape of the pocket in which it lies. Its increasing dimensions and the limitations of its pocket cause an inflammatory reaction which stimulates the excretion of sebum. As this, too, is retained, further inflammation occurs, the skin around the umbilicus becoming infiltrated and firm. Only a slight blow is now sufficient to precipitate an infectious process which may also begin spontaneously, for the calculus contains cocci as well as cholesterol crystals and drops of fat. The symptoms at this stage consist of pain in the deeper portions of the umbilicus and tenderness over the abdomen. Usually after a month or two they suddenly become much worse.

The diagnosis is not easily made unless a hard substance can be detected on probing, or a portion of the calculus detached thereby. Ignorance of the existence of umbilical calculi is responsible for failure in diagnosis; and they are mistaken for a dermoid cyst, an adenoma, or actinomycosis. Indeed, any of these may present a picture identical with that of umbilical calculi, and the true condition be detected only on operation. The differential diagnosis is particularly difficult between umbilical calculi and broken-down dermoid cysts, for the contents of the two are identical. VILLAR even goes so far as to suggest that many recorded cases of umbilical dermoid cysts were really cases of umbilical calculi. The following case is recorded by the writer:

A labourer, aged 32, who had not previously been ill, began to suffer from itching in the depth of the umbilicus, which he attempted to clean with a match. The itching, however, continued; and was succeeded in a few days by a dull ache and swelling of the umbilicus. A fortnight after the beginning of these symptoms, a purulent discharge from the umbilicus appeared, and 3 weeks later he was admitted to hospital complaining of abdominal pain on defæcation, coughing and sneezing.

He was pale and emaciated, and the mucous membranes were anæmic. The pulse was 92, and the temperature 101.3° . The umbilicus appeared as a red, round swelling, $2\frac{1}{2}$ cm. high, and about 5 cm. in circumference. From a crater-like opening at the top of the swelling, greenish yellow, offensive pus trickled. The skin around this crater was macerated, and for an area of several cm. it was red, swollen, and tender. The tumour was hard, movable, and yielded thick pus on pressure. A sound passed to a depth of 3 cm., and on its withdrawal some blood escaped. When the opening at the top of the tumour was dried, its walls were seen to consist of granulations which bled readily and were coated with pus. The discharge, examined under the microscope, consisted of pus-cells, epithelial cells, crystals of fatty acids, and strepto and staphylo-cocci.

The patient was operated on, the diagnosis being: suppurating dermoid cyst or adenoma. An elliptical incision was made 3 cm. from the umbilicus, which was easily detached at a depth of 5 cm. A funnel-shaped wound was left in the abdomen, the cavity of which was not opened by the operation. Nor could any communication between the umbilicus and abdominal cavity be found. A tampon was inserted into the wound which healed satisfactorily, the patient being discharged on the 18th day.

The excised umbilicus contained a quantity of pus and a hard body of the shape and size of an almond. It was of a yellowish-grey colour, and consisted of cholesterin, crystals of fatty acid, lumps of fat, epithelial cells, and a large quantity of small inorganic particles. These formed a nucleus about which the other components of the calculus were arranged in layers. The calculus became swollen in water, and was soluble in ether which, on evaporation, left a deposit of dust.

This case differs from others in which a calculus formed in the spiral groove leading from the depth of the umbilicus to the surface. For the pocket in which the calculus lodged was directly continuous with the fascia of the abdominal wall, and had apparently been lined with epithelium, a relic of the allantois or ductus omphalo-mesentericus.

The peripheral portion of the latter may not have closed, and thus a pocket may have formed in which debris collected.

The records of umbilical calculi are scarce. LEDDERHOSE and PER-NICE have collected 10 cases in which the calculi ranged from the size of a pea to that of a cherry stone. HAHN has recorded the case of a man, aged 43, who had unwittingly harboured a calculus, as large as a pigeon's egg, for a long time. A phlegmon was precipitated by some unknown cause, and after a fortnight's illness the umbilicus was explored with a probe with which a few white fragments were detached from the depths of the umbilicus. The diagnosis was therefore facilitated.

—*The Medical Review.*

When to Operate in Appendicitis.

DISCUSSING this question in the "Lancet," Mr. F. KIDD writes:—"Every patient with the diagnosis of acute appendicitis that comes into my wards at the London Hospital is at once put to bed on the back in the head-up ('Fowler') position, and watched. The directions are: 'No food, no drink, no purge, no enema, no opium.' An hourly chart of the temperature, pulse-rate, and respiration-rate is at once started and a mental note is made of the severity of the pain and deep tenderness. At the end of four to six hours (usually four) the chart is reviewed, and the abdomen again examined. If the temperature, pulse-rate and respiration-rate are all falling and if the pain is less no operation is performed, and these patients soon settle down into 'interval' cases. But if any one of these four things is no better or is worse, then an operation is at once performed, and so far I have had no reason to doubt from the operative findings that the peritonitis was spreading and needed immediate operation. I would therefore appeal to the practitioner to make a trial of this method directly he is called to a patient with severe abdominal pain, especially if accompanied by fever. Let him at once take steps to call in a surgical opinion, but let him employ the interval before the surgeon can arrive in placing the patient in the Fowler position by putting two kitchen chairs under the head end of the bed, and in preparing an hourly chart. An intelligent mother can easily be taught how to prepare the chart if it is not possible for the practitioner to do so himself. Meantime, while the surgeon is on his way to the case, valuable time will not have been wasted, and when the surgeon arrives there will be some definite evidence for him to go upon in forming an opinion as to immediate operation or expectant treatment. I exclude cases seen within the first twelve hours of their illness, as these are practically

the same as interval cases from the operative standpoint, and should always be operated on at once."—*The Medical Times*.

OBSTETRICS AND GYNÆCOLOGY.

Post-Mortem Cæsarean Section with Living Child.

BRUNNER.—A woman, aged 33, was admitted to hospital at the end of pregnancy in an asphyxiated condition. She was unconscious and deeply cyanosed, with stridulous, rattling respiration. She was immediately placed on the operating table. A gag was inserted with some difficulty owing to trismus. A tracheal catheter and large-bore intubation tube were fixed in position, and artificial respiration was begun. In the meantime she became pallid and pulseless and the heart and respiration were arrested. The insufflation of air and artificial respiration failed to resuscitate her.

Laparotomy was performed, the uterus was incised, a male child was extracted, and the umbilical cord was ligatured. The boy was cyanosed but the heart pulsated. After the insufflation of air through a catheter and the performance of Schultze's swinging method of artificial respiration he began to cry. The weight was 8½ lbs.

Necropsy of mother.—A process of about the size of a fist extended from the left of the enlarged thyroid gland deeply into the thorax. The lower end was close to the upper part of the heart and the aortic arch crossed it anteriorly. The trachea was situated to the right and posterior to the process, which was readily removed from its bed. After removal of the cervical and thoracic organs it was found that the two lateral lobes of the goitre passed backwards behind the œsophagus and almost met in the middle line. The trachea was compressed laterally, so that its lumen was represented by a narrow slit, the compression extending almost to its bifurcation. On pressure yellowish-brown pus exuded from the lungs. The survival of the child was the more satisfactory in that maternal dyspnoea renders the prognosis as regards the child extremely bad.—*The Medical Review*.

The Diagnosis of Extra-Uterine Pregnancy.

BY

SAMUEL M. BRIKNER.

Mistakes are constantly made in the diagnosis of extra-uterine pregnancy, both of omission and commission. At times the diagnosis is most difficult. Four of the last 10 cases in the gynecological service of

Mt. Sinai Hospital were incorrectly diagnosed as follows: incomplete abortion, a small ovarian cyst, hydrosalpinx, and pyosalpinx. Errors on the other side are by no means infrequent. Thus a patient was admitted with a history of irregular menstruation, hæmoglobin of 30, temperature of 103°, and a pulse of 130. She said she had been ill only 24 hours. The uterus was slightly enlarged, she had a dark bloody discharge and a mass was felt on the left side near the uterus. Extra-uterine pregnancy was diagnosed but operation showed a pyosalpinx, which was removed. The patient died the same night. At the necropsy, the anterior wall of the uterus and the entire endometrium were found gangrenous and there was streptococcus peritonitis. Criminal abortion had been induced. If such errors are not uncommon in hospital practice, where patients are subjected to the close scrutiny and study of many observers, they are no less common in general practice. The writer's paper is based on 130 hospital cases.

Three symptoms usually point to extra-uterine pregnancy; 1 and 2: A period of amenorrhœa combined with irregular uterine bleeding. 3. Abdominal pain.

1 and 2. *Amenorrhœa and Irregular Bleeding.*—The amenorrhœa is not important, for only a little over half of the patients had missed a period. In many the menstrual history was not easy to obtain. In several cases of tubal abortion and tubal rupture the periods had been regular. In one case the first sign of any abnormal pelvic condition was the rupture of a pregnant tube. In general, however, there is a history of irregularity. Usually the patient was a few days or a week or two overdue, with some bleeding before the expected arrival of the next period. Every variation can be found. One patient will have had no irregular bleeding, while another will complain of profuse bleeding. But profuse bleeding in ectopic pregnancy is the exception and points rather to the interruption of an intra-uterine pregnancy.

3. *Abdominal Pain.*—This is one of the most characteristic symptoms of extra-uterine pregnancy. Almost every patient complains of it. It may be constant or intermittent, it may be cutting or cramp-like. Sometimes it is described as simulating labour pains and occasionally patients complain of bearing down pains. It is usually localized over the site of the lesion but it may be felt on the opposite side of the abdomen or over the abdomen generally. Not infrequently vomiting accompanies the onset of the pain. The character of the pain has no definite relation to the lesion. It may be due to a tubal mole, an unruptured tubal pregnancy, or a tubal abortion. But there is usually no mistaking the

pain which accompanies tubal rupture. It is sharp and cutting and is associated with such evidences of shock and internal bleeding that the diagnosis is usually not difficult. Yet a similar picture can sometimes be seen in tubal abortion. It is unusual for the pain of an extra-uterine pregnancy to be localized over the uterus. Such pain suggests uterine abortion.

Other Symptoms.—The concomitant symptoms of pregnancy are often present and as often absent. A full feeling in the breasts, vomiting, nausea, and sometimes frequent micturition are complained of. Many patients think themselves pregnant. But it is the irregular bleeding or the pain which has compelled them to seek advice. A sign which may lead to the diagnosis of extra-uterine pregnancy is pyrexia varying from 99° to 102.5° . The writer pointed out this in 1905 and the observation has been confirmed by various writers. It is necessary to exclude the pyrexia due to an infected abortion. The rise of temperature has two causes—the pouring out of blood into the abdominal cavity which is absorbed slowly, and the mild pelvic peritonitis about the extravasated blood and tube. It is usual to find filmy adhesions about the diseased tube, and in the case of an hæmatocele a thick capsule is eventually developed. In infected hæmatocèles, the temperature is, of course, much higher, and is not to be taken as an indication of extra-uterine pregnancy *per se*. A very rapid and feeble pulse with great pallor and evidences of an intra-abdominal hæmorrhage would naturally lead to the diagnosis of a ruptured ectopic pregnancy. But the other varieties of this condition give no pathognomonic signs in the pulse. Prolonged bleeding, even without rupture, will eventually affect the character of the pulse and with a relatively low hæmoglobin count, may weigh in the balance in favour of an ectopic gestation.

Local Signs.—Usually the cervix is softened, but not as soft as in a uterine pregnancy of the corresponding duration. The uterus itself is almost invariably enlarged and has a feeling of softness. But the writer has never been able to elicit Hegor's sign in extra-uterine pregnancy except in a case of simultaneous intra and extra-uterine pregnancy.

In unruptured tubal pregnancy, tubal abortion and tubal hæmatoma, a mass may be felt on one side or the other of the uterus. It may be high, near the top of the broad ligament, it may be between the layers of the broad ligament, or it may be found most easily in one of the lateral fornices. This mass may feel elastic or boggy; or, if it is an accumulation of blood, it may feel like a cyst. Its presence arouses the suspicion of extra-uterine pregnancy, especially if other data are to be found in the

history or by examination. Pulsation of the uterine artery over the mass is not necessarily of pathognomonic significance. It is often present and is frequently absent and may also be found in other conditions. The mass is always tender. This is highly suggestive when present with other symptoms of extra-uterine pregnancy.

When confronted with a ruptured tubal pregnancy, one frequently finds no mass. The ruptured tube has collapsed, having extruded all its contents into the abdominal cavity. But the picture is then usually so complete that the local examination is unimportant.

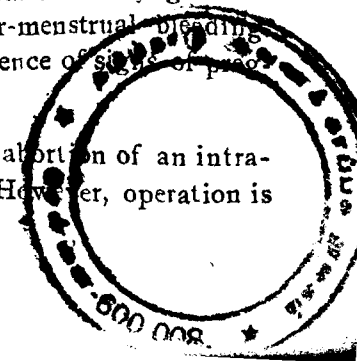
The blood count is of little use in the diagnosis. Often the white cells run from 15,000 to 25,000 after rupture, and frequently before they will number from 10,000 to 15,000. The hæmoglobin, too, gives little indication, although in cases of prolonged bleeding it corresponds to the figures of acute anæmia. When below 60 per cent. it may be of help in diagnosis.

Not infrequently one of the symptoms is faintness. This may vary from a slight feeling of faintness to complete syncope. When a tubal abortion or rupture takes place, the patient usually faints, but she may also have the feeling of faintness during the few weeks of tubal pregnancy. This is a highly suggestive symptom when taken in connection with the other features. If called to a woman who has suddenly fainted, who is exceedingly pallid and who has a rapid pulse, the suspicion of extra-uterine pregnancy is justified.

Differential Diagnosis.—Extra-uterine pregnancy must be differentiated from uterine pregnancy with impending or incomplete abortion. The size of the uterus, the open cervix and the bright red bleeding, and the absence of pain on either side in the latter case will usually be sufficient. Microscopic examination of the expelled pieces will be of great aid, as the decidua of intra-uterine pregnancy differs materially from that of an ectopic one.

Inflammatory diseases of the tube—hydrosalpinx and pyosalpinx—come next. A mistake is excusable, for these conditions may give rise to temporary amenorrhœa and sometimes to inter-menstrual bleeding. But the size and texture of the uterus and the absence of signs of pregnancy should help.

Small ovarian cysts in combination with an abortion of an intra-uterine pregnancy may also give rise to doubt. However, operation is indicated in either case.



SUMMARY.

1. Suspicions of extra-uterine pregnancy should be aroused by a history of irregularity of menstruation, of bleeding, and of abdominal pain usually of a cramp-like character.
2. The uterus does not usually correspond in size to the assumed length of the pregnancy.
3. If at the same time, a soft tumour can be felt adjacent to the uterus, the diagnosis is probable.
4. There may or may not be the concomitant signs of pregnancy.
5. Women seen in collapse with a rapid pulse should be regarded as having an extra-uterine pregnancy when other conditions are clearly not responsible.—*The Medical Review*.

Common Mistakes in the Treatment of the Diseases of Women.

BY

F. J. McCANN, M. D., F. R. C. S.

Urethral Caruncle.—Urethral caruncle is prone to recur after treatment, because a portion is inside the urethra, and unless that is removed it grows. It is usual to treat urethral caruncle with the cautery. This is not infrequently followed by stricture. The writer, therefore, never uses the cautery but excises the whole caruncle, and brings the mucous membrane of the urethra to the mucous membrane round the urethral orifice by fine catgut sutures.

Pruritus in elderly women frequently leads to mistakes in treatment. It is often a precursor of carcinoma of the labium. Therefore do not continue treating pruritus in an elderly woman without taking trouble to ascertain that you are not dealing with carcinoma of the labium. Carcinomata of the labia are sometimes treated as warts. In their earlier stages certain forms appear as a wart-like growth. In one case in which they had been treated with the cautery the writer found a cancerous growth and metastases in the inguinal glands.

Gummata in this region are often treated as cancers. A patient was intending to undergo a course of radium, but was found to have a gumma excavating each labium. The whole condition cleared up under antisyphilitic treatment.

Chronic gleet of the duct of Bartholin is treated by vaginal injections, on the supposition that the discharge is coming from the

vagina. In all cases of vaginal discharge carefully examine the ducts of Bartholin, which open external to the hymen, so as to be sure there is not a gleet discharge issuing from them. The treatment is to slit up the ducts with a canaliculus knife, so as to allow free exit for the discharge.

An intermittent discharge from an infected Bartholinian cyst leads to mistakes in treatment. A patient will say she has had a swelling of one or other labium which has suddenly disappeared, and that previously to its disappearance there was a free discharge. You may examine without finding anything; but if that patient comes again, you may be fortunate in discovering a swelling, the contents of which have reaccumulated.

Vaginal pain.—A number of cases associated with vaginal pain lead to mistakes in treatment. They are often due to anal fissures or hæmorrhoids and unless these be treated the vaginal pain persists. All kinds of sedative pessaries are used without benefit.

Frequency of micturition.—Many mistakes occur in connection with this condition. It may be due to commencing tuberculosis of the kidney or to *Bacillus coli* cystitis. Some cases defy all treatment until bacteriological examination of the urine is made. A vaccine will cure cases due to the *Bacillus coli*. Another cause of frequency of micturition is ureteral calculus, which may easily be overlooked.

Gonorrhæal vaginitis is frequently treated wrongly. If direct treatment of gonococcal infection in the female were carried out early it could be cured quickly. At present either the patient begins treatment herself by injection, or she is ordered to do so, and the condition is made worse. The infection can be attacked with much greater facility than in the male. By swabbing out a few times the vagina and the cervical canal with strong carbolic or strong nitrate of silver you can stamp out the disease.

Vaginal discharges are a potent source of error in treatment. The writer has seen a patient who had had a prolonged course of iron for a vaginal discharge, when what was the matter with that vagina was that it contained a foreign body. A profuse vaginal discharge, occurring in an otherwise healthy virgin, should suggest a foreign body.

Dyspareunia.—One may fall into the error of employing repeated dilatation of the vagina when the cause may be male impotence. Bear this in mind if you have thoroughly dilated the vagina and failed to obtain benefit.

Uterine conditions.—One of the commonest mistakes is the use of pessaries when the uterus is fixed in a backward position. The pessary frequently causes so much pain that the patient at once demands its removal. If, on the other hand, she bears the pain caused, the pessary will not do good. These cases, of course, are instances of uterine adnexal inflammation binding the uterus down, and fixing it in the pelvis in a backward position. Therefore the treatment should be reduction of the inflammation by repeated blistering externally, *i. e.*, on the flanks, or painting the fornices with iodine, and the internal administration of iodide of potassium. This treatment must be kept up continually for at least 12 months, and should be combined with rest and saline purgatives. Ichthyol treatment is of the greatest possible benefit and is much too little used in this country. A recent authority dismissed ichthyol by saying, "Ichthyol is dark in colour, and has a nasty smell." It is true that the smell is an objection, but the results are excellent. The ichthyol treatment consists in inserting 10 per cent. ichthyol and glycerine tampons well up into the vaginal fornices. Secondly, ichthyol vaseline, 10 per cent., is rubbed into the flanks; thirdly, ichthyol pills, 2 to 3 gr., are given thrice daily.

Pessaries should not be used in displacements in nulliparæ, especially in virgins, for they stretch the vagina, and the longer worn, the greater the stretching, and the larger the instrument required. Secondly, in the pessary treatment of displacements in a virgin, you introduce a septic element into the vaginal canal, and with it the risk of infection. Operations for displacements are now so satisfactory and safe that the proper treatment is operation, instead of condemning the patient to pessary treatment for years, perhaps for life.

Curetting.—One of the greatest abuses in present-day gynaecology is curetting. The curette should be abandoned in the treatment of infection of the uterus, whether gonococcal, staphylococcal, or streptococcal, post-abortion or post-partum, or tuberculous, because in all these conditions it tends to spread the infection. If you curette a gonococcal endometritis, you are lucky if the patient does not get double salpingitis. Sometimes that is the way the diagnosis is made. Do not curette the uterus post-partum or post-abortion. If a curette is used in those conditions it should be used as a rake—that is to say, to get away the loose pieces—but not as a scraper. What is meant to come out of the uterus will come away easily. If you scrape, you do not know when to stop. The operator goes on scraping until he has done what is called "thorough curettage." It would be well if he could see the uterus opened up after

curetting, and note the amount of injury. It may be followed by chronic uterine pain. After abortion one may perforate the uterus. Therefore, again, use the curette as a rake, not as a scraper. To get out the fragments, the use of gauze in squares wound round long forceps to swab the interior of the uterus is a most satisfactory proceeding. It is excellent in post-partum infection as well as in post-abortion cases.

Another condition in which the curette should never be used is primary sterility. For a sterile woman who has dysmenorrhœa the treatment adopted throughout the world is dilatation and curetting. The writer says dilate but do not curette. You may make that patient permanently sterile by the damage done to the endometrium in curetting. In another condition—dysmenorrhœa associated with scanty menstruation—never use the curette. Occasionally menstruation has never recurred after the operation. Always make a careful bimanual examination under an anæsthetic before using the curette, because in the presence of salpingitis or tubal enlargement all curetting is dangerous.

Uterine bleeding.—Curetting is frequently used for uterine bleeding. The uterine bleeding, however, may be associated with hæmatocele, and the curetting may set up inflammation and infection with serious consequences. A hæmatocele would be discovered by examination under an anæsthetic if not discovered before. Again, the similarity between the histories and the signs of a threatened miscarriage and tubal pregnancy are so close that it is necessary to make a careful bimanual examination lest the latter be present.

When bleeding is due to uterine cancer the disease is often overlooked. Therefore remember these three very simple rules:

(1) All irregular uterine bleeding during menstrual life demands a careful pelvic examination. If the patient be a virgin, it should be conducted under an anæsthetic, or per rectum (recto-abdominal), for by the latter, even without an anæsthetic, you can feel any growth connected with the cervix. In a suspicious case you would have to make a more thorough examination.

(2) Profuse bleeding at the menopause should give rise to the suspicion that cancer is the cause.

(3) Uterine bleeding after the menopause should be regarded as due to cancer until the contrary has been proved.

A patient had ceased menstruating for 10 months, and then bleeding started again. It was called "change of life," but it was cancer. Five months' valuable time was lost, and the growth was only just removable.

If those three rules were generally remembered countless lives would be saved because the results from an extensive operation for the removal of uterine cancer are much better than they were.

Probably no type of cancer is now so amenable to operation as uterine. That leads to the following rule: *All post-climacteric uterine activity, evidenced by discharge or bleeding, requires prompt surgical treatment.* That statement includes conditions of so-called senile endometritis, which are nearly all due to cancer. In the few that are not, the best treatment is hysterectomy, because they soon may become cancerous. Bleeding after the menopause means cancer in most cases. It may be due to simple polypus, but this is rare.

"Ovaritis," a frequent source of wealth and practice to the practitioner, is often something else altogether. Remember that the normal ovary is very sensitive; it is especially sensitive in nervous women. Therefore do not condemn women to ovaritis because the ovary is sensitive. Treatment is frequently directed to the ovaries when the pain is intestinal in origin. The majority of those right and left-sided pains in women are intestinal—the cæcum and appendix on the right side, the pelvic colon on the left. The right appendages have been removed, but the pain has continued until the appendix, the seat of the trouble, has been removed. Conversely, the appendix may be removed when the right appendages are diseased and pain still continues. Therefore no operation for appendix trouble in the female is complete until the condition of the appendages on that side has been investigated. There is also an important relation, on the left side, between diseases of the pelvic colon and diseases of the appendages. Often the trouble originates in the bowel, and spreads to the appendages. The left appendages have been blamed, and been removed, and yet the pain still continued.

Salpingitis.—In cases of double salpingitis always try to ascertain the nature of the infection. It may be gonococcal, streptococcal, staphylococcal, tuberculous, or infection from the appendix or pelvic colon. You can then proceed to a rational treatment.

The "Acute Abdomen."—Mistakes are made in connection with what is known, in surgical slang, as "the acute abdomen." If there is evidence of great internal bleeding, do not give salt solution until the bleeding point has been arrested. To give salt solution, whether subcutaneously or per rectum, when you have not arrested the bleeding point, is to court disaster. Keep the patient absolutely quiet, and give opium, or morphia. Some may say you should not give opium or morphia. But if you have diagnosed great internal bleeding, or tubal pregnancy,

and are not prepared to operate yourself, the best treatment is to give a dose of morphia or opium, because it quiets the circulation, and minimises that terrible fear of death which is felt. This was the old treatment for severe bleeding in the battle-field, and is still used.

Pedicle-twisting.—This is a frequent complication, and is often treated as a "bilious attack." If called to a patient with one of these attacks, make a careful examination. You may thus discover something.

In cases of acute appendix trouble, do not give a purgative. If you do you may be lucky if you do not kill her straight away, and even then you will probably cause perforation. The same applies to a perforated viscus, or intestinal strangulation. In many cases a patient has had a bottle of medicine given without examination, and has gone home to die of acute strangulation. In case of acute abdominal trouble other than great internal bleeding, the best treatment is to keep the patient quiet and put hot applications on the abdomen. The public ought to know and be taught that it is dangerous to take a purgative before a diagnosis has been made. Their usual treatment for pains in the abdomen is to take some purgative. If that pain is due to appendix trouble, perforation will occur, and even if not, the patient will be made much worse. If due to internal strangulation, the condition is made much worse. Let the patient lie down, place a hot-water bag on the abdomen, and send for a medical man; and he must not give a purgative until he has made a correct diagnosis.

Constipation in elderly women is frequently treated badly. Never continue to treat it until you are satisfied that there is no growth in the pelvic colon or the upper part of the rectum. Such growths are common in elderly women at the recto-sigmoid junction. If discovered in an early stage they can be excised and an end-to-end anastomosis done with as much success as most abdominal operations.—*The Medical Review.*

THERAPEUTICS.

Emetine a Specific in Amœbic Dysentery, Hepatitis and Hepatic Abscesses.

A few months ago Leonard Rogers, Professor of Pathology in Calcutta, who had ten years before definitely established the causative relationship of amœbic dysentery to tropical abscess of the liver, reported in the *British Medical Journal* his remarkable cures of amœbic colitis by a few injections in each case of $\frac{1}{2}$ grain or grain dose

of hydrobromide, preferably, hydrochloride of emetine, the alkaloid active principle of ipecacuanha. His recent paper on "The Rapid and Radical Cure of Amœbic Dysentery and Hepatitis by the Hypodermatic Injection of Soluble Salts of Emetine" (*Therapeutic Gazette*, December 15, 1912), adds to the appreciation of the value of his demonstration of a specific remedy for this dread malady.

Rogers had himself shown that large doses of ipecacuanha exercise a controlling and often curative influence in amœbic (not in bacillary) dysentery and amœbic hepatitis in the presuppurative stage. Prompted by Vedder's experiments showing that emetine, the alkaloid of ipecacuanha, inhibits the growth of the dysentery bacillus and in a very high dilution kills amœbæ in bouillon cultures, Rogers tested the effects of the very soluble emetine hydrochloride on amœbæ in the mucous stools of amœbic dysentery, and found that in a dilution of 1 in 10,000 it immediately produced physical changes in them visible under the microscope, while in higher dilutions it also appeared to kill them. He then determined to try the drug hypodermatically in severe amœbic colitis, expecting it to produce sickness, but only after it had entered the blood and had thus been able to exert its specific action on the amœbæ in the body tissues.

After experimentation, Rogers came to use half to two-thirds a grain doses of hydrochloride of emetine (equivalent to 30 to 40 grains of ipecacuanha) dissolved in water, for adults, administered hypodermatically twice daily. He reports that he has seen no depressing symptom follow one-grain doses three times daily in severe cases. Even these large doses, thus administered, produce no vomiting, and usually no nausea. The amœbæ immediately disappear from the stools and in a very few days the patient is cured. In none of Rogers' cases has there been a relapse. The two of his 25 patients who died of the disease while under the treatment were in a hopeless condition when it was undertaken. He regards a high leucocyte count as indicating a serious infection. Of ten cases with leucocytosis of 25,000 to 50,000, only two recovered under ipecacuanha. Of five similar cases four recovered under emetine, and the fifth had a count of 61,750 and died within twenty-four hours after admission.

He thus compares his ipecacuanha and emetine cures: "The average stay in hospital of the recovering ipecacuanha cases was 16.4 days, and of the emetine ones 7.2 days, including one day they were kept under observation, if not urgent cases, before the treatment was begun. Further, the average number of days under ipecacuanha before the

stools became finally normal was 11.4, and the average amount of the drug given amounted to 406 grains; while the corresponding figures for the emetine treatment were respectively 2.35 days and 2 grains of the drug, equal to 180 grains of powdered ipecacuanha."

Equally interesting is the diagnostic value of emetine injection in dysentery. In amœbic dysentery the blood and mucus disappear from the stools, almost always, within three days; while in bacillary dysentery emetine exerts little or no effect.

Quite as remarkable as the effect of emetine on the intestinal inflammation is its influence on amœbic hepatitis and liver abscess. It "removes the pain of an acute hepatitis in about twenty-four hours, reduces the temperature in a very few days, and, if suppuration has not already taken place, the leucocytosis also quickly subsides. * * * Should leucocytosis persist for some time after the pain and fever have subsided, it is highly probable that an abscess is present in the liver, which had formed before the treatment was begun. In that case * * * it is only necessary to remove the pus by aspiration, and to inject one grain of emetine hydrochloride dissolved in about one ounce of water into the abscess cavity through the aspiration cannula before withdrawing it, and sealing the puncture with collodion. If a full course of emetine has not already been given, half a grain should be injected subcutaneously twice a day for three days, commencing from the day after the aspiration. The pus withdrawn should be examined by culture for bacteria, and if it proves sterile it is highly probable that nothing further will be required, for the amœbæ having all been killed by the emetine, the remains of the abscess will encyst. * * * If the abscess is a very large one, a second aspiration may be required after a week or ten days."

Specific therapy has gained another triumph, and emetine will take its place with quinine, salvarsan and mercury. Indeed, in the promptness and completeness with which it destroys the invading organisms it seems to quite surpass these!—*American Journal of Surgery*.

Iron Perchloride in Ringworm of the Scalp.

J. H. GARET, M.D., D.P.H.—After trying various applications for ringworm of the scalp at a school clinic, the writer found liq. ferri perchlor. fort. much superior to any other. The scalp is freed from grease and scurf by the use of motor petrol on pledgets of tow. The perchloride should be dabbed with a camel hair brush on the scalp until it is thoroughly stained. As the effect upon the skin and hair is quite harmless, an occasional prophylactic dressing can be given to the unaffected

parts. The patches affected should be treated every second day three times, afterwards every third day six times, when the cure will generally be effected although the disease has been extensive. By holding the hair aside, part by part, the very fluent liq. ferri. perchlor. fort. stains the scalp thoroughly without cutting the hair, though, of course, it is well to cut the hair close over the affected patches. The head should be well washed before the application, not after, as the perchloride is very soluble and easily washed away. The iron-stained scurf and epidermis will, in some days, come away, leaving a healthy skin beneath.—*The Medical Review*.

Iodine in Corneal Ulcer.

FLEET SURGEON G. T. BISHOP.—A stoker, aged 23, was admitted to hospital with an ulcer of the cornea of 3 weeks' duration, which showed no inclination to improve. There was a crescentic, unhealthy-looking ulcer below the pupil, accompanied with much pain, circumcorneal inflammation, slight chemosis, photophobia, and lachrymation. Boracic fomentations and irrigation, with just sufficient atropine to keep the pupil dilated, had no effect.

On Oct. 9, after some 2 per cent. solution of cocaine had been dropped in the eye, tincture of iodine was applied. This treatment was repeated twice a day (with an occasional drop of atropine solution) until Oct. 14. The ulcer was then clean-looking, although much circumcorneal injection remained. This inflammation soon cleared up and the eye was well on Oct. 20, there being only slight opacity at the seat of the ulcer.

The writer is not aware that iodine has been applied to corneal ulcers. Its effect was very striking. A fine camel-hair brush was found the best means of applying the tincture. Possibly the treatment was not required for so long as 5 days, for the surrounding inflammation persisted while the application was being made and rather masked the improvement in the ulcer. Cocaine was required after instillation as well as before.—*The Medical Review*.

Some Disadvantages of Neo-Salvarsan.

Beside the great advantage of easy solubility, neo-salvarsan, according to KALL, has some decided disadvantages. He has used it in 24 cases, giving 141 injections in all; highest single dose, 0.9 grm.; highest total dose, 6.3 grm. Where the injections were given in rapid succession severe arsenical poisoning was not uncommon. He has seen five

cases of severe arsenical exanthema, with decidedly alarming symptoms at times. The blood pressure dropped suddenly just before the appearance of the exanthema. Neo-salvarsan decomposes so readily that it should not be used by intra-muscular injections. It should not be used in rapidly following injections, and hence accomplishes no shortening of the time of treatment as opposed to the original drug. By rapidly following injections a dangerously cumulative action is easily produced. It should not be used in office patients. Its effect on the syphilis seems to be about the same as that of salvarsan, although the Wassermann test often remains positive, for a considerable time at least, after giving it.—*The Canadian Practitioner & Review*.

PATHOLOGY.

Directions for Collecting Material for Examination.

BY

WYATT WINGRAVE, M. D.

The Collection of Blood.

For most purposes it is best obtained from the back of the thumb. Should the patient be in bed, let the arm hang over the side for a few minutes. With a narrow bandage make five or six turns from the metacarpo-phalangeal knuckle.

Prick by sharp quick stab with a lancet or flattened stilette having cutting edges; an ordinary round needle is useless.

Total Count.

Red Corpuscles.—Take pipette marked 101. Prove patency by blowing into normal saline solution. Suck up blood to mark 1. Fill bulb to mark 101 with normal saline solution. Shake well, carefully close each end of pipette with rubber cap.

For White Corpuscles.—Take pipette marked 11. Charge with blood to mark 1. Dilute with normal saline solution to which 0.5 per cent. of acetic acid has been added. Shake and close with rubber cap.

Differential Count.

Remove bandage, and allow arm to hang down or swing five to ten times. Bandage thumb as before as far as terminal joint. Further pricking should not be necessary.

Quickly place a clean slide over drop; spread thinly by another slide pushed or drawn through the drop. Take at least four films,

wiping off blood from thumb between each specimen. Allow film to dry in air; wrap separately or back to back in tissue paper. It is advisable to remove bandage, and suspend the arm between each specimen taken.

Hæmoglobin.—From same puncture take 10 c.mm. of blood and blow it into 90 c.mm. of distilled water.

Or, place one drop on fine white filter paper.

For Bacteriological Examination.

Blood must be taken direct from a vein into a serum syringe containing 1 per cent. sodium citrate in normal saline solution, and transferred at once to tubes of broth medium.

Blood.—For Widal's test, 0.5 c.c. (a few drops) is sufficient. But for Wassermann and all other serum reaction at least 5 c.c. should be collected.

Sputum.—A first or early morning (before food) specimen is preferable, also one which is easily coughed up and free from post-nasal and oral contamination. Do not dilute with water. If for culture purposes, the mouth should be well cleansed with boiled water before passing the sputum into a sterile tube.

State special points required for report.

Urine.—When bacteriological report is required the specimen *must* be collected by catheter if from a female, but may be passed directly into a sterile flask when from a male.

For quantitative purposes an example of the mixed twenty-four hours' excretion should be sent.

Pus and Discharge.—*Films* for cytological and direct bacteriological examination should be made by thinly spreading a drop between two slides, then separated by *sliding*, and dried in warm air, but not by direct contact with flame, as scorching spoils. Four films should be made and packed in tissue paper "back to back."

Pipettes.—When the material is plentiful and when cultivation is required it should be sucked up into pipette by teat, and the end sealed in flame. If the discharge is scanty, as in conjunctival and aural cases, collect as much as possible on a moistened cotton wool swab (as for diphtheria), and place in test tube.

When plentiful the pus may be collected in the sterile tubes as for sputum.

Throat and other Swabs for Diphtheria, etc.—The wool should be dipped into boiled water, then passed through a flame. When sufficiently cooled, collect plenty of material from diseased surface, and transfer to tube. Avoid antiseptics. A report on film is made at once; cultures are reported in twelve to twenty-four hours.

N. B.—Reports on all specimens whenever practicable will be forwarded by return of post.

Tissue.—Small fragments should at once be placed in rectified or absolute alcohol. If dense they should be incised to facilitate penetration. Large pieces may be placed in 1 per cent. formol, which is always preferable for nerve tissues. Should bacteriological *culture* be required they must be placed in a sterile tube without any preservative. For immediate diagnosis tissue may be also transmitted without any fluid addition.

N. B.—*Stains and Solutions* freshly made can be obtained from the laboratory. Also stilettes for blood punctures and other apparatus for collecting material.

Outfits supplied:—

Sputum tubes.

Diphtheria swabs.

Wright's capsules for Widal, Wassermann and Opsonic tests.

Pipettes for discharge, pus, &c.

Slides and cover glasses.

Special ampoules for cerebro-spinal fluid.

Collecting tubes for blood and hæmoglobin estimate with solution.

Bottles for tissues.—*The Polyclinic,*

THE ANTISEPTIC.

JULY, 1913.

The Medical Profession and the Racial Question in India.



THE racial question is still the most important question in India. The Queen's Proclamation of 1858 was supposed to have laid it at rest, at least so far as employment under the Crown was concerned. But we find in practice that it is precisely when questions connected with the public services are discussed that the racial question comes up in its most virulent form. Except for the purposes of election to the Legislative Councils, for appointments to high official posts, and for some of the purposes of the Criminal Procedure Code, there is no consideration of caste, colour or creed in India. It is a fine sentiment that—"no distinction of caste, colour or creed" especially for use in a peroration. During the Ilbert Bill agitation the sentiment did not get very much of a chance. We believe that the fight then was more about caste and creed. We don't think that "colour" entered very much into the question in those days, for among the agitators who used to contemptuously call the people of this country "natives" were some on whom, as Sir Ali Baba once remarked, "the best shoe-blackening would leave a white mark." We may explain that the term "native" has since then become obsolete as the result of a Government Order and is now strictly confined in its application to oysters. Then we had the war of the creeds when the Legislative Councils were reconstituted. The establishment of separate electorates has brought about a temporary truce between the opposing creeds. Then came the Public Service Commission for its first innings which was confined to enquiries into the Indian Civil Service and the Provincial Civil Service. The famous declaration of the Queen's Proclamation again was checkmated by the theory of the "irreducible minimum." And now that the Public Service Commission is about to come out again for its second innings—the Defence Association is on the war path with its doctrine of "*racially unfitted*" doctors. We had better quote the whole letter of the Defence Association before we comment on it:—

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The following letter has been addressed by the Secretary of the European Defence Association to the Secretary to the Government of India, Home Department, on the subject of skilled European Medical Aid for Europeans in the mofussil:—"I am directed to address you on a question gravely affecting Europeans in the Mofussil or Country districts of India. Hitherto Europeans, both official and non-official, in these districts have usually been able to obtain skilled European Medical aid. The advice and assistance of European Medical officers has been made available by posting officers of the Indian Medical Service to the different stations and districts who, besides being in charge of the Hospitals, attend European officials and their families and are permitted to take private practice and attend non-officials.

It has been brought to the notice of my Council that for some time past there has been a tendency to remove the European Civil Surgeons from various districts. This tendency, which appears to be not fortuitous but the result of a systematic policy, has caused alarm and dissatisfaction among Europeans residing in the Country districts in India and among their relatives, friends and employers in the larger towns. My Council have made enquiries as to the reasons for these changes and have ascertained that they are the result of a policy which is the outcome of a despatch No. 225, Military, from His Majesty's Secretary of State for India dated the 11th December 1908, in which the following passages occur expressing the final order of the then Secretary of State, Lord Morley of Blackburn:—

'Paragraph 3. I have consequently decided that the time has now arrived when no further increase of the civil side of the service can be allowed, and when a strong effort should be made to reduce it by gradually extending the employment of civil medical practitioners recruited in India.'

'Paragraph 5. When it is found impossible to obtain a man from outside the Indian Medical Service to fill a particular new civil appointment, or one which has not previously been so filled, I will not object for the present to that service being drawn upon; but the vacancy so caused must be filled from outside it, *i. e.*, no appointment must be made in succession which would involve an addition to the cadre of the Indian Medical Service.'

EFFECT OF THE POLICY.

My Council desire to point out that the effect of the policy indicated in this order has already been a gradual but appreciable withdrawal of European Civil Surgeons from Mofussil districts. It is clear that as the demand for medical practitioners of high professional qualifications increases, as it continually is increasing and must increase, in the big Cities, for the purposes of such great and developing institutions as the Hospitals and Medical

Colleges, to say nothing of the posts which are constantly being created for bacteriological and scientific research and for sanitary purposes calling for men of the highest scientific attainments such appointments can only be filled at the expense of the Civil Surgeoncies, unless properly qualified independent practitioners can be found willing to accept them. Unfortunately it is very evident that India does not attract a supply of independent European practitioners of high qualifications and the few such independent men who do seek to establish themselves professionally in India have no need to look beyond the private practice obtainable in the big Cities and are attracted by the civil posts created by Government. The result, therefore, of the orders of the Right Honourable Viscount Morley is that in order to fill the posts above referred to Civil Surgeoncies in the Mofussil are being surrendered to Civil and Military Assistant Surgeons or to independent practitioners of secondary attainments and that the highly qualified European members of the Indian Medical Service are being drawn more and more into the Towns for the purpose of there occupying the high civil positions and specialist appointments which they alone are qualified to fill. There is nothing to prevent this process continuing under the existing state of affairs until such time as the Civil Surgeoncies in the Mofussil areas are entirely in the hands of those who, it is submitted, are either professionally or racially unfitted to hold them.

SOME STATISTICS.

A study of the various Provincial Civil Lists give the following results:—Out of a total of 246 Civil Surgeoncies, 138 are at present held by European Officers of the Indian Medical Service, 17 by Indian Officers of the Indian Medical Service, 53 by European and Anglo-Indian Military Assistant Surgeons, 8 by European and Anglo-Indian independent practitioners, 29 by Indian Civil Assistant Surgeons and 1 by an independent Indian practitioner. It is understood that the Military Assistant Surgeons form a reserve in case of war, but the fact remains, and prominent attention is drawn thereto, as a body they possess no registrable qualifications. The distribution of these appointments is as follows;—Punjab 7, United Provinces 11, Central Provinces 6, Bihar and Orissa 3, Bengal 3, Assam 3, Madras 2, Burma 15, Bombay 3, while of the European and Anglo-Indian independent practitioners holding Civil Surgeoncies there are 3 in Bengal, 2 in Madras and 3 in Burma. The Indian Civil Assistant Surgeons are, it is believed, qualified in the technical sense, but their employment in Civil Surgeoncies opens up another aspect of the case which I am instructed to bring specially to notice. These appointments are distributed as follows;—Punjab 6, United Provinces 5, Central Provinces 2, Bihar and Orissa 2, Bengal 5, Madras 3 (including the one independent practitioner), Burma 4 and Bombay 8.

QUESTION NOT A RACIAL ONE.

My Council wish to make it perfectly clear that they do not approach this question from a racial standpoint in the sense of any point of antagonism between the European and Indian races, but from the universal racial standpoint as touching the most intimate and delicate side of private life. From this standpoint, it is no question as between European and Indian any more than between one European race and another. It is a question of the intimate relations which must of necessity exist between a doctor and a patient and of the sacred right and privilege which every man and especially every woman seeks to exercise of being professionally attended by a qualified practitioner of his or her own race, customs, and ideas in life. To force upon European ladies, more especially in maternity cases, practitioners of secondary qualifications, or, as the case may be, practitioners of alien race and customs, is to create a position which no British Government should tolerate for one moment and yet this is the situation which arises to-day, and which is being steadily extended, as the result of the operation of the orders passed by the Right Honourable Viscount Morley. No Government would dream of attempting to force European male doctors on Indian ladies but, nevertheless, it has not been considered improper to adopt the reverse attitude and to issue orders which have the effect of forcing Indian doctors on European ladies. It is not considered necessary to enlarge further on the subject. My Council trust that the Government of India will view the matter in the light in which it has been put forward and that steps will be taken to remedy the evil complained of and to so alter the existing system that gradually the Civil Surgeoncies throughout India may be placed in the hands of fully qualified European officers of the Indian Medical Service in the event of equally qualified independent European practitioners not being available for the posts, I am directed to request that the Government of India will forward a copy of this letter to His Majesty's Secretary of State for India."

Of course the Defence Association "want to make it perfectly clear that they do not approach this question from a racial standpoint in the sense of any point of antagonism between the European and the Indian races." Very well, then what is the meaning of this sentence contained in the letter of the Defence Association—"There is nothing to prevent this process continuing under the existing state of affairs until such time as the Civil Surgeoncies in the Mofussil areas are entirely in the hands of those who, it is submitted, are either professionally or racially unfitted to hold them."

We understand what 'professional' unfitness is, and it is by no means the monopoly of any race. But what is 'race' unfitness for a medical man?

If Europeans have so much objection to be professionally attended to by Indian medical men, we suppose that Indians will have the same objection to be attended to by European medical men, for "the universal racial standpoint as touching the most intimate and delicate side of private life" is applicable to Indians as much as to Europeans unless the Defence Association believes that God made the white man and the Devil the black. In the Maternity Hospital in Madras there are several Indian Assistant Surgeons who have to, and who as a matter of fact do examine European patients in that institution. We have heard no complaints about the arrangement till now. We fear that the tender susceptibilities of the European patients in India have of late been exaggerated for the purposes of the Public Service Commission.

Some time ago we pointed out in these columns the disabilities imposed on Indians in serving as Medical officers in the colonies such as West Indies, Gold Coast, &c. Indians are not eligible to serve as Medical officers in the colonies *because they are Indians!* And now it is urged that they ought not to be eligible to become Civil Surgeons in India *because they are not Europeans!!* And yet Mr. Montagu, in his Indian Budget speech the other day, assured the House of Commons that "the old era of hard-and-fast division between the government and the governed on rational lines has disappeared for ever."

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Original Articles.

* CHRONIC DIARRHOEA.

BY

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CHRONIC diarrhoea is one of those interesting conditions in which the provinces of the physician and the surgeon overlap, and it is worthy of very close attention in consequence, because there is always a danger that the personal bias of the medical attendant may lead him to underrate the importance of affections which do not usually come under his observation.

The physician may therefore be tempted to neglect the possibility of a malignant growth until it is too late to remove it, and the surgeon may propose to operate on a case of simple catarrh.

Chronic diarrhoea in adults may be classified under four main headings, several of these being further subdivided. The main headings are *sprue*, *mucous-membranous colitis*, *ulceration of the intestine*, and *idiopathic diarrhoea*.

SPRUE. This very serious disease is common in the Malay Peninsula and in South China, and occasionally seen in some parts of India. It is apt to attack Europeans who have been long in the country. The special pathology of the condition is shallow ulceration and atrophy of the mucous membrane of the tongue, stomach and intestines.

The principal symptoms are a profuse long-standing diarrhoea in which large quantities of pale yeasty material looking like oatmeal

* Specially contributed to *The Antiseptic*.

porridge are passed many times a day. The abdomen is tender, and there is great wasting. The tongue is usually very sore, and vesicles or shallow ulcers are to be found upon it. The outlook is grave, as many of the patients die, or the diarrhoea may persist for months or years, with a tendency to relapse.

The treatment is to keep the patient in bed and to confine the diet to milk only, which may well be concentrated by evaporation. It should be sipped, not gulped. In some cases a raw meat and meat juice diet, or milk varied with a fruit regime, may effect a cure. Dr. Begg has long and earnestly advocated the Santonin treatment, five grains twice daily for a week, and he specially insists that it must be old yellow santonin. Europeans should be sent home as soon as they are fit to travel.

MUCO-MEMBRANOUS COLITIS. In this not uncommon disease, the nature of which is liable to be overlooked, the patient passes long white shreds of membranous casts of the bowel. There is usually great pain and attacks of alternating diarrhoea and constipation. The individual is often very neurotic, and women are more frequently affected than men. It is probably a secretion-neurosis.

In some cases mucous casts are merely a symptom of growth or even of appendicitis.

The treatment is to give bromides and phosphates, restrict the diet to fluids, and to keep in bed during the acuter stages. Washing out the bowel with warm water or boric lotion is very valuable, but it is necessary to see that the boric lotion is well returned, as the writer has seen a patient nearly die of boric acid poisoning from rectal lavage, the symptoms being urgent vomiting and a red papular rash. In bad cases of mucous colitis an appendicostomy ought to be performed. In a recent series this cured 13 out of 20, and 3 others were improved. The appendix is brought out and anchored, and the tip cut off; then irrigation is carried out daily with warm water injected through the appendix, the patient sitting, and a rectal tube inserted to drain away the lotion. If this is well borne, boracic lotion or very weak silver nitrate may be used. When the patient is cured the appendix sinus, which does not leak faeces, is closed by destroying the mucous membrane with a cautery.

ULCERATIVE ENTERO-COLITIS. It may be suspected that chronic diarrhoea is due to intestinal ulcers when the stools contain obvious or occult blood, pus, or very much mucus. Again, the colon may be felt to be thickened and tender. Malignant ulcers can be felt with the finger.

The real diagnosis, however, must usually be made with the sigmoidoscope.

The following are the causes of intestinal ulcers:—

Tuberculous enteritis. In this condition the ulcers are in the small intestine, and cannot be seen with the sigmoidoscope, nor is the colon thickened. Unless obvious tuberculous peritonitis is present the diagnosis is difficult, but tubercle should be suspected when there is chronic diarrhoea with always a trace of blood in the motions. The ulcers often contract and cause obstruction, or they may perforate. The treatment is on general principles, but the outlook is very grave.

Chronic Dysentery. This is very common, the large intestine being riddled with ulcers.

Ulcerative Colitis. In this disease, which usually attacks middle-aged men, the symptoms and the ulcers closely resemble those of chronic dysentery, and in both cases the diagnosis may be confirmed by the sigmoidoscope. In ulcerative colitis the patient has not usually started with an acute attack of dysentery, and the *Entamoeba histolytica* and the Shiga-Flexner bacillus are not present. Dysentery will usually be relieved by rest in bed, milk diet, a large dose of ipecacuanha, and rectal lavage, but in ulcerative colitis these measures, though worthy of a trial, usually fail, and under medical treatment probably 80 per cent of the cases die.

In both these conditions, the patient should not be allowed to pass into extreme exhaustion without surgical intervention. If ordinary treatment as just described is not successful, appendicostomy ought to be performed to allow of efficient lavage, and if done in time it nearly always saves the patient. A more drastic remedy, necessary in severe cases, is to perform right inguinal colostomy so as prevent the intestinal contents from passing through the colon, which should of course be washed through daily. After six months the opening can be closed.

Malignant Ulceration. It is very important to remember that chronic diarrhoea may be due to cancer of the rectum or pelvic colon, and many lives are thrown away because medical practitioners fail to make an early diagnosis. The growth may be felt *per rectum* or by the abdomen in some cases, but there is an intervening space in which it can only be diagnosed by the sigmoidoscope. Every case of chronic diarrhoea therefore ought to be examined with this instrument.

The treatment, in early cases, is removal either by the perineal or the abdomino-perineal route. In late cases, a palliative colostomy is occasionally worth while.

Stercoral Ulceration. Patients with hard masses of faeces in the bowel may develop ulcers by reason of the friction. These evidence themselves by spurious diarrhoea and often a smart hæmorrhage.

The diagnosis is made by feeling the faecal mass either *per rectum* or by the abdomen, and the treatment is to remove it by enemata.

IDIOPATHIC DIARRHOEA. In this group the diarrhoea is due to indigestion, inflammation of the intestinal mucous membrane, or to a simple neurosis. There is no blood or pus in the stools, and the sigmoidoscope reveals no ulcers.

Hill Diarrhoea. This complaint affects persons in India on going to the hills, and though severe in the morning improves after midday. It has been attributed to mica in the drinking water. The stools are very pale, and there is much flatulence. The treatment consists of rest in bed, milk diet, and pepsin with liq. hydrarg. perchloridi.

Gastrogenic Diarrhoea. This is not common. It is due to absence of hydrochloric acid in the gastric juice, and the diagnosis is made by a test meal. It is cured by giving H Cl and pepsin with food.

Pancreatic Diarrhoea. In this form, due to deficiency of pancreatic juice as in cases of pancreatitis, or cancer of that organ, there is diarrhoea with great excess of fat and of undigested meat fibres in the stools. The treatment is to give some reliable pancreatic preparation in capsules.

Enteritis. Intestinal catarrh is not common, and is most often seen in alcoholic subjects or in patients with phthisis. It may be set up by an aperient. The local signs of colitis are absent. The treatment is on general principles.

Catarrhal Colitis. This is common and may last for months. The diarrhoea is worst in the morning, and the colon may be tender. The sigmoidoscope shows that the mucous membrane is thickened, velvety and red.

The treatment is to prescribe a diet leaving as little residue as possible, and often fluids are necessary. The drug treatment includes opium, large doses of bismuth, B-naphthol, or tannigen. Washing out the colon is often useful.

Neurotic Diarrhoea. Sometimes it is not possible to demonstrate any cause, and yet a patient gets diarrhoea immediately after meals, or whenever he or she is anxious or upset. For this form there is no treatment so useful as occasional doses of tincture of opium.

* MAMMARY TROUBLES INCIDENT UPON CHILD-BIRTH.

BY

J. BERNARD DAWSON, M.D. (LOND.), F.R.C.S. (ENG.)

Retracted or Umbilicated Nipple.

Properly speaking this is not a condition consequent upon pregnancy or labour, but since it only becomes manifest as a trouble at child-birth it deserves mention.

The condition may be due partly to a defect co-existent with the development of the mammae and in part to the pressure of corsets.

It varies greatly in severity from a mere diminution in size and prominence of the organ to a nipple which is either almost non-existent or sunk completely below the level of the breast.

The breasts of all *primi-paræ* should be carefully examined during the early months of pregnancy and if the condition is found it should be actively treated.

The woman should be taught to wash her hands and to disinfect them in 1 in 2000 corrosive sublimate solution or other efficient antiseptic and germicidal lotion.

She should further be instructed to draw out the nipple gently two or three times a day. After each such attempt the nipple and areola should be thoroughly cleansed with boric acid lotion and then bathed in a lotion consisting of one part of rectified spirit of wine and two parts of water. The latter solution should be gradually increased in strength until it contains 50 % of alcohol.

This usually suffices to render the nipple sufficiently prominent for the purpose of suckling.

Various plastic operations have been suggested for retracted nipples but, so far, they have had little or no practical application.

If the condition be untreated until the puerperium, other methods must be employed. To a limited degree the baby may be put to the breast with the hope that his efforts at obtaining nourishment may induce the nipples to assume a more normal appearance.

This must only be tried for a short time, since the baby will probably be peevish and unsatisfied, whilst his efforts will give the mother pain and possibly cause excoriation and fissure of the nipple.

* Specially contributed to *The Antiseptic*.

The better plan is to use a breast pump which both draws off the milk and at the same time tends to elevate the nipples. Even after this the baby may be unable to suck in the natural way and it will be advisable to use a glass nipple shield fitted with a rubber teat. Should all efforts at breast-feeding fail the child must be weaned and the most careful attention paid to the breasts to prevent inflammatory troubles supervening.

Abrasions, Excoriations and Fissures of the Nipples.

These very painful and dangerous conditions are most commonly found upon the tender nipples of the *primi-paræ* or upon nipples that are retracted or otherwise deformed.

They are intensely painful, bleed easily, and afford a point of entrance for micro-organisms.

They give rise to much maternal distress, disturb the child's digestive functions, and are a source of danger since they are the frequent cause of mastitis or abscess.

The prophylactic treatment has been considered when the question of depressed nipples was discussed. The treatment of the established condition is that of a similar change in another part of the skin. Rest is an essential and it must be obtained even at the cost of weaning the child. Before this is done, however, an effort should be made to continue the suckling with the help of a breast shield.

Cleanliness must be obtained by scrupulous care before and after the use of the nipple, the part must be tenderly washed with warm water and soap and then bathed in boric acid lotion. The abrasion must be stimulated and encouraged to heal by the use of one of the following applications:—

Sulphurosi Acidi	Oz. $\frac{1}{2}$.
Glycerini	Oz. $\frac{1}{2}$.
Aquam Rosae ad	Oz. 2.
Misce, fiat pigmentum.	
or	
Olei Ricini	Oz. 1.
Tinct: Benzoini Co.	Oz. 1.
Misce, fiat pigmentum.	

If the healing is unduly slow the abrasion or fissure should be touched with solid silver nitrate or painted with undiluted compound tincture of benzoin.

Congestion of the Breast. If from any cause the child experiences difficulty in obtaining milk, the breast becomes hard, knotty and painful.

This accumulation of secretion predisposes to mastitis especially if there are any cracks or abrasions to afford an entrance for micro-organisms.

If perseverance with suckling, assisted, if necessary, by the use of the breast pump, fail to relieve the congested condition, the child should be weaned and active measures adopted to suppress the secretion of milk.

Mastitis and Abscess. This trouble is characterised by painful, swollen, tender, red and inflamed *mammæ*, often with red *striæ* radiating from the nipple. The great majority of cases are associated with some lesion of the nipple through which the invading micro-organism finds entrance, but the offending germ may, in a few cases, enter by the lacteal ducts.

At the onset of inflammation the breast should be supported and the patient kept in bed.

The child must be removed from the breasts, which must, however, be relieved with a breast pump. Saline aperients must be freely given and the breasts painted with glycerine of belladonna and wrapped in wool. Opiates will probably be needed for the pain and if suppuration is thought inevitable, poultices give great relief.

If pus forms the breast must be incised as soon as it can be determined at which point the abscess is tending to point. Oedema of the superimposed skin is the best sign of suppuration, fluctuation seldom being satisfactorily obtained. The use of the exploring needle is sometimes of valuable assistance.

Deficient and Excessive Secretion of Milk.

Galactorrhœa. This name is given to the condition present when the amount of milk is in great excess and the milk itself deficient in solid constituents.

Its establishment may be accompanied by a return of menstruation when the double drain upon the mother may lead to serious debility. When the condition is present the child should be weaned and efforts directed to checking the flow of milk. The breasts should be wrapped in cotton wool and gentle pressure exerted by a carefully applied bandage. Glycerine of belladonna should be painted on the *mammæ* and belladonna combined with potassium iodide given internally. The latter drug should be exhibited in full doses.

Tonics will probably be needed later to recruit the mother's health.

Deficient Secretion of Milk.—It is unfortunately far too common for a mother not to nurse her child. She assumes or is assured by the nurse that she has not enough milk. Whilst undoubtedly deficient secretion of milk is a fully recognised condition, it is not so common as the frequent and early weaning of children appears to suggest. So long as there is any chance of the mother being able to nurse her child, the baby should be put to the breast at regular but rather lengthened intervals.

If necessary the natural may be augmented by artificial food given immediately after suckling.

The mother's diet should consist of as much fluid as possible, especially in the form of milk, and gruel, fish, notably oysters, and leguminous foods are recommended. Stout in moderation is sometimes surprisingly beneficial.

Drug treatment is usually unsatisfactory, pilocarpine or jaborandi being the only ones of any use.

Galactoele.—Very rarely, owing to obstruction in a lacteal duct, a collection of milk may form in a lobule of breast tissue. This becomes inspissated until it resembles a thick cheesy material.

The swelling is of moderate size and painless.

The child should be weaned and steps taken to stop the secretion of milk. The cystic formation should be incised with all surgical precaution and packed with gauze so that it may heal by granulation.

THE INTERNATIONAL MEDICAL CONGRESS ABSTRACT OF PAPERS.

SECTION I.—ANATOMY AND EMBRYOLOGY.

Cerebral Localization and the Precise Significance of Sulci.

Abstract of Report by DR. C. U. ARIENS-KAPPERS, *Amsterdam.*

To judge the significance of Sulci in regard to intrinsic localization, it is necessary to study Sulci and intrinsic localizations separately.

A considerable parallelism exists between the evolutionary features of fissuration and the evolutionary features of intrinsic localisations in the cortex, so that morphological studies keep a great value also from the viewpoint of intrinsic localizations.

More and less principal deviations from this parallelism occur, so that a study on fissuration shall always want a control by a study of intrinsic localizations.

These deviations can often be explained by a greater conservatism of Sulci.

The homology or non-homology of Sulci may not be made dependent on the homology or non-homology of adjoining intrinsic areas.

SECTIONS II AND III A.—PHYSIOLOGY AND CHEMICAL PATHOLOGY. JOINT DISCUSSION.

Decomposition of Proteins in Cells. Resume of Report by

PROFESSOR DR. EMIL ABERHALDEN, *Halle, A. S.*

A sort of decomposition of the proteins in cellular metabolism has now been to a great extent explained. It represents a hydrolysis of the proteins. From it originates peptones, polypeptids and amino-acids. Further decomposition commences on the appearance of the latter. In the first place, carbonic acid is separated. Then amin is formed. Or, in the first place, the amino group is removed, after which further transformations follow. The non-nitrogenous carbon chains may form manifold syntheses. The formation of carbohydrates from amino-acids is doubtless due to these remnants of carbon. The amino-acids themselves may supply the material for the bases, which are employed as a foundation for the phosphids. On all sides we are confronted by a process of gradual decomposition.

SECTION III.—GENERAL PATHOLOGY AND PATHOLOGICAL ANATOMY.

The Influence of the Radio-active Bodies and the Rays on Normal and Pathological Tissues. Abstract of the Report of PROFESSOR DR. O. HERTWIG.

Radium and mesothorium rays produce in the first place changes in the nuclear substances of the cells of animals and plants. The spermatozoon and ovum, in spite of their very dissimilar protoplasmic contents, are influenced to approximately the same extent by rays of equal intensity. This is shown by the disturbance in the development of the impregnated ovum after treatment before impregnation of one of the two germ cells. Intensive irradiation of the spermatozoon results in parthenogenetic development of the ovum impregnated by it. The former hypothesis that lecithin is decomposed in the cells can therefore no longer be maintained. Embryonal cells and indifferent cells in course of development are more intensely fixed by radio-active rays than completely developed tissues, owing to the fact that nuclear substances predominate in proportion to plasma products.

SECTION V.—THERAPEUTICS.

The Defences of the Animal Organism Against Foreign Materials Entering the Blood Channels. Abstract of the Report of PROFESSOR DR. EMIL ABDERHALDEN, *Halle, A. S.*

The animal organism possesses a powerful defence against all kinds of foreign materials. This is digestion. It destroys every specific structure in the nutrient material offered to it. In addition that which is resorbed passes to the cells of the liver, which again control everything. Similar material thus always passes into the circulation, and the cells invariably receive similar nutrient material.

This harmony is disturbed if the body cells themselves, or foreign cells, such as micro-organisms, or cancer cells, pass into the blood still retaining the characteristics of the kind of cell from which they originate. In this case also there is an important safeguard, namely, the lymphatic channels with all their ramifications. If in spite of all the protective forces material reaches the blood which is foreign to it, and which still retains its original characters, various protective measures come into play. On the one hand the excretory organs endeavour to remove the material. In addition ferments are given off by the blood plasma, which have the property of decomposing complex materials, and thus depriving them of their original characteristics. The appearance of certain ferments indicates the presence of various substances in the blood, and thus investigation of the blood by ferments which are developed upon certain substrata gives us an idea of the function of the individual organs. The products of gradual decomposition, due to the ferments, may have a toxic influence.

UNDER-SECTION VII A.—ORTHOPÆDIC.

The Treatment of Tuberculous Bones and Joints. Abstract of the Report of JULIUS DOLLINGER.

Joints which come under treatment in a contracted position should immediately be redressed for the time being in a plaster of Paris dressing. The most important adjunct to the local treatment is complete fixation by means of removable bandages or apparatus. The reclining position is of service in regard to the vertebral column, and freedom from weight in regard to the lower extremities. Here follow illustrations.

In dealing with the general treatment Dollinger emphasized the value of sunlight, the present employment of which was described in detail. This and the X-ray treatment have contributed to further limit the domain of operative surgery in this connection.

SECTION VII B.—ANAESTHESIA.

A Comparison of the Immediate and After Effects of Spinal and Local Analgesia with those of Inhalational Anaesthesia, in Respect to Shock and Psychic Shock. Abstract of Report by YANDELL HENDERSON, PH. D., Professor of Physiology in the Yale Medical School, New Haven, Conn., U.S.A.

Shock may be the result of mental states, *e.g.*, fear or anxiety, in much the same manner as it is of physical pain, although in less degree. In using local and spinal analgesia it is important that the mind also should be protected, unless the patient is of phlegmatic character. In general anaesthesia not only the consciousness of pain is to be avoided, but also over-stimulation of the nerve centres controlling vegetative functions. Shock is not, however, fatigue of such centres, but consists in a general depression of vitality resulting from the excessive respiration induced by abnormally intense afferent irritations and by ether excitement, from over-stimulation of adrenalin secretion, and from disturbance of other general functions. The acapnia theory of fatalities under anaesthesia (to be presented in some detail) teaches that excessive respiration during the stage of excitement, especially under ether, produces alterations of function which, if the method of anaesthetization is sufficiently unskilful, may render even a perfectly healthy man or animal liable to fail under a dosage which would otherwise be borne with impunity. The use of "rebreathing" methods in connection with nitrous oxide oxygen anaesthesia will be touched on and also the use of oxygen containing a small amount of carbon dioxide.

SUB-SECTION VII B.—ANAESTHESIA, GENERAL AND LOCAL.

Chloroform Dosimetric Method. Abstract of Report by DR. DUDLEY BUXTON, London.

Dr. Dudley Buxton points out that within a few years of the introduction of chloroform experiment proved its safety lay in its vapour being administered highly diluted. Snow fixed its limit of safety at 2% and all succeeding experiments have confirmed his view. Since Snow much research has taken place and its unanimous findings have shown that the safety or danger of the drug lies in the percentage strength of the vapour introduced into the organism. Means of ensuring exact definite doses being given have been suggested. The criteria of their value appear to be (1) whether the method controls the percentage strength of chloroform vapour independently of the person using it; (2) and does so by providing a limit of strength which can be inhaled however the condition of the patient's respiration may be; (3) whether the

anæsthetist knows precisely the percentage of strength he is giving; (4) and can vary that strength at will; (5) whatever strength has been selected that will automatically remain constant until the anæsthetist voluntarily alters it.

All open methods depend for safety wholly upon the personal skill and mental activity of the anæsthetist, and must from their very nature supply a varying strength of vapour. Hence they fail as dosimetric methods. The apparatus of Dubois, of Vernon Harcourt, of Waller and others supply exact dosages and so satisfy the conditions of the criteria. Of these Dubois' and Waller's are plenum systems and as such are extolled by some authorities while the more compact and universally applicable Regulator of Vernon Harcourt can be used on a draw over or a plenum system. It has been pointed out that the only difference between these systems is that in the draw over a dead space is interposed between the patient and the ultimate plenum—the atmospheric—since except in intratracheal anæsthetisation it is the patient whose respiratory action actually does the work of inspiring in the one case from a space filled with air and chloroform vapour of definite strength and in the other from the atmosphere through a system of tubes containing the vapour and air drawn into it by successive respirations. The comparison of the incidence of danger when open methods and dosimetric methods are used indicates the latter are infinitely more safe. They are also more scientific and supply the skilled anæsthetist with an accurate and reliable apparatus by which he can evince his skill by controlling the drug which he is employing.

SECTION VII B.—ANAESTHESIA, GENERAL AND LOCAL.

Rectal Anæsthesia. Abstract of Report by JOHN H. CUNNINGHAM, JR., Boston, U.S.A.

In reporting upon this subject I feel that there is little for me to maintain, for since the first few years following the introduction of the method of producing narcosis, I have had no personal experience with it except in so much as I have performed certain operations upon patients anæsthetized by the method by some skilled anæsthetist. Realizing that there are here present persons expert in various forms of anæsthesia, and some probably with much more experience with rectal anæsthesia than I, it is my desire to simply review the subject; to give my personal experience and to refer to the work of others which is familiar to me, trusting that in discussion it may be decided where this form of anæsthesia should be placed in relation to other special methods of anæsthesia.

SECTIONS VIII AND XVIII.—OBSTETRICS AND GYNAECOLOGY.

Infant Mortality in the First Four Weeks of Life. Abstract of Report by DR. HENRY KOPLIK, New York City.

Influences detrimental to the foetus; their effect on post natal life. How shown in the new born infant. Disease in the parent as influencing the resistance to post natal infections. Infections at birth; mortality at birth and in the first hours after labor; percentage mortality at this period; influences of modern methods in reducing mortality at this time; diseases formerly common now unusual owing to improved methods. Morbidity among the new-born; prevalence of infections. Causes of death among the newly born in institutions; preventable causes, and those which result either from inherent weakness or from pre-natal influences.

Some forms of disease begin at birth and the infant thrives apparently to succumb after the first month of life. Mortality in lying-in institutions and hospitals; causes; influence of the mode of feeding; prevalence of breast feeding as compared to artificial; management of congenitally weak infants. Mortality outside of institutions; causes. Difficulty of obtaining statistics and a comparison of mortality of to-day with that of a decade ago. Systematic registry of birth and mortality a necessary preliminary to the institution of measures of prevention. Statistics and methods of the United States, as compared with that of foreign countries. Detailed tables of statistics of mortality in the first four weeks of life.

SECTION VIII.—OBSTETRICS AND GYNAECOLOGY.

Cancer of the Uterus (Body and Cervix); Technique and Results. Resume of Report by PROFESSOR DR. DM. DE OTT, St. Petersburg.

CONCLUSIONS.

1. In operating for cancer of the uterus the abdominal route, with removal of the lymphatic glands, should be employed only in special cases, as its results do not sufficiently justify its immediate risks.
2. The operation of election is the vaginal method. The results obtained are in no way inferior to those of the abdominal method, whilst at the same time the risk of a fatal result and of injury to the neighbouring organs is infinitely less.
3. Operations in cases which are obviously desperate, which serve only to increase the percentage of operability, should be completely

abandoned, as the exposure of a patient to a foolish and hopeless risk cannot be justified from a humanitarian point of view.

SECTION IX.—OPHTHALMOLOGY.

Injury of the Eyes by Light. Abstract of the Report of
PROFESSOR CARL VON HESS, Würzburg.

In the first place Hess discussed the widespread opinion that ordinary sunlight may injure both the normal and diseased eye respectively, and arrived at the conclusion that this is not the case. He was especially opposed to the usual assumption that the closing of the lids in scrofulous ophthalmia is due to photophobia. He demonstrated by various examples that the term photophobia is very unsuitable in this connection, and that the terminations of the trigeminus in the cornea and iris cannot give rise to photophobia, as is frequently assumed. In the same way in the scrofulous there are many diseases of the retina and choroid for which various dark cures are employed (the darkened room, dark spectacles), but these dark cures have not a sufficiently established basis, either theoretical or experimental. Senile cataract cannot be traced to an intense effect of daylight, as is frequently assumed. In the following section he discussed injuries of the eye, due to unusually intense influence of sunlight. Blinding after eclipse of the sun, usually due to the influence of the long undulation rays of the spectrum, leading to an injury of the retina by heat, and snow blindness, which is usually due to the influence of the short undulation rays. He further described the results of experimental investigation in regard to the influence of rays of various lengths of undulations, especially short undulation rays, upon the cornea, lens and retina, lightning blindness, short-sightedness, and injuries due to working for prolonged periods with ultra-violet rays.

A special section was devoted to the question of the influence of the modern artificial sources of light upon the eyes. With the ordinary use of our Auer arc lamps red light (through grey or yellow glasses), which is a special protection to the eyes in regard to short undulation rays, is not requisite, as in most cases, if the light is placed in a proper position, the light reaching the eyes is not stronger in light or contains more abundant ultra-violet rays than the sunlight. Workmen, who are in the habit of using arc lamps regularly, rarely have affections of the eyes, the protective measures employed by them being as a rule sufficient. It was otherwise in glass blowers' cataract, which was discussed in more detail. The assumption that it is essentially due to short undulation rays had many arguments in its favor, but has not been established on a sufficiently firm basis.

SECTION XI.—NEUROPATHOLOGY.

With Reference to Myopathic Diseases. Abstract of the Report of
PROFESSOR DR. H. OPPENHEIM, Berlin.

The myopathies are conditions which exclusively or predominantly affect the voluntary muscles, and which cannot be traced to any demonstrable disease of the central or peripheral nervous system. The term myopathy, taken in its most exclusive sense, includes the following diseases:—

1. Dystrophies. (2) Congenital muscular defects. (3) Myotonic congenita. (4) Myasthenic paralysis. (5) Periodical paralysis of the extremities. (6) Rachitic and osteomalacic paralysis.

The myopathies are distinguished by the following characteristics:—

(a) Simple (non-degenerative) atrophy, dystrophy, paralysis or impediment to movement, which are associated with changes in electrical excitability. The latter do not correspond to the type of the reaction of degeneration, but otherwise exhibit several variations, notably, (1) simple quantitative diminution of excitability; (2) the myotonic reaction; (3) temporary loss of excitability; (4) the myasthenic reaction. (b) Extension of functional disturbances according to a fixed rule, which corresponds neither to cerebral, spinal, radicular or peripheral innervation. (c) By the purely motor character of the symptoms. (d) By the tendency to familial occurrence, congenital diathesis, etc. (e) By a certain tendency to combinations and transitions.

Causes of Myopathy—Congenital factors, hyper-hypo- or dys-function of the endocrinous glands, exogenous injuries, etc.

SECTION XI.—NEUROPATHOLOGY.

The Nature of the Condition Termed Parasyphilis. Synopsis of Report
by F. W. MOTT, M.D., F.R.S.

Parasyphilis limited to tabes and general paralysis. Characterized by mild forms of infection, slight bone and skin lesions, long latent period before signs of nervous degeneration. Causes discussed. Immunity or partial immunity due to widespread latent syphilis. Causes of latent syphilis. The Wassermann reaction and disclosure of latent syphilis, congenital and acquired. Modification of the specific organism by widespread use of mercury discussed, also the possibility of infection by "mercury fast" organisms. Analogy to "arsenic fast" trypanosomes. Relation to comparative uselessness of mercury in treatment. Different

forms of spirochaetes discussed in relation to analogy with trypanosomes, possible neurotoxic organism or special affinity of specific organism for the nervous system. Primary degenerative changes of neurones characteristic of parasyphilis in relation to the Wasserman reaction of the blood and cerebro-spinal fluid of the nervous system. Evidence in favour of a hypersensibility of the neurones in parasyphilis. Excess of complement fixative in fluid drawn by lumbar puncture compared with that from ventricles indicating degenerating neurones as a source of complement fixative. Parasyphilis due either to the effect of the specific virus or the specific organism on the metabolism of the neurones in conjunction with contributory exhausting factors causing abiotrophy and proportional chronic inflammatory hyperplasia. The discovery of Noguchi and Moore of the spindioti in 12 cases of general paralysis out of 70 may lead to a change of our views in respect to the existence of parasyphilis as distinct from parenchymatous syphilis.

SECTION XIII.—DERMATOLOGY.

Alopecia and Allied Conditions. Resume of the Report of
DR. SABOURAUD, Paris.

Since the work done by L. Jacquet we in France no longer believe in the contagion of alopecia areata. Jacquet, applying the researches of Head to this condition, believes it to be of reflex origin, and frequently gingivo-dental. Sabouraud points out that this theory does not apply to all cases, but only to unilateral alopecias, and those of slight or medium severity, and that it is in the most severe forms of alopecia areata that we realize most clearly that we are ignorant of its cause. According to Sabouraud the depilation in alopecia areata is a specific process, and the evolution of the severe forms appears to be associated with general disease, and to coincide with various changes in the skin and nails, vitiligo, erythematous lupus of the ears, psoriasis, etc.

Alopecia areata is a familial and hereditary disease in a quarter of the cases, and there is recurrence in half of them. It is apparently common amongst those suffering from congenital syphilis and tuberculosis, without being in itself a syphilitic or tuberculous lesion. The results of the most recent investigations of Sabouraud indicate its frequency in women at the menopause, and also that it is often associated with thyroid disease in both sexes, or thyro-ovarian in women—numerous owing to prostitution—and also in those who suffer from pathological sexual inversion, compulsory treatment is desirable, with subsequent control until complete recovery has occurred.

SECTION XIV.—UROLOGY.

The Diagnosis and Treatment of Early Malignant Disease of the Prostate. Abstract of Report by HUGH H. YOUNG, M.A., M.D.
Associate Professor of Urological Surgery, Johns Hopkins University, Baltimore, Md., U. S. A.

Twelve early cases of carcinoma studied in detail. The early symptoms are not different from that of benign hypertrophy. Pain and hematuria not early symptoms. Diagnosis based on presence of marked induration—either a small nodule, or a lobule, or a whole lobe or the entire prostate—with or without infiltration beneath the trigone. Carcinoma is accompanied by benign hypertrophy in fifty per cent. of the cases, the cancer being separate and occupying the posterior subcapsular portion in almost all cases.

Radical operation must include the whole prostate, a cuff of the bladder with most of the trigone, and both seminal vesicles (the author's operation). Six cases, with three radical cures (10 and 5 years) in cases with small cancer nodules completely excised by less radical operation reported. Forty-six cases of extensive carcinoma, operated by conservative perineal prostatectomy with 65 % permanent relief of obstruction and only two deaths reported.

SECTIONS XIII AND XIX.—DERMATOLOGY AND SYPHILOGRAPHY
AND FORENSIC MEDICINE.

Syphilis as a Danger to the State and the Question of State Control.
Abstract of Report by DR. A. BLASCHKO, Berlin.

Amongst the measures for the combat with syphilis which are absolutely essential is state control, that is to say, political measures against the communication of the disease by means of prostitution. In no country, however, has the so-called regulation of prostitution shown itself an effectual method for reducing the incidence of venereal disease, chiefly owing to the fact that the regulations do not include the most dangerous individuals. A purely sanitary system is therefore to be preferred to this system of regulation, which, recognizing the impossibility of dealing with all sources of infection through any system of supervision, aims at rendering this especially dangerous one innocuous. Such a system, as it already exists in Norway, should affect both sexes in a similar manner, should stamp no single person authoritatively as a prostitute, and on this account burden them with exceptional enactments, such as the entering their names on a list, preventive visits and police control.

SECTION XV.—LARYNGOLOGY.

(Jointly with Section XVI. Otology; Discussion II).

The Methods and Results of Treatment of Diseases of the Throat, Nose and Ear by Salvarsan and Other Arsenical Compounds. Abstract of Report by DR ANDRÉ CASTEX, Paris.

1. Salvarsan and neo-salvarsan are often useless and sometimes harmful to the ears, as the syphilitic poison appears to have an elective influence upon the nervous system.

2. In cases in which mercury has been employed in the same individual, it has obviously been more efficacious than salvarsan and neo-salvarsan.

3. On the other hand "606" is useful in syphilitic affections of the nose, pharynx and larynx.

4. The employment of atoxyl exposes the patient to the risk of the development of neuritis, and hectin is not of much service.

It therefore seems to me that the arsenical compounds are only of moderate importance in oto-rhino-laryngology.

SECTION XIII.—DERMATOLOGY AND SYPHILOGRAPHY.

Epithelioma of the Skin—Benign and Malignant. Abstract of Report by JOHN A. FORDYCE, M.D., New York.

Dermatological observations favor the view that epithelial hyperplasia is the result of stimulation of parasitic, mechanical, physical or chemical origin, the amount and kind of irritation, as well as individual susceptibility, determining the result.

A consideration of the precancerous affections of the skin—senile, keratosis, seborrhæic warts, xeroderma pigmentosum, leucoplakia, lupus, nævi, X-ray and other burns, cicatrices.

A demonstration of various types of epitheliomata belonging to the squamous and basal-celled group.

The treatment of cutaneous epitheliomata by surgical and dermatological methods, including radiotherapy.

SECTION XVII.—STOMATOLOGY.

Dental Diseases in Relation to Public Health. Abstract of Report by J. SIM WALLACE, D. Sc., M. D., L. D. S.

The diseases of the teeth are extremely common and lead almost inevitably to many other ailments, often serious. Such diseases cost the public many millions of pounds annually. The diseases which result

from the same errors as those which cause dental diseases are also numerous and costly. The treatment of dental diseases is expensive and of but temporary utility. The prevention of dental diseases by physiological methods of preventing dental diseases has resulted in an enormous decrease of these diseases wherever the method has been adopted.

SECTION XVIII.—HYGIENE AND PREVENTIVE MEDICINE.

The Factors that Determine the Rise, Spread and Degree of Epidemic Diseases. Abstract of Report by DR. G. STICKER, Bonn a/Rh.

We have learnt from the well-known examples of influenza, plague and cholera that he who wishes to ascertain the conditions of parasitic epidemics must first of all study their general characteristics. He must then investigate each disease individually and in its whole extent, historically, geographically, biologically, monographically, experimentally, in short, philosophically. It never has been and is not now sufficient to study a disease solely from an anthropological standpoint as a human disease but it is essential also to study it from a higher standpoint, that of the leimologist. The leimology of the future will enquire as to what particular time and place are favourable to a particular epidemic, and what unfavourable, which are permanently favourable or unfavourable; whether and to what extent animals and plants participate in the human disease, and whether they do so as sufferers from the effects of the germ or as transmitters of it. Also where the transmitter of the germ harbours it, who its transmitters are, whether animals or plants, whether there are lifeless producers, immediate bearers and transmitters of it, whether normal accessory bearers and lifeless harborers participate; what other epidemics, are constantly or occasionally associated with the parasitic epidemic, rendering its course longer and its severity greater, and thus influencing the particular disease under consideration.

SECTION XVIII.—HYGIENE AND PREVENTIVE MEDICINE.

Schools and Myopia. Abstract of Report by DR. JAMES KERR, London.

High grade myopia in children requires special education in so-called myopic schools.

The prevalence in the population of a mass of low grade myopia largely associated with excess of eye work calls for prophylactic school treatment, in the diminution of all book work, and its practical elimination before the age of eight. The lighting of schools requires much improvement, and back lighting as the main source of illumination in class rooms should be absolutely prohibited.

A stringent rule to exclude myopes from literary careers should refuse scholarships to myopes of 4D or more, and all candidates for the teaching profession should be rejected for myopia of 6D or more.

SECTION XIX.

The Teaching of Forensic Medicine, Including the Construction and Equipment of a Medico-Legal Institute. Abstract of Report by PROFESSOR DR. H. ZANGGER, Zurich.

The duties of the Medico-Legal Institute and the teaching of forensic medicine consist in carrying out, theoretically and practically, the various legislative enactments in regard to medicine, more especially in the qualitative and quantitative estimation of facts which influence any real or supposed deviation from justice in regard to the human body or any of its parts (criminal law, civil law, warrants of arrest, insurances). In this connection comparative study of the information acquired (or evidence) is alone sufficient to supply a vivid picture of the actual occurrences. The student should take a personal interest in the individual cases, and be interested in the results of the sentence; he should endeavor to ascertain the method, the choice of methods, and, above all, the possibility of applying them under various conditions. The most important acquisition is the power of reconstructing, from the dynamic and substantial traces deduced from evidence, the processes and causes which led up to the prejudicial actions.

SECTION XIX.—FORENSIC MEDICINE.

The Psychology of Crime. Abstract of Report by PROF. DR. WRYGANDT, Hamburg.

The matter has been the subject of recent legislation in Hungary (1908), England (1909), Italy (1910). The idea of crime changes and the law is sometimes in advance of and sometimes behind general opinion. Crime is a product of the individual and his environment, and among the former inheritance plays the principal part. Criminals may be divided into:

1. Occasional criminals.
2. Emotional and inductional criminals.
3. Opportunists.
4. Habitual criminals.
5. Professional criminals.
6. Feeble-minded criminals.
7. Insane criminals.

which represent progressive degrees of variation from the normal.

Punishment can no longer be defended as retribution. This idea has led to much injustice, although still held by the Vulga. It seldom deters. Punishment should aim at protection from fresh crime, and may take the form of segregation of habitual criminals, industrial and reform institutions for occasional criminals, educational institutions for the young or feeble-minded, inebriate and lunatic asylums, but the duration of such segregation should depend upon the success of treatment and should not be settled beforehand. Preventive measures are at least as important as punitive.

SECTION XX.—NAVAL AND MILITARY MEDICINE.

Physiology of Physical Exercises and Marches. Abstract of the Report of Naval Staff Physician, DR. BUCHINGER, Flensburg.

The reporter reviewed very briefly the most important facts in regard to the physiology of physical exercise. Then followed a summary of the scientific experiments in marching by Zuntz and Schumburg, after which he gave a short account of his own experimental results.

He then referred in rather more detail to two special questions, which he considered especially important. In the first place he dealt with the influence of alcohol upon physical exercise and marching. He recommended total abstinence for every gymnast, sportsman and soldier. He then discussed the question of nutrition, which was equally important. He reported a series of scientific facts and observations, which were very much in favour of a vegetarian diet, especially in cases of constant and long-continued exercise.

He finally referred to some experiments in marching in soldiers who were living on a vegetarian diet, the experiments being conducted by trained physiologists, who participated in the nutrition investigations.

SECTION XXI.—TROPICAL MEDICINE AND HYGIENE.

Sanitary Organization in the Tropics. Abstract of Report by DR. NITZE.

Sanitary organization in the German Colonies varies according to tropical and sub-tropical conditions, and further in these regions according to whether they are with or without protective forces, and according to white and colored races. In regard to *personnel* there are for the civil medical service physicians and sanitary assistants; for the military service, sanitary officers and assistant officers, and, in addition, there are in connection with both services nursing sisters. He referred to the duties, rights and payment of these officers, their duties in hospitals, military

hospitals, convalescent homes, polyclinics, and on expeditions. Lying-in Hospital in Southwest Africa. Sleeping sickness investigations. Scientific investigations. Drawing up reports. Disposition of sanitary material. Qualifications and distribution. Sanitary care of the troops.

SECTION XXII.—RADIOLOGY; AND VII A.—ORTHOPÆDICS.

(Joint Discussion 5.)

The Radiography of Bones and Joints and Its Value in Orthopædic Surgery. Summary of Report by DR. G. NOVE-JOSSERAND, Lyons.

Radiography renders possible the study of deformities in the living subject and during the period of growth. It permits of their recognition, of distinguishing their varieties, of following their evolution, and of determining the modifications in the architecture of the bone which result from them. It therefore gives valuable information in regard to diagnosis and treatment; it has also added to the casuistic of deformities, has discovered new ones, and shown their relation to one another. Its importance is particularly great in the study of congenital scoliosis, the diseases of Dupuytren and Madelung, congenital dislocation of the hip, deviations of the neck of the femur, and of pes planus.

SECTION XXIII.—RADIOLOGY.

(Discussion 1.)

The Radiography of the Stomach and Intestines. Abstract of Report by CHARLES LESTER LEONARD, A.M., M.D., Philadelphia, U.S.A.

The advance in radiography of the stomach and intestines has been very rapid. The Rontgen examination is now a *sine qua non* before all operations.

The diagnosis of functional motility, perforating and penetrating ulcers, hour-glass contractions and their differentiation from malignant disease renders it of undisputed value to the internist and surgeon. The recognition of ptoses of the stomach and intestines is impossible without its aid. Studies of various forms of constipation and the action of drugs in these conditions are of the utmost value, while the diagnosis of lesions of the large intestine are impossible without the precision it affords in exactly determining their position and extent.—*The Canadian Practitioner and Review.*

Our Contemporaries.

MEDICINE.

The present Evidence For and Against the use of Tuberculin as a Specific Cure.

BY

H. BATTY SHAW, M.D., F.R.C.P.

It is a fact that no such unanimity exists in the profession as to the specifically curative effects of tuberculin in any of its forms in cases of tuberculosis as exists with regard to the use of diphtheritic antitoxin against infection with the Klebs-Loeffler bacillus. It is also a fact that tuberculin is nevertheless being widely used as true specific, and observers are to be found—some who are certainly convinced of its efficacy; some who, though they are uncertain, are driven to use it by the force of opinion of those who are certain. There are others who are equally sure that the evidence of its specific value is insufficient and even that it is a harmful drug, and they will not prescribe it.

With such a chaotic state of affairs it is reasonable to consider the whole subject critically, to take the evidence for and against its use, and to endeavour to arrive at some satisfactory conclusion.

KOCH'S FUNDAMENTAL EXPERIMENT.

It cannot be out of place, with such a programme, to go back to Koch's own experiments and to examine calmly his statements and see whether, after all the years that have elapsed since 1890-91, any support for his contentions has been advanced.

Koch's first public utterance on the use of what was known as tuberculin three months later was made at the first general session of the Tenth International Medical Congress, held in Berlin on August 4th, 1890, and can be found in the reports of the congress in various periodicals—for example, in the *Deutsche medizinische Wochenschrift*—and in the *BRITISH MEDICAL JOURNAL* of August 16th, 1890, p. 388. His address was largely a general survey of the accomplishments and the hopes of bacteriological study. After referring to the efforts he had made to discover something which, whilst checking the growth in the body of tubercle bacilli, effected no harm on the body, he said, with a very pointed observation, that his investigations, though carried out for nearly a year, were not complete, and that guinea-pigs, which, as is well known, are extraordinarily susceptible to tuberculosis, if exposed to the

infected guinea-pig can be cured by the use of tuberculin, whether old tuberculin (T.A.) or the second tuberculin (T.R.) or the third tuberculin (B.E.), or albumen-free tuberculin, or bovine tuberculin, or tuberculin derived from avian or other sources? Has it ever been successfully essayed to cure cattle of tuberculosis by such means rather than slay them because they have been proved to be tuberculous by the tuberculin test? Is it not a certainty that if bovine tuberculosis could be cured by the use of tuberculin, its use for such purposes would be world-wide? On the contrary, we hear of numbers of cattle being slain in order to stamp out the malady. We even hear of cattle being "doctored" so that they will not give the tuberculin test, and so be saved from destruction. If it were proven that tuberculous cattle would be cured by vaccination by means of tuberculin, we may be quite sure (1) that it would be widespread in veterinary practice, (2) that the whole medical profession would have adopted it with very little hesitation, and they would have been justified. But where are the reports on cattle which should make us at ease on this point? Frankly, they do not exist. There are many reports dealing with the preventive treatment of calves by means of tuberculin, but even that important question cannot be satisfactorily answered because of fallacies which in part beset Koch's own original investigation. Supposing a calf does not give the tuberculin test, and therefore is considered to be free from tuberculosis, and a prophylactic course of tuberculin is given to it, and it neither yields a tuberculin test eventually nor becomes tuberculous, how can any one argue from such data that the apparent freedom from tuberculosis is a reality, when it is known—

(1) That an animal may cure tuberculosis spontaneously (and yet give a tuberculin test);

(2) That it may be tuberculous and yet not give a tuberculin test, and

(3) That the undetected tuberculosis that it may already be burdened with may be (see Koch's experiment) the reason why it cannot be reinfected?

These facts have plagued veterinary surgeons to such an extent that there is not unanimity amongst them as to the value of the evidence for using even prophylactic vaccination in calves, and it also explains why there is no attempt to vaccinate tuberculous cattle in order to cure them. Can it be wondered at that the medical profession is not unanimous in its advocacy of the present fashion for curing human tuberculosis with any form of tuberculin administered in any particular

method? Contemporary text books and guides to the use of tuberculin do not face these difficulties of comparative therapeutics, and one well-known one is a standing example of the troubles caused by Koch's unconfirmed experiments—on one page it makes out that when the tuberculous guinea-pig was injected with subsequent doses of tubercle bacilli the ulcerating wound formed where the *first* injection was made, which caused the guinea-pig to become tuberculous, healed as a result of the second injection, and yet on a later page the author says it was the small superficial necrosis of the *second* site of inoculation which healed.

To sum up the evidence in favour of the allegation that tuberculin can cure a tuberculous animal, whether calf or guinea-pig, there is *no evidence but Koch's*. Banielier and Roepke admit that they must confess that the healing of infected guinea-pigs and rabbits by means of tuberculin preparations has been accomplished by only a few authorities who have been engaged in such extremely tedious studies, and shield themselves from criticism in this direction by saying that rabbits and guinea-pigs are such unsuitable animals to work upon. And yet these two authors, like all others who advocate the use of tuberculin, set out in full the details of Koch's experiments which led to the introduction of tuberculin and say that the basis of its use is these self-same experiments on guinea-pigs. What has been said to be a proof is entirely nullified by the fact, admitted by bacteriologists, that both varieties of animals may be spontaneously tuberculous and may spontaneously cure themselves of the tuberculosis, and yet this cannot be established until after the death and complete dissection of the animal. If this is the case with guinea-pigs and cattle, the lives and deaths of which can be so fully observed and encompassed, it is just as certain with regard to human beings, who, like the animals, may be tuberculous and yet yield no test, chemical or otherwise, that they are.

To many physicians the result of animal experiments is quite enough, or shall we say the difficulty of establishing or not the fact of tuberculous disease in animals is great enough to make them set their faces against the practice of using tuberculin to cure human tuberculosis? And yet hard things have been said about withholding tuberculin from tuberculous mankind. The pendulum has swung back in favour of using tuberculin again; but it is even more impossible to-day than it was in the years immediately succeeding 1890-91 to quote evidence in support of Koch's experimental results.

The Modern Dosage in the Use of Tuberculin.

Ignoring the unsatisfactory nature of Koch's alleged cures of tuberculosis in animals which have never been confirmed and which will not stand criticism, though such of his experiments which show merely the truth of the principles of anaphylaxis have been fully confirmed, workers abroad have developed the practice of giving the tuberculin in infinitesimal doses compared with the original ones. But in face of the objections already raised in the last section, it really does not matter whether the dosage is large or small so long as the experimental proof of cure by means of tuberculin has never been established. Neither large nor small doses of tuberculin are used to cure the tuberculosis of cattle.

The Experience of Urinary Surgeons of the Value of Tuberculin.

It is pointed out that, despite the abandonment of the use of tuberculin in other affections, certain urinary surgeons have remained loyal to the use of tuberculin in this disease. Marvellous cures of the disease are recorded even during the years immediately succeeding 1890-91.

Later on it will be pointed out that the element of "control," without which no specific cure can be established, forms no part of the demonstration of the extreme usefulness of tuberculin in these cases. It is usually found that some of the number to whom tuberculin is given are "better after receiving it."

The Post-mortem Demonstration of Cured Pulmonary Tuberculosis.

Much capital has been made out of such well-known phenomena. There is no hesitation whatever in admitting that tuberculosis may be completely cured but to argue that because tuberculin does produce a reaction in a large number of tuberculous animals and in man it must be a means of effecting this cure is illogical. No one questions that the Widal test is a proof of typhoid fever, and yet no one has established that typhoid vaccine is a cure for typhoid fever already contracted. Observations seem to show that it is a prophylactic against typhoid fever for one or two years, and so tuberculin may be a prophylactic against tuberculosis for a period of three months in cattle, but no one has the right to say that a process which is an effective agent in preventing a disease must *ipso facto* be effective when the disease has already begun.

The encouraging Effect upon the Patient and Doctor of doing something for the Patient instead of leaving him to specifically Cure or Not Cure Himself.

It almost seems out of place to consider such a matter in the discussion of so serious a subject as the adoption of tuberculin to cure tuberculosis. No reference would be made to it were it not that we are in direct contact with patients. Patients ask for tuberculin to be administered, and how can we refuse them when the public press lends its advocacy, when tuberculin is even used in obedience to the permission of the Insurance Act? What every man must feel is that if his convictions are that such and such a remedy cannot cure specifically he must say so and withhold it.

The Antitoxin Treatment of Diphtheria.

So impressive was the great reduction of the mortality after the introduction of diphtheria antitoxin that the hope arose that all infections would yield the same happy issues. It is a fact that there are many who to this day think that tuberculin is an antitoxic serum, and should therefore be successful. The final section of this address will serve to show that such a view is utterly wrong. The use of the serum of a horse which carries in it material which is capable of neutralizing the poisonous effects of diphtheria bacilli, and that this can be shown to occur in a test tube as well as in the human body, is one thing, but to cure an infection with the tubercle bacillus by means of tuberculin derived by breaking up tubercle bacilli and making an emulsion of them is quite another.

The Variety of the Cures of Tuberculosis.

There are those workers who still maintain that sanatorium methods are the only ones which effect a cure of tuberculosis; there are others, again, who repudiate all such claims, and who advocate treatment with tuberculin alone; and now there is a group of workers who maintain that the combination of tuberculin and sanatorium treatment is necessary. These facts alone point to a difference of opinion which begets the suspicion that perhaps the tests applied to prove the efficacy or not are at fault. A most important paper has recently been published by Messrs. Palin Elderton and Perry. They show that tuberculin treatment does not contribute any increased length of life to the patient when carried out in conjunction with sanatorium treatment, as judged by the large amount of material for investigation provided by Dr. Lawrason Brown in America and Drs. Prest and Guy in Scotland. The same suspicions are aroused when distinguished Continental workers put forward the

idea that the disease is after all to be cured by an anti-tuberculous serum, and when it is said a "cure" is to be found in quite a different direction—namely, by the production of artificial pneumothorax. Of Friedmann's cure we have still to await further details. We have heard of "pneumosan" and "dioradin." With such a varied list of cures, blessed by one school and condemned by another, is it remarkable that the layman should also offer his "remedies" for a cure? Further, is it remarkable that members of our profession are also convinced that the specific cure has yet to be found? Professor Metchnikoff in his recent address delivered in London has nothing to tell us of a remedy which specifically cures tuberculosis.

The Method Adopted to Test the Value of Tuberculin.

No one can look into the problem of the cure of tuberculosis without becoming aware that the secret which underlies the existence and development of so many vaunted "cures" is to be discovered in our ways of estimating their value. When the layman copies these ways we are angry, and condemn him, and feel justified in doing so (1) because he does not announce his cure through channels which we consider proper and (2) because we argue that he does not know the nature or course of the disease. We have seen with regard to tuberculin that there is no confirmation that an animal can be cured of tuberculosis by means of it; therefore in advocating it, we put ourselves in a faulty position similar to that of the layman with his "causal" cure. There remains, then, but one way in which we differ from him—we know the nature and course of tuberculosis, and he does not. It seems to me that we have not made enough of our knowledge of the course of tuberculosis if left unaided. Of 1,532 cases of pulmonary tuberculosis (tubercle bacilli being present in the sputum), it was found that one-seventh lived five years and more from the date of the manifestation of tuberculosis, one-thirtieth lived over fifteen years and in five cases there was documentary proof that they had lived sixteen, eighteen, twenty-four, twenty-five, and forty years. Not one of these cases had been treated in a sanatorium nor had they received tuberculin.

The fact is that as a profession we are wrong in our methods of estimating "cures" in the only sense a layman wants to hear of them—real "cures," complete eradication of the cause. We have too long judged of "specific" cures without allowing for the *post hoc, propter hoc* fallacy. We cannot afford to do so any longer, because our statements are being revised by skilled mathematicians; our "impressions" of proof of cure have been put into the scales and they are found wanting.

Professor Karl Pearson tells us that, taking our own death certificates as supplied to the Registrar-General, it is clear that a fall in the death-rate from tuberculosis of the lungs had begun in 1835 and continued till 1891. Since then it has ceased to fall, despite the help that has come, so it is said, from the use of sanatoriums and of tuberculin. It has been said that tuberculosis dispensaries have led to a great fall in tuberculosis in a certain town, but the same critic is able to show that the fall was paralleled in two other towns in which the dispensary system had not been introduced. We physicians, therefore, have failed to establish by our own death certificates or by our methods of inquiry any improvement due to sanatoriums, tuberculin, or dispensaries. The improvement was due to a natural process of which we have been unmindful.

It is not without interest that I should have figured as one of the collectors of evidence in favour of the use of tuberculin. In 1905 tuberculin was not used in this country for the cure of pulmonary tuberculosis. I circularized every institution which had to do with this disease and found this out. Following out non-critical methods, I published results such as the following: Of 656 early cases treated with tuberculin, 91 per cent. reached a certain standard of improvement, whereas, of 611 not treated with tuberculin, only 62 per cent. reached the same standard. But when the individual accounts of certain workers whose reputation is world-wide were looked at, the large difference of 29 per cent. disappears. Dr. Turban treated 86 cases with tuberculin, and of these 52.6 per cent. achieved permanent good results; of 241 not treated with tuberculin, only 39.4 per cent. achieved the same result—a difference of 13.2 per cent. Dr. Trudeau was able to find that the use of tuberculin was followed by an increase of 8 per cent.

Now it may be argued that these last figures are quite good enough and until they are found to be wrong it would be useless to deny the use of tuberculin simply because experiments on animals had failed to establish the same happy results. At the time I wrote that article I thought so too, but subsequent experience has shown that cases reported to be cured too often broke down again later, that "permanent good results" gave place to permanent and final bad ones, and that physicians are not sufficiently skilled in making mathematical deductions. It is obviously difficult to find proof of the efficacy of tuberculin treatment by methods which do not take into consideration the whole of the life or which cannot be controlled as can those in animals, by slaughter and the examination for active disease. An interested critic of our methods of testing the value of tuberculin propounded to me a method which, if

carried out in a large number of cases, would satisfy him. I was to find a group of cases of pulmonary tuberculosis which were recognized by tuberculin advocates as suitable for treatment with a reacting dose of tuberculin; half were to be treated with tuberculin and half without, other conditions being equal. The choice of each half was to be left to chance; I was not to pick out those "specially" favourable ones as suitable for tuberculin. This method of testing the value of tuberculin is opposed entirely in principle to that advocated by modern workers. Bandelier and Roepke lay it down as an axiom that the cases must be selected ones—individualization is the secret of success—extremely early cases are the only likely ones to give satisfactory results (*sic*); they do not give sufficient prominence to the fact of spontaneous cures in such cases. As a test of the improvement of the lung condition, I chose the method of registration of the advance or retrogression of rales after three months' treatment. Dr. Rigg, the house-physician who bore the burden of the test, has recently published the results. Of the 10 tuberculin treated patients, 1 improved, 4 became worse, and 5 remained *in statu quo*. Of 9 non-tuberculin treated patients, 4 improved, 3 were worse, and 2 remained *in statu quo*. It cannot be said that this is a clear argument against the tuberculin effects on the lung, because it might equally well be maintained that it was an argument against using a remedy which so raised the temperature as to keep the tuberculin treated patients in bed, whilst the others were up and about; but still this method of giving tuberculin is advocated at the present time and is being extensively used. We are now trying a series of cases in which this difficulty will be met.

*The Evidence of Individual Cases, or of Series of Cases
Neither Controlled.*

No greater fallacy needs exposing than that which underlies the statements of individuals who have been "cured" after this, that, or another treatment. One has only to ask, as veterinary surgeons have now to ask themselves: How can one be sure when a human being or animal appears to overcome a tuberculous lung affection that such victory has necessarily followed, not from Nature's efforts, but because of the remedy used before the improvement comes? It is certain that if any proprietary article or quack remedy, etc., were applied to cases of pulmonary tuberculosis, some of the individuals would get better after its use. The same may be said of tuberculin. Such evidence is set at naught because patients recover spontaneously just as cattle do. But there have been many series of cases reported in which it is said there is evidence that

tuberculin is a specific cure. The criteria have differed in different reports. Bandelier has published results of tuberculin treatment; he found that 100 per cent. of the cases in Turban's first stage lost their tubercle bacilli; 87 per cent. of the cases in Turban's third stage also lost their tubercle bacilli. The total cases treated numbered 202. We have a right to ask: What would such cases have done without tuberculin? And it is right to object that disappearance of tubercle bacilli from the sputum is too often but a temporary phenomenon.

What Does Tuberculin Do?

Like all vaccine treatment, tuberculin is certainly capable of effecting a change in the aspects of the disease. But it has never been experimentally proved that such changes are curative; the alleged curative changes can be explained on anaphylactic grounds. To explain this requires technical consideration.

We know that when diphtheria bacilli invade the body, they poison the body by means of diphtheria toxin; the patient may resist the effects of this toxin by manufacturing his own antitoxin; now-a-days we do not wait to see if he does, we administer antitoxin developed experimentally in the horse. The toxins of tetanus and botulism or sausage poisoning can be met by a similar mechanism. The chemical response of the cells of the body to and against the toxin are figuratively expressed as receptors of the "first" order of Ehrlich. Their interaction is diagrammatically figured in most text-books of bacteriology. These receptors are certainly of therapeutic value.

When the typhoid organism assails the body, a different group of chemical actions is developed on the part of the body cells; the serum of the body now possesses not antitoxic but agglutinative properties: no one has demonstrated that this development of what are known as receptors of the second order has any therapeutic significance, though the diagnostic value is of the greatest importance (Widal test for typhoid fever).

It is seen, then, that receptor development following upon bacterial invasion is not necessarily of benign curative purpose. We may expect more complicated receptors than those of the first and second orders to be developed, of different properties, and again not necessarily of therapeutic value.

This brings us to the consideration of another group of receptors—the third order—which has particular interest in connection with this address. It enables us to understand better the meaning of anaphylaxis of a von Pirquet test, and of a tuberculin test; it also enables us to

understand such complicated tests as the "complement fixation" test or tuberculosis, and if recent experiments are confirmed it will enable us to understand how the effects of tuberculin administered as a curative agent can be explained on other grounds than therapeutic ones; finally, it will help us to understand why two cases—one under the care of A. Fraenkel and one under Wolff-Eisner—developed a tuberculous ulcer on the tongue and tuberculosis of the lungs respectively whilst undergoing a course of tuberculin treatment for lesions located elsewhere in the body.

Let us suppose that tubercle bacillus (A) enters into the body of an animal. It may, and probably does, in countless instances, suffer annihilation by agencies which have been transmitted from the animal's parents. No infection occurs, and the animal is none the worse. But supposing there is more than one bacillus, or that the one gaining access is more virulent, or suppose that the animal has inherited from the parent no insusceptibility, something like the following takes place: A cell of the body (B) in the neighbourhood of the deposit of tubercle bacilli is busy with one of its physiological duties of absorbing nourishment, it includes the tubercle bacilli in this category, and the effect upon the cell is to increase its appetite for more (a popular expression for Weigert's law that an excessive stimulus provokes an increased supply of receptors or chemical affinities). Let us represent this increased appetite by a cell with several receptors attached to it of the pattern (C). This is known as an "amboceptor," because it can attach at (D) a special agent known as complement (K), which is present in all living healthy animals, more in some than in others, at its opposite extremity (E), it can also attach to itself a tubercle bacillus (A) or tuberculin (A), which also have chemical affinities represented figuratively as receptors (H and H). We must also suppose that resident in the amboceptor is a special ferment (F) which is capable of acting upon protein and breaking it up into much simpler bodies—for example, peptones or albumoses, or amido-acids, and into some substance capable of influencing temperature. We will suppose (at first) that these amboceptors are anchored to the cell (B). When to this "sessile" or "fixed" amboceptor complement is attached at (D) and antigen (in the shape of tuberculin or tubercle bacilli) at (E), it is as if a match had been put to a firework. The ferment resident in the amboceptor can now operate on the cell (B) and the antigen (K), and lead to the above proteolysis of both. If this is complete a liquid residue is all that remains, if incomplete the cell B is swollen and its nucleus obscured, cell death is more or less

complete. Presumably when a focus of tuberculosis develops all the cells in the neighbourhood undergo change, and we recognize a "tubercle" by the naked eye—grey, white, or caseating according to the stage of action. But it is possible that cells far removed from the seat of tuberculosis may also have their special receptors developed—for example in the skin (L), subcutaneous tissues, etc. We must suppose, too, that these receptors may be inherited, or they may develop after the birth as the result of an infection. They may exist, therefore, although there is no certain tuberculosis present in any part of the body. In other words, these receptors are a sort of hall mark of infection which may be inherited or acquired.

Now let us introduce into such a tuberculous animal a dose of tuberculin as Koch did in his original experiments. This reaches (E) in numerous cells; complement is fixed and a "reaction" is set going, so thoroughly described by Koch years ago. One thing we now know is that such reaction is a test of the presence of suitable receptors, *not necessarily of active tuberculosis*. The reaction is slight or brisk, and may be fatal, according to the available receptors and the dose of tuberculin. This helps us to understand the catastrophes following on Koch's introduction of tuberculin. The temperature may rise or fall or remain unaltered according to the amount of poisonous material let loose when the reaction takes place. The combination of complement, amboceptors and antigen, for example, tubercle bacilli or tuberculin, is known as "anaphylatoxin," the reaction this brings about as "anaphylaxis." If tuberculin is given repeatedly, it will use up all the tuberculo-amboceptors, until reaction is no longer given. The individual insensitiveness cannot experimentally be transmitted from one animal to another. We begin to see why it is that the giving of tuberculin is not necessarily followed by cure because there is no reaction, and we see why Fraenkel and Wolff-Eisner's cases, though undergoing treatment with tuberculin, were yet developing fresh tuberculous lesions elsewhere. Koch was able to show the difficulty of reinfecting his tuberculous guinea-pigs when he reinjected them with tubercle bacilli in small amounts; it is easy now to see why; the tubercle bacilli were at once fixed by tuberculo-amboceptors and digested, producing symptoms or not according to the amount of available receptors and tubercle bacilli; these experiments, first announced by Koch, have now been shown by Romer to be true. Whether temperature alterations occur is dependent upon the amount of poison liberated (Thiele and Embleton).

Now, the theory thus given says nothing about an attack upon the tubercle bacilli which are responsible for the formation of the amboceptors in the first case. Such organisms may be looked up in some fibrous focus, they may be quite unaffected, they may be busy provoking the formation of fresh amboceptors. Indeed, so far as animal experiments go, no one has ever succeeded since Koch did, *pace* the "few cases" referred to by Bandelier and Roepke (no reference given), in showing that the injection of tuberculin does affect the life of these organisms to the extent of bringing the tuberculous process to a standstill. This part of his original statement has never been confirmed, whereas the rest has been repeated by Romer. Romer gives no statement to the effect that in repeating Koch's experiments he also was able to cause the original tuberculous process to come to an end. Romer's writings show only too well the impossibility, which he fully recognizes, of ruling out spontaneous cures and infection. It is so common to hear that vaccines, including tuberculin, increase the individual resistance, that the increase of the resistance is shown in the diagram, and that the diagram is a perfect support of the contention that just as the amboceptors attach themselves to artificially introduced tuberculin or tubercle bacilli, so they will attach themselves to tubercle bacilli naturally occurring and causing the development of amboceptors. The reply must be that the absence of proof of this last happy issue in animals negatives such a view, and it is also understandable that tubercle bacilli ring-fenced in inaccessible fibrotic or caseous foci are not approachable by such a mechanism. There is nothing of a curative nature to be discovered from anaphylaxis; it is a reaction, not necessarily defensive, of the body to any foreign protein introduced from without, whether bacterial or other.

The recent work of Drs. F. H. Thiele and D. Embleton on some observations on the production of temperature variations should be read by those who are interested in the problems associated with tuberculin treatment. They show that very probably the poisonous effects produced in the body by bacterial invasion are not the results of poisons developed in and by the living bacteria, but are due to the operations of the invaded organism which, by means of its amboceptors, produces poisons by the digestion of the invading bacteria. Indeed it looks as if the body may tolerate infection well enough, but what it cannot always tolerate is the poisoning which is set agoing when the body cells react against these bacteria. Tuberculin when administered actually helps this poisoning; in 1890 and 1891 such catastrophes were frequently seen because large doses of tuberculin were used; when, since 1905 and 1906, some form of

tuberculin has been administered in small doses the poisoning has been whittled down to small injuries as tuberculin reactions and tuberculin cures. This may sound a revolutionary doctrine, but it is one which follows upon the advent of the discovery of anaphylaxis.

The Bearing of the Success of Antityphoid Inoculation.

So far my task has been an easy one; practically all the points in favour of the use of tuberculin to cure disease already existent have been met with counter-explanations, and I sincerely hope my arguments have been fair and have convinced you that the tuberculin cure of human tuberculosis so far is unproven.

But I admit to you I am in a great difficulty when I contemplate the fact announced by Sir William Leishman in this country and by workers abroad in favour of antityphoid inoculation. It has been shown that the prophylactic inoculation with a typhoid vaccine confers on the individual for about two years a lessened risk of contracting typhoid fever; or if contracted, of reducing the case mortality until at the present time, amongst those so inoculated, the number of soldiers in the British army who contract typhoid fever is less than the number who died from it a few years ago. The advocates of the tuberculin treatment of *established* tuberculosis, or for the vaccine treatment of any *established* infection, feel that if typhoid fever can be reduced in case incidence and in case mortality by vaccination before the disease is developed, it should be able to be controlled by vaccination after the disease is developed. I can say at once that figures have yet to be published to establish this speculation. It is not difficult to see that if antityphoid amboceptors are developed in a healthy individual before he contracts typhoid fever, when the infection does occur it finds the cells of the body *ready* to digest the bacilli as they arrive. Every cell to which the typhoid organism gets access is provided with receptors whose life is about two years, which are ready to behave in the manner above described.

If tubercle bacilli, on the other hand, gain access to the body, if they surround themselves with an almost impenetrable ring of fibrous tissue, caseous or calcified material, then any subsequent development at a remote part, say, of the skin or subdermic tissues of "sessile" tuberculin or tuberculo-amboceptors by means of injections of tuberculin or tubercle bacilli, may be quite unable to reach the tubercle bacilli. Once again, and finally, until animal experiments can be made showing that this difficulty can be overcome, or until a critically controlled application of tuberculin to a large number of tuberculous human beings can be shown

to cure the tuberculous lesion, I submit that the case for tuberculin cure is unproven.

There still remains one more point which must be discussed, and it is this: It may be fairly asked whether it is not possible that some of the alleged cases of cure of tuberculosis by means of tuberculin are, after all, real and explainable on the ground that all the tuberculin-amboceptors figured in the above diagram do not exist in the form of "fixed" receptors—that some are "free," circulating in the blood stream, and are capable in certain "suitable" "early" cases of tuberculosis of gaining access to the tubercle bacilli present in the focus of tuberculous disease before the latter is rendered inaccessible by fibrosis or other processes of caseation, etc. Such a possibility must be admitted, because by the "complement" fixation method it is possible to demonstrate in certain tuberculous subjects the presence of antibodies in the serum. The answer is that, though infection with living tubercle bacilli may be productive of the formation of tuberculo-amboceptors, which will react to living tubercle bacilli introduced at a second injection or to tuberculin, and which may be free in the blood stream and may give a positive complement fixation test, no one has ever succeeded in proving that if a healthy animal is injected with tuberculin, tuberculin-amboceptors are produced, which will react to living tubercle bacilli, causing their death and solution, or that the serum of such an animal gives a complement fixation test, using living tubercle bacilli as antigen. Moreover, it is well known that no one has ever succeeded in demonstrating in a non-tuberculous man a positive von Pirquet reaction, simply dependent upon repeated previous injections with tuberculin.

Though experimentation has shown that previous tuberculosis, by means of tuberculo-amboceptors, certainly "fixed" in character and may be "free," may prevent subsequent infection with tuberculosis, it has not shown that tuberculin-amboceptors, "fixed" or "free," can prevent subsequent tuberculous infection. Romer has supplied some evidence which supports this latter contention, for he has found that cattle immunized by living tubercle bacilli and normal animals both show about the same sensitiveness to tuberculin, while the immunized animals show a high degree of hypersensitiveness to tubercle bacilli as a sign of their immunity, and the control normal animals do not.—*B. M. Journal.*

Experimented Study on the Feeding with Polished Rice in Fowls and Pigeons.

SEGAWA.—There already have been numerous publications published on the subject of fowl's beri-beri and on the relation of the disease in fowls and human being, but most of them failed to make the thorough comparative study of the disease which comes in such different species as fowls and men.

The author examined as many organs as possible from very large materials and tried to explain the importance of the above mentioned disease with due consideration to the difference in species after considering the essential meanings of every symptoms and pathological changes. In the experiments by means of the feeding with polished rice which lasted 219 days 61.1 % of the birds showed beri-beri like symptoms; 13.9 % of them a state of simple inanition; 11.1 % died of intercurrent disease such as tuberculosis and the rest of them (13.9 %) remained quite normal. One distinguishes 2 forms in the birds which showed beri-beri-like symptoms; (a) neuromuscular type—pure beri-beri-like symptoms—and (b) mixed type—beri-beri-like symptoms+inanition's symptoms. The time in which the disease appears varies greatly—from 20 to 111 days. The clinical symptoms are in short as follows:

1. *Neuromuscular symptoms.* They are of two kinds—paralysis and spasm. The paralysis sets in the lower extremities, wings, neck and etc., and dysphagia occurs in rare cases. The paralysis are particularly marked in the lower extremities, which affect chiefly the muscles of the flexor side and causes a peculiar reeling and stooping gait. Finally the paralysis is complete and the birds are no longer capable of standing up. The spastic symptoms are altogether very rare and of slight degree in fowls and appears mostly in the neck and occasionally in the lower extremities. In the first case opisthotonus occurs and in the second case reeling spastic gait. The spasm attacks, contrary to the paralysis, the muscles of the extensor surface, although it is always accompanied by paralysis and never alone. The consciousness is dulled toward the end.

2. *Inanition's symptoms.* The polished rice is apparently loathsome to the bird and consequently the symptoms of inanition such as loss of weight, and emaciation, etc., set in them. These symptoms occur in those birds which are affected by the disease in an early stage. In short it is quite intelligible that these symptoms are the result of general inanition and quite independent of the nervous symptoms or diarrhoea.

3. Diarrhoea, indolent movements, atrophy, paleness and cyanosis of the comb are occasionally observed, but never œdema and dyspnoea. Pathologico-anatomical examinations were made in 27 diseased, 5 which are put to hunger for the control and 10 healthy fowls, and 5 diseased, 5 hungered and 3 healthy pigeons.

The results are as follows :

1. Vascular system.

Hydropericardium. Dilation of the heart on both sides. Degeneration of heart's muscles. Degeneration of subepicardial ganglion-cells. Fatty degeneration of the muscular layer of peripheral arteries (chiefly those in myocardium and skeletal muscles.) Congestion in venous system.

2. Nervous system.

Degeneration of the sheath and axis-cylinder of peripheral nerves. High degree of congestion—especially severe in those with spastic symptoms—in central nervous system (particularly in brain). Slight changes in the ganglion cells of anterior root of spinal cord.

3. Muscle.

Severe degeneration of muscular fibres (especially in the flexors of lower extremities.

Degeneration of muscular fibres. Degeneration of intramuscular nervous fibres. Degeneration of the muscular layer of peripheral arteries.

4. Digestive apparatus.

Acid fermentation of rice in primary stomach.

Catarrh, congestion and pigmentation of the mucosa of stomach proper and intestines. Congestion, pigmentation and slight parenchymatous degeneration of liver. Congestion and slight parenchymatous degeneration of pancreas.

5. High degree of congestion, slight parenchymatous degeneration and pigmentation of kidney. Pigmentation of spleen. Severe congestion and slight hydrops of lung. Slight degeneration of the parenchyma of suprarenal gland. Hæmorrhage in the follicle and congestion of thyroid gland. Destruction of red blood corpuscles and pigmentation in various organs as its consequence.

6. Atrophic state of the various organs in the cases with inanition's symptoms.

From the above clinical and pathological anatomical changes one can say that the feeding of fowls and pigeons with polished rice produces two different types of symptoms, namely the so-called beri-beri symptoms and inanition's symptoms.

The first type is due to an intoxication which is caused by the acid fermentation of rice in primary stomach.

The poison thus produced attacks the nervous system (peripheral nerves) and causes severe degeneration of the muscles innervated by them. The dilatation of heart and congestion in central nervous system are to be considered as secondary changes.

The author is consequently inclined to consider this disease as a polyneuritis.

As regards its relation to the human beri-beri the author comes to the following conclusions after due comparison of the symptoms and pathological changes.

The clinical symptoms in both cases are on the whole same. The emaciation and atrophy are the result of inanition and it is natural that they do not occur in men. A few differences, such as irritation's symptom (spasm) by one and dyspnoea by another are to be explained by the difference in species. Diarrhoea by the birds is a local phenomenon and one can not put too much stress on it. The chief pathological changes such as the degeneration of nerves, dilatation of heart's chambers (heart's hypertrophy is not important as it is a secondary change) changes in muscles, and congestion in various organs are on the whole same.

The author therefore concludes that the so-called fowl's beri-beri which is produced by the feeding with rice is a polyneuritis caused by the poison of the acid fermentation of polished rice and is not the result of partial inanition. Also it is same as the human beri-beri from clinical as well as pathological anatomical stand point.—*The Sei-i-kwai Medical Journal*.

Superfluous Hair—Some Methods of Treatment.

IN an able and exhaustive survey of the subject of hypertrichosis or excessive hairiness, Dr. D. Freshwater discusses the relative merits and advantages of the different methods of circumventing this condition. He enumerates eight separate and distinct sorts of remedy, some of which are applied in different ways or can be subdivided into varying forms. And he also points out that, although as a rule it is the female

sex which most often applies for relief from hypertrichosis, yet sometimes men also come for treatment of this condition.

The first method on the list is the plucking of individual hairs out by the roots, an unpleasant remedy, but highly effective for the time being. Unfortunately, the growth recurs, and may even be of a stronger sort than before. Moreover, if the number of offending hairs be large, considerable inflammation is excited by this process, which is on many grounds inferior to some of the less ancient devices.

Shaving, with which may be included cutting and singeing, is held in disfavour by ladies, owing to the widespread impression that shaving stimulates the hair-growth. It is, nevertheless, extremely valuable in many cases, and although it may be admitted that individual hairs seem to grow thicker after some years of shaving, yet there is no increase in the actual number of hairs. As a matter of fact, shaving is so thoroughly effective for the time being, so harmless, and so safe and painless, that the disfavour in which it is often held is somewhat surprising. By using a safety razor once a fortnight or so, many ladies are able to conceal quite successfully from the world at large that they are the subjects of hypertrichosis.

The *x*-rays, as is well known by now, will cause the hair to fall from any part which is exposed to a sufficient dose: this fact is taken advantage of in the treatment of ringworm. A somewhat larger dose causes permanent, instead of temporary, baldness, and a good many cases of the kind have occurred during the *x*-ray treatment of ringworm. Can the rays, therefore, be made use of to produce intentional destruction of the hair-roots? Dr. Freshwater is against it on the grounds that scars, pigmentation, or telangiectasis may be accidentally produced, and may be permanent. This would indeed be out of the frying-pan into the fire.

Next on the list stand depilatory drugs, which, like tweezer-plucking, have been used in the harems of the East for many centuries. These substances, when applied to the hairy part, soften and destroy that part of the hair shaft to which they get access. In other words, in order to destroy the hidden part of the hair, they would have to be left on long enough to eat away the skin itself, which would leave a scar. Depilatories, therefore, are no more effective than shaving, and have to be reapplied at much the same interval of time. Moreover, they tend to cause eventually a thicker growth, so that their advantage over shaving is much less real than apparent. No preparation, says Dr. Freshwater, has yet been discovered which will with certainty produce permanent

removal of the hair without destroying also the skin. Although many advertised secret nostrums pretend to this, their extravagant claims are far in excess of their performances.

Yet another method is that of bleaching the hair by means of hydrogen peroxide or some preparation containing it, thus rendering it comparatively inconspicuous. This is, naturally, most useful in those cases where the hairs are numerous but minute. Besides bleaching the hair, preparations of this kind after a while render it brittle and much more likely to fall, and they also retard to some degree its further growth. This method is therefore harmless and fairly effective for some cases, which is more than can be said of all the remedies for hypertrichosis.

The use of pumice-stone is also not to be despised as an auxiliary. After shaving the affected part, a piece of smooth pumice-stone is rubbed gently over the skin against the direction of the hairgrowth twice a day. The friction must be quite gentle, and the place should be anointed with cold cream afterwards. This is done every day for six months, and then a rest of one month is taken. The new growth of hair will probably be found to be much weaker and more scanty, and a decision can then be taken whether another six months of the treatment is necessary. If this succeeds, an occasional rubbing every now and then will sustain the improvement.

Last come methods of epilation, which aim at destruction of the hair-root, so preventing any return of the growth. One drastic method for doing this is known by the name of "Kromeyer," its inventor, but the risks of this severe process are generally considered to contra-indicate its use. The alternative is electrolysis, which is safe, effective, and not very uncomfortable. Unfortunately, it is so tedious that only twenty to thirty hairs can be dealt with at one sitting: also it is of much more value for thick sparse hairs than for a great number of fine downy ones. About 80 per cent. of the hairs thus dealt with never grow again, but the operator requires considerable experience to be able to get results as good as this. Various precautions are advisable if scarring is to be avoided, and it is well to pick out hairs at some distance from one another and uniformly distributed over the region to be depilated. It is also necessary to warn the patient that a skin which has shown a tendency to hypertrichosis may continue to do so, and that new hairs may appear which would have done so in any case; otherwise the treatment may be thought to have failed, and disappointment may ensue.—*The Hospital*.

Pepper in Hot Countries.

For some reason or other which we do not as yet clearly understand, says Dr. Hutchinson, it appears desirable, or at least grateful, in the tropics to add to most dishes a surprising amount of peppers, curries, spices, and hot stuff of all sorts and descriptions. This is probably due partly to the fact that they are good germicides and intestinal antiseptics, not interfering with the action of the digestive ferments. While unable actually to burn up the bacteria—though from their taste one is ready to believe them capable of anything—yet they powerfully discourage the growth of bacteria and reduce their billions to millions—or even thousands. Nevertheless, nearly all native Mexicans, says Dr. Kellogg, suffer from hardening of the liver—due to the “hot stuff” they eat.—*The P. M. Journal*.

A Case in which Round Worms caused Symptoms leading to a Diagnosis of Appendicitis.

BY

D. KELLY, M.B., B.S., *Hon., Surgeon to Mater Misericordiae Hospital, North Sydney.*

Joe F., *act.* 5 years, was admitted to hospital on April 12th, 1913. His mother gave the following history:—

Five months ago he complained of severe pain in his belly, and was admitted to St. Thomas' Hospital, London, where a diagnosis of appendicitis was made, and an operation advised. The family having taken passages to Australia, did not wish an operation, and the boy recovering, was, after a stay of a few weeks in hospital, brought out here.

He has complained of light attacks off and on since, but none were of the severity of the present attack. His temperature on admission was 100 deg., and pulse 106. He looked pale and ill, and was complaining of the pain in his belly. His tongue was coated, but moist, and he had vomited once. His bowels had been constipated for some time. Heart and lungs sound, urine normal. There was rigidity of the right rectus muscle, and he was very tender on pressure in the appendix area. An operation for the removal of his appendix was decided on.

Operation.—On opening the abdomen, the appendix was easily found. It was slightly reddened, but there were no evidences of previous trouble. The appendix was removed. As the condition of the appendix could not possibly account for the acute symptoms, further

examination was made, and a coil of small intestine was found to have a peculiar whip-like feel about it. This was pulled out, and was seen to be intensely congested and inflamed, and with some flakes of lymph on it. Three or four round worms could be felt, and also seen to move in it. They occupied about eight inches of the bowel, and were lying lengthwise and all together. It did not seem wise to open the bowel and remove them, nor yet to crush them, as one could not say what symptoms might follow the crushing. Had the worms been near the cæcum it would have been an easy matter to push them along and remove them at the appendix stump, but they were at least three feet away. The bowel was replaced, and the abdomen closed. Three days later whilst still on a liquid diet, the patient was given 1 gr. of santonin and 6 gr. pulv. scam. co. followed in six hours by castor oil, and two round worm each about ten inches long, were passed. Two days after this, santonin was again given, and two more worms were passed. Santonin was administered again on the sixth day, but there was no result.

The boy is now gaining in weight, and is quite rosy, and his mother says he has never looked so well in the last 18 months.

I have seen cases where the appendix, on removal, has been found full of thread worms, but I never before had the experience of feeling and seeing round worms in the small intestine.—*The Australasian Medical Gazette*.

SURGERY.

A New Treatment for Acute Gonorrhœa.

O. L. Mulot reports good result from the use of a five per cent. solution of iodine in oil as a urethral injection, three times daily until the discharge ceases. If the discharge reappears, the iodine is used once daily and is supplemented with a sulphocarbolate of zinc injection, twice a day. The writer believes this treatment applicable also to streptococcus and staphylococcus infections of the urethra. The best results from this treatment will be obtained if the physician will administer the posterior urethra involved, including the seminal ducts, the prostate, seminal vesicles, etc., about the end of the third week. Here, after an intelligent massage of the parts, and these washed out by micturition of iodine will do good, but will not yield such prompt results as are obtained in the acute cases.—*The P. M. Journal*.

Rectal Administration of Salvarsan.

RAJAT while not wishing to defend salvarsan nor wishing to advocate its employment instead of mercury, draws attention to the administration of the drug, per rectum, a method which he considers of equal value to other methods. The patient is prepared by an enema of a litre of water. The dose of salvarsan is dissolved in 120 c.cm. of artificial serum in the proportion of 5 per 1,000, with the addition of soda, if necessary, to obtain complete solution. It is administered by means of a rubber injector, and retained for thirty-six to forty-eight hours. The author maintains that the effects obtained are absolutely similar to those after intravenous injection, and that rectal administration is free from many of the dangers of other methods. He has tried it in 125 cases.—*The Canadian Practitioner & Review.*

OBSTETRICS AND GYNÆCOLOGY.

Thyroid Extract in Sterility.

DR. WEIL states that in certain cases of sterility the cause of the condition may lie in the lack of correlation of function between ovaries and thyroid gland. During menstruation and pregnancy the thyroid swells, while in castrates the latter organ may be seen to be atrophic. The administration of thyroid extract may therefore be of service. The author reports three cases of apparently permanent sterility, in which the administration of thyroid extract was followed by conception. There appears to be no doubt that the thyroid hormone, artificially supplied, determined a physiological congestion of the ovary which promoted conception.—*The P. M. Journal.*

A Case of Multiple Pregnancy—Quadruplets.

BY

HENRY PEET, M.B. (LOND.), D.P.H. (CAMB.), GILGANDRA, N.S.W.

The following case is of interest on account of its rarity. Mrs. M. was admitted to a private hospital in Gilgandra at 10 p.m., on December 13th, 1912, in a state of labour. She was a small and wiry built type of woman, aged 31 years, and this was her fourth confinement. Her previous confinements had, all of them, been of a severe and abnormal type, but none of them multiple, and her health during the present pregnancy had been uniformly bad.

On admission she was found to be in labour with the os dilated to size of a two-shilling piece, with pains of moderate severity, and the abdomen of enormous size due to multiple pregnancy, the labour being, according to her calculation, two months before the expected time. At 3-10 p.m. the next day, the os being fully dilated and the patient somewhat worn out, chloroform was administered, the first bag of membranes ruptured, forceps applied, and the first child delivered alive, being a male child in the normal occipito-anterior caput position. The pains having ceased ergot was given, and at 9-20 p.m. chloroform was again given, the second bag of membranes ruptured, forceps applied, and the second child delivered alive, being a male child in the normal occipito-anterior caput position. The pains again ceased, but as the patient felt so much better and comfortable she was left for the night. The following morning ergot was given, and at 10-45 a.m. chloroform was administered, the third bag of membranes ruptured, forceps applied, and the third child delivered alive, being a female child in the normal occipito-anterior caput position. Immediately afterwards the fourth bag of membranes was ruptured, forceps applied, and the fourth child delivered still-born, being a female foetus in the normal occipito-anterior caput position. Without further delay the right hand was passed into the uterus, and two placentæ removed, the patient still under chloroform. There was very little hæmorrhage, the uterus contracting well. Convalescence was tedious, but otherwise uneventful, the patient getting up on the fourteenth day, but did not leave the hospital until the fifth week.

All four infants were equal in size and development, the period of development being that of a seven months' foetus, and each weighed 4lbs. The first, male, lived five hours; the second, male, lived 38 hours; the third, female, lived sixty-five hours; the fourth, female, was still born.

The first placenta was very large and bulky, weighing 50 oz., and had three cords and three bags of membranes attached. The second placenta was small, weighing 12 oz., and had one cord and one bag of membranes, that belonging to the still-born infant.

Turning to statistics in New South Wales during the nineteen years, 1893-1911, the total number of confinements was 746,326. Out of this number there were three cases of quadruplets. It follows, therefore, that at per 1,000,000 confinements there were four cases of four children at a birth.—*The Australasian Medical Gazette.*

BACTERIOLOGY.

On the Excretion of Typhoid Bacillus in
Mother's Milk.

SAKAI :—The author found typhoid bacillus in the mother's milk of 10 out of 13 typhoid patient and in that of one out of 2 cases of paratyphoid fever, and came to the following conclusions :—

1. The mother's milk is one way by which typhoid and paratyphoid bacillus is excreted out of the human body beside the already known way of the excretion.
2. The period, in which this excretion occurs, is mostly between $2\frac{1}{2}$ and 3 weeks.
3. Although the number of the bacillus excreted in the milk may be small it is quite necessary to sterilise the mother's milk from the prophylactic point of view.
4. If a woman who is feeding child with her own milk has any fever suspicious of typhoid fever she must isolate the child and stop feeding it with her milk. When she is diagnosed as a typhoid or paratyphoid patient she must stop giving her milk to any child.
5. It makes the diagnosis more exact if one can prove the presence of typhoid bacillus in the milk.—*The Sei-i-Kwai Medical Journal*.

OPHTHALMOLOGY.

Ætiology of Phlyctænular Conjunctivitis and
Suggested Treatments.

HOWARD F. PYFER believes that phlyctænulosis is a manifestation of a general tubercular infection, if not a true tubercular lesion. While this theory is not accepted in any of the modern text-books he has reviewed, yet numerous writers, mostly European, have adopted it and he gives the views of quite a number, and summarizes briefly the results of tests made by many of them which tend to substantiate this theory. The results of his own investigations by the use of the tuberculin test are as follows. "In twenty-two patients, positive; sixteen, seventy-three per cent.; five had some other eye lesion, and one had only a slight reddening that I ruled out as not positive." These were private patients. Of the hospital patients tested, the results were; "In twenty-seven cases, positive in all, 100 per cent; many of these patients had all the stigmata of tuberculosis." He says in conclusion :

The evidences, the clinical findings, the treatments, all show that phlyctænulosis is a tubercular manifestation of a general tubercular infection. Therefore let us treat the eyes of these little sufferers judiciously, bearing constantly in mind the importance of constitutional measures, emphasizing the use of tuberculin, the necessity of good diet, fresh air, sunshine and ocean breezes.—*The American Journal of Ophthalmology*.

Glaucoma, particularly in regard to the
Surgical Treatment.

JOHN E. WEEKS believes that the power of resistance in the eyes of some individuals is lower than normal, so that in simple glaucoma there may be decided cupping of the optic disc in eyes in which the tension is not above normal so far as can be determined. Hence, while tonometers may give very definite information as to the exact tension, yet, from a practical standpoint, the effect increased tension is producing on an eye is better determined by the visual acuity and the changes in the visual fields for form and color than by a tonometer.

Non-operative treatment consists of constitutional and local treatment. The diet should be regulated and any tendency to constipation overcome. As laxative remedies, salines are preferable. If the blood pressure is abnormally high the remedies generally used should be employed to reduce it. For local use the miotics, pilocarpin and eserine are the main remedies used, and they should be employed in strong enough solutions to keep the pupil very small. Dionin may be used for its anodyne effect, but it often does not affect the tension. Massage of the eyeball applied through the upper lid once or twice daily for about two minutes is of value when properly used in connection with the use of miotics. Operation is recommended, on cases that can be kept under observation, "only when diminution in the field of vision for form or color or in the acuity of vision, or both, take place, or an attack of glaucoma occurs, or there is a distressing element of pain, in spite of the non-operative treatment." The writer believes operative procedure is indicated in cases of glaucoma: (1) when the patient cannot be kept under observation; (2) when the field of vision for form or color diminishes or visual acuity diminishes in spite of non-surgical treatment, as indicated by repeated examinations; (3) when an acute attack occurs in spite of non-surgical treatment; (4) when the element of pain is distressing in spite of non-surgical treatment.

He classifies the direct results obtained by operative procedures for the relief of tension in glaucoma as follows: (1) To remove a portion of

the vitreous body or to permit the aqueous to escape; (2) to form a permanent communication between the aqueous chamber and the perichoroidal lymph space; (3) to form a permanent avenue for filtration from the anterior chamber to the exterior of the eyeball, (a) by the formation of a cystoid scar with incarceration of the iris or other tissue, (b) by the formation of a filtering cicatrix without incarceration; (4) to so influence the secretion into the eye that an excess will not occur; (5) to relieve pain by cutting off the sensory nerve supply to the eyeball.

He places under the first division: (1) Posterior sclerotomy, (2) trephining back of the ciliary zone, (3) sclerociliotomy (Hancock), (4) paracentesis of the anterior chamber, (5) anterior sclerotomy (de Wecker). Under the second: (1) Cyclodialysis (Heine), (2) sclerociliotomy, (3) De Vincentiis' operation, (4) sclerochoriotomy (Querenghi). Under the third: (1) Fistulous cystoid cicatrix, (2) anterior sclerotomy, (3) sclerectomy (Lagrange), (4) filtering cicatrix, (5) trephining (Holth, Major Elliot, Verhoeff, Fergus). To the fourth belong: (1) Section of the cervical sympathetic (Abadie), (2) resection of the superior cervical ganglion, of the sympathetic (Jounesco). To the fifth: (1) Stretching of the supratrochlear nerve (Bailey), (2) laceration of the infratrochlear nerve (Badal), (3) optic ciliary neurectomy.

After discussing briefly the foregoing operations, Weeks says: "The value of the operations mentioned in this communication appears to the writer to be as follows:

"Posterior sclerotomy and trephining back of the ciliary zone are operations that give good results in sightless, painful eyes in absolute glaucoma, relieving pain and permitting of the retention of the eyeball without danger of subsequent infection or injury of the fellow eye by sympathy. The writer's experience covers seven cases only. The operation was performed in absolute glaucoma for the relief of pain; it was successful in that the pain was relieved. The patients were under observation for various periods from three months to two years. In two of the cases the tension became about T—I, and remained so.

"Sclerociliotomy (Hancock, Walker) and ciliarotomy (Abadie and Querenghi) are operations which have been strongly advocated by their originators. They are operations with which the writer has had no experience. It is, however, very probable that they give temporary relief, at least, and they may be of permanent value in cases of absolute glaucoma. The writer would hesitate to perform the operation of Hancock in any case because of an open wound through the ciliary zone.

Operators of experience are unanimously agreed that paracentesis of the anterior chamber is only of very temporary benefit.

"Anterior sclerotomy, (de Wecker and Querenghi) belongs to the same category as paracentesis of the anterior chamber, except that the reduction of the tension of the eye is of much longer duration. If these operations alone are employed, the tension returns sooner or later, usually in from two weeks to three months. The greatest value that the operations possess is as a supplement to iridectomy.

"Bjerrum's sclerotomy, since it contemplates incarceration of the iris, is a different proposition. The opening of the sclera is covered by a conjunctival flap and communication between the anterior chamber and the loose subconjunctival tissue is brought about and made permanent, when possible, by subsequent massage of the eye. The incision must, in many cases at least, cause the anterior chamber and the perichoroidal lymph space to communicate by dividing part of the annular ciliary ligament. This operation raises the question of the desirability of inducing and making permanent incarceration or prolapse of the iris, even subconjunctivally.

"The operations of Rochon-Duvigneaud and de Vincentiis, which contemplate dividing the tissues at the iris angle and making more direct communication between the anterior chamber and Schlemm's canal, must of necessity fail to bring about permanent reduction of the intraocular tension in a large percentage of the cases operated upon, although the favourable reports on the results of this operation by Tailer, Sgroso and others make it appear that a fair percentage of the cases are very materially benefited.

"Cyclodialysis as practised by Heine is apparently losing favor. The reports of the operators who have practised this procedure, other than Heine, G. Weinicke, Elschmig and others, indicate that it succeeds in effecting a permanent reduction of tension in approximately fifty per cent. of the cases. A. Knapp writes: 'It can be conservatively stated that cyclodialysis is of value in certain limited conditions; it is indicated in the advanced cases of chronic glaucoma, especially those in which iridectomy has not succeeded in reducing the tension. It cannot in any way replace the classical operation of iridectomy or its recent modifications in incipient glaucoma.'

"The experimental research of Joudine, Wichodzeff and others made on animals demonstrate the fact, in the animals experimented on at least, that the communication between the choroidal space and the anterior chamber is soon closed by a deposition of cicatricial tissue. It

is possible that the results of these experiments can be compared only in a limited sense to results in the human eye.

"The operation of Fergus, which differs from that of Heine only in that the opening in the sclera is made by removing a disc 2 to 3 mm. in diameter by means of a trephine, cannot as yet be passed upon, as a sufficiently large number of cases has not been reported. It is evident that its superiority over Heine's operation could result only from a more persistent filtering scar, due to the removal of the disk of sclera.

"Operations that contemplate the incarceration or prolapse of iris, the incarceration of the conjunctiva or other tissue, or the formation of a cystoid scar without adequate covering, as by the conjunctival tissue, are open to the objection that infection may take place at a favourable time, days or years after the operation, and that sympathetic inflammation may occur. All ophthalmologists of large experience have observed these complications in such cases and have learned to look upon eyes in this condition as possessing a constant menace to vision. Operations that contemplate prolapse or incarceration with adequate conjunctival covering are objectionable because of necessary distortion of the pupil and, in some cases, deformity at the side of the wound. These eyes are not entirely free from danger of subsequent infection, but infection will be extremely rare and the benefits derived from some of the procedures, as for instance that of Holth, may justify the operator in making the operation. However, if the same result can be obtained by operation not complicated by incarceration or prolapse, the procedure is much more desirable. A protected filtering cicatrix without incarceration or prolapse of the iris or other tissue, with or without iridectomy, is a desirable condition to obtain. The endeavors of Lagrange, Holth, Herbert, Elliot and Verhoeff are in the right direction. The writer's experience has been almost entirely with the Lagrange operation. He has records of eighty-four Lagrange operations.

"The cases were, simple chronic glaucoma, 35; subacute glaucoma, 35; acute glaucoma, 7; absolute glaucoma, 2; secondary glaucoma, 5. Thirty-seven of the patients operated upon (33 private and 4 dispensary cases) have been under observation for periods varying from two weeks to four and a half years. The remainder were dispensary cases and were not kept track of. Vision before operation ranged from zero to 20/20. In the cases of chronic glaucoma, twenty in number, all the patients have retained vision as good or better than before operation except five. Of these, nuclear cataract is developing in two, in three the

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Original Articles.

* INJURIES OF AND INVOLVING THE EYE.

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Continued from p. 197, Vol. X, No. 4, "The Antiseptic."

PART III.



WE will now consider injuries to the eyeball itself and, pursuing our subject chiefly, along the line of anatomical arrangement we shall discuss, more directly, injuries to the cornea and sclerotic, to the iris, aqueous and lens, and finally conclude with a few remarks concerning conditions where vitreous, retina, choroid, etc., are more directly affected by blunt violence to the eye. We must endeavour to keep in mind the fact that injuries to one structure will probably affect, by spread of the inflammatory process, contiguous structures, and also the great and exceedingly important question of the supervention of sympathetic ophthalmitis in the other eye.

An abrasion or erosion of the cornea arises in a variety of ways; generally speaking, it is due to some foreign body impinging upon or brushing the cornea with enough force to rub away a part of its epithelial surface but without sufficient force for it to deeply wound or become lodged in its substance. Wind blowing dust against the cornea causes abrasions in this way, especially if it blows minute foreign bodies of a hard silicious nature, such as the sand of a desert, or perhaps a still harder and sharper mineral nature, as we have in the dust of iron foundries, workshops, etc. These minute abrasions may be easily detected by instilling a 2% solution of potassium fluorescein, which stains



• Specially contributed to *The Antiseptic*.

them green, washing the superfluous stain away with a little boric acid solution or cocain and then carefully examining with *the corneal loupe*, this latter being a small powerful achromatic lens made for the purpose and obtainable from any good surgical instrument maker or optician. I well remember the enthusiasm, years ago, that the discovery of fluorescin created, in regard to its being of diagnostic assistance in corneal cases, nearly every cornea that came into the eye department of a certain great London Hospital, which I attended as a student, having fluorescin instilled upon it. However, with good eyesight, if the observer carefully examines with the loupe, he can generally detect the very smallest abrasion; not that there is the slightest objection to the use of this green stain, it is slightly antiseptic, it can be kept sterilized, is practically non-irritating, and can do no harm. Moreover it is quite possible a very small abrasion may be overlooked without it. An erosion is distinguished by its shallowness, the only substance lost being superficial epithelial layers above Bowman's membrane, and by the absence of any muddiness beneath; deeper lesions such as herpes, ulcer, etc., would certainly show a muddy appearance.

The treatment consists in washing out the conjunctival sac with warm boracic lotion, the use of a weak atropine ointment (gr. i to the ounce), and keeping the eye tied up until the surface is healed. Professor Elschmig recommends a lotion of oxycyanate of mercury (1 to 5,000) or asterol (1 to 2,000); also, once or twice daily, an ointment containing orthoform 10 % or xeroform 2 % till all the irritative phenomena have disappeared. Our atropine might well be added to this ointment. The symptoms that speedily disappear under this treatment are severe pain, photophobia and lachrymation and the erosion should be quite healed in from 2 to 5 days. Owing to the eye being in an unhealthy condition through the presence of pneumococci or through purulent dacryo-cystitis this slight injury, however, may give rise to a very serious and perilous state of affairs. It is imperative then that the conjunctival sac should be thoroughly washed many times a day with a suitable antiseptic solution such as one of the above and the lachrymal sac frequently syringed out, using an Anel's syringe, or else it should be extirpated. Cauterization of the erosion is strongly urged by Elschmig, if there is the smallest suspicion of infection, "if possible," he says, "after identification of the infective agent, but even without this." In the absence of a Paquelin's cautery I have made use of a fine probe fastened into a wooden holder and its tip heated thoroughly in the flame of a spirit lamp. Dark glasses or a shade should be used for the photophobia and the lids of the injured eye, during the

intervals between the douching and syringing, kept closed by a thick pad of antiseptic wool fastened lightly on with a piece of plaster. Sometimes cases of recurrent erosion occur. After apparent healing the incompletely regenerated epithelium having adhered to the closed lids during sleep comes away when the eyes are opened on awaking. Then there is again severe pain, photophobia, etc., and in fact a complete repetition of all the phenomena of a new erosion. A little borovase-line between the lids at night is generally sufficient to prevent this condition arising. Foreign bodies in the cornea should be removed without delay. The corneal surface should be thoroughly anæsthetized. It is generally necessary to use either a sterilized needle or a spud, care being taken to injure the surrounding tissue as little as possible. Sometimes pieces of hot iron from an emery wheel are embedded in the cornea; these have a little brown ring of stain where the foreign body has been. This should as much as possible be removed. If there is any danger of the foreign body being pushed into the anterior chamber a broad needle should be passed into the cornea behind it and it can then be removed without risk. A magnet, if available, is the best for removing large iron splinters, but even the depth of fixation may make preliminary incision around these necessary. Always remember the possibility of there being more than one foreign body in the eye at the same time; one having been removed from the cornea, you may find another or more in the conjunctival sac. The after-treatment consists in well washing out the conjunctival sac with warm boric acid lotion, instilling atropine drops, and bandaging the eye with an antiseptic pad, such as cyanide gangee. This should be worn till the eye is quiet and the surface healed. The atropine drops should be continued until the eye has quieted down completely. I usually give a little sedative medicine containing a minute quantity of aconite. This acts specially well where there is much nervous erethism and suits admirably all these cases of corneal injury.

Wounds of the cornea and sclerotic come under two classes: (a) the non-perforating; (b) perforating. Our three points in every case to consider are: (1) whether perforation has taken place or not? (2) is there any infection or any likelihood or special danger of infection? and (3) lastly, this being the most important of all, has a foreign body entered the eye? These points are determined by the history and also by making a careful examination of the eye. Special care should be taken as regards the last of the three points, by means of a careful and very thorough ophthalmoscopic examination. The modern up-to-date

methods of observation, such as that of the sideroscope, radiography, etc., are of great value, but are not always within the observer's reach; however, with careful ophthalmoscopic examination accurate diagnosis of the existence and position of a foreign body deeply situated may be made without these extra resources. The history is of help in giving us the answer to our questions: "What was it that struck the eye?" "What was it the patient was doing at the time?" Often the appearance of the eye, on careful inspection, gives us much desired information. By oblique focal illumination a minute track is discovered through the cornea or lens or a small gap may be seen in the iris; then the ophthalmoscope reveals possibly even the foreign body itself lying in the vitreous or elsewhere with a track through lens and vitreous towards it. Macular disease is very apt to follow injury to the retina by these metallic foreign bodies, especially when such a body as, say, an iron splinter, has become fixed in any part of the retina and choroid; even although not near the macular region and although promptly removed by Haab's Magnet, yet prognosis as regards vision of the injured eye should be extremely guarded. "Such," says Professor Haab, "is the sensitiveness of the macula lutea that even aseptic bodies that have penetrated into the deeper layers of the eye, often produce, after a short time, an isolated disease of this portion of the retina without directly injuring the macula." He gives four examples in Fig. 51 of his atlas showing conditions of the fundus produced by particles of iron and copper, in two cases each, where there had been no actual impingement of the metal upon the retina, the foreign body being in the vitreous and in three of the cases removed from thence by means of the magnet. The copper ones are generally the splinters of percussion caps or copper shells. The iron splinters occur usually in those who work at welding pieces of steel in factories, etc. Sometimes along with the splinter air bubbles can be seen in the vitreous; these look exactly like those seen under the microscope in a badly mounted specimen. If the magnet is at hand it is imperative that it should be used at once, as soon as the position and character of the splinter has been determined. "Delay of an hour" says, Elschmig, "may seal the fate of the eye."

A foreign body is best tolerated in the lens, and least in the ciliary body, iris or choroid. By far the most irritating and dangerous material is copper, next iron, and least irritating of all is perhaps glass. As a general rule, the eye must either have the foreign body promptly removed or be removed itself. Elschmig advises evisceration rather than enucleation. Neglect means, in all probability,

progressive irido-cyclitis, etc., with the great risk of sympathetic ophthalmitis of the fellow-eye. Moreover, immediate removal of the foreign body gives practically the only hope of there ever again being useful vision in the eye that has been injured. Atropine should only be instilled in those cases where the uveal tract is implicated. Elschmig recommends that the conjunctiva and wound should be thoroughly bathed with mercuric oxycyanate 1 in 5,000 solution; while, later on, in corneal injuries which have not been covered with conjunctiva, ointment of xeroform 2% or orthoform 10% may be used. A binoculus (double eye bandage) should be worn for at least twenty-four hours. When the capsule of the lens has been injured, swelling of the lens and rise of ocular tension should be specially looked for and the lens should be delivered at an early date.

The chances of the removal of a non-magnetic foreign body such as glass or wood with forceps are small, but should be attempted before enucleating or eviscerating the eye.

The question of a foreign body having been negatived, our next important consideration is the answer to the query: "Has septic matter been introduced through the wound?" If so the eye will in all probability be lost through irido-cyclitis or panophthalmitis. Sympathetic trouble in the fellow-eye is very likely to arise when a penetrating injury causes chronic irido-cyclitis. It is not the rule, on the other hand, for panophthalmitis to cause sympathetic mischief, although it will cause that utter destruction of the eye known as phthisis bulbi.

If on careful examination we find perforation of cornea or sclerotic has not taken place and we are able to keep the eye practically aseptic, our prognosis may be considered favourable. The wound is treated like an abrasion, the sac washed out, atropine instilled, eye bandaged, etc. Wounds of the conjunctiva heal readily, but they may need to be sutured with fine sterilized silk if laceration has taken place.

If hypopyon results after the injury, either as the result of a perforating or a non-perforating wound, the prognosis is grave; it nearly always means, I believe, the advent of irido-cyclitis or panophthalmitis (even although the pus is free from cocci) especially if there is great tenderness and pain as is generally the case. For the sake of the fellow-eye enucleation or evisceration is, by far, the best course to pursue. I eviscerated the eye of a little Spanish girl, aged 6 years, who was struck in the eye by a sharp stone thrown at her by a boy;

she had hypopyon with pain and tenderness and at the same time attacks of tertian ague, etc. The operation gave great relief, saved, I believe, her other eye, and now she is a healthy little girl running about happily, wearing an artificial eye that is hardly noticeable.

W. Tyndell Lister in his article appearing in Hutchison and Collier's Index of Treatment suggests the making of an attempt to disinfect the eye with normal saline or hydrogen peroxide solution, but he is obliged to admit that this is seldom successful in preventing panophthalmitis, and the eye has usually to be excised or eviscerated. For my own part, especially in the case of children, I certainly prefer evisceration. The shrinking up of the sclerotic is certainly rather a tedious process, but there is the reward of a better stump for the artificial eye. The danger of enucleation consists in meningitis from infection of the vaginal sheath of the nerve by the scissors with some of the pus that has escaped from the eye.

Non-perforating wounds are to be treated by operation only when they gape widely, either by direct suture, or in the case of the cornea, covering the wound with a conjunctival flap according to Kuhnt's method. Direct suture of the corneal substance should, if possible, be avoided, because even with the finest conjunctival silk they leave a scar which will greatly interfere with vision and corneal wounds heal more slowly, so that there is greater danger of stitch infection. The greatest danger, in the healing of all corneal wounds that have perforated, is the inclusion or entanglement of the iris in the scar. Excision of the prolapsed portion of iris, without delay, is absolutely necessary. If only a small entanglement, and it is possible to do so, it should be released by pushing it back through the wound with the spatula. A prolapsed iris, allowed to remain, means very soon heightened tension, especially in elderly persons, the formation of a staphyloma, or of a fistula through the healing of the wound being delayed and also a secondary infection of the scar. "Prolapse of the uveal tract through fresh wounds, whether of cornea or sclerotic," says Elschnig, "should be treated by excision and the wound closed either by direct suture, or, as in the case of the cornea, by covering the lesion with a conjunctival flap. Prolapse of the lens capsule calls for similar treatment.

"In cases," says Lister, "seen directly after the injury, cocaine is instilled or a general anæsthetic given, according to the character of the patient; the conjunctival sac is carefully washed out with boracic lotion, all lymph adherent to the wound being thoroughly removed;

the prolapse is picked up with forceps, gently freed all round from the lips of the wound with the repositor, and then drawn out as far as it will come and cut off close to the cornea. We hope by this means that the iris, after being cut, will retract free from the wound."

Lister warns against accidentally producing traumatic cataract through injury to the lens capsule, when introducing forceps into the anterior chamber to remove tags of iris, the lens not being already injured. This is a most disastrous accident. If there is a delay of several days before the case is seen the condition of affairs is much more serious; it is no longer possible as a rule to free the prolapse; an attempt may be made to cut through the base of the prolapse with a linear knife passed across the anterior chamber and the performance of an iridectomy so as to completely free all adhesions of the iris. Energetic treatment by leeches, hot applications, must be adopted if there supervene any indications of irido-cyclitis and if the eye has not quieted down in a fortnight or three weeks there is very little hope for it, and it is far better to enucleate without any further delay, especially if the iris has become muddy, the cornea hazy and spots of keratitis punctata are to be seen on the back of the cornea, all these symptoms indicating the supervention of irido-cyclitis and the great danger of sympathetic ophthalmitis. Too great a risk should certainly not be run lest blindness of both the eyes occur.

Clean punctured wounds that have injured the lens, as a rule, give rise to no trouble, except that of the traumatic cataract which almost invariably follows.

We now come to the consideration of injuries to the eyeball by various forms of blunt violence. These are divided into injuries affecting the anterior segment of the eyeball and injuries chiefly limited to the posterior segment, the latter only being discoverable by careful ophthalmoscopy and their diagnosis beyond our present limits. The former are divided into:

(1) *Hyphæmia*, or extravasation of blood into the anterior chamber, probably due to rupture of the canal of Schlemm.

(2) *Traumatic Iridoplegia*. This is shown by a wide round immobile pupil which reacts but sluggishly, if at all, to any form of stimulation, and with it we have a concomitant paralysis of the accommodation (cycloplegia). Hæmorrhage and visible tears show signs of laceration of the iris.

(3) *Irido-dialysis* occurs when the anterior chamber is injured. At first the injury is hidden by blood clot, but when that is absorbed

a black cleft is seen where the iris falls away at the periphery; this of course shows red by the ophthalmoscope. The treatment is to give rest to the eye by means of a bandage and enjoining abstinence from all excitement. Only where there are large clots, which do not absorb, should hot applications, etc., be applied. Atropine is reserved for cases where there is formation of synechiæ and absorption is delayed.

(4) *Injuries to the Lens by Blunt Force* (a) TRAUMATIC CATARACT. As a general rule perforation of the capsule is followed by cataract, and indeed, complete cataract I have known to occur in quite a number of cases where there has apparently been no damage to the lens capsule at all by indirect injury. The explanation of this is that the zonule of Zinn has been ruptured with partial dislocation of the lens or there has been a rupture at the equator of the lens immediately after the injury. The intraocular tension should be carefully watched, and if iritis supervenes extraction of the lens should not be delayed but performed forthwith. (b) DISLOCATION OF THE LENS. This may be in the anterior chamber or into the vitreous or there may be subconjunctival dislocation of the lens. In the anterior chamber besides this being deep and the pupil dilated and not reacting to light, the shining edge of the lens is seen near the corneal margin when examination is made with artificial illumination. It should be removed without delay. In subluxation of the lens, the depth of the anterior chamber is irregular, the edge of the lens may be seen through the widened pupil as a black arc-shaped line across the pupil, the iris and lens are tremulous. This is best seen by the reflected light of the ophthalmoscope. If the lens has been totally displaced into the vitreous we have a very black pupil and a deep anterior chamber and the iris is tremulous. The pupil gives the red reflex and on careful examination the lens may be seen lying deeply in the vitreous. If it is transparent it may be discovered by its black shining edge, or an opaque lens shaped body may be seen partly fixed to the zonule, or lying free through the total tearing of the zonule. Extraction of the dislocated lens is indicated.

(5) *Traumatic Rupture of the Sclerotic*. This is brought about by powerful blunt force such as the horn of a cow or bull. It occurs along with much injury as a rule to the other ocular structures and if the eyeball is not removed there will be a gradually progressive phthisis bulbi under the guise of a chronic irido-cyclitis and secondary glaucoma, with probably sympathetic ophthalmitis of the other eye, etc. It is best to enucleate unless the visual acuity and projection are still normal.

(6) The vitreous is always injured secondarily to that of the other structures. There is hæmorrhage into the vitreous. Sometimes the tension of the eye is lowered through the volume of the vitreous being diminished.

Detachment of the retina, detachment of the choroid from the sclera, rupture of the choroid, hæmorrhages into the choroid, etc., are all lesions we may merely mention as occurring at the posterior segment of the eyeball, the result of severe force. The vitreous becomes detached, by the traumatism, from the retina; this dragging upon it causes the detachment of that membrane.

* MICROSCOPICAL EXAMINATION OF SMEARS FROM EYE-DISEASES AND THEIR RESULTS.

BY

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PRESIDENT AND GENTLEMEN,—As the title of this small paper itself indicates, what I am going to read before you this evening is nothing more than a short narration of a few notes on Bacteriology of the Eye which I have been able to collect in the course of my duties at the Government Ophthalmic Hospital, Madras.

With the kind permission of the President and the Members of the South Indian Branch of the British Medical Association, the results of a series of 164 such smears were published before them at their meeting held at Madras on March 13, 1912. Although nothing new has since been added to the list, yet we hope that we shall be able to do so before long.

Bacteriology of the Eye in diagnosis and treatment of ophthalmic diseases, is, as is well known to every ophthalmic practitioner, as important a subject to him as General Bacteriology is to the general practitioner, and a knowledge of the latter subject is also highly essential to the former. Important as it is, it becomes necessary to have a small laboratory for carrying out such a kind of work, and it can be equipped at no great cost. But we shall not deal any further on this point, as it is not the purpose of the present paper.

The following analyses of the work done at the Bacteriological Section of the Government Ophthalmic Hospital, Madras, during the

* A paper read before the Madras Branch of the "All-India Sub-Assistant Surgeons' Association" at a Meeting held at the Medical College Hall, Madras, on 6th October 1913, and sent to *The Antiseptic* for publication.

past two-years-and-a-half set forth a summary of the results of microscopical examination of smears taken from a series of 354 cases of various diseases of the eye, *e. g.*, Catarrhal Ophthalmia, Angular Blepharo-Conjunctivitis, Purulent Ophthalmia, Phlyctenular Conjunctivitis, Ulcer of the Cornea, Dacryo-Cystitis, etc., etc. For want of cultural and other reactionary observations, some bacteria in our findings could not be named at all, and for the same reason it is possible that even those that are named might not be actually those. As far as possible, they have been named after a close study of their staining characteristics and of their morphological appearances, aided by the clinical facts of the cases. For a beginner like the reader of this paper, with but a few laboratory necessities before him, it is just possible that he might have been drifted away by mistakes, and it is therefore earnestly requested that any such faults or shortcomings may be kindly forgiven.

It will not be out of place here to mention a few words about the collection of material for microscopic examination and the staining employed in our laboratory. In all cases care is taken to avoid, as far as possible, extraneous organisms from coming into our preparations; as for example: wherever conjunctival secretions have to be examined, they are always taken from the lower fornix of the conjunctiva without being contaminated by the margins of the lids or by the outer skin; from ulcers, our rule is to take a scraping direct from them, after carefully washing out the conjunctival sac with sterilised normal saline solution; and so on, in each individual case. The staining employed in our laboratory is, as a rule, Gram's as recommended by Dr. Axenfeld in his book on "The Bacteriology of the Eye," and special stains are also resorted to whenever occasion requires them.

To come to the analyses proper, smears taken from 103 cases of Catarrhal Ophthalmia showed Kochweek's bacilli in 44, or in 42.71 % of them; here they were seen alone in 36 cases, and in conjunction with other organisms as pneumococci, staphylococci, and xerose bacilli in the remaining 8. Pneumococci with xerose bacilli, Morax-Axenfeld's bacilli, and some Gram positive diplococci were seen in a small number of cases, *i. e.*, in 8, or in 7.76 %. Staphylococci, either alone or mixed with other bacteria as xerose bacilli, some gram positive diplococci, and tetrads (probably sarcinæ) were seen in 3 cases. Xerose bacilli alone were met with in 7 cases or in 6.8 %, and they were seen mixed with some Gram positive diplococci in one; diplococcus *amplus*, some micrococci which were smaller than ordinary staphylococci with xerose bacilli were observed in 5 cases. Streptococci were seen in one case, and streptococcus *mucosus* in another, micrococcus *catarrhalis*

in a third, and Morax-Axenfeld's bacilli in a fourth, while in 31, or 30.1 % of the cases, no bacteria at all were found.

The most commonly occurring bacteria in the series of catarrhal ophthalmia being Kochweek's bacilli, some points as to the spread of this kind of infection may be worth noting. "Some authors hold that the bacilli are incapable of resisting dryness. Others think that the contagion may spread by the air. Infected material may pass down into the nose and also into the mouth on account of the simultaneous cold in the head and lachrymation. It is not unlikely that a spray infection may occur and thus reach other eyes by means of the air." Transference of the secretion may take place from one eye to the other by means of direct contact or by means of moist towels used to clean the eyes of such infected persons. What commonly takes place among people in the Madras Presidency, especially in the south, is that a cloth moistened in turmeric solution is invariably given to patients to wipe their eyes with; other children in the house, who are not affected, sometimes handle such towels when in a moist state and unknowingly wipe their eyes with the soiled hands without either washing or disinfecting them. This may carry infection in a way. Another common observation among the people of these parts as to the spread of infection is that of the flies acting as a medium. Many believe, and probably rightly so, that these have something to do in carrying infection. These flies, which are commonly known as "mango-flies," are prevalent at a time when mangoes are ripe and winds blow furiously over; hence their name, "mango-flies." This happens during the time of the S.-W. Moonsoon in South India. The flies settle on the infected eyes and are carried away by the wind for long distances in their infected state. When in such a condition they settle on other eyes previously unaffected, they probably give them the contagion. But how far these are really responsible for this kind of a mischief will be worth being observed and studied.

The next most frequently met with conjunctival infection is what is known as "Angular Blepharo-Conjunctivitis" or "Diplo-Bacillary Conjunctivitis." The former suggests the parts affected, the characteristic feature of the disease, and the latter the cause of it. Smears examined from 76 such cases, showed Morax-Axenfeld's diplo-bacilli, either alone or mixed with other organisms in 58, or in 76.31 % of them, while no bacteria were found in 9.21 %. In the remaining few, a diplo-bacillus resembling Morax Axenfeld's, probably of the Petit's type, was seen in 4 cases, Kochweek's bacillus in one, pneumococcus in another, diplococcus *amplus* in a third, influenza bacillus in two,

and staphylococcus in two others. It is interesting to note here that a few of them were associated with chronic granular ophthalmia and with a similar inflammation of the mucous membrane of the nostrils and of the angles of the mouth. Unfortunately, however, exact figures are not available on the latter kind of observation, and every effort is now being made to record each such case definitely. Out of curiosity, a few of those cases were submitted for a bacteriological examination and smears taken from some of them—I mean from the angles of the mouth and nostrils. All showed a diplo-bacillus exactly similar to the Morax-Axenfeld's in its morphological appearances and in its staining reactions. The history given in the majority of these cases as to the duration of the disease showed more or less a chronic nature of this kind of conjunctivitis, and the shortest duration that any one patient gave was three days, and the longest five years.

The next most frequent form of conjunctivitis in our series is Purulent Ophthalmia. This includes Ophthalmia Neonatorum also. 55 cases were examined, and gonococci were found in 35 of them, or in 63·63 %; Kochweek's bacilli, either alone or in conjunction with other organisms as pneumococci, etc., were found in 9, or in 16·36 %. Pneumococci alone were seen in 2 cases, staphylococcus in 1, and xerose bacilli in another, while no bacteria at all were found in 7, or in 12·72 % of the cases. The clinical features of these cases are interesting, in as much as they resemble each other so closely, and not uncommonly one form of infection is mistaken for the other. This is all the more confounding when only one eye of a patient is affected and that too in an adult with a history of gonorrhœa. As Kochweek's bacilli, pneumococci, and staphylococcus pyogenes aureus are all known to produce a purulent form of conjunctivitis which occasionally cannot be distinguished clinically from the true gonorrhœa, a microscopical examination of the suspicious smear becomes an absolute necessity, and this alone solves the difficulty quickly and easily; and therefore the usefulness of the study of bacteriology in such cases need not be more emphasised.

Phlyctenular Conjunctivitis comes next in frequency of occurrence, and 29 cases were examined with the result that Kochweek's bacilli were found in 14, or in 48·27 % of them. Staphylococcus and xerose bacillus were seen in 3 cases, pneumococcus in 1, Morax Axenfeld's in 2, a bacterium of an unknown nature, resembling the tubercle bacillus in 1, and no bacteria at all in 8, or 27·58 %.

Scrapings from ulcers of the cornea were taken in 41 cases, and pneumococci were seen in 16, or in 39·26 % of them, either alone or

mixed with other organisms. Staphylococci were found in 8, or in 19·63% of cases; Kochweek's bacilli in one, and in one case a conjunctival secretion showed pneumococci, staphylococci, and streptococcus mucosus. On the whole, streptococcus mucosus was seen twice in our preparations, and this organism is believed to be only another form of pneumococcus. 15 cases, or 36·58 % showed no bacteria whatever, and how far staphylococci alone, which bear a percentage of 19·68 of our cases, are responsible for the production of ulcers of the cornea will be worth investigating into.

In 48 cases of lachrymal obstruction and dacryo-cystitis, pus taken from the sac showed pneumococci, either alone or mixed with other organisms, in 34, or in 79·07 % of them; the other organisms that were seen with pneumococci were streptococci and influenza bacilli. Some bacilli resembling the Kochweek's were seen in two cases, Morax-Axenfeld's in one, streptococci and xerose bacilli in another and influenza bacilli and some cocci in a third. In 4, or 9·80 % of the cases no organisms at all could be found. The pathogenicity of these organisms is well known to everybody here assembled, and the practice in our hospital in all such cases is to completely extirpate the lachrymal sac before a cataract is extracted or an ulcer cauterised.

Seven cases of Panophthalmitis revealed pneumococci in 6, or in 71·42 % of them, staphylococcus and xerose bacillus in one, and a bacillus resembling the bacillus subtilis in another. This last bacillus had all the morphological appearances of B—Subtilis but stained reversely, and many more organisms whose nature could not be decided by a mere microscopical examination of the smear alone were also seen, as for instance, a bacillus resembling Herbert's intra-epithelial bacilli, found in keratitis punctata superficialis.

A thorough study of these organisms will repay one's trouble in small degree.

Before I close the paper, I wish to express my indebtedness to Lieut. Colonel Elliot, I. M. S., now on leave at Home, my superior and teacher, for the valuable support and scope that he has given me in carrying out these observations, and to Captain Gray, I. M. S., our President and Acting Superintendent of the Government Ophthalmic Hospital, Madras, for giving me equal facilities in my work and for his kind permission to let me publish the results of these few cases. Lastly, to one and all here assembled this evening my thanks are due for the patient hearing they have given me in all my insipid utterances of cocci and bacilli.

Our Contemporaries.

MEDICINE.

On the Absence of Abdominal Respiratory Movement as an Indication of Pericarditis.

BY

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In January, 1911, I read in the Medical Section of the Royal Society of Medicine a short paper on "Absence of Abdominal Respiratory Movement as an Indication of Pericarditis," pointing out that though "in the majority of thoracic cases affecting the lung and pleura this is one-sided, and the influence on abdominal movement proportionately less marked," in acute pericarditis the cessation of phrenic action is bilateral, and consequently absence of abdominal movement is as obvious as in abdominal disorders, though rigidity and general tenderness are for the most part lacking.

The two cases first cited illustrated this point in a very striking manner, in that the remarkable stillness of the abdomen led to the diagnosis of acute abdominal lesions, the pericarditis being discovered later.

The first, seen in October, 1905, was a young Irishman in the service of a medical friend who had been seized with acute epigastric pain while waiting at table. Conspicuous absence of abdominal movement led to the supposition that he had a perforated gastric ulcer, and I was asked to take him into hospital for operation. The observation and inference had been made by an independent local practitioner, and were quite disinterested as regards pericarditis, which was not thought of at the time.

Next morning the pain had subsided, the patient had slept fairly, was obviously better, and was clamouring for food and impatient of restraint. There was neither evidence of free gas in the peritoneum nor of local irritation. A routine examination revealed nothing. Next day he got up and went out of his own accord, but experienced a recurrence of his pain.

When re-examined on the fourth day, pericardial friction was quite obvious. There was then dyspnoea and præcordial pain, the abdomen remaining immobile. Pericardial friction was audible four days. Temperature 101.4. Pulse 96. On getting up a week later

temperature rose to 103° and pulse 104°, but no further development occurred, and he was able to leave the hospital after a stay of three weeks.

The second case, seen in November, 1909, was a man, aged 40, admitted with complaint of pain in the abdomen extending to the thighs—headache, anorexia, vomiting, and parched mouth of two days' duration. Temperature 102.6°. Pulse 92. He lay on his back with the legs drawn up, the right rectus was tense, and there was some tenderness in the right iliac region. Abdominal respiratory movement was scarcely discernible. The only thoracic sign present was a reduplicated second sound. No local indication of pericarditis then existed. Five weeks after the original attack an operation for appendectomy was performed, but careful examination revealed no morbid condition, and there were no adhesions. The incision healed rapidly, but after five days there was a rise of temperature with recurrence of symptoms, and pericardial friction was recognized. The diaphragm was not contracting at all, the abdominal wall actually sinking in with each inspiration. Pulse 90 to 100. The stomach was dilated, and its resonance could be traced as high as the fourth intercostal space in the axilla. Breath sounds were absent at both bases, but there was no complete dulness on percussion. Under the X-ray screen a large shadow could be seen in the heart region, suggesting pericardial effusion. The diaphragm was motionless in the position of expiration. Ten days later movement of the diaphragm was returning, though friction could still be heard over the heart. Breathing became audible at both bases, and the patient was discharged a month after the first appearance of the pericardial friction.

Both these cases illustrate the independent observation of loss of abdominal movement as a precursor of pericarditis, and likewise the temporary remission of symptoms attending rest in bed. They suggest also that inflammation of the pericardium, possibly commencing on the diaphragmatic surface, caused reflex inhibition of movement some days before the appearance of the ordinary clinical signs over the præcordia.

Ten other cases were subjoined in which loss of abdominal movement had been conspicuous, some with screen examinations demonstrating the stasis of the diaphragm, and three showing evidence of pericardial effusion. In one case the contents of the upper abdomen, such as the kidneys and opaque masses in the intestine, could be seen to participate in the upward inspiratory movement; for in this the diaphragm actually rose with inspiration instead of descend-

ing, following the aspiration of the upper chest. Associated phenomena are dilatation of the hollow abdominal viscera, especially the stomach, and collapse and loss of function of the lower lobes of the lungs, with slight upward displacement of the heart.

Loss of abdominal movement, as a sign of pericarditis, is the more valuable in that it may precede and outlast the other indications, and so afford grounds for anticipatory or retrospective diagnosis. The condition of diaphragm paresis affords a reasonable explanation of the cyanosis and dyspnoea so usual in the complaint, and of the upright position so commonly assumed by the patient. The former expresses the effect of respiration restricted to the function of the upper lobes of the lungs, and the latter points to an unconscious effort on the part of the patient to utilize the weight of the abdominal viscera to depress the passive diaphragm and enlarge the thoracic area.

Restriction of abdominal movement was apparently more marked with a fibrinous exudate than with effusion, in this respect being parallel to similar affections of the pleura or peritoneum.

The detection of a limited amount of effusion in some of the cases by X-ray examination was a new discovery, though it can readily be understood that two or three ounces of serum gravitating to the back or bottom of the pericardial sac would give no evidence of its existence by the ordinary method of percussion over the præcordia.

The conclusion in regard to these cases was that where loss of abdominal respiratory movement was well marked, in the absence of more obvious thoracic and abdominal lesions, pericarditis should be closely looked for, and where this sign was wanting, dubious indications of pericarditis might be discounted.

Since formulating this statement rather more than two years ago I have met with thirty cases in my hospital wards containing fifty beds, in which the loss of abdominal respiratory movement has led to the detection of pericarditis. A number so much in excess of those usually noted demonstrates at once the value of such a sign in assisting to recognize a very obscure condition, and strongly suggests that numbers of instances of pericarditis have hitherto been overlooked. This is not altogether incredible in view of the favourable course usually followed by the commonest form, rheumatic pericarditis, without excess of effusion, and is entirely in accord with the dictum of pathologists that affections of the pericardium of all kinds are recognized far more frequently in the *post-mortem* room than in the wards, which is tantamount to saying that even the most severe cases are commonly overlooked during life.

But it is not merely in redressing the discrepancy between the clinical and pathological aspects of pericarditis that this sign is of value.

There are many instances of primary illness otherwise unexplained, as well as exacerbations in the course of other complaints, and terminal phases proving fatal in chronic maladies, where the timely recognition of pericarditis which is the dominant factor would dispel a great deal of mystery and uncertainty, and might relieve much suffering, and even prolong life.

Terminal cases are represented in my series by the only ones, four in number, that proved fatal. None were rheumatic.

A young woman, aged 21, was admitted with puerperal sepsis, which proved fatal on the third day after admission.

Abdominal movement was absent.—There was evidence of effusion in the right pleura, and friction could be heard over the pulmonary cartilage. Pericarditis was diagnosed. At the autopsy the pericarditis was demonstrated. There were 8 oz. of fluid in the pericardial sac and 20 oz. in the right pleura; the fluid contained streptococci.

On May 1, 1913, a young woman, aged 18, was admitted in a state of orthopnoea. The temperature was subnormal. The urine sp. gr. 10.15, free from albumin (80 oz.). There was much restricted abdominal movement, and friction could be heard to right and left of sternum, both pericarditis and left pleurisy being present. She died May 4, and at a *post-mortem* examination the lesions of the pericardium and pleura were verified. They were secondary to small white kidney and uræmia, the heart weighing 14 oz.

Two other cases proved fatal in children, aged 5; one complicated with purpura and parotitis, and presenting well-marked friction and cantering rhythm over the præcordia. This was a septic case. The other displayed not only to-and-fro friction over the heart, but effusion was recognized by the aid of the X-ray screen. Unfortunately she developed acute œdema of the lungs, and died very rapidly. Both cases exhibited marked restriction of movement of the abdominal wall.

As no *post-mortem* examination was permitted, there was no ocular demonstration of the pericarditis—though no reasonable doubt existed.

In four cases the pericarditis was associated with chorea in children. Two were admitted with this complaint, and there was evidence of pericarditis either in to-and-fro friction or cantering rhythm with loss of abdominal movement.

Another, admitted with rheumatism and mitral regurgitation developed chorea, and, at the same time loss of abdominal movement was noted and pericarditis recognized by well-marked friction at the base of the heart. When readmitted for recurrence of chorea three months later the pericardium was found to be adherent.

The fourth case admitted with chorea, later developed pericarditis and effusion. Abdominal respiration was abolished, and the X-ray screen demonstrated the stasis of the diaphragm and a non-pulsating shadow surrounding the heart, representing effusion. All these patients were discharged convalescent.

Next to *post-mortem* evidence of pericarditis comes that of paracentesis of the pericardium, very infrequently called for, and still more infrequently performed.

H. M., a boy, aged 13, was admitted for rheumatism and mitral regurgitation on November 1, 1911. There was restriction of abdominal movement and præcordial pain. Temperature 100° F.; pulse 108. Friction was discovered at the base of the heart.

On November 3 an extensive non-pulsating shadow in the cardiac area was seen by means of the X-ray screen. In spite of local and general treatment by salicylates, the area of dulness over the pericardium increased, and the patient became much distressed.

On November 13 paracentesis was performed. Under a general anaesthetic, given with great caution, the aspirating needle, 4 in. long, was introduced half an inch outside the sternum in the fourth right interchondral space, being directed horizontally backwards and inwards so as to graze the back of the sternum. By this path, as you may see by looking at this specimen from the front of the chest, the needle passes internal to the mammary vessels, and entering the pericardium about the middle line avoids either pleura. The needle was inserted about 2 in., and without any difficulty some 2½ oz. of blood-stained fluid were withdrawn. Immediate relief followed, and the boy was subsequently discharged convalescent.

This and the remaining cases were all rheumatic. These run usually a favourable course, and in most instances, being included in the general treatment by salicylates, do not greatly suffer if the pericarditis is overlooked, as indeed, commonly happens.

In a fair number of cases, however, the pericarditis develops late in the attack, not infrequently while the patient is regarded as convalescent, and sometimes is the cause of delayed recovery or apparent

relapse. For instance, a man, aged 27, was admitted on December 28, 1912, having been laid up with rheumatism for six weeks. Getting alarmingly worse he was brought to hospital, and it was at once noted that abdominal respiration was absent. There was an apex systolic and a double aortic murmur, which made the detection of pericardial friction increasingly difficult. The screen, however, confirmed the diagnosis of diaphragm stasis, and excluded effusion in the pericardium; his recovery took six weeks.

One case, a young woman, aged 23, was reclaimed from a surgical ward, where she was admitted on account of loss of movement and rigidity in the upper abdomen, suggesting peritonitis. No physical signs were detected in the chest, but next day there was a well-marked pericardial rub in the second left interspace. This was at first to and fro, but it persisted as a crackling systolic bruit. I had the confirmation of Sir James Kingston Fowler that this was produced over the auricular appendix.

In six cases pericarditis developed some days or weeks after the patient had been admitted with rheumatism, the routine examination, on admission, satisfactorily excluding this condition, which moreover supervened with rise of temperature, sometimes to 104° F., and increased rapidity of pulse. In two cases pericarditis was diagnosed, and local remedies applied on the strength of these signs, and of loss of abdominal movement and in both friction developed in twenty-four to forty-eight hours.

One case of double basic pneumonia with left-sided empyema developed pericarditis, indicated by loss of abdominal movement and præcordial friction, which subsided on draining the pleura, showing that, as in the pleura, an effusion of pneumococcic origin need not necessarily be purulent.

Perhaps the most signal instance of the value of this sign occurred in a young domestic servant who has only just left the hospital. She had been laid up for three weeks with fever, dyspnoea and dulness at both bases posteriorly, and was considered to have had double basic pneumonia. On the fifteenth day, as the temperature had not fallen, and she was still very ill, it was thought she must either have an obscure, possibly interlobar, empyema or acute pneumonic phthisis. There was, however, loss of abdominal movement, and, in spite of the long and severe illness, she was able to sit up to be examined. Moreover, there had been frequent sweating, the temperature had only once reached 108° F., and she was not as prostrated as would be

expected after double pneumonia. An immediate screen examination disclosed stasis of the diaphragm, a pericardial rub having previously been detected. Local remedies were applied, and she made a rapid recovery.

I have little doubt that this was an instance of pericarditis, probably rheumatic, associated with stasis of the diaphragm and collapse, not pneumonia, of the lower lobes. This altered aspect of the case based on the abdominal symptoms made all the treatment of the case, with the happiest result.

I have picked out the above cases to illustrate special points. The bulk of those included in the survey of the thirty seen in two years were ordinary rheumatic cases in children and young adults. In all of them pericarditis occurred as a complication, and was first suspected either on account of loss of abdominal movement or where such defective movement was noted after finding the pericarditis. But I think they help to prove how constant this sign is, and how very much commoner pericarditis is than was formerly believed.

In conclusion, a few words may be added about the treatment of the common form of rheumatic pericarditis. Of course, salicylates are the potent remedies, but I have long been convinced by the frequency with which pericarditis develops in patients already taking salicylates in the course of rheumatism, that the internal administration is not sufficient. In all cases I apply to the præcordia an ointment of 2 dr. salicylate of methyl in 1 oz. lanoline, renewing it daily for four or five days, till the temperature and other signs subside. It may be even necessary to omit the internal administration of salicylates if symptoms of over-dosage have appeared, but with the above local treatment sufficient is absorbed through the skin to keep up the general effect, besides concentrating its maximum influence locally. This remedy is effective in effusion as well as in cases exhibiting friction only. Screen examinations, however, show that even in the absence of the clinical signs of effusion fluid in small quantity is often present.—*The Polyclinic*.

Pyorrhœa Alveolaris with Fatal Complications.

C. MEREDYTH JONES, M.B., B.S., M.R.C.S. and H. MORGAN HUGHES, L.D.S.—A butcher's assistant, aged 44, was admitted to the wards of Westminster Hospital under Mr. Walter C. Spencer, on November 24, 1912. He had a large indurated swelling extending from the left angle of the mandible across the midline to the submaxillary

region of the opposite side. It appeared to be a well-marked case of Ludwig's angina, or submaxillary cellulitis.

The mouth was in a filthy condition, those teeth remaining (12 in number) being in the last stage of chronic suppurative periodontitis, the alveolus being almost absorbed and the teeth exposed nearly to their apices. The patient was suffering from profound toxæmia, was delirious, and unable to give a clear account of himself. He had been in failing health for some months.

Under anæsthesia two incisions were made into the swelling, one below the angle of the jaw on the left side and the other in the midline of the neck just below the symphysis menti. A small amount of pus was evacuated and kept for bacteriological examination. The incisions were plugged and fomentations applied to the face and neck. Twenty c.c. of antistreptococcic serum (polyvalent) were given partly as a prophylactic in case the lesion should turn out to be streptococcic, and partly to stimulate phagocytosis. As soon as permission could be obtained the remaining teeth were extracted, and under the right upper third molar a large alveolar abscess was opened containing stinking pus. An autogenous vaccine was prepared by culture from the organisms present.

On December 4 a large swelling appeared in the floor of the mouth. Under gas anæsthesia Mr. Spencer enlarged the sinus under the jaw and made a counter-opening through the floor of the mouth. A drainage tube was then drawn through between them for continuous irrigation. On December 7th secondary abscesses at the level of the cricoid and below the mastoid processes were opened and a large amount of pus evacuated. Signs of broncho-pneumonia appeared in both lungs. There was incontinence of urine and fæces. On December 12th there were 3 rigors, the temperature rising to 104° and 105° F. The chest was explored in 3 places, but no pus was withdrawn by syringe. Next day the chest was again explored and a small quantity of fluid withdrawn. Under gas resection of rib was performed and at the same time the sinuses in the neck were enlarged and more loculi of pus evacuated. The patient recovered from the shock of the operation, but died the same evening.

Necropsy. The gums were in a septic state and the tongue in a condition of diffuse septic glossitis. Stinking pus was found in the pleural cavities and there was diffuse septic broncho-pneumonia with foul pus exuding from bronchioles. The pus in the pleural cavities

from lungs and from abscesses in the neck contained the same organisms. In all the specimens of pus mouth organisms—Gram-negative long slender bacilli and many long filaments, also Gram-positive cocci in clumps and chains—were found.

Great difficulty was experienced in obtaining cultures of the organisms, with the exception of the *Staphylococcus albus*, which quickly outgrew the other organisms. Consequently the autogenous vaccine given in the case was of little use.

This case is of interest from the fact that the chronic septic periodontitis had given rise successively to—

(1) Ludwig's angina, with secondary suppuration extending back to mastoid process and down as far as level of cricoid cartilage.

(2) Diffuse septic broncho-pneumonia of both lungs. The broncho-pneumonia was deglutitive or aspirative in type and was not due to septicæmia, as cultures from the blood and spleen were sterile.

(3) Empyema of both pleural cavities, secondary to the condition in the lungs.—*The Medical Review*.

Deaths after Salvarsan and Neo-Salvarsan.

BUMIER has collected 23 cases of death after the administration of salvarsan and neo-salvarsan during 6 months. Analysis of these cases shows: (1) the subjects were mostly young, aged from 19 to 32 years; (2) death nearly always occurred after the second injection in the case of salvarsan, and the third or fourth in the case of neo-salvarsan; (3) the dose of salvarsan was not usually above 0.60 grammes, and in some cases was only 0.30 or 0.40 grammes, but in the case of neo-salvarsan high doses of 1.20 or 1.40 grammes were often given; (4) the injections were mostly intravenous, but in 2 cases death occurred after the second injection of 0.35 grammes, and after an intramuscular injection of 0.80 grammes in each buttock; (5) the toxic effects are in most cases identical with those produced by experiment. Almost immediately after injection appear fever, vomiting, diarrhoea, sometimes scarlatiniform eruptions, paralysis, delirium and convulsions, followed by coma and death on the third or fourth day after injection. The necropsy generally shows hyperæmia of the brain and meninges, hæmorrhagic encephalitis and congestion of all the viscera.

To explain these accidents faulty preparation, impurities in the distilled water, Herxheimer's reaction, etc., have been invoked. But they are the symptoms of the arsenical intoxication. As there is no

criterion by which these accidents can be avoided, even in young subjects with no organic disease, nor any therapeutic means by which they can be got rid of when produced, such dangerous drugs cannot be used with too much prudence.—*The Medical Review*.

Non-Surgical Septicæmia.

BY

PROF. GOLUBOW.

The existence of septicæmia as an infectious disease not due to obvious surgical lesions is insufficiently recognized. The milder forms are exceedingly common, but until recently were seldom diagnosed. During the past 10 years the writer has seen more cases of "medical" septicæmia than of typhoid fever. This indicates not necessarily that non-surgical septicæmia is in Moscow commoner than typhoid fever, but that, as an obscure disease, it more often requires the services of a consultant. Of the last 20 cases 7 were severe and ended fatally; the remainder were mild. In typical cases the diagnosis is simple. There are high pyrexia with repeated rigors, endocarditis, involvement of one or more joints, and thrombo-phlebitis or other signs of dissemination through the circulation. In the majority of cases (in 18 out of the 20) it was possible to determine the primary focus, which was frequently (in 7 of the 20) the pharynx and tonsils. In a minority the primary lesion remained undiscovered (cryptogenetic septicæmia). Microscopical and bacteriological investigation may suggest the nature of the complaint, but bacteriological examinations of the blood are unreliable. Lenhartz's statistics, embracing 218 cases of mostly severe septicæmia, show that a positive result is obtained in only 50 per cent. Hence the cultural result from the blood is of prognostic rather than diagnostic value; a positive result indicates the probability that the infection is severe, a negative favours a mild infection. In doubtful cases the diagnosis often rests largely on exclusion of all other infectious diseases, especially typhoid and paratyphoid fevers, influenza, and malaria.

The organism responsible for non-surgical septicæmia is most often the streptococcus. Of Lenhartz's 218 cases it was found in all but 37. Of the latter, 18 were due to the staphylococcus, 20 to the pneumococcus, 8 to the bacillus coli communis, and 1 to the gonococcus. A mixed infection was present in 6 cases. The preponderance of the streptococcus is also brought out by examination of the blood. Of 1,200 positive results the streptococcus was present in 63 per cent; the

pneumococcus in 18 per cent.; the bacillus coli in 17 per cent.; and the staphylococcus in only 6 per cent. The comparative rarity of the staphylococcus as a source of "medical" septicæmia is due to the fact that this organism has a great tendency to produce metastatic (pyæmic) suppuration, which is said to occur in 90 per cent. of all cases of staphylococcic septicæmia as compared with 20 to 25 per cent. of streptococcic sepsis. Hence the former comes under the observation of the surgeon rather than the physician.

Frequent local complications of septicæmia are pleurisy and patches of pneumonic consolidation. Especially in the slighter non-surgical forms evanescence is characteristic. One day there is well marked pleural friction; 2 or 3 days later no trace remains. Or a small pleural effusion is completely absorbed in a week. Or localized crepitations disappear within 2 or 3 days. Renal symptoms, including albumin, casts, renal epithelium, erythrocytes, and leucocytes in the urine, usually accompany even the mildest forms of sepsis.

CASE 1.—A woman, aged 45, had had an evening temperature ranging from 99·7° to 100·4° for 1½ months. Prolonged influenza was diagnosed by the medical attendant. There was cough with some expectoration. On two or three occasions areas of small moist crepitations appeared in the lower lobes. There was albuminuria (0·05 to 0·1 per mille) with hyaline and a few granular casts. The sputum contained streptococci in large numbers and no influenza or tubercle bacilli. On searching for a possible source of sepsis it appeared that the illness began after a tooth had been crowned. This was followed by slight periostitis and gingivitis, and catarrhal stomatitis. The process then spread to the pharynx, larynx, and trachea. Recovery occurred without specific treatment, and the albuminuria disappeared.

CASE 2.—A woman, aged 52, was in bed with a simple fracture of the radius when she was attacked with severe pain in the side and marked pleural friction. Several foci of moist crepitations then appeared with cough and slight hæmoptysis. The temperature was 100·4° or more, and there was albuminuria with casts. The pulmonary signs changed from day to day and constantly altered their localization. The sputum contained exclusively streptococci. The writer's suspicion of a septic process was soon confirmed by the appearance of thrombo-phlebitis in the left leg. Treatment consisted of yeast internally and inunctions of a preparation of silver. After being bedridden for more than 3 months the patient recovered.

CASE 3.—A woman, aged 40, had a disease which was diagnosed by an experienced practitioner as typhoid fever with bronchitis. The typical symptoms of typhoid fever—such as rose spots—were absent, and Widal's reaction was negative. The sputum contained numerous streptococci. The writer suspected a streptococcic infection and regarded the diarrhoea which was present as of septic origin. The illness began with severe pharyngitis with high pyrexia. Streptococci were found in the blood, and death occurred from typical septicæmia.

CASE 4.—A woman, aged 50, was seen in consultation. The general condition was excellent and nothing abnormal was found. But there was a history of repeated pyrexial attacks of several days' duration during the preceding 6 weeks. As relapsing influenza, malaria, and other common infectious diseases could be excluded with some probability, the writer suspected a septic infection of undiscoverable origin. Two or three days later a severe attack of streptococcic pharyngitis began and rapidly proved fatal, the symptoms being those of severe septicæmia including a hæmorrhagic vesicular eruption.

This is an example of the prolonged intermittent form of streptococcic infection described by Lenhartz. It is well known that in follicular tonsillitis, as in croupous pneumonia, the general symptoms, such as pyrexia, may precede the local signs by some days. In this case the follicular tonsillitis was a secondary localization of the septic process, and the primary focus was not discovered.

It is probable that many cases of pernicious anæmia represent the final stage of slight chronic septicæmia. The following is an example:—

CASE 5.—A man, aged 55, had a mixed infection of the upper respiratory passages. The sputum constantly contained pneumococci, streptococci, and influenza bacilli. The symptoms were those of obstinate respiratory catarrh with pyrexia and slight nephritis. They persisted for 8 months and then terminated fatally with progressive pernicious anæmia.

It is probable that further investigation of cases of non-surgical septicæmia may reveal the septic nature of several other obscure conditions, such as Hodgkin's disease, muscular rheumatism, peliosis rheumatica, and other rheumatoid affections.—*The Medical Review*.

Insomnia : Especially in Relation to Dyspepsia.

BY

GUTHRIE RANKIN, M. D., F. R. C. P.

Physician to the "Dreadnought" and Royal Waterloo Hospitals.

Many devices have been suggested as means of procuring sleep for those who, apparently healthy and free from strain of any kind, are yet unable to command it. We are all familiar with many of the popular nostrums, some of the more well known of which have been recounted by Wordsworth, himself a victim of insomnia, in the following lines :—

A flock of sheep that leisurely pass by
One after one : the sound of rain, and trees
Murmuring ; the fall of rivers, winds, and seas,
Smooth fields, white sheets of water, and pure sky ;
I've thought of all by turns, and still I lie
Sleepless ; and soon the small birds' melodies
Must hear, first uttered from my orchard trees,
And the first cuckoo's melancholy cry.
Even thus last night, and two nights more I lay
And could not win thee Sleep ! by any stealth :
So do not let me wear to-night away :
Without thee what is all the morning's wealth ?
Come, blessed barrier between day and day,
Dear mother of fresh thoughts and joyous health !

As a rule, but one to which there are many exceptions, those who wish to sleep soundly should cease hard work for an hour or more before going to bed. Other conditions being favourable, it is said that if you think of nothing you will sleep, but it is difficult for most men completely to control thought by an effort of the will. The drowsy effect of monotony is a well-known sedative, the enumeration of figures, the falling of rain, the lap of the sea on a shingly beach, the droning voice of an uninteresting and prosy reader are examples familiar to us all. On this principle it has been suggested that sleep may be induced by an arrangement in the bedroom whereby drops of water are allowed to fall at regular intervals into a resonant vessel, but this and all other such ingenious contrivances are, for the most part, useful just for so long as they are novel, and apply to the individual only. Similarly it has been urged that the system of tiring the eyes by directing them to a small beam of light placed in front and slightly above their level is an inducement to sleep. This, again,

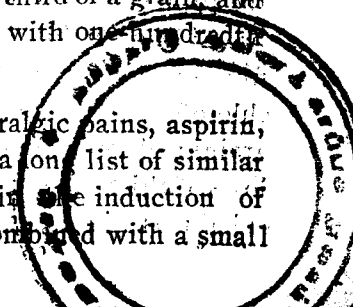
is a recommendation of individual application, and borders on the larger question of hypnotism, which, however useful, cannot be discussed now.

In mild cases of insomnia change of scene, a sea voyage, moderate exercise in the open air, temporary withdrawal from the ordinary activities of life are, each and all of them, minor measures not to be neglected. It must also be remembered that in those who sleep lightly, trivial discomforts may be enough to produce sleepless nights. Cold feet, an unwise evening meal, an absorbing game, a heated discussion, postponed hour of retirement, and a hundred other small departures from the accustomed routine may be responsible for a bad night. It is quite remarkable how this is exemplified in the common experience of a sleepless night on Sunday, when the usual activities of the week are interrupted by comparative freedom from care, more than the usual amount of repose, and frequently also more than the average allowance of food and drink.

Massage, especially when practised thoroughly and rapidly over the abdomen, a hot bath, a mustard foot-bath, a wet-pack, applied to the trunk of the body, a hot drink fortified by alcohol are all homely measures which, by provoking a temporary anæmia of the brain, are conducive to the acquisition of refreshing sleep. Many forms of electricity have also been requisitioned with varying degrees of success.

When all these minor methods fail, recourse to drugs of the narcotic and hypnotic class becomes a necessity. The most certain of all sleep-producers is opium or morphia, and in most cases where pain is the cause of the insomnia its advantages outweigh those of any other drug though its use in chronic sleeplessness is not to be advocated because of the fear that the opium habit may be engendered. Nevertheless, even in these cases one or two initial hypodermic injections of morphia, given by the doctor or nurse and not left to the patients' own discretion of administration, often provides for a better result from whatever subsequent form of hypnotic is chosen. For such a purpose the dose should be a quarter or a third of a grain, and the good effect will be intensified by combination with one-hundredth of a grain of atropine.

When sleep is prevented by muscular or neuralgic pains, aspirin, antipyrine, antifebrin, exalgin, phenacetin, and a long list of similar analgesics may, by relieving the pains, assist in the induction of sleep. They often act most efficaciously when combined with a small



quantity of narcotic. Here are two illustrative prescriptions which are frequently successful under such circumstances: (a) Aspirin and phenacetin, of each 10 grains; Dover's powder, four grains; (b) antipyrine and salicin, of each ten grains; heroin one-tenth of a grain.

Of all the hypnotics the bromides are the least harmful, and a full dose of one or other of the salts is sometimes sufficient to procure calm and refreshing sleep. Thirty or forty grains should be taken at bedtime, and repeated during the night if the patient awakes. The bromide is in many cases more reliable if given with hop and sumbul in this combination: Bromide of sodium, thirty grains; tincture of hop and tincture of sumbul, of each half a drachm; chloroform water to one ounce. Many compounds of bromide have been advocated instead of the simple salt, and there are two which are specially worthy of mention—namely, bromural, which may be given in a cachet of ten grains or more; and dilute hydrobromic acid, in doses of from half to one drachm.

Next to the bromides, chloral hydrate is one of our most valuable hypnotics. It has always seemed to me that the depressing influence of chloral has been made too much of, and that we are often debarred from its administration by a wholly unjustifiable fear of the possible harm to the circulation which may ensue upon its use. If it is chosen only for cases where there is no debility of the cardiac walls, and given in judicious dosage, it is reliable and excellent. It may, in many instances, be advantageously combined with one of the bromides: chloral hydrate, twenty grains; potassium bromide, forty grains; tincture of henbane, thirty minims; and peppermint water to one ounce constitutes a hypnotic mixture of the greatest service when selected for a suitable patient. Though the combination of morphia with chloral and bromide is, as a rule undesirable, it is none the less true that if the above mixture fails to secure a good night, the addition to it of twenty minims of the liquor morphiæ hydrochloratis frequently secures the desired result. After a few evenings the morphia may be withdrawn, when the original mixture will be found to be of itself sufficient. Of the many chloral compounds which are on the market the following are useful; Bromidia, which is a mixture of chloral bromide, cannabis indica, and hyoscyamus, may be given in doses of from one to two drachms; chloretone, obtained by heating acetone and chloroform with caustic potash, may be given in doses of ten to twenty grains; chloralamide, a combination of chloral with formamide, in doses of thirty to sixty grains; and chloralose, a mixture of chloral and glucose, in doses of from four to ten grains.

Hyoscine is one of our most powerful hypnotics and is said never to induce a habit, but owing to its toxicity care must be observed in its administration. It is of special advantage in cases where there is great restlessness but no valvular disease, and is best administered hypodermically in doses of from one two-hundredth to one one-hundredth of a grain of the hydrobromide.

Cannabis indica, though sometimes used as a hypnotic, is uncertain in its action; it is distinctly sedative in its effect upon the nervous system, but except in combination with other drugs of the hypnotic type, cannot be relied upon as conducive to a better habit of sleep.

Of other hypnotics, reference can only be made to those that are better known because they have been tried and proved. Sulphonal is the type of a pure hypnotic. It possesses no analgesic properties, but in insomnia, uncomplicated by pain, it still remains one of our best and most trustworthy remedies. It ought to be given in a full dose of thirty grains, and is suitable, in proportionate quantity, for children. It is tasteless and may be taken in hot soup or milk, or, better still, in a strong glassful of hot brandy or whisky and water. Trional is an allied drug which, in twenty to thirty grain doses for adults and in proportionate quantities for children, is a reliable substitute for sulphonal. It is said to be less cumulative and more rapid in its effect, and certainly cases are met with where it succeeds brilliantly in securing sound sleep when sulphonal has proved quite useless. Veronal has recently come much into vogue, and is used by the public with a happy ignorance of its power for evil. It is given in doses of from seven to ten grains, but it is less reliable than either sulphonal or trional, and is much more liable to produce unpleasant and even dangerous consequences. If it were not for its evil taste and the unpleasant odour which it communicates to the patient's breath, paraldehyde is one of the safest and most effective of all the simple hypnotics. In doses of from one to two drachms it may be given with full confidence that, whatever the state of the heart and circulation, it will produce no depressing effect even if it should fail to secure the desired amount of sleep. Its disagreeable taste is best concealed by combination with tincture of orange or oil of cinnamon. When one after another of the simple hypnotics given alone fail, it will be found that they may sometimes be combined so as to achieve a satisfactory result. The explanation which has been offered of this well-known fact is that when two or more medicaments find separate receptors in the cells of the body the physiological effect of each drug in an ordinary dose will be obtained,

and is of greater value than a double dose of either drug give alone. The following examples are quoted in illustration: (a) Trional, twenty grains; aphomorphia, one-twentieth of a grain; (b) sulphonal, twenty grains; bromural, ten grains. (c) Paraldehyde, one drachm; bromide of potassium, thirty grains. (d) Chloralamide, thirty grains; morphia one-eighth of a grain. (e) Bromide of ammonium, thirty grains; tincture of valerian, one drachm; spirits of chloroform, twenty minims. (f) Veronal, five grains; phenacetin, ten grains; codeia, half a grain.

Of the vast army of recent hypnotics no mention need be made here. Few of them are better than those that are now accepted on their proved merits; some are dangerous except in selected cases, and many are quite ineffective. We cannot glance at the advertising columns of the medical, and even the lay, papers without being struck by the versatility of the chemist and the simple faith of the public. The demand for them obviously exists, else the supply would not be forthcoming in such luxuriant abundance, and the inference would seem to be either that humanity is more sleepless than it used to be, or that it is less tolerant of occasional disturbance of its night's rest.

The widespread addiction to hypnotics without any reference to the actual need or to the form of drugs most suited to personal requirements is now-a-days a popular practice with is greatly to be deplored. It is not only unscientific but unwise and is one of the many influences which are, in the present stage of our civilisation, weakening the adaptability of the human nervous system. The sooner it is recognised that drugs of the hypnotic and narcotic class should be only procurable on the prescription of a qualified medical practitioner the better it will be not only for the individual but for the nation.—*The Hospital*.

A case of Amoebic Colitis Treated by Emetine Hydrochloride.

BY

WM. VAN VALZAH HAYES, M. D., New York.

To Shaudinn and Craig is largely due the credit for making clear the varieties and character of the amoebæ which may be found in the intestines of man.

Only recently the world became indebted to Major Rogers of the English Army Medical Service in India for a discovery which promises to rob the dreaded amoebic dysentery of all terrors and to confer a benefit of inestimable value not only on those living in the tropics but on

those in the temperate zone as well. For a long time ipecac has been known to be of value in these cases. Rogers found that he could banish the *entamoeba histolytica* from the intestine by injecting one-half grain of emetine hydrochloride in sterile water hypodermatically twice daily for two days, and then once daily for two or three days longer, if necessary.

I have had an opportunity to test the emetine treatment in two or three cases with results uniformly satisfactory. To illustrate:

Mr. F., aged, 21, presented himself at the Polyclinic Hospital in the latter part of February and gave the following history: Born in Brooklyn, he had spent his life in the immediate neighbourhood, never having taken a long journey. In September, 1911, diarrhoea, 10 to 30 movements daily. In December he discovered that he was passing blood. He rested in bed for two weeks and then felt well for six or seven months when the dysentery returned but was soon controlled by medicine. There was now a period of fair health until December, 1912, when the frequent bloody movements (10 to 12 daily) returned. These have persisted with slight intermissions, when strong medicines were used, up to the present time. Loss of weight in the past eighteen months, 15 pounds. For several months has been unable to work.

Physical examination: Good color and fairly healthy in appearance. Heart and lungs normal. Liver one finger hepatoptosis. Abdomen otherwise negative but for moderate excess of flatus. No tenderness. Rectal examination showed numerous shallow ulcers, covered with a grayish membrane and bleeding easily, particularly on the edges of the folds. Urine normal. Fæces—thin, with blood, mucus and “amoebæ present in abundance.”

Treatment: The patient was put to bed in the Polyclinic Hospital and given a diet of peptonized milk, rice, pulled bread and butter. In the two days that this simple treatment was employed there was little improvement. One-half grain of emetine hydrochloride was then given in the gluteal muscles twice daily for three days and then once daily for seven days longer. After two days of the emetine treatment the blood and mucus disappeared from the stools. The movements, light in color, diminished to two or three daily, after the first two days. On March 4 there was no movement until an enema was given. The diet during the first week in the hospital remained the same, when the ordinary soft diet was permitted. After two weeks the rectal ulcers were found to have healed and the patient was permitted to go home.

since which time he has steadily improved, gaining in weight and strength, with no recurrence of the dysentery. Examination of the stools showed no amœbæ.—*American Journal of Surgery*.

A Report of Nine Cases of Ocular Syphilis treated by Salvarsan ("606").

BY

J. F. SHOEMAKER, M.D., ST. LOUIS, MO.

Frederick E. Cheney reports four cases of uveitis and five of interstitial keratitis due to syphilis, treated by salvarsan. He summarizes the results as follows:

In the two cases of acute iritis with a condyloma, the rapid subsidence of the inflammatory symptoms and the disappearance of condyloma was most interesting and impressive to observe. These patients do, of course, get well quickly at times under mercury and iodid of potassium, but that salvarsan will prove more valuable in the treatment of this class of cases certainly seems probable. The deposits on the membrane of Descemet in the second case did not disappear rapidly, but such deposits, unless increasing, in no way indicate that the inflammatory process has not come to an end. In the third case, a chronic general uveitis, the inflammatory symptoms had entirely disappeared eleven days after the salvarsan injection, and this was certainly a satisfactory result in a case of this nature. A rapid disappearance of the vitreous membranes, however, was a hope not realized and hardly to be expected.

In the fourth case, a low form of long-continued general uveitis, there was no immediate result following the use of salvarsan. It was an eye in which the products of past inflammatory attacks were much more in evidence than an existing inflammation, and the remedy was given with little expectation of immediate benefit, but rather with the hope of preventing future exacerbations and further impairment of vision. The improvement found in the vision and the condition of the vitreous when he reported November 1 was certainly gratifying.

Concerning the cases of interstitial keratitis he says:

In the first case, so far as can be judged, the course of the disease was in no wise influenced by salvarsan. In the four other cases, the rapid disappearance of circumcorneal injection, of intolerance of light and lacrimation (well marked in three of these four cases) following the salvarsan injection would seem to be more than a simple chance happening. As to the clearing of the corneal infiltration, there was

no indication of any exceptional rapidity in three of the cases. In the other case (Case VI), the cornea certainly cleared more rapidly than usual. There was an infiltration involving the entire surface and the vision equalled 20/100. Seventy-two days after the first signs of irritation were noticed by the patient and forty-two days after the salvarsan injection, this infiltration had entirely disappeared with the exception of a very slight central haze and the vision equalled 20/20. On the other hand, it must be said that the infiltration of the cornea at no time was of extreme density and that a certain number of cases with no special treatment do make equally good recoveries. On the whole, it would not be wise to conclude that salvarsan was responsible for the rapid clearing of the cornea in the case. It is going to be difficult to form accurate conclusions as to the value of this salvarsan in this disease because of the variability of its course. If, however, a good number of these cases can be treated early, that is, at the beginning of corneal infiltration, carefully observed and accurately reported, it will probably be possible after a few years to arrive at a fairly definite appreciation of its value.—*American Journal of Ophthalmology*.

True and False Gastric Dyspepsias.

BY

DR. ALEXANDER CAWADIAS.

Chief of the Clinique attached to the Faculty of Medicine of Paris.

BOAS demands in his treatise on the subject that the chapter dealing with "Chronic Dyspepsias" in works on diseases of the stomach should be suppressed. The suggestion would be a judicious one (a) if authors took care to describe in their treatises morbid entities only. For dyspepsia cannot, in fact, be truly considered in the light of a morbid entity. But it, nevertheless, preserves a considerable value while regarded as a *functional syndrome* of troubles associated with gastric digestion. This functional syndrome is connected with a derangement of the nervous system of the stomach—or is it really dependent in every case on the presence of a gastric lesion (Hayem and Lion)? These are questions of pathogeny which we do not propose to attack. Our present aim is to determine clearly this functional gastric syndrome—dyspepsia—to separate it from the false gastric syndromes; the false gastropathies of Deperine; the psychogenous dyspepsias of Strumpelli.

1.—TRUE DYSPEPSIAS.

A great deal of confusion prevails in the descriptions of dyspepsias, properly so-called; that is to say, functional troubles of the gastric digestion. Some authorities decompose this syndrome into numerous constituent elements. They describe separately: hyperchlorhydria; the hypersecretion of fasting or syndrome of Reichmann; the hypersecretion of digestion or syndrome of Boas; hypochlorhydria; apepsia; spasm of the pylorus; gastric atony; gastralgia; etc. Others, following the example of Professor Robin, arrange these elements in groups. The functions of the stomach are, in fact, inseparably bonded, in the pathological states as well as in the normal. To excess of functional activity (motor, sensory, secretory) corresponds the hypersthenic dyspepsia in which we have to deal with hyperchlorhydria (sometimes the syndromes of Reichmann and of Boas), pyloric spasm or gastric hyperkinesis, and acute pains. Hypochlorhydria, combined with gastric atony, constitutes hyposthenic dyspepsia. Finally, the old flatulent dyspepsia—Robin's dyspepsia of fermentations—which are frequently complicated by the accompaniment of ærophagia, constitutes the third dyspeptic syndrome. These are, as we now see, true dyspepsias. By the exact procedures which we now possess for exploration of the stomach, we find *real* alterations of the functions of that organ. The *gastric* treatment (*regime*, alkalies, bitters—according to the type of dyspepsia) constitutes the principal agent in the cure of those conditions.

Now, as the result of a regrettable confusion, we apply *a propos* of those cases the term "nervous dyspepsias," and we endeavour to relegate them to the domain of neurology. This name, nervous dyspepsia, is not a suitable one. It is a term which presumes a pathogeny that has not been demonstrated, and which does not correspond to the reality, either clinical or therapeutic. For the former of these teaches us that *real* gastric troubles co-exist in those gastric syndromes, while the latter demonstrates the fact that gastric treatment is that which, above all others, succeeds in those cases. Let us then make the diagnosis of true functional dyspepsia, determine its type, and treat it accordingly. We shall then have the advantage of treading on the firm ground of functional diagnosis and not on the more slippery one of pathogenic diagnosis. And, on the other hand, we shall avoid the danger of confusion with the following syndrome.

2.—FALSE DYSPEPSIAS.

This syndrome differs from the preceding. It belongs, in reality, not at all to the domain of digestive pathology, but to that of psychiatry.

As it is on this point that recent discussions have been brought to bear, we consider it worth while to give a complete description, in the light afforded by the works of Strumpell and Dejerine, as well as that of our own personal observations. An emotional derangement, or a series of *chagrins* and of *ennuis* are found at the basis of this syndrome, which is found to develop in those who are predisposed to neurosis, and in asthenic subjects. The attention of the patient is directed to his stomach by vague digestive trouble, or by intercostal or cutaneous abdominal neuralgias. He believes that he has been attacked by some gastric affection (they are so frequent, everybody speaks of them). From that moment the troubles are definitely outlined. The appetite is modified; it becomes capricious, sometimes exaggerated, sometimes greatly diminished; gastric pain and feeling of weight develop. In some cases these last all day long; in others they supervene directly after a meal, or even at quiet irregular periods. These symptoms are vague, and even the volubility of the patients fails to succeed in defining them precisely. But even in the midst of this chaos of subjective troubles, we are able to distinguish the following general characteristics: These phenomena are at first irregular as regards character and time of appearance. They have no direct relationship to the alimentation. They are accentuated by *chagrins* and emotions, while pleasures and distractions cause them to disappear. One of our patients suffered from racking pains at the level of the epigastrium after each meal. She was obliged to take to bed and have recourse to the use of various sedatives * * *. But when she dined in the City she experienced no inconvenience. Some patients display very pronounced nervous reactions (sense of suffocation, abnormal and bizarre sensations, loss of consciousness). We frequently find at the same time, anxiety, anguish accompanying the false gastric sensations. Examination of the stomach by the procedures of functional exploration demonstrates the integrity of that organ. We may perhaps make an exception as regards gastric chemism. In this domain we do find modifications, but these are irregular (hyperacidity of gastric juice today, while it is normal on some other days), and always *slight*; a fact which, having regard to the imperfection of the actual procedures in our study of gastric chemism, obliges us not to accord them a great importance.

But when we find the chemical troubles accentuated and permanent, it will be necessary to reserve our diagnosis. In such cases we have to deal with true symptomatic dyspepsias, with neurasthenia, and not with false gastropathies. The proof of this fact is that

psycho-therapeutic treatment fails to suffice, and it will be necessary to watch over the state of the stomach and the alimentation of the patient.

In way of resuming, those "false gastropathies" are really psychic syndromes. They take their origin from auto- or hetero-suggestion, and may be made to disappear as the effect of a course of psycho-therapy by *persuasion*. They are the characteristics which are attributed by M. Babinski to pithiatic phenomena, whence the term pithiatic (or hysterical) dyspepsias by which we propose to designate them.

In order to arrive at a diagnosis of these false gastropathies, it is necessary to examine the stomach with great care. Such examination is repudiated by Professor Dejerine from the fear of turning the patient's attention too much in the direction of the digestive apparatus. We have been able to establish the fact that a thorough exploration is not dangerous; we are enabled to persuade a patient that he suffers from no grave lesion of the stomach when we have made a thorough examination of his digestive tube; while, on the other hand, by neglecting exploration by the precise modes of procedure which we now actually possess, we run the risk of taking for psychogenous dyspepsias, those forms which are real and even symptomatic—and also gross lesions of the stomach, gastritis, ulcer. We may say of pithiatic dyspepsias, in way of analogy, what has already been said of hysteria in general: it is unnecessary to adopt this diagnosis except in those cases in which every real affection of the stomach has been thoroughly eliminated by the minutest possible examination. In carrying out numerous examinations, radioscopic, chemical, and coprological, we have been struck by the discovery of real troubles of digestion in patients presenting the clinical characteristics of false gastropathies. And the results of therapeusis have confirmed those of our examination; for without the adoption of rest and appropriate *regime*, those patients were unable to recover.

Among the false gastropathies, and side by side with pithiatic dyspepsias, we propose to range their gastric malingerers. These simulate disease of the stomach in order to attain a special object. Such is the case of a young collegian (analogous to that cited by Mathieu and J.-Ch. Roux) observed by us; he vomited voluntarily after meals in order to be released from attendance at school. Severe corporal punishments would have promptly rationalized that case, which caused great distress to the parents during two whole years. We can easily perceive the difference between those true simulators and the demi-simulators (to make use of M. Babinski's term), the

pithiatic patients, who, by a morbid and almost unconscious tendency to imitation, present the tableau of psychogenous dyspepsias that we have just been tracing.

3.—RELATIONS BETWEEN TRUE AND FALSE GASTROPATHIES.

The pathogeny of these conditions is obscure. It would be quite too simple to speak of dyspepsias of nervous, cortical origin; and dyspepsias of bulbar or sympathetic origin, and to group the whole under a heading of gastro-neurosis or nervous dyspepsia. That would constitute a reversion to the old theories of the imperialism of the nervous system which was promulgated by Cutten. The frequency of these syndromes can be variously appreciated while still remaining within the domain of observation. Among consultations with nervous individuals, we specially note the frequency of false gastropathies. Thus the neurologists, such as Dejerine, Dubois of Berne, admit that the majority of dyspeptics are to be found among the psychic subjects (no less than 90 per cent. according to Dubois). In the *Consultation du tube digestif* controlled by Professor Chantemesse, we find, on rejecting doubtful cases, not more than 4 per cent. of purely psychic dyspeptics. But our material differs, of course, from that of the Salpêtrière; while, on the other hand, too, we have systematically explored the gastric functions in each of our patients—with the result that the statistics of the two groups are not at all comparable.

The cases most frequently met with are the neurasthenic, the psychopathic; who present genuine gastric troubles, which are exaggerated in their clinical manifestations by the psychic condition of the patient. But we do not propose to dwell on those cases. We are considering the description of the functional syndromes only; and without discussion of the ætiological types of dyspepsias. In this domain lies another chapter of pathology. However this may be as regards frequency, the clinical division between these two syndromes persists none the less, and gives us precise indications for the prognosis and the treatment. As regards the prognosis, we do not forget that the false gastropathies are associated with a special mental state; and it is on the latter that the evolution of the affection depends. With regard to the treatment (so far as the therapeusis of functional troubles is concerned, we do not consider the treatment of the cause from which the syndrome proceeded) true dyspepsia will be treated according to the classic rules which are to be found in the recognized treatises.

Psychogenic dyspepsia will be modified by the employment of psychotherapy by persuasion, such as we find described in the recent works of Dejerine and Gauckler, and of Thomas. Then we insist above all things that our patients should regulate their diet; for it is among them that we find so highly accentuated those phenomena of voluntary inanition which have been described in dyspeptic cases by Mathieu and J.-Ch. Roux. It is desirable to diet those patients suitably without having recourse to the processes of cure by super-alimentation which are extolled by the German and American practitioners.

We now see the interest which is presented by this division of dyspepsias, from the practical point of view. By determining with the aid of a thorough functional examination what the type is of the functional trouble with which we have to deal, we attain a firm grasp of the important indications for treatment. And in the matter of dyspepsias, it is desirable to recall the saying of Sydenham: "It is not the medications that are defective, it is that knowledge of the indications is imperfect."—*The Canadian Practitioner & Review*.

The Diagnosis and Treatment of Dysentery.

BY

SIR CHARLES PARDEY LUKIS, K.H.S., K.C.S.I., M.D., F.R.C.S.,
Director-General, I. M. S.

GENTLEMEN,—In the first place let me say how greatly I appreciate the honour which your President has conferred upon me by asking me to address you to-day. When I first received his invitation I was doubtful as to my ability to tell you anything in connection with tropical diseases that would be of use to you in your practice; but when I remembered that a large Anglo-Indian colony exists in Bedford, it appeared to me that the choice of a subject lay between malaria and dysentery, and I finally decided upon the latter.

The term "dysentery" was first employed by Hippocrates to distinguish a disease of the bowels characterized by the presence of blood in the stools, but later on the disease was differentiated more clearly by emphasizing the fact that there must be mucus as well as blood in the stools, and that the symptoms of tormina and tenesmus must be present. This definition still held good when I went to India thirty-four years ago. We were taught that the association of frequent dejections and straining with blood and mucus in the stools was sufficient for the diagnosis of clinical dysentery, and any patient

exhibiting this syndrome was at once placed upon enormous doses of ipecacuanha, elaborate precautions being taken to prevent it from acting as an emetic.

Here I wish to warn you against the danger of thinking that because a patient who comes to you for advice has resided for many years in the tropics, he is on that account necessarily a victim to some form of tropical disease. If, therefore, an Anglo-Indian comes to you complaining of the classical symptoms of dysentery, do not at once jump to the conclusion that he is really suffering from that disease. There are numerous "pseudo-dysenteries," and the symptoms in question may be merely manifestations of tuberculous or malignant ulceration of the bowel, of stricture or gumma of the rectum, of inflamed piles, of helminthic infections, or they may be a terminal condition of that very fatal disease, kala-azar. All these may, however, be excluded by careful examination of the thorax, abdomen, by digital exploration of the rectum, by microscopic examination of the faeces, and, in the case of kala-azar, by an exploratory puncture of the enlarged spleen and search for the *Leishmania-Donovani* parasite.

Bacillary and Amœbic dysentery.

Having by these means satisfied yourselves that you are dealing with a true dysentery, the next point for consideration is "What type is it—is it bacillary or amœbic?" This is of paramount importance, because the treatment suitable in the one form of the disease is useless or even harmful, in the other. We owe our knowledge of the etiology of bacillary dysentery to the investigations of Shiga in Japan and Kruse in Germany during the years 1898-1900. They proved that the causal organism of the disease is a short bacillus, belonging to the *typho-coli* group, which is Gram-negative, nonmotile, and which does not either clot milk or produce gas in any sugar media. Further investigations by Flexner, His and Russell, and Strong have shown that there are various strains of dysentery bacilli which resemble the original Shiga-Kruse bacillus, in that all of them have the common property of producing and in the monosaccharides, glucose and galactose, whilst they do not ferment either lactose, dulcitol or sorbitol. They differ from the Shiga-Kruse bacillus, however, in two important particulars—they all ferment mannite and they produce indol. Considerable divergence of opinion exists as to the exact significance of bacilli belonging to the latter sub-group. American writers regard all of them as being of equal etiological importance, whilst the German school hold that the Shiga-Kruse bacillus is the only true type, and this

view receives some support from the results obtained by serum therapy. These various forms of *B-dysenteriae* are responsible for the production of three distinct types of disease—(1) epidemic dysentery, as seen in India; (2) asylum dysentery, as seen in England; and (3) certain types of infantile diarrhoea.

But there is another type of dysentery which is endemic or sporadic in its nature, which is most apt to run a chronic course, and which in a large porportion of cases is complicated by abscess of the liver. This type is associated with the constant presence of amœbæ in the stools and in the lesions, especially in the walls of liver abscesses, and the pathological changes found in the bowel after death are entirely different from those of bacterial dysentery. As regards the relationship of the amœbæ to this disease, there are three views: (1) That the presence of the amœbæ is accidental, and they play no part in the causation of the disease; (2) that the ordinary *Amœba coli* is a harmless saprophyte, but that there are two pathogenic amœbæ—namely, *Entamœba histolytica* and *E. tetragen*; (3) that, under certain conditions, all amœbæ may become pathogenic. For reasons which I shall give later on we may, I think, reject the first view. The other two are subjects for academic discussion, and do not concern us as practical clinicians. It is sufficient for our purpose to remember that in one form of dysentery there is an absence from the stools of the various types of *B. dysenteriae*, and that their place is taken by certain forms of amœbæ. Also that this disease differs from bacterial dysentery both in its pathology, symptomatology, prognosis, and its reaction to treatment.

As regards the symptomatology, the points of distinction between the two diseases are as follows:

1. Bacillary dysentery is always acute in onset, and it runs a rapid course in nearly all cases. Amœbic dysentery, on the other hand, even though it may begin with an acute attack, always runs a chronic course. It is therefore the form you are most likely to see in this country.

2. In bacillary dysentery pyrexia is common; in amœbic dysentery it is rare.

3. In bacillary dysentery toxæmia is a marked symptom; in amœbic dysentery it is absent except when a liver abscess is forming.

4. In bacillary dysentery the stools are muco-purulent, with large cellular exudate and small in bulk; in amœbic dysentery they are grumous, like those of serous colitis, they are copious, and they contain little or no cellular exudate.

5. Liver abscess never occurs in bacillary dysentery: it is a common complication in amœbic dysentery.

Diagnosis of Abscess of the Liver.

Its onset is always insidious, but no difficulty occurs in a typical case in which you have the classical symptom of hectic temperature with night sweats, leucocytosis, diminished movement of the right side of the diaphragm, pain under the right shoulder blade, a dragging sensation on the right side associated with fullness and tenderness in the right hypochondrium, and rigidity of the right rectus. In many cases, however, all or many of these signs are wanting. You must remember (1) that the interior of the liver does not contain sensory nerves, and that quite a large abscess may form deep in the substance of that organ without causing any pain; (2) that a considerable portion of the liver is under the ribs, so that there may be no appreciable swelling, especially if the abscess is on the upper surface of the liver; and (3) that about 40 per cent. of liver abscesses are sterile, so that there may be a complete absence of fever or leucocytosis. Indeed, I have on several occasions diagnosed and evacuated abscesses of the liver in which all these signs and symptoms have been conspicuous by their absence.

How, then, is the diagnosis to be made in a case of this kind? The answer is simple—"By watching your patient." In amœbic dysentery there is an absence of toxæmia, except when a liver abscess is forming. If, therefore, a patient who has suffered from amœbic dysentery is obviously toxic and is losing flesh rapidly, if his face is drawn and his expression listless, his complexion sallow, his conjunctivæ dull, and his tongue thickly furred, lose no time in making an exploratory aspiration of his liver. The operation can do no harm even if you fail to find pus, and it may save you from the unpleasant experience of being sent for one day to find your patient coughing up pus from an unsuspected abscess of his liver which has burst into the lungs, or writhing in agony from its rupture into the peritoneum. Moreover, if when you aspirate the liver you find only a small abscess, and especially if the absence of fever leads you to think it is sterile, you may frequently cut short the disease and render subsequent operation unnecessary by repeated irrigation of the abscess cavity with a solution of bihydrochloride of quinine (3 to 5 grains to 1 oz.) by means of the flexible sheathed aspiration cannula which has been designed by Major Rogers for that purpose.

From the description I have given of the symptoms you will see that in the majority of cases no great difficulty arises in the diagnosis of amœbic dysentery from the bacillary form of the disease, but it is not always plain sailing, and in any doubtful case a complete microscopic and bacteriological examination of the fæces is advisable. The identification of the various forms *B. dysenteriae* takes up more time than the busy practitioner can afford to give to it, and shreds of mucus should be put up in sterile tubes and sent to a pathological laboratory. But it is quite easy to detect the amœbæ; for this purpose all that is necessary is to take a small piece of a freshly-passed stool and place it on a slide, adding to it one or two drops of a 1 in 10,000 solution of neutral red in normal saline. A cover-glass is then placed on top, gently pressed down and "ringed" with vaseline, and the preparation is examined under a $\frac{1}{4}$ objective and a 1 or 2 in. eyepiece. With this magnification the amœbæ are easily detected, and it will be found that they have taken up the neutral red, all the other constituents of the fæces, even the leucocytes, remaining uncoloured.

Treatment.

It is impossible to deal with this very important subject fully in the short time at my disposal. I shall confine myself, therefore, to the specific treatment of the causal organisms.

Bacillary Dysentery.

In bacillary dysentery we may adopt either the saline or the bacteriological methods of treatment; but in the amœbic form of the disease we must rely upon ipecacuanha or emetine.

There are two methods of treating bacteriologically a case of bacillary dysentery: (1) The use of a vaccine, thus producing an active immunity; (2) the use of an antitoxic serum, thus raising passively the immunity of the patient.

1. *Vaccines.*—Much work on this subject has been done in India by Major Forster, Professor of Pathology in the Lahore Medical College. His vaccine is prepared with the Shiga-Kruse bacillus, which he uses for all types of bacillary dysentery. He uses it in both acute and chronic cases, but in acute cases it is contraindicated from the fourth to the twenty-first day. After this period inoculation may be commenced with an interval of ten days between each dose. In both acute and chronic cases, the dose recommended for an adult male is: first dose, 0.1 c.cm.; second dose, 0.2 c.cm.; third dose, 0.3 c.cm. fourth dose, 0.4 c.cm. Females and children are given proportionately smaller doses. According to Forster these doses produce little or no

negative phase, and in fourteen days the immunity is considerably raised, whilst a course of four doses usually suffices to get rid of all bacilli and to prevent the patient from becoming a chronic "carrier." Most authorities consider that on account of the severity of the local reaction and the risk of producing a negative phase the vaccine method is best reserved for chronic cases, and that in acute cases it is inferior to the serum and saline treatments. Certain experiments, however, to the serum and saline treatments. Certain experiments, however, are now being made with "sensitized vaccines," which, as you are doubtless aware, consist of bacilli which have become coated with specific antibodies (lysins, agglutinins, etc.) as the result of exposure to the action of an immune serum. Such bacilli are now "sensitized" and do not lose this property when killed by heat. As the result of this sensitization, they are more easily dealt with by the leucocytes, and the toxicity of the vaccine is decreased, whilst its immunizing power remains unaltered. For these reasons I am disposed to think that there is a great future before these sensitized vaccines, and that it may be necessary ere long to modify our views as regards the unsuitability of vaccine treatment in the acute stages of disease.

2. *Antidysenteric Serums.*—These may be either monovalent or polyvalent, but the highest degree of immunity is conferred when the Shiga-Kruse bacillus is used in their preparation. These serums are of the greatest value in the acute stages of the disease, especially if there be profound and prolonged toxæmia unaffected by other forms of treatment. The dosage depends upon the strength of the serum used, and is, as a rule, marked on the phial, but it is necessary to give it in large doses, the injections being made with the usual antiseptic precautions under the skin of the abdomen or flank. Thus the serum from the Lister Institute should be given in 20 c.cm. doses twice, or even, in severe cases, four times daily. The interval between the injections should be six hours. They need not, as a rule, be continued after the second or third day, and the only untoward effects likely to follow are urticarial rashes and other anaphylactic phenomena such as pain in the joints, etc. Text-books tell us that these complications may be avoided by the administration of calcium chloride or lactate. Experience does not support this statement, but it may be taken as granted that grave anaphylactic phenomena only occur when the interval between the doses is long or irregular. The remedy, therefore, is regular and systematic administration of the serum.

Salines.—When the serum treatment cannot be carried out, or when you get the patient in the first day of the disease, the saline

treatment is, in my experience, the most useful. Indeed in many early cases it suffices for a complete cure. Two drachms each of magnesium sulphate and sodium sulphate dissolved in 1 oz. of water should be administered and then half doses of a similar mixture should be given every hour or every two hours until the motions became feculent, after which it is given every three or four hours for another twenty-four hours and then discontinued; but do not stop it too soon, otherwise the patient will still suffer from fecal retention even though he be passing a large number of stools containing only blood and mucus.

Amœbic Dysentery.

Up till recently our only method of treatment of this disease was by the administration of huge doses of ipecacuanha. This treatment, if persevered in, was undoubtedly efficacious, but the nausea caused by the drug was so severe that it was extremely difficult to persuade patients to take it. To remedy this a de-emetinized ipecacuanha was put on the market some years ago, but this proved to be useless, and we were reluctantly compelled to return to our old methods. Recently, however, the treatment of amœbic dysentery has been revolutionized by the researches of Vedder in 1911 and by the brilliant discovery of Major Rogers that the amœbæ can be quickly killed by the hypodermic injection of emetine, and that, when given in this way, the patient experiences no nausea or discomfort of any kind. Both the hydrochloride and the hydrobromide of emetine are equally useful, but the former is more soluble, the latter requiring 2 c.cm. of sterile water or saline for the solution of one dose. Rogers began with $\frac{1}{2}$ grain, which is equal to 30 grains of ipecacuanha, but he now gives 1 grain of emetine each day, in two hypodermic doses of $\frac{1}{2}$ grain each, and he claims that by this method all the amœbæ in the body can be killed in from two to four days, the average for a number of cases being 2.35 days. He has also shown that one or two $\frac{1}{2}$ grain tabloids may be given by the mouth on an empty stomach without exciting any great nausea, especially if they are keratine-coated. This method of administration does not effect a cure as speedily as when the drug is given hypodermically, but it may be useful when for any reason there are difficulties in connection with the giving of the injections.

The hypodermic injection of emetine is also a valuable aid to diagnosis. If you have a case which you suspect to be amœbic dysentery, but which does not react to emetine within three days, you may be sure that your diagnosis is wrong, and you need waste no further time in treating it as such. Moreover, the powerful effect of

emetine on amœbic cases, compared with its uselessness in bacillary cases, may, I think, be taken as strong proof that amœbic dysentery is really a separate entity. That is why, in the earlier part of this address, I said that we might reject the view that intestinal amœbæ play no part in the causation of this disease.—*B. M. Journal.*

SURGERY.

The Conservative Treatment of Diabetic Gangrene of the Lower Extremity.

DEWITT STETTEN, NEW YORK.

Impelled by observation of the high mortality resulting from the usual former practice of high amputation in diabetic gangrene, Stetten has made a study of conservative methods in the treatment of this condition. Its essential features are, he says, defective nutrition due to obliterating endarteritis of the large vessels of the limb with an excessive susceptibility to local death from the perverted metabolism and the greater liability to bacterial invasion, together with the systemic complications of the disease. He holds that amputation is not necessary in the incipency of the gangrene and when it does become so on account of the extension of the disease, a high amputation is by no means always indicated. He has evolved a method of conservative therapy based on the three following principles: "1. Systemic treatment of the diabetes and prophylaxis against the development of dangerous complications, especially coma. 2. An attempt to improve the circulation in the extremity. 3. The treatment of the local infection on rational general surgical and aseptic principles." Seventeen cases treated by this method during the past two and-a-half years are reported and analyzed: eleven of the patients were cured; five died, and one is reported not improved. The average duration of treatment was two-and-three-quarters months. The causes of death in the fatal cases were pneumonia, sepsis and diabetic coma, either one of these alone or coma following the two others. Of the eleven patients who recovered, the routine treatment included in nine cases either no operative procedure at all, or such minor operations as opening an abscess or removal of a gangrenous toe. In the other two, on account of a rapidly advancing gangrene, amputation of the leg at the junction of the upper and middle thirds had to be performed. Each of these patients has a useful stump and a movable knee. While the number is not sufficient from which to draw a broad general conclusion, he

says that they were not selected cases and some of them were very severe and all of them would probably have been subjected to amputation under the former methods of treatment. The routine conservative treatment consisted of an antidiabetic regimen guided by daily examinations of the twenty-four hour urine, the diet being relaxed only when coma impended. Stetten has no great faith in any drugs, but he regularly administered sodium bicarbonate in large doses (not, however, sufficiently large to derange the stomach), and codein and morphin to relieve pain. If anæsthesia is required for operation, chloroform should never be employed and ether should be used seldom if ever. Nitrous-oxid or nitrous-oxid-oxygen anæsthesia is chosen instead. The attempt to improve the circulation of the extremities narrows itself down to the production of hyperemia by Bier's method which Stetten is convinced is of positive value. Passive hyperemia is contraindicated. On general principles Stetten administers sodium or potassium iodid for their absorbent qualities and nitroglycerin as an arterial dilator. Definite directions are given as to local infection. There should be the strictest asepsis and the greatest attention to the needs of the individual case; antiseptics should be avoided as devitalizing, as well as tight bandaging, and retention of pus must not be permitted to occur. As regards amputation when required, Stetten never uses an Esmarch bandage and the operation should be done as simply and rapidly as possible and with a minimum amount of traumatism. The suggestion has been made to him by Dr. Garbat that autogenous vaccine might hasten the separation of sloughs. The flaps should be relieved as far as possible from all tension and the dressings loosely applied. A word is given as regards prophylaxis. Chiropodists should be avoided as well as tight shoes. Many patients date the origin of their gangrene to clumsy manipulations of a pedicure.—*American Journal of Surgery*.

Epididymitis due to the Colon Bacillus.

WALTER S. REYNOLDS. reports a rather severe epididymitis following a cystitis in which the bacillus coli was demonstrated in pure culture. There was no urethritis. The exudate was very slow in subsiding. Reynolds believes that the infection travels in most cases through the ejaculatory ducts, either from a posterior urethritis and cystitis, or it may arise through infection from the intestine either with or without a gross lesion.—*Ibid*.

A Year's Experience with Spinal Anæsthesia.

BY

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WILLIAMSPORT, PA.

In presenting a report on spinal anæsthesia, as used in the abdominal service of Williamsport Hospital, by my assistant and myself, I desire to state that it embodies the result of our first experiences with this method in major surgery.

After careful consideration of the subject, and equally careful investigation and study of the method of rachistovainization, I decided that it was worthy of a thorough trial before accepting or condemning; therefore, November 23, 1911, we gave our first injections, performing upon one patient, a cholecystectomy, and upon another a vaginal hysterectomy; two days later, November 25th, we performed three more operations, one an abdominal hysterectomy, the second a vaginal hysterectomy, and the third, perineorrhaphy, suspension of the uterus, and appendectomy.

Our results were so pleasing that we continued using spinal anæsthesia, at first upon the most serious and difficult cases, for the reason that we desired to thoroughly test its merits; this is well shown by the fact that in our first eleven cases, there were seven hysterectomies, in one of which, the ninth case, cholecystotomy was also done.

During the year, from November 23, 1911, to November 23, 1912, we administered spinal anæsthesia to 234 patients, upon whom we performed 338 operations, this not including operations performed outside of the hospital.

I shall here relate briefly the number and class of operations in order to indicate the severe test put upon the anæsthetic, for remember, we were investigating the drug.

There were—Abdominal Hysterectomies 31; Appendectomies, 88; Cholecystotomy, 9; Ovarian Operations, 21; Dilatation and Curettment, 31; Suspension of Uterus, 26; Salpingectomy, 8; Amputation of Cervix, 6; Lipectomy 1; Trachelorrhaphy, 5; Retroperitoneal Abscess, 1; Laparotomy for Intestinal Adhesions, Lane's Kink, etc., 10; Vaginal Hysterectomies, 22; Cholecystectomy, 4; Nephrotomy, 1; Perineorrhaphy, 20; Herniotomy, 11; Watkins Op. for Utero prolapse, 5;

Salpingoophorectomy, 15; Arthrotomy of Knee Joint, 2; Colporrhaphy, 2; Rectal Fistula, 1; Excision of Hemorrhoids, 3; Excision of Cervix by Cautey, 1; Dilatation of Urethral Stricture, 1; Ruptured Ectopic Gestation, 2; Exploratory Incision, 1; Amputation of Upper Third of Thigh, 1; Varicocele, 1; Stab Wound of Abdomen and Stomach, 1; Relieving Incarcerated Uterus, 1; Inguinal Cholestomy, Intestinal Obstruction, 1; Suprapubic Cystotomy, 1; Removal of Testes, 3; Vaginal Incision of Salpingitis, 1; Acute Diffuse Peritonitis, Typhoid Perforation, 1; Radical Cure of Hydrocele, 1; Cæsarian Section, 1; Splenectomy, 1; Gastroenterostomy for Ulcer, 1.

These operations were done under difficulties. A serious handicap was placed upon the service by the seeming combined efforts of some physicians, the public press, and the laity, filling our patients' minds with various vague fears, but especially, with fear of stovaine; thereby putting upon us the burden of attempting to give or trying to submit to spinal anæsthesia, patients whose minds were in a distinctly unfavourable and unsettled condition, owing to the foolish and useless fear by people with no experience, and little knowledge upon the subject.

Our patients were frightened to begin with; those naturally nervous and fearful of operations, were especially so, and those who were not in a condition to take ether were usually the ones who had been most prejudiced. One patient had been sent to the hospital with implicit instructions not to submit to spinal anæsthesia, yet this patient was suffering with an acute diffuse peritonitis, with valvular heart disease and chronic nephritis. Her mental condition was pitiful when our anæsthetizer informed her that she could not take ether.

Our best examples of the influence of stovaine spinal anæsthesia were exhibited by those patients who were either too young to understand, or had never before heard of it. These patients invariably had good anæsthesia and were not aware that they were undergoing an operation; and it was amusing to watch their perplexity when informed that an operation had been done and they were ready to return to bed, feeling little or no difference, for their experience.

The youngest patient was 9 years, and the oldest 85, and these were both splendid cases for neither exhibited any fear, as neither was told that an operation was to be done.

As might be inferred, therefore, the mental condition of the patient is largely responsible for an apparently incomplete anæsthesia, as

many nervous patients who complain loudly of pain during the operation, smilingly confessed when back in the security of their bed, that it was only fear, and we usually can accurately determine the degree of anæsthesia and, therefore, know as well as the patient, whether the complaint is real or not.

In the 234 patients, the anæsthesia was complete in 212; and in 15 cases it was necessary to give either a second dose or a little ether.

Of the 15 cases, ether was used in 8, because the stovaine did not give complete anæsthesia for the purpose for which it was given. It could have been made complete by a second injection, but as our clinic is large, and we are always hurried, I preferred a few minutes of ether rather than disturb my prepared field of operation. In the other 7 cases, the operations for which the spinal anæsthesia was given had been completed, and it was afterwards determined that more work should be done above the area of anæsthesia, hence a little ether was necessary.

There is no objection whatever to giving ether with stovaine. Some patients go to sleep without it; in others, who are highly hysterical, the ether cone and a whiff of ether remove their mind from the thought of operation, thereby giving them a few minutes to regain their composure, and therefore does good.

In the apparently incomplete cases, we find other reasons as our experience grows; it is so easy to elevate the foot of the table a little too high, thus limiting the anæsthesia to too small an area; the smell of burning flesh from the cautery is so suggestive; the manipulations necessary to the removal of the gall-bladder, fastened with adhesions in close proximity to the diaphragm, and the rough handling of a fixed uterus, in a vaginal hysterectomy, are apt to give the patients sensations, some nausea which causes them to be fearful of pain.

We also sometimes under-estimate the amount necessary to produce a given effect, for as with ether some patients require more than others. Probably more important than all other factors is a knowledge of the proper method of administration.

There were 34 patients who suffered from nausea and vomiting. This most always occurs within a few minutes after the administration, or if it occurs later, is due to traction upon the mesentery, is quickly relieved, and causes the patients little or no inconvenience; and we have lately found it is diminished greatly by a light breakfast taken shortly before the operation; there is no objection to the patient taking some fluids during the operation, and they are much benefited

by allowing them to move their arms about in order to secure greater comfort, but conversation, as a rule, is harmful.

A brief mention of a few complicating conditions, in which stovaine showed to the best effect, might be in order, and I will mention nine cases which, in my judgment, somewhat show the value of the method.

(1) Acute suppurative appendicitis in a patient with a fatty heart and a weak and irregular pulse.

(2) A vaginal hysterectomy in a patient with chronic parenchymatous nephritis, with a pronounced myocarditis.

(3) A double salpingo-oophorectomy and appendicectomy in a patient with parenchymatous nephritis and myocarditis.

(4) An acute gangrenous appendicitis in a patient with an exophthalmic goiter and myocarditis.

(5) A perineorrhaphy, salpingectomy, and appendicectomy in a patient with chronic nephritis.

(6) An acute appendicitis in a young girl with valvular heart disease.

(7) An acute diffuse peritonitis and ruptured pyro-salpinx in a girl with valvular heart disease.

(8) A man in profound shock from strangulated hernia with gangrene of three feet of small intestine, and all its mesentery; resection of gut and mesentery, and anastomosis of the intestine.

(9) A man in profound shock from a strangulated hernia, with 6 inches of small gut, requiring resection. These patients all recovered.

One patient died before leaving the operating room. We had completed an operation for Cæsarian section, in something less than thirty minutes, and the patient was in good shape and was talking to us after I had completed the operation and started for the dressing room, and though she was given every attention, her heart suddenly went bad and we were unable to resuscitate her. This patient had been in labor for several days, was thoroughly infected, and the fœtus was decomposed. We do not believe this fatality was due to stovaine, for her death had been expected for some hours before admission to the hospital; however, I desire to make frank mention of the case, this being the only case that died within 24 hours after the completion of the operation. There were only three deaths in this series of cases, viz., in those of the Cæsarian section, the splenectomy (death three

days later), and a thigh amputation for septicemia (death two weeks later).

Thus as briefly as possible I have given the results of our work in spinal anæsthesia, and from our brief, yet thorough investigation, I am quite positive in my assertion, that to me, at least, spinal anæsthesia is a big asset to the surgeon. I can see no reason for the prejudice there seems to be against it. It certainly is safer than ether, providing, of course, it be used as we desire ether to be used, by one familiar with it.

It produces a relaxation far greater than ether, and for example, the anus dilates widely. The descent of the diaphragm is much lessened, and once pushed aside, it remains out of the field of operation, thereby causing less shock from lessened handling of the viscera. Blood pressure falls, making hemostasis much easier. Relaxation of the abdominal incision lessens the use of retractors and therefore diminishes traumatism and increases the ease of manipulation through the opening.

So much assistance do I find from these sources, that I have been able to reduce, in a large percentage of cases, my abdominal hysterectomies to 30 minutes and vaginal hysterectomies to an average time still less; in fact, one vaginal hysterectomy required to completion of the dressing 15 minutes, this for a bleeding fibroid in a patient where haste was a prime requisite.

During the past year I have been unable to use rhachistovainization as frequently as I wished, because of the objections of the friends which, I must confess, I quite fail to understand, for if a surgeon elects to operate upon a patient, it is to be presumed that he knows her condition and has estimated her resisting power to a greater degree than has her friends. He takes the risks and responsibility; why should not his judgment, as to the entire detail of the operation, be taken?

I have the greatest respect for ether, and never advise chloroform. I am perfectly willing that all patients, applying for operation, shall express their wishes, and it is my greatest desire to assist them in every way possible through a most trying ordeal; but if the operation will be safer, and more quickly made by the use of spinal anæsthesia, my experience teaches me that it is my duty to advise it.—*American Journal of Surgery.*

The Diagnosis and Treatment of Acute Mastoiditis.

BY

GEORGE H. MATHEWSON, B.A., M.D.

In the course of my work I have found that a great diversity of opinion still exists among the general practitioners in this locality as to the nature, the gravity, and the treatment of mastoid disease, and I have been forced to the conclusion that some effort should be made to put before them in concrete form the current teaching of the otologists. This is my excuse for introducing so well-worn a subject on the programme of this society.

By way of illustrating the divergent views of the family doctors let me give you a few data. Not a few physicians were of the opinion, and strongly held to it too, that in cases of recent otitis media where swelling and fluctuation developed behind the auricle, there was no great danger or need for operative interference since there was no marked elevation of temperature. Other men pinned their faith on the presence of swelling of the tissues behind the auricle, holding the belief that in the absence of such swelling there could be no mastoiditis. A smaller number again expected a successful operation to be performed in cases which, when brought to the hospital, had definite symptoms of meningitis. In one case where the symptoms, including swelling behind the auricle, were clearly to be seen, the family physician agreed with the diagnosis but wished to defer the operation for six weeks until the patient should be in better condition. Another physician insisted that the very large fluctuating mass behind the auricle in his patient was caused by air which had come from the Eustachian tube, while still another put down the pain about the ear to neuralgia and had the patient's teeth extracted. I bring these few facts before you to show what some of the practitioners think on the subject and not with any idea of censuring them, but in the hope of coming to a clearer conception of the matter.

To start at the beginning, what is mastoiditis? It is an inflammation, not necessarily a suppuration of that part of the temporal bone that is called the mastoid process. From the anatomical preparations which I have brought with me you can easily see that the middle ear is directly continuous, through the auditus, with that large cell in the upper part of the mastoid, which is known as the mastoid antrum. This antrum again is in communication with the other cells of the mastoid. The

mastoid then is a sort of annex to the middle ear. Such being the anatomical relations between the middle ear and mastoid, it is evident that an acute otitis media can hardly occur without some involvement of the mastoid cells, and it is generally conceded that in all severe cases of acute otitis media the mastoid participates to a certain extent. The mastoid involvement is, however, usually slight and clears up without special treatment as the otitis becomes less acute.

In a small proportion of cases the mastoid is severely inflamed, and in a certain proportion of these again the inflammation goes on to suppuration. If suppuration occurs in the mastoid process, the necrotic focus is not necessarily in the mastoid antrum, but may be elsewhere, as in the tip, while the antrum is apparently normal. One usually finds the greater part of the process involved. Acute mastoiditis in the great majority of cases arises as a complication or sequela of an acute or subacute suppurative otitis media. While the temporal bone is often invaded during the course of a chronic suppurative otitis media, the resulting condition is very seldom a simple mastoiditis but rather a slow carious process in the roof of the tympanum or of the aditus or antrum with the formation, in most cases, of cholesteatoma. The carious disease may invade the labyrinth or the meninges, or produce cerebral or cerebellar abscess or sinus thrombosis, and very often gives but slight indication of its advance until the symptoms of its extension are all too clear, and it is too late to save the patient. In chronic suppurative otitis media operation should be undertaken *before* the occurrence of serious symptoms.

We have not the time at present to discuss all the complications of middle ear disease, so with this brief reference to the possible results of chronic suppuration, let us return to the consideration of that form of mastoid disease that usually results from acute otitis media.

Acute mastoiditis, then, resulting from, or at any rate accompanying suppurative middle ear disease, is the form of mastoid disease that is commonly seen, and it is of vital importance that the family physician should be able to diagnose it early, for in its incipient stages it can often be aborted, and even if that happy result be not obtained, an early operation will lead to prompt recovery in almost all cases.

Primary mastoiditis, that is, a mastoiditis that is not secondary to middle ear disease, has been described, but it is very rare. I have never seen such a case. I have, however, seen five or six cases which

might have been mistaken for primary mastoiditis since the drum membrane and middle ear were normal at the time when the symptoms of mastoiditis became evident. In some of these cases I had seen the patient while the middle ear disease was active, and in the others, all of which were young children, the parents gave the history that there had been a discharge from the child's ears within a short time. The presence of an acute or subacute otitis media, then, may be considered as almost essential before one can make a diagnosis of acute mastoiditis. In this connection, I should like to point out that a case of otitis media should show signs of improvement within a few days of its onset, especially if the drum membrane has ruptured, so that, if improvement does not take place, the attending physician should be suspicious of some complication, especially mastoiditis.

The symptoms of acute mastoiditis are: (1) tenderness on digital pressure on the mastoid process; (2) pain in the mastoid region; (3) œdema and redness of the soft parts behind the auricle, in some cases abscess; (4) prolapse of the postero-superior wall of the membranous meatus near the drum membrane; (5) the presence of an excessive amount of purulent discharge from the ear, especially when the pus is of creamy consistence; (6) elevation of temperature.

To my mind the most important of these symptoms is the presence of tenderness on pressure over the bone. This tenderness may be elicited in all parts of the mastoid in some cases, while in others, the tenderness is limited to certain areas only. The points where tenderness is most likely to be found are, first, over the site of the antrum that is just behind the external meatus; secondly at the tip of the process; thirdly, and much less frequently, at the spot where the mastoid emissary vein perforates the bone, that is, about an inch posterior to first point just mentioned.

The tenderness is of course due to an osteitis, or a periostitis of the underlying bone. The presence of tenderness does not mean that operative interference is necessary, but the persistence of tenderness after the use of proper antiphlogistic treatment does. In many cases of suppurative middle ear disease there is a moderate degree of mastoid tenderness, but this usually disappears promptly when the middle ear condition becomes less acute. Just here it may be worth while to bring to your notice that there are hysterical persons who may claim that pressure on the mastoid is painful, in which contingency we must depend on other symptoms. The condition that is most apt to lead one astray is furunculosis of the meatus. The tenderness over the mastoid which accompanies some cases of furunculosis is not due to

disease in the mastoid, but is caused by the movement of the meatus which results from the pressure on the soft part behind the ear, since this movement of the meatus produces compression of the inflamed area about the furuncle, and in such doubtful cases, if one takes care to employ pressure without giving any movement to the meatus, no pain whatever is elicited. Of course in many cases the furuncle can be easily seen. It is usually possible in mastoid disease to manipulate the auricle without causing pain, while in cases of furunculosis, the slightest movement of the auricle is painful.

Pain in the mastoid, apart from tenderness is a symptom that is not very constant. In some cases pain is the chief symptom, while in others it is slight or entirely absent. If present, it is of great value but its absence is not of much import.

œdema of the soft parts behind the auricle is often seen, but it is usually a late symptom and we must not wait for it. If present in any marked degree it usually indicates operation, but this is by no means always the case. Of course, if there is a definite abscess behind the ear, operation is unavoidable, but where there is simply œdema, we can still bring about resolution in a certain number of cases. œdema is perhaps as much a symptom of furuncle in the posterior part of the meatus as it is of mastoiditis.

Prolapse of the postero-superior wall of the meatus if present is an indication for operation. It is by no means a common symptom. It is produced by an extension of the inflammation in the underlying bone into the soft parts.

The persistence of an excessive quantity of purulent discharge is strongly indicative that operative interference will be necessary. The cavity of the middle ear is of very small size and therefore it is physiologically impossible that any large quantity of pus should be produced in it, so that if a large quantity of pus is coming from the meatus, it must be coming not only from the middle ear, but from somewhere else, usually from the mastoid cells.

Elevation of the body temperature is usually found in cases of mastoiditis, but is not a symptom which gives us much help. In the first place, many mastoid patients are suffering from some general disease which of itself gives rise to temperature, such as influenza, the exanthemata, and typhoid, to mention a few examples. Then again the height of the fever by no means bears a constant relation to the severity of the disease in the mastoid. Many very serious cases show very slight elevation of temperature. For instance in a case operated

on some little time ago the temperature during a period of four days previous to the operation did not go higher than 99° and yet on opening the bone the whole process was found to be full of pus and necrotic bone and granulations, while the lateral sinus and dura mater were both lying exposed. If you have other symptoms, such as tenderness, pain, etc., the presence of an elevation of temperature strengthens the diagnosis. Great variation in temperature or persistent high temperature suggests not mastoid disease, but sinus thrombosis or meningitis, respectively. On the whole then the presence of a moderate elevation of temperature would be corroborative evidence, but its absence by no means is to be regarded as a proof that the mastoid is intact.

Of eighty-nine cases of mastoiditis on which the simple mastoid operation was performed in the General Hospital in the last three years the temperature on admission was as follows:

Not over 98-3/5° F.	Not over 100° F.	Over 100° F.
27-30 per cent.	30-33 per cent.	32-35 per cent.

Or adding the first two columns together, 63 per cent., showed a temperature not over 100° F.

In most cases we have more than one of the above symptoms and here of course the diagnosis is more easily made.

It is hardly necessary to give you the reasons why mastoid disease should be recognized early and given proper treatment, but perhaps a very brief *resume* will do no harm.

Its anatomical relations are such that when it is the seat of suppuration there is only one direction in which the pus can safely go, that is outward or laterally. Above lies the brain, while the lateral sinus is behind as is the cerebellum. If the inflammatory process extends to the leptomeninges, death is almost certain. If an abscess is formed in the cerebrum or cerebellum, the chances for recovery are slightly better but the prognosis on the whole is very bad. If the lateral sinus becomes infected, the prognosis is still grave, though the chances for recovery are much better than in cases of abscess. I have seen many cases of otitic meningitis, far too many, and I have operated on three, one of which recovered. I have operated on four cases of brain abscess with one recovery, and on six cases of sinus thrombosis, with two recoveries. Of course early operation in cases of sinus thrombosis gives a much better chance for recovery.

As regards the treatment of mastoid disease, there is room for much improvement, especially in the way of prophylaxis, and in our efforts at prophylaxis we should begin at the root of the matter. We should try to prevent the occurrence and the recurrence of middle ear suppuration. This work is mainly in the hands of the family physician. In cases where there is inflammation of the nasopharynx, notably in such disease as influenza, measles, scarlatina, and diphtheria, the attendant should be instructed to use hot cleansing gargles or to paint the nasopharynx or nostrils, or both, with 20 per cent. argyrol, etc., in order, if possible, to limit the severity of the inflammation. Then again in otherwise healthy children the occurrence of ear-ache should not be neglected but should make one carefully examine the nose and throat, especially for the presence of adenoids and hypertrophied tonsils which in such cases should be removed.

When otitis media has already made its appearance we can very often hasten recovery and forestall possible extension to the mastoid or elsewhere by performing a paracentesis of the drum membrane. This is a very valuable procedure. If the drum membrane is bulging, or if it does not rupture early, even if it is not bulging, paracentesis should be performed. In those cases too where the existing perforation does not provide a sufficiently free exit, paracentesis is indicated. There exists among the laity, and even to some extent among the profession, a belief that once the drum membrane is ruptured, the patient's hearing is permanently impaired or even entirely destroyed. This idea, of course, is entirely erroneous. It arose, no doubt, from the fact that in ears which have a permanent perforation of the membrane the hearing is usually impaired but the impaired hearing is due, not to the perforation, but to the damage done by the suppuration which caused it. The wound made by paracentesis causes much less damage to the drum membrane than does spontaneous rupture, and is rather more apt to heal too soon than to persist too long. The paracentesis relieves the tension within the middle ear and does good by providing free drainage. As this operation is very painful, and also because it is difficult to estimate distance properly with one eye, as one is obliged to do in operations on the membrane, a general anæsthetic is to be given in all cases. I have found nitrous oxide gas very satisfactory for these cases, as it can be given without previous preparation of the patient, and is rapid, pleasant and safe.

Even where actual mastoiditis is present we can often by proper measures bring about a cure without operation on the bone. The

patient should be put to bed and given a free purge, the membrane should be incised, if good drainage is not already established, and the ear should be syringed out with hot boric acid solution every two hours, while cold should be applied to the mastoid by means of a Leiter's coil. In many cases such treatment will stop the inflammation and lead to cure. The percentage of cases which can be thus aborted varies with the epidemic, but I should say 50 to 75 per cent. of cases, if treated early, can be aborted.

If tenderness still persists after twenty-four hours, treatment may be continued for another twenty-four hours, but by this time if there is no marked improvement, operation is necessary. If there is an abscess or a fistula over the mastoid when the patient is first examined the use of this abortive treatment is out of the question, and operation is the only recourse. The same is true in those cases which present extensive prolapse of the postero-superior wall of the meatus.

With regard to the length of time after the onset of the middle ear suppuration at which serious mastoid involvement may occur great variations are seen. The majority of cases in my experience arise in from ten days to eight weeks. I have seen quite a number where operation was undertaken within a week of the onset of the middle ear trouble in which very extensive destruction had already taken place in the mastoid.

I have tried to get statistics as to the frequency with which mastoiditis complicates recent otitis media, but have not as yet been successful. Our hospital statistics are useless since most of the cases we see are the severe ones. From the statement of busy practitioners as to the rarity of mastoiditis among their patients coupled with the fact that suppurative otitis media is a very common disease, and in the light of my own experience, I am inclined to think that the proportion is not greater than 1 to 500, and this is probably over-stating it.

When mastoiditis has been diagnosed, how long should one wait before operating? I think that once one is sure that the disease cannot be aborted, operation should be undertaken at once.

In conclusion, bear in mind that the simple mastoid operation in skilled hands exposes the patient to very slight risk, while the evils which may result from extension of mastoid disease to the neighbouring parts are so great that in case of doubt it is infinitely better to

operate, and thus settle the question on the safe side.—*The Canadian Medical Association Journal.*

OBSTETRICS AND GYNÆCOLOGY.

Treatment of the Excessive Vomiting of Pregnancy.

JAMES H. MARTIN, M. D.—While the writer was senior house surgeon in the Glasgow Maternity and Women's Hospital 17 cases of the excessive vomiting of pregnancy were admitted. All the patients had for several weeks been treated with the usual "stomach drugs," and in two cases rectal feeding had been tried without improvement. One patient was admitted very ill and died. She could retain nutriment neither by the mouth nor the rectum.

The history was carefully gone into. A thorough examination was made, particular attention being paid to the alimentary canal, vagina, uterus, and appendages. Bad teeth and chronic constipation were found associated in every case.

The patient was strictly confined to bed. The stomach was washed out thoroughly with warm water at a temperature of 100°. The large quantity of mucus obtained was surprising. Sips of cold water were allowed that night, and an enema of soap and water was administered. For several days the patients were put on peptonized milk, and milk and soda, and were thereafter given little diet. The patients were not allowed up until they had been on light diet for 2 days. A powder containing 1 grain of mercury—with chalk—and 3 of sodium bicarbonate was given thrice daily. For chronic constipation, in conjunction with the above powder, magnesium sulphate in hot water every second morning proved the best aperient. If a satisfactory motion was not obtained, then a soap and water enema was given. For the septic condition of the mouth a wash of carbolic acid solution 1 to 8 was used frequently and always immediately before and immediately after food.

This treatment was quite successful in the 16 cases, the average duration of residence in the hospital being 17 days. One patient was treated for about 10 days with the text book drugs without improvement. She was then treated as above and at once improved. She had no return of vomiting and went to term. In another case there was retroversion of the uterus with tendency to prolapse; the uterus was

not interfered with and she made a complete recovery. In 5 cases there was a well marked acetone odor.—*The Canadian Practitioner & Review.*

Urodiagnosis and Uroprognosis by means of Perchloride of Iron in Severe Vomiting of Pregnancy.

V. LE LORIER finds that in cases of severe vomiting of pregnancy one may, by certain tests of the urine, predict whether the attack will be fatal or so severe as to necessitate the induction of premature labor. By the test of perchloride of iron applied to the urine we get a reaction with acetyl-acetic acid in distilled water. The gravity of the vomiting is in relation with the intensity of the color reaction. When intense acidosis appears in the course of pregnancy it is not illogical to suppose that intravenous injections of alkaline water containing carbonate of soda may be employed and give good results in the neutralization of the circulating acid.—*Ibid.*

MEDICAL EQUIPMENT OF CAPT. SCOTT'S EXPEDITION.

The official report by the Surgeons to the British Antarctic Expedition, 1910, upon the medical equipment, has been received and reads as follows:—

BRITISH ANTARCTIC EXPEDITION 1910. JULY 18th 1918.

"The complete satisfaction derived from the medical equipment supplied to the National Antarctic Expedition, 1902-1904, guided us in selecting Messrs. Burroughs Wellcome & Co. for the sole supply of Medical Equipment.

This equipment consisted entirely of 'Tabloid' medicine chests and cases, and 'Tabloid' medicines, and we have to report that the good opinion previously formed was maintained. The equipment was absolutely complete and perfect in every detail, and the 'Tabloid' products retained their full activity under trying and varying conditions of climate and transport.

The actual 'Tabloid' equipment designed by the late Dr. E. A. Wilson for the Southern Journey, and carried to the Pole, is being returned to you, with its remaining contents, which are in perfect condition."

(Signed)

G. Murray Levick, Surgeon, R. N.

E. L. Atkinson, Surgeon, R. N.

I confirm this report
in every detail.

Edward R.G.R. Evans, Commander, R. N.

THE ANTISEPTIC.

SEPTEMBER, 1913.

Investigation of Elephantiasis in Cochin.



Government order published recently contains the letter of the Surgeon-General addressed to Government in forwarding the report of Captan J. A. Cruickshank, I. M. S., and Captain R. E. Wright, I. M. S., on elephantiasis in Cochin. We have not the report of these officers before us, but from the summary of the conclusions they have arrived at, contained in the Surgeon-General's letter, we note that the important results of the investigation are (1) that the mosquitoes that act as carriers of the disease in Cochin are of four kinds: (a) *Culex fatigans*, (b) *Nyssomyzomyia* Rossi, (c) *Culex micro annulatus*, and (d) *Stegomyia scutellaris*, and (2) that there is a filarial fever preceding by many months the appearance of elephantiasis. As to the variety of mosquito which acts as an intermediate host for the *Filaria nocturna*, as Sir Patrick Manson calls it, it was known that *Culex fatigans* was the chief carrier of elephantiasis. According to James, *Anopheles nigerrimus* was also a carrier of *Filaria nocturna*. Now it has been brought out that in Cochin there are three other kinds of mosquitoes which act as carriers of this disease. It is quite possible that as a complete elephantiasis survey, especially of the West Coast, is made, other varieties of mosquitoes may also be found to be acting as intermediate hosts for *Filaria nocturna*. But what we want to impress on the Surgeon-General is this—that while it has been completely established that one stage of the development of the *Filaria nocturna* takes place inside the mosquito, the way in which the filaria inside the mosquito is transferred to man has not yet been satisfactorily demonstrated. Sir Patrick Manson originally held the theory that the filaria escapes from the mosquito into water and enters the stomach of man through his drinking water. He seems to have changed his view subsequently and apparently is now of opinion that the filaria is transferred to man through the mosquito bite. Says Sir Patrick Manson:—"These observations almost prove that like malarial parasite, the filaria is introduced into its human definitive

host by mosquito bite. Whether it may obtain an entrance by any other channel or medium it would be hard to prove and rash to deny." There is one fact in connection with this point that deserves a little closer examination. In many places elephantiasis has been greatly diminished if not completely eradicated by the introduction of a covered drinking water supply. Take the city of Madras for instance. Elephantiasis was extremely prevalent here before the introduction of the pipe water supply. And since its introduction elephantiasis has gradually gone down till at the present time it is only seen, as the Surgeon-General himself observes, in Thousand Lights and Royapettah, within the Municipal limits of Madras. Between 1872 and now we have practically done nothing to destroy the *Culex* mosquitoes or their breeding places in Madras, and yet elephantiasis went down in spite of the continued and undiminished existence of *Culex* mosquitoes. How was that diminution in elephantiasis accomplished? The places within Madras Municipal limits where elephantiasis still prevails may on investigation be found to have open tanks or wells from which some of the inhabitants of the locality may still be drawing their drinking water supply. To our mind none of the ingenious explanations of Grassi, Annett, Dutton, Sambon and others, of the exact nature of the process by which filaria gets out of the proboscis of the mosquito and into the human system are satisfactory. This is a point on which further research is necessary.

We have to sound one note of warning so far as the piscicultural expert is concerned. Larvicidal fish can only get at the larvæ in a clear tank. In a tank overgrown with weeds, etc., larvæ may thrive in spite of the presence of larvicidal fish. To keep tanks clean requires constant attention and expenditure of money. Who is going to do it for instance in a place like Shertallay which we believe has 78 per cent. of its population with filaria in their system?

With regard to the next point, namely, that of filarial fever before the actual manifestation of elephantiasis, we do not think that the discovery is altogether new. Filarial fever, apart altogether from erysepalatoid inflammations, does occur not only before the appearance of elephantiasis but also during the course of its existence. We should like to see what evidence there is to support the theory advanced by the investigators for this filarial fever before we can accept it.

The subject is a most interesting one and we would suggest to intending workers a visit to Shertallay in Travancore territory.



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Original Articles.

* RHEUMATISM IN CHILDHOOD.

BY

JAMES BURNET, M.A., M.D., M.R.C.P.E.



THE cause of rheumatism is still largely a matter of dispute. Heredity and environment no doubt play a not unimportant role in the etiology of this disease. Acute rheumatism, however, is undoubtedly set up by the presence of a definite organism in the blood; whether or not this is really the *diplococcus rheumaticus* we cannot as yet definitely say.

I have stated elsewhere† that the hereditary nature of rheumatism probably implies more of a negative than a positive condition. The rheumatic child is, in all probability, one who has not inherited immunity to that disease; whereas the boy or girl who grows up to adult life without being attacked by rheumatism in some one of its manifold forms is no doubt possessed of a blood which is antitoxic to the disease.

Rheumatism in childhood differs very essentially from the same disease as it is encountered in adult life. We are all well acquainted with the typical tripod of acute rheumatism in adults, viz., severe arthritis, profuse sour-smelling sweat, and thickly coated tongue. In the child the picture is quite a different one. Here the arthritis, which is such a prominent feature of acute rheumatism in the adult, fades into insignificance when we come to deal with the child suffering from this disease. Profuse acid sweat is likewise a most uncommon symptom in children. Accordingly sweat rashes are rare. Hyperpyrexia, a dreaded complication in the adult, is practically

* Specially contributed to *The Antiseptic*.

† *Manual of Diseases of Children*; Edinburgh; E. S. Livingstone.

never seen in children, although it would be a mistake to say that it is never encountered, for I have personally recorded such a case* in a boy of 8½ years whose temperature suddenly rose up to 107°·2 and who developed a pericarditis.

The various conditions met with in the acute rheumatism of childhood may now be referred to. First and foremost come the cardiac evidences. In fact it may be said that rheumatism in children is essentially cardiac and not arthritic. The cardiac manifestations include endocarditis, which is usually much less severe and acute than in the adult type, but at the same time is much less transient in its nature. It tends rather to relapse and to recur, or even to go on for weeks or months with a provoking degree of persistency in spite of treatment. In the child pericarditis is generally encountered in a subacute form. As a general rule it is very insidious in its origin, and it is only by very close and constant examination of the præcordial region that one is able to detect the onset of this condition. When it sets in, the little patient becomes restless and irritable, and in some cases may complain of discomfort or even pain in the region of the heart. The pulse is rapid, and the temperature is definitely raised. The friction heard over the affected area is often so soft in character as to be mistaken for a cardiac bruit. The friction may disappear, but it always reappears, or if it does not, we notice that the pulse is rapid and weak, while the heart is distinctly fluttering in its action. More or less permanent dilatation of the heart ensues, while the patient tends to become anæmic, and in some cases may die from general enfeeblement and emaciation. The chief characteristic of pericarditis in the child is its marked tendency to recur and to persist.

Another feature of rheumatism in the child is the presence of what are known as subcutaneous tendinous nodules. These take the form of small protuberances about the elbows, knees, back of the head, and along the spine. They are usually quite painless. When met with, they are said to be indicative of the presence of heart complications, but this statement I am inclined to question, as they may occur apart from any heart affection in cases of rheumatism. I should like to mention the fact that skin complications, such as purpura and psoriasis, are often met with in rheumatic children. The latter disease is probably always rheumatic in origin so far as children are concerned. Acute sore throat is often rheumatic in the child. In fact it may

* British Journal of Children's Diseases. Sept. 1909

usher in an attack of acute rheumatism. Appendicitis, as I pointed out long ago, may also be rheumatic in origin, and this view has recently been confirmed. I ventured to state that even pneumonia in the child may, in rare cases, be caused by the organism of rheumatism, but this view has been questioned. I have no doubt that it will be confirmed in the same way as my original contention as regards appendicitis has been.

Rheumatism in childhood is a complex disease pretty much like gout in adults. Its manifestations are so varied that almost any symptom-group may be present. This fact is so often lost sight of that I feel it necessary once more to state my own firm conviction on this point. When this fact has been duly recognised, then a definite advance will have been made in our knowledge of rheumatism as it affects the child. The rheumatic child is extremely nervous and irritable, extremely sensitive, thin and spare, subject to fits of violent temper, generally of a restless disposition, constantly on the move, and consequently we do not wonder to find that it is the rheumatic child who suffers from attacks of chorea, which after all is but an exaggerated form of the nervous unrest and instability so characteristic of the rheumatic child.

Treatment may be briefly referred to. There are, in my opinion, but two drugs which are of any value. These are calomel and acidum acetyl-salicylicum. The latter entirely replaces salicylate of soda so far as children are concerned, as this is very nauseous, whereas the acid is quite pleasant to take. Rest is of first importance, and must be insisted on in every case. There is often a tendency to allow the patient out of bed far too soon; and school life should not be resumed for several weeks after the attack is over. During convalescence I know of nothing so valuable as cod liver oil and iron for restoring nutrition and relieving the anæmia.

In giving acidum acetyl-salicylicum (or even salicylate of soda) alkalis must not be combined with it. I am aware that some actually advise a combination of the bicarbonate and the salicylate of soda, but this I regard as a therapeutic error. To give alkalis with acid acetyl-salicylicum would, of course, result in decomposition of the latter. The dose must be large, never less than 7½ grains. Children tolerate the drug well, and I have often given larger doses with only the best results. Calomel is one of the best purgatives in acute infective fevers, and so too we find it of the greatest possible service in acute rheumatism occurring in children. A word of

warning is perhaps necessary as regards the use of cod liver oil. This cannot be replaced by petroleum which is often given under the impression that it is quite as good. As it cannot possibly be absorbed it is no exaggeration to say that it is worse than useless when substituted in cases where cod liver oil is indicated.

THE DIMINUTION OF OUR RACE.

BY

R. C. KRISHNASAMY IYER, M. B. & C. M., MADRAS.

We are told in the Ramayana about persons who were very tall and stout and with strength greater than that of an elephant, capable of uprooting trees, and they have been given the name of Rakshasas. All those things that are said in the Ramayana either about the existence of the said persons or about the actions of such persons are not incredible. It is a well-known fact in nature that all animals which took to more of eating vegetables became gigantic in growth with strong and big bones and with a very elaborate digestive system. All those animals which took to animal diet were comparatively smaller in bulk and became possessed of greater irritability and fierceness. The intelligence in herbivorous animals is more advanced as also the inhibitive power, whereas, in the carnivorous animals the intelligence is much less marked and we see more of fierceness and barbarity in the carnivorous animals, but during the course of evolution man stood midway between the two. He is a herbivorous as well as a carnivorous animal. Just as we said the herbivorous animals were more sensitive, intelligent and inhibitive in their nature and the carnivorous more fierce, so man must have both these qualities combined in the proportion in which the vegetable or the animal preponderates in his diet. Now we see how the more intelligent of the various races have given up animal diet and taken to vegetable diet as the better of the two. When the primitive man was directly eating the roots and corns uncooked or without being able to extract the essence out of the raw vegetables, *i. e.*, the various kinds of preparations, it is no wonder that he had an elaborate digestive system and big bones and muscles like the elephant. Now, however, we have diminished in stature on account of various causes, of which the mistake in diet is one of the very important ones. If we must be strong and sinewy we must take a good quantity of vegetables and fat, thereby lessening the amount of rice eaten. I know as a matter of fact that very little vegetables are eaten by many people on account

of (1) the difficulty of rearing vegetables for oneself on account of want of space in densely populated and closely packed towns where not an inch of empty land is left without some superstructure; (2) want of time or person to fetch the necessary vegetables from the market owing to pressure of business and the great distance from the market sometimes; (3) poverty which does not allow to spend much money on vegetables. The fact of buying vegetables may prove to be cheaper in the long run on account of its supplying some of the necessary ingredients in a better adapted form than rice from which they are to be manufactured afresh if such vegetables are not eaten and hence tends to the eating of more rice than is necessary. To come to a concrete example, if some element or salt, say *X*, was wanted for the upkeep of the body to a certain amount per diem and if that salt were to exist in rice only in the proportion of .001 and if the very same salt were to be contained in some vegetable in the proportion of .01, the same weights of the two being used, then we should certainly economise our animal energy ten times more by using the vegetable instead of rice. The same argument applies to the use of fat also. It is no wonder to see, therefore, that the poor have a voracious appetite and eat larger quantities of rice than the generality of the rich who take much less at a meal because they generally consume more fat and more vegetables.

By vegetables I mean all those green vegetables like beans, brinjals, cabbages, etc., and roots such as potatoes, carrots, etc., which are generally taken as accompaniments to the staple food which we take, which may be either wheat or rice. Nature is so plentiful in her production of these things that man cannot sufficiently thank the Almighty for the richness of the various species and man is compelled to eat different things on different days on account of either scarcity or absence of production or the dearth of the articles, and it is in varying these vegetables on every day that man can get the good effects of all; for, if one indulges upon one and the same kind of vegetable every day, then, either one is likely to become sick of it or one may have to overtax the excretory system on account of his assimilating the same kind of salts and nourishments from it which are likely to become superfluous.

The absence of *dhal* in our diet is another factor in diminishing the growth of man. *Dhal* and some other beans of the same class are the only substances which can give the necessary proteid matter to our body. I have often seen that people do not take a sufficient quantity of *dhal* every day and there are good many number of cases where no

dhal is used for days together. It is no wonder that such people are puny, half-starved and bloodless and in the long run their blood becomes so weak that they fall an easy prey to some kind of bacterial disease or other and die an early death.

It is in the power of man to live a very long life provided he takes particular care about the proper diet that suits him and takes sufficient exercise to use up the material that has been taken up into the system and allow the eliminatory functions to work properly. Living a long life is only possible when one takes such diet as would allow all his internal organs to grow to a sufficiently proportionate size. It must not be argued here whether people who are very diminutive in size do not live a long life; for, it must be understood that such cases form only a minority and even if they live a long life their progeny cannot be very strong. As we are now concerned both with the growth of the person individually and the propagation of the species of men called the Indo-Aryan and Dravidian it is our duty to see that our races do not dwindle out and become extinct.

If Indians want to aspire to the position to which other nations have risen they must have a physique as good as other nations possess. The Indians will be respected by other nations only when they show that they also form a race comparable with the other nations of the world. We have shown that our intelligence is far superior to that of the Western Nations, that our spiritualistic ideals are also not in any way comparable with the Western People, and the only item in which we are deficient and which we can rectify very soon is the attendance to our proper physique. So one must bring home to his mind the importance of his living upon a mixed diet rather than upon the exclusive use of any single diet.

Cocoanuts form another valuable addition to our diet. It must be taken both in the form of raw coconut added to the curries and in the form of coconut oil which must be used for frying purposes. All the properties of coconut oil can be summed up in the words that it is the "Vegetable Cod Liver Oil." Some say that coconut oil produces giddiness and vomiting, but it must be due to adulteration in the coconut oil, the details of which I have already written in the *Indian Patriot* about two years back. Those who use cocoanuts in excess are found to be more intelligent than those who do not.

When I have been saying that plenty of vegetables, dhal and other pulses, fats and cocoanuts ought to be taken more than is usually the case, I mean only those people who are not up to the normal build of

human stature, *i. e.*, those who are less than 5 feet 5 inches in height at adult age and about 34 inches in chest girth and about 11 inches in the middle of the arm. Only those people should have recourse to such measure.

People who are more fatty than normal will have to do one of three things to come to the normal condition of other people; *viz.*,—

1. To reduce the amount of fat taken every day;
2. To increase dhal and other pulses (beans, etc.) and
3. To take a good amount of exercise.

If even after using these three methods one does not succeed in reducing his fat, he must forego a meal or two once every three or four days; and, with regard to that point our time-honoured observance of fasting on the Ekadasi day and Dasami night has such a beautiful effect upon our animal economy that it is incumbent upon scientific principles that every man or woman should observe such a fasting.

Human constitution is so varied in nature and the number of substances that form the food of the man at various periods are also so varied that, it is impossible to define what will be the nature and quantity of substances which will form such a kind of diet as will enable one to always keep a balance between the anabolism and katabolism of the human system. So the effort of every man ought to be to try to eliminate from the system those products of the various substances that have been eaten, which are of no use to the body—

- (1) either before assimilation into the system,
- (2) after assimilation, but, as an elimination from the blood like the urine and sweat, and
- (3) the accumulated carbonic acid gas on account of the metabolism of the body.

The first point is gained by trying to keep the bowel free; the second is gained by drinking a large quantity of water, and the third is gained by taking plenty of exercise in open air or in a well ventilated room so as to take up a large quantity of oxygen and eliminate carbonic acid gas. When all these three things are used in their proper place, time and amount, there is no difficulty for men to have a very good growth and a very long life, provided they do not abuse their health by some other evil practices.

What are those that tend to shorten life and how to avoid them I shall reserve for another article.

Our Contemporaries.

MEDICINE.

Abstract of a Lecture on Ionic Medication.

BY

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Ionic medication is the introduction of drugs into the body by means of an electric current. To understand the method and to practise it successfully it is necessary to know the following facts:—

1. That when certain chemical substances are dissolved in water many of the molecules of the dissolved substances dissociate or divide into two parts, one taking a positive electric charge, the other a negative electric charge. These bodies are known as "ions."

2. That when an electric current is passed through the solution, the ions bearing the positive charge are repelled from the positive pole (the pole by which the current *enters* the solution—the anode) and reach the negative pole. The ions bearing the negative charge are repelled from the negative pole (the pole by which the current *leaves* the solution—the kathode) and reach the positive pole. The ions with the positive charge travel *with* the current "down stream"; those with the negative charge travel *against* the current "up stream."

3. That when the ions reach the opposite pole some may accumulate there, others may give up their electric charge and become free and then perhaps undergo further chemical changes. New chemical products thus accumulate at the poles.

4. That the ions which shall take the positive charge are the ions of hydrogen, of the metals, of the basic portions of the alkaloidal salts. The ions taking the negative charge are the acid portions of the molecule—chlorine, iodine, SO_4 , PO_4 , the acid portion of sodium salicylate ("salicyl") and others.

In order to introduce the ions into the part required the following procedure must be adopted:—

The drugs must be in dilute solutions, not stronger than 1 or 2 per cent.

They are applied to the part requiring treatment, in absorbent pads placed over the part. The pads must be sufficiently thick, must make good contact with the skin and be evenly bandaged to it. Or a

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sand-bag may be used in certain parts in place of the bandage. It is better to wash the skin first with ether soap to remove grease. The pad may be made of sixteen layers of lint, or it may be a folded towel of similar thickness. This pad is connected to the positive or negative pole of the source of current according to the nature of the electric charge of the ion which we wish to drive in.

The connection is made by a flexible wire insulated by some waterproof covering.

To complete the circuit, the other pole of the source of current is similarly connected with another pad like the first (it must not be smaller or thinner) and placed on some other part of the body. This pad may be soaked in 1 per cent. salt solution. The current must always be started from zero and gradually increased until it is as strong as the patient can bear without pain. Sessions may last twenty or thirty minutes or even longer, and repeated every day or every other day, provided that the skin remains normal. At the end of each session diminish the current gradually to zero before disconnecting. If the current is turned on suddenly or switched off suddenly an electric shock will be felt.

The current may be taken from the mains by means of a switch-board provided with a "volt-selector." In using this method take care that the patient does not touch any conductors connected with earth, such as gas or water pipes, or radiators. The current may be taken from the mains through a motor transformer. This apparatus costs more but is quite safe and the precautions mentioned before need not be observed. It is generally put up as a compact apparatus which gives also other forms of current for other forms of electric treatment.

The ionic method procures the local introduction of drugs into the more superficial parts with a thoroughness unequalled by any other method. Every cell traversed by the current receives some of the ions. The ions spread further afield as they penetrate deeper, and any good effect produced on the deeper parts is more likely due to re-distribution of the ions contained therein, than to the introduction of foreign ions from without.

The following ions have been used with successful results: Zinc ions for chronic and callous ulcers, for bed-sores, for discharging sinuses. For treatment of the latter a zinc rod or wire is wrapped with lint or tape, soaked in 1 per cent. zinc sulphate solution and passed down the sinus. For a successful result the solution must be in contact with each part of the sinus wall.

Zinc ions have proved successful in the removal of moles and warts. For this purpose a zinc needle, connected with the positive pole, transfixes the skin at the base of the growth and a current of 1 milli-ampere is given for one minute. The process may be repeated, transfixing the growth in a direction at right angles to that of the first.

Magnesium ions act like a specific in the removal of certain varieties of warts. A pad, soaked in a 1 per cent. solution of magnesium sulphate, covers the warts and is connected to the positive pole.

Lithium ions have been used for the treatment of chronic forms of arthritis, *e. g.*, gouty and rheumatoid.

Salicyl ions are used for the treatment of neuritis (*e. g.*, sciatica), neuralgia, rheumatoid, arthritis and osteo-arthritis.

In the treatment of joints, salicyl ions may be driven in from one aspect of the joint, lithium ions from another. If the wires are bifurcated more than one joint may be treated at the same time.

Chlorine ions are of great value in producing softening and resolution of fibrous and scar tissue, such as that seen in partially ankylosed joints, and in old burns, but many sessions are, as a rule, required.

This list by no means includes all the ions that have been successfully used, or all the conditions for which they have proved of value. For such a list refer to the *British Medical Journal* of August 31, 1912, in which will be found a paper, read by Dr. Lewis Jones at the Annual Meeting of the Association, introducing a discussion on the subject. An account of the theory and practice of ionication will be found in "Medical Electricity" by the same author. A monograph on Ionic Medication, also by the same author, has recently been published.—*The Polyclinic*.

The Detection of Amœba Dysentery.

ROGERS gives these directions for the examination of the feces for the amœba dysenterica:

A rapid method of detecting amebæ when present in scanty numbers: Although as a rule it is very easy to find the amebæ owing to their numbers, in the exceptional cases in which they are very few the following technique will be of great assistance. French writers in particular have advised the addition of a drop of one-per-cent. watery methylene blue to a piece of dysenteric mucus, as it stains the pus and epithelial cells at once, while for a time the amebæ resist taking up

the stain and also retain their activity. They thus stand out clearly amid their blue surroundings as light refractile motile bodies, and are readily detected even if comparatively few are present. Recently Rogers has found that with a little practice it is possible to detect them in such a preparation examined directly after it is made with a very low power, such as a Zeiss A or a half-inch lens, a higher power being turned on to verify the find. The specimen may be kept at blood heat for a short time and the slide warmed.—*The Therapeutic Gazette*.

Intermittent Swelling of the Parotid Glands.

BY

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IN the *British Medical Journal* of August 10th, 1912, there is an interesting article on this subject.

Seven cases have been recorded by Goebel, Remouchamp, Kussmaul, Lange and Luders. Only one patient was a woman; of the six men two had had syphilis, but although both received energetic anti-syphilitic treatment, the recurrent inflammation of the parotid glands continued.

In Kussmaul's case the periodical swelling was followed by escape of fibrinous plugs from Stenson's ducts, accompanied by a free flow of saliva.

In Remouchamp's case (a man of 85, who had suffered from this disease for fifty-nine years) chemical and microscopical examination of the saliva showed that it was alkaline, rich in mucin and ptyalin, and that it contained pus cells, large nucleated leucocytes, fragments of leucocytes, streptococci and short gram-staining rods, and a blood-count revealed a marked degree of leucocytosis. This appears to be the only case in which a bacteriological examination of the saliva has been made.

Luders considers that the disease (in his two cases) was due to "chills," and the writer of the article thinks that "the above cases were probably due to catarrh of the mucous membrane lining the ducts of the glands."

Drugs appear to have had little effect upon the swelling, and the treatment consisted chiefly of fomentations during an attack, and subsequent massage of the glands,

In one case only (that a woman aged 39) was there any abscess formation; this occurred seven years after the first attack and the abscess was opened and drained.

In the following case iron, strychnine, quinine and belladonna were given at intervals for a considerable time, and during the attacks fomentations, ichthyol-glycerine and belladonna liniment were applied, but the results were disappointing. Massage was never employed, as the glands were always too tender, even when of normal size.

It is interesting to note that the patient had suffered for many years from chronic nasal catarrh with frequent exacerbations, and had one or two severe attacks of acute bronchitis before the recurrent parotid inflammation commenced.

On October 24th, 1901, I saw Miss Mary G., aged 26, head mistress of a public elementary school. She was suffering from painful swelling of both parotid glands with salivation, "cold shivers" and general malaise. The temperature was 100° and the pulse-rate 88. I told the patient that she had an attack of "mumps," and inquired if there were any cases in her school. Her reply was rather surprising, and, at the time, unconvincing: "This is not infectious; I have had it several times before." And she said further that she had been treated for the same disease on several occasions by her former medical attendant, who eventually sent her to a laryngologist for treatment of the chronic nasal catarrh.

I was still incredulous, and insisted upon isolation, as there were two small children in the house. The swelling subsided in four or five days, as in an ordinary attack of mumps; there was no metastatic inflammation, and no other case occurred in the house.

The patient was not seen again until November 5th, 1907, an interval of more than six years, when she had a similar attack affecting both parotids, and she then told me that she had had several attacks in the interval, the swellings being sometimes unilateral, but usually both glands were affected, though it occasionally happened that, as in ordinary "mumps," the inflammation of one gland preceded that of the other by a few days.

Another attack occurred on March 31st, 1908, *i.e.*, in less than five months, and there were recurrences in the following December and again on March 4th, 1909. On July 19th there was another recurrence, followed by an interval of eleven months. The next attack occurred on June 23rd, 1910; this was more severe and lasted for a week. The next attack occurred in seven months, *i.e.*, January 23rd, 1911; and the last recurrence commenced in ten months on November 24th, 1911.

Miss G. informed me that she could not tell how many slight attacks occurred at intervals of a few months, and she only sent for me when the swelling was so severe and painful that she could not go to school; but I attended her in no less than nine attacks, each one reproducing the ordinary symptoms of uncomplicated "mumps." At no time was there any mastitis; menstruation has always been painless and quite regular; the teeth and digestive organs are quite healthy. Every attack was followed by lassitude, neuralgic pain in the face, and much tenderness of the parotid glands, persisting after all obvious swelling had subsided. During and after the attacks the patient was treated with iron, quinine, strychnine and belladonna, and on one or two occasions sodium salicylate was prescribed. Hot fomentations and belladonna liniment were used, and on several occasions ichthyol-glycerine was applied. The periodical recurrence, uninfluenced by ordinary treatment, suggested a chronic bacterial infection, and after discussing the case with Professor Walker Hall, I asked the patient to send for me when an attack was coming on. She came to see me on June 23rd, 1911, when an attack was at its height, the left gland being more swollen than the right. The buccal mucous membrane around the orifice of Stenson's duct on the left side was well washed with a 20 per cent. solution of hydrogen peroxide, and a small sterilised swab on a fine probe was introduced into the patulous orifice. Saliva was flowing freely at the time, and it proved to be quite sterile.

The patient was told to send earlier next time, and she did so on November 24th, 1911, when another attack was commencing. The same technique was carried out, and a swab was introduced into the left duct. On this occasion we were more successful. The culture yielded a pure growth of a gram-negative micrococcus, morphologically identical with *micrococcus catarrhalis*. Professor Walker Hall prepared a vaccine, and the patient received nineteen injections in increasing doses. She suffered from considerable malaise during the course of injections and complained of much "tingling pain" in the parotid glands.

She had a severe attack of acute bronchitis in April, 1912, but remained free from parotid inflammation for more than a year—a longer period than at any time during the last eleven years. The after-history of the case, however, is very disappointing.

Miss G. went to Cheshire to spend her Christmas holidays, and whilst there had another attack, as severe as that in November, 1911. Dr. Robertson, of Dukinfield, suggested that it might be a form of rheumatism, and prescribed aspirin in 15-grain doses. "This,"

she wrote, "relieved the pain far more speedily than anything I had previously had," but naturally she was very depressed by the recurrence. The patient suffered from constant lassitude and depression, but had no further attack until March 11th, 1913, when both parotid glands suddenly swelled simultaneously and the inflammation persisted for eleven days; the temperature never rose above 102 deg., but there was great dysphagia, loss of appetite, and general malaise. Aspirin in 15-grain doses was given from the commencement of the attack, but after a few days it appeared to cause gastritis, so natural sodium salicylate in similar doses was prescribed; neither drug, however, appeared to give any relief. When the swellings subsided an intensely tender nodule as large as a hazel nut was felt over the posterior border of the right masseter; it appeared to be a retention-cyst. On May 9th it had contracted to the size of a large pea, and was still very tender.

This case has followed the course of the seven previously recorded, in that all treatment has been simply palliative, and nothing that has been tried has prevented frequent recurrences in every case. In regard to the vaccine treatment, the question arises: Did the vaccine confer a temporary passive immunity which protected the patient for a year, or was the absence of an attack during that period a mere coincidence? It will be remembered that the general experience of *micrococcus catarrhalis* vaccines suggests that the resultant period of immunity is comparatively short, and does not usually last for more than eighteen months or two years. The failure of the vaccine would have been less remarkable had the culture shown a mixed infection, as in Remou-champ's case, quoted above.

It may well be that these cases are not so rare as one might suppose, in view of the fact that this appears to be only the eighth recorded case, but it is probable that many more have escaped attention; and if anything can be done to relieve a very painful and distressing condition, it is necessary to collect as many cases as possible with details of their treatment.—*The Bristol Medico-Chirurgical Journal*.

Adrenalin in the Treatment of Asthma.

MCCORD discusses the experimental basis for adrenalin treatment and attempts to correlate clinical results obtained by its adoption in cases of asthma. At the time of injection certain unpleasant results have been pointed out as occurring transiently. Severe palpitation of the heart may occur, which leads to a very

pronounced but not accelerated pulse. A peculiar restlessness may set in which may create the patient's alarm, and at times the face may become very pale, but all of these pass rapidly away, and at the same time the respiration becomes easier and softer, and the rattling and wheezing sounds cease. From the results indicated above growing out of the use of adrenalin by both laboratory and clinical workers it seems reasonable to conclude: (1) Adrenalin extends the lumina of contracted bronchioles; (2) this dilatation of the bronchioles is probably the basis for the beneficial action of adrenalin in the treatment of asthma; (3) the dilatation follows subcutaneous, intravenous, and endobronchial administration; (4) the action is transient, but very effective in relieving the acute attack. The subcutaneous administration apparently is the most transient; (5) the administration is simple, and no injurious results follow as a secondary sequence.—*The Australasian Medical Gazette*.

Notes on a Case of Acute Dermatitis following the Ingestion of Brandy.

BY

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It is almost superfluous to write upon the subject of Dermatitis medicamentosa, the number of drugs causing skin troubles being a large one, but the following case seems to possess features interesting and unusual.

Mr. A. (aged 50) suffers a good deal from sleeplessness, and is in the habit of drinking a glass or two of port wine upon retiring for the night, with, he has stated, a beneficial result. I was summoned to see him on the 16th August, and found him suffering from well marked acute gastritis. He stated that early in the morning, being quite unable to sleep, he had, in the semi-darkness mistaken a bottle of brandy for the port, and had drunk over four ounces almost neat. In two hours he was seized with severe abdominal pain, violent vomiting (the vomitus being streaked with blood), and intense itching of the skin. During the morning he had also two rigors.

When I saw the patient he had all the symptoms and physical signs of a severe attack of gastritis, such as follows over-indulgence in alcohol, and a temperature of 102 F. But what was most remarkable was the presence of a bright scarlet rash over the whole body. In distribution, it was well marked upon the chest and back, less well marked upon the abdomen, thighs and legs, it covered the arms and fore-

arms, disappearing towards the wrists. The neck and face were free from the eruption, but slightly flushed. It was curious to observe that at the shoulders, it came no further forward than one inch above the anterior axillary fold. In appearance the rash took on two different characters:—

(1) Bright scarlet red points closely placed together on a flushed surface, resembling a scarlatinal rash. This was well seen on the chest and abdomen.

(2) A patchy condition (resembling the rash of measles), where slightly papular elevations were seen in groups, leaving areas of white skin. This condition was to be seen upon the arms and forearms, and when examined was of a slightly more bluish-red shade than the eruption on the chest.

The itching over the whole surface was very great. There were no patches of an urticarial nature.

Calomel (grs. v.) followed by a dose of Carlsbad Water, was administered; gastric lavage was used once (Sod. bicarb., 30 grs., to 1 pint of warm water); and the intense sickness was treated by Bismuth Carbonate in large doses. Potassium Bromide (grs. x.) and Ammonium Bromide (grs. x.) were also given to allay the mental agitation present. The gastritis responded quickly to the treatment.

On visiting the patient next day, it was found that the temperature was normal, and that the rash had faded considerably, all over the body, and had taken on the bluish appearance seen on the arms the previous day. The itching had almost gone.

On the third visit, two days later, the skin was normal, and the patient was going about as usual. No desquamation could afterwards be discovered.

Except on the first day, the patient experienced little constitutional disturbance.

As a rule he suffers from slight chronic gastritis, and some albuminuria. The heart is slightly dilated, and there is marked arteriosclerosis, probably all due to his habits.

That it was the brandy which caused the eruption seems quite clear. The patient had been living very simply for some time before the onset of his illness, and had not eaten any of those toxic foods which from time to time give rise to rashes in certain persons. The brandy, too, was free from noxious matter, as others had drunk from the same bottle without any evil effects.

The case is interesting from the point of view of diagnosis, and the acuteness of the rash, alcohol generally affecting the skin with chronic troubles.—*The Medical Times*.

Classification of the Phases of Diabetes.

WITH the accumulation of experience concerning the condition which is characterised by the appearance of sugar (glucose) in the urine, physicians long ago began to recognise that in some cases very simple dietary, and other treatment sufficed to restore the patient to health, whereas in others all the resources of the Pharmacopœia proved quite unable to do so. Accordingly, a habit sprang up a few years ago of dubbing these milder curable cases "alimentary glycosuria," while reserving the term "diabetes" for the more serious and intractable forms. This differentiation probably received more favour than it otherwise might have done, because the ominous import of the word diabetes is fairly common knowledge with the public; and any euphemistic synonym was not unnaturally made welcome. In Dr. Garrod's Lettsonian Lectures last year he brought forward a mass of evidence in support of the thesis that no such double nomenclature is admissible; that the condition of voiding glucose in the urine is not a single definite circumscribed disease; and that the disturbance of metabolism which leads to hyperglycæmia, and so to glycosuria, has its origin in a variety of causes.

Pathologically classified, these causes can be divided into those which produce an excess of sugar in the blood; this is then filtered off by the kidneys and appears in the urine. (It has to be remembered that minute quantities of sugar are present in normal urine, but not enough to answer the usual reduction test.) In a second class stand those cases in which the sugar contained in the blood is normal, or below normal; in these the kidneys must be to blame for failing to retain the normal percentage which in health they can succeed in doing.

But pathological classification does not at present carry us sufficiently far to be helpful in the treatment and prognosis of diabetes. From a clinical standpoint cases of metabolic glycosuria can be sifted into three main varieties: those in which glycosuria does not occur in normal circumstances, but may be induced by an indulgence in sugar or sugar-containing foods, which would not suffice to disturb the urinary content of an ordinary individual; those in which spontaneous glycosuria occurs intermittently, apart from

dietary peculiarities; and those in which glycosuria is firmly established, and cannot be got rid of, or only very temporarily, by the most rigid anti-diabetic regimen. The first of these is the condition to which the label of alimentary glycosuria has been frequently fastened. But Dr. Garrod draws attention to the fact that there is no hard-and-fast line between these classes, and that individual patients may pass from one class to another. In other words, there is no true distinction between diabetes and glycosuria, although those terms do certainly cover a collection of diseases of diverse origins having the presence of sugar in the urine as their leading feature.

Dr. Garrod states that a normal person can consume somewhere about five to seven ounces of grape-sugar without thereafter passing it in the urine. Not many adult people, it may be supposed, consume anywhere approaching such a surfeit; so that their tolerance is never strained to the region of its limits. But children are often given to gorging themselves on sugary foods, and may therefore, if allowed to exercise their own lack of discretion, do themselves an injury by imprudent sweetmeat-or sugar-eating. The writer knows of a case in which an adult was discovered to be passing sugar in the urine, and admitted a passion for children's sweets, which had long been gratified to great excess. When the habit was discontinued, the urine returned to a normal condition after no very great interval of time.

Starchy foods are, as is well known, very provocative of glycosuria in those with a tendency to diabetes. This is due to the fact that they are converted into soluble sugar during the processes of digestion. In healthy people it seems impossible to set up glycosuria by any dose of starch which can be taken, as the conversion into sugar does not take place sufficiently rapidly to tax the tolerance. When a meal of starch produces glycosuria, a definitely morbid condition of the metabolism exists. He who excretes small quantities of sugar after a meal rich in carbohydrates differs only in degree from him who has pronounced and advanced diabetes; and the interval between them is bridged by intermediate cases of all grades. It is a matter of dispute, says Dr. Boyd, whether lowering of glucose tolerance is to be regarded as the initial manifestation of that error of carbohydrate metabolism which culminates in diabetes, or of a wholly different significance from glycosuria "ex amylo" and spontaneous glycosuria. But it may be said that when a patient shows lowered glucose tolerance in the course of an acute disease, it

does not in the least follow that he is likely to develop diabetes later on.

Many of the "ductless glands" seem to have peculiar influences upon the metabolic processes which lead to glycosuria, possibly through the action of enzymes. Though not strictly speaking ductless, the pancreas has long been held to form an internal secretion quite distinct from the pancreatic juice, and to have a great deal to do with diabetes. Exophthalmic goitre, again, Dr. Garrod points out, is sometimes associated with diabetes, and more often still with a distinct reduction of glucose tolerance. Moreover, the two conditions of lowered glucose tolerance and actual glycosuria can be induced by the medicinal use of thyroid extract. Out of eleven cases of myxœdema under thyroid medication, glycosuria was actually found in four. In the same way the pituitary body has an influence on carbohydrate metabolism. Glycosuria may occur in acromegaly, and is said to be curiously capricious, appearing or disappearing without sufficient obvious reason. The suprarenals, again, have an influence, though as yet it is very obscure, upon the production of glycosuria, or possibly of hyper-glycæmia primarily.

Diabetes, then, appears to be merely the maximal phase of a series, rising by gradual steps from the normal of metabolism; just as myxœdema is the culminating point of the almost insensible grades of hypothyroidism. With the possible exception of so-called renal glycosuria, there is no such thing as non-diabetic glycosuria, although there are many varieties which lack the sinister significance associated with the name of diabetes. The differences are rather of degree than of kind.—*The Hospital*.

Abstract of a Lecture on some Disorders of Liver Function.

BY

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THE first essential for a perfect consideration of disorders of the functions of the liver is a full knowledge of these functions under normal conditions. We are far from having attained this knowledge; but, being compelled to treat disease as it occurs, we cannot wait until such time as physiology perfects itself, but must make the best of the facts which are already at our disposal.

That the liver exerts important functions in connection with nutrition was deduced in very early times, because of the anatomical fact that the portal vein drains the whole of the digestive tract. Later physiology has confirmed and amplified this deduction, but physiologists have not laid sufficient stress on the fact that this tract, from which all the nutriment for our tissues has to be absorbed, also contains, under normal conditions and mixed with this nutriment, the most septic and filthy material connected with our bodies.

We now know that some of the products of normal tissue katabolism, and of normal digestion, and many of the products of abnormal digestion, are poisonous, and that it is the duty of the liver to protect us from these poisons. The importance of this detoxicating function of the liver has been insisted on by Brunton, and Hunter, and others, but it has not received the attention it deserves from our profession as a whole, though the lay public has always remained faithful to the "disordered liver."

There are three main reasons to account for this attitude on the part of our profession. The first is that too much was claimed for the liver when the condition known as "Lithæmia" held a position analogous to that now held by "Alimentary Toxæmia." The conception of lithæmia as a functional disorder of the liver lost credit when it was shown to be based in part upon faulty physiology; the pendulum swung back, carrying the liver with it into a position of comparative unimportance. The second reason is the difficulty of investigating the liver functions. When it is remembered that there are no cells set apart to perform special functions, but that all the functions of glycogenesis and glycolysis, fat storing, fat splitting, and fat building, protein disintegration, and urea formation, detoxication, bile formation, heat formation, and possibly fibrinogen and antithrombin formation, are carried out by each individual liver cell by means of intracellular enzymes, one reason for this difficulty is clear. When it is remembered further that the liver is a most difficult organ for operative manipulations, owing to its anatomical arrangements, and that complete ablation of the liver is very rapidly followed by death, the paucity of our knowledge of its functions is accounted for.

The third reason for our professional neglect of the detoxicating function of the liver is that we have no simple clinical test which may be applied to investigate the functional condition of the liver. It was once thought that a comparison of the amount of nitrogen excreted in the urine as ammonia with the amount excreted as urea would

serve this purpose; but we now know that this comparison gives an expression of relative body acidosis rather than of liver function. The method of giving large doses of certain sugars has been tried, but has given disappointing results, and is complicated by several physiological factors.

On similar lines Glaessner has tried the administration of certain amino-acids, having determined the amounts which the normal liver should be able to break up. He has obtained positive results in certain cases, and further investigation on these lines may lead to useful results. Roger has suggested the injection of sulphuretted hydrogen by the rectum, and states that in functional incapacity of the liver this gas gets through to the lungs, and can be demonstrated in the breath. He has shown that this will occur in experiments on animals, but it is doubtful whether the method will be adopted for clinical use. Since none of these tests are at present satisfactory, it is upon symptoms that we are still mainly dependent in the diagnosis of disorders of liver function.

The toxic bodies with which our livers may have to deal may be "endogenous," that is to say, formed within our bodies by tissue katabolism; or "exogenous" that is to say, taken into, or formed in, our intestines, and absorbed from thence. Since the endogenous products are represented among the exogenous, they need not be considered separately; but it must be remembered that in many cases they are of equal, or greater, importance.

The exogenous bodies include the following:—

Proteoses and Peptones.—These cause inhibition of blood coagulation, lowered arterial pressure, marked fever, and may be fatal to experiment animals. Injections have caused portal cirrhosis in rabbits.

Ammonia Compounds.—Dogs on which the operation of Eck's fistula has been performed develop severe, and often fatal, nervous symptoms, when given flesh diet. It has been shown that these symptoms may be caused by carbamic acid, and since this exists in the blood in the form of ammonium carbamate, it is generally held that they are due to some compound of ammonium.

Cholin and its Derivative Neurin.—These rare bodies result from the putrefaction of lecithin. They are toxic when given subcutaneously, but not when given by mouth, probably owing to liver action.

Plomaines.—The clinical nature of ptomaine poisoning establishes the toxic nature of these animal alkaloids, and it is probable that the

liver acts on them in the same way as it acts on the vegetable alkaloids, such as strychnine, nicotine, &c.

Aromatic Products—Indol, Skatol, Phenol, &c.—These bodies are oxidized by the liver, and combined with sulphuric acid, form innocuous aromatic sulphates. Excess of indol by mouth in man causes irritability, headache, loss of power of concentration, and early muscle fatigue. Early muscle fatigue has been produced experimentally, and it has been shown that small amounts of indol injected into the carotid artery produce violent nervous excitation, followed by nerve exhaustion.

Bacteria and their Products.—It is established that the liver exerts a destructive action on many bacteria, and on certain bacterial toxins; and further that this protective action is diminished by anything which produces lessened vitality of the liver. In conditions of general reduction of body vitality bacteria frequently gain entrance to the portal blood, even without the presence of any recognizable intestinal lesion, but the systemic blood usually remains sterile.

Fatty Acids and Amino-acids.—It is possible that some forms of these bodies are toxic. It is the duty of the liver to deal with both, and injection of some fatty acids has been shown to cause histological changes in the liver cells, so that, if not directly toxic themselves, they may affect the antitoxic power of the liver indirectly.

Finally, it should be remembered that the number and nature of these toxic bodies is by no means fully worked out. It is probable that there are many substances, and among them possibly the most toxic, which have yet to be isolated.

The fact that the portal blood of a normal dog has double the toxic power of the blood of the hepatic veins of the same animal, gives a broad example of the antitoxic action of the liver.

In dealing with the clinical aspect of this subject, it must always be borne in mind that the livers of different individuals will differ just as much as their brain power or muscular development.

The main symptoms and signs which have been ascribed to the disordered or sluggish liver, though individually not severe, form a formidable list when added together. They include anorexia, nausea, bad taste in the mouth, with a furred flabby tongue, sensations of epigastric distension—possibly heart-burn and eructations. Constipation is common, but the bowels may be regular, or even loose. The skin is muddy and sallow, the pulse slow or irregular. Attacks of

palpitation may occur. Oxalate crystals or indican may be present in the urine. The most marked and distressing symptoms occur in connection with the nervous system. These patients can hardly but be pessimists, and to them the term "melancholy" really applies. Commonly they have a little dull head-ache, hardly a definite pain, but sufficient to remind them constantly of its presence. Constantly languid and lacking energy, everything is for them an effort. They are prone to slight giddiness, drowsy, dull, and heavy after meals, and can scarcely be blamed if their tempers are irritable. Having been inclined to sleep after every meal during the day, they are often tormented by insomnia at night, and if sleep has come, they yet wake in the morning unrefreshed.

Of these symptoms, those connected with the nervous system are probably due to diminution of the detoxicating power of the liver. We saw that most of the toxic bodies which the liver should destroy act on the nervous system, and the above symptoms are such as we should expect to result from their incomplete destruction. Further, it is difficult to see to what else they could be due. At one time these symptoms were believed to be due to stagnation and absorption of bile; hence the term "bilious"; but we now know that the toxicity of bile pigments is very slight, if indeed, it exists at all, and that, of the above signs, bile salts would only cause slowing of the pulse. We must all be familiar, too, with cases showing deep jaundice but an absence of all these symptoms.

No doubt some would class all these cases as "Alimentary Toxæmias," but this would imply that all the toxic material is exogenous in origin, and present in excess, and it seems better to divide patients presenting these symptoms into three groups:—

(1) Patients born into the world with livers of weak functional capacity. Primary functional liver deficiency.

(2) Patients in whom the functional condition of the liver has been reduced from some cause; sedentary life, malnutrition, fevers, passive congestion, nerve strain, &c. Secondary functional liver deficiency.

(3) Patients in whom the functional capacity of the liver is normal; but the toxins are present in excess, whether from errors of diet or errors of digestion. True alimentary toxæmias.

The above classes only include those patients who suffer from slight deficiency of liver function. A more severe degree causes the fatal condition known as cholæmia—a condition which may in the future be shown to have a close connection with puerperal eclampsia, with severe acidosis, and even with ordinary uræmia.

Treatment.—The so-called cholagogues, with the possible exception of the bile salts, act merely as purgatives. By hurrying the bile through the intestines, they prevent a large amount from being reabsorbed, and so lead to the removal of an increased amount in the feces. They are only of use in the treatment of functional deficiencies of the liver because this purgative action clears away toxic material, which would otherwise be absorbed.

Intestinal antiseptics should be of considerable value theoretically, but in practice they cannot be given in doses sufficient to be of real use.

Even if we could keep the intestines clean by these drugs, the toxic endogenous bodies and the toxic products of normal digestion would still remain to be dealt with, and for this purpose we need some method of directly stimulating the liver functions. We know of no drug which will do this, but the work of Roger, dealing with the action of certain substances in modifying the action of the liver against bacteria, is very suggestive. He found that small doses of ether stimulate this function, but large doses depress it. Now ether is a liver poison, and there is nothing new to us in the conception that drugs which are poisonous to an organ in large doses act as stimulants when given in small, or therapeutic, doses. Investigation of drugs which injure the liver in large doses might show that the moderate use of alcohol with meals, and the therapeutic use of phosphorus and arsenic as tonics, are justified in part by a stimulant action exerted by them on the liver.

This, however, is but conjecture. At present our only sound means of liver stimulation is mechanical, by exercise. This should be ordered and applied with a due regard to the mechanics of the liver circulation.

The liver is not hard, but a soft and sponge like organ, which can enlarge and contract with great ease. Salaman has shown that a normal liver will take up about half its own volume of blood at a pressure of 1 ft. of water, or its own volume at 2 ft. 3 in. On consideration of the pressures which obtain in the abdomen around the liver, and in the main vessels connected with it, during the different phases of respiration, we find the following figures:—

Quiet inspiration	In abdomen ...	+ 12 mm. Hg.
	In inf. ven. cava ...	- 10 "
Forced inspiration	In abdomen ...	+ 70 to 200 mm. Hg.
	In inf. ven. cava ...	- 20 to 30 "
Quiet expiration	In abdomen ...	+ 6 mm. Hg.
	In inf. ven. cava ...	+ 5 "

Forced expiration: No exact figures, but probably, as in the case of quiet expiration, the difference between pressures in abdomen and inf. ven. cava will be practically nil.

These figures show that owing to differences between the pressures in the abdomen and the thoracic inferior vena cava during inspiration, there is a force equal to some 20 mm. Hg., which tends to squeeze the liver and to propel blood through it, and that under conditions of effort this force rises until it may equal arterial pressure. During expiration, on the other hand, the pressures become approximately equal, and consequently the driving force drops to practically nil.

It is obvious that the act of respiration exerts a massaging or milking action on the liver, and that the liver must be largely dependent upon this action for the healthy performance of its functions.

This fact helps to explain the action of the sedentary life in causing the sluggish liver, and the well-established beneficial effect of exercise. Since, however, the majority of patients do not know how to breathe properly, their methods of expanding their lungs should be examined, and, if necessary, a course of breathing exercises under supervision should be ordered, as a preliminary to more general exercise.

The liver needs a large amount of oxygen to carry out its duties; and so the better the atmosphere in which exercise can be taken, the more good it will do the patient.

In connection with diet in the treatment of these patients, the essential requirements are common-sense and moderation. No hard-and-fast rules can be given, but the individual experiences of each patient should be studied. It is well to remember that many patients suffer from intestinal fermentation and putrefaction, not because of what they have eaten, but because of the way they have eaten it, and to insist on efficient mastication.

There seems to be an inclination to pay too much attention to abnormal toxic substances as causes of symptoms of liver deficiency, and to ignore the fact that the endogenous products of tissue katabolism and the products of normal digestion are toxic.—*The Polyclinic*.

Glycosuria due to Salvarsan.

L. NIELSEN.—A man, aged 28, who had rheumatic fever 16 years before, and apical pneumonia with slight hæmoptysis 10 years before, developed an indurated erosion on the corona glandis. Spirochaetes

were found, but the patient's general condition was satisfactory, and the urine contained neither albumin nor sugar. Sixty cgm. of salvarsan were injected with 4 minims of glycerine and 4 c. c. of warm distilled water into the left buttock. This caused but slight tenderness and pain, and the temperature and general condition were at first satisfactory. Two days after the injection the temperature rose to 103.9°, the site of the injection became very tender and painful, and a swelling could be detected in the depths of the buttock. Though the urine had contained no sugar on the day previous to the injection, it contained a considerable amount 5 days later. There were no other symptoms of diabetes. On the ninth day after the injection, polarization showed no sugar, and the phenyl-hydrazin test showed but a trace. A week later, polarization showed 0.3% sugar and there was marked reduction of Fehling's solution even after precipitation with lead acetate. About a month after the first injection, a second injection of 35 cgm. of salvarsan was given. This was well tolerated. The urine examined immediately before and after the injection contained no sugar, but a trace was found on the evening of the same day. On the morning of the second day the sugar had increased, but in the evening of the same day it had again diminished. In a few days the urine again contained no sugar.

Boas has observed a patient who had previously been treated for diabetes, but whose urine contained no sugar previous to 2 injections of salvarsan. Both were followed by transient glycosuria. Jersild has also observed glycosuria lasting a few days after an injection of salvarsan. Lewin has also found a reducing agent, similar in its action to sugar, in the urine of patients treated with arsenic. The writer thinks that glycosuria as a sequel to treatment with salvarsan may be relatively common.—*The Medical Review*.

Importance of Albumin in the Sputum in Early Diagnosis of Tuberculosis.

KAUFFMANN states that tests for albumin in the sputum gave constantly positive findings in his 108 tuberculous patients examined. Albumin does not appear in the sputum in chronic bronchitis, but it occurs in pneumonia, congestion, catarrh and foetid bronchitis. The finding of albumin in the sputum confirms the positive evidence of the skin and subcutaneous tubercular reactions; it indicates an active tuberculous focus, and locates it in the lung. As the tubercular focus heals, the albumin disappears from the sputum. In pneumonia, it disappears from the sputum after the crisis. If it is found later,

this indicates the development of new foci, or empyæma, or the existence of pulmonary tuberculosis. The test is simple. The sputum is shaken up with a little acetic acid, which precipitates out the mucin and nucleo-albumin. The filtrate is then tested for albumin by boiling or with potassium cyanide. Kauffmann applied both tests, adding a few drops of a concentrated salt solution to the filtrate, and then boiling, or a few drops of the cyanide solution were added to the filtrate. In doubtful cases the cyanide solution can be poured on the filtrate; a whitish gray ring forms at the zone of contact. The importance of this test is most marked in the incipient stages of pulmonary tuberculosis. The findings may be negative until a subcutaneous injection of tuberculin induces a focal reaction. In one case the findings were negative until the dose of tuberculin was doubled, when the temperature rose, but there was no apparent focal reaction, and yet albumin appeared in the sputum, and the later course of the case confirmed the positive findings. In 37 of the cases the tuberculosis was in the earliest stage, and no tubercle bacilli were found on daily examination, but the albumin reaction was constantly positive. Gerard declares that a negative skin tuberculin reaction, and a positive albumin reaction are signs of a non-tuberculous pulmonary affection; while a positive skin reaction and a negative albumin reaction signify latent tuberculosis. When both reactions are positive, an active tuberculous process in the lung may be assumed. Albumin appears in the sputum in a number of other affections, in heart and kidney disease, and in pulmonary œdema. Its great value is that it enables pulmonary tuberculosis to be differentiated from bronchitis. In two of the cases of chronic bronchitis reported, the albumin test had been constantly negative, and autopsy failed to reveal any trace of a tuberculous focus.—*The Australasian Medical Gazette*.

SURGERY.

Lymphatic Gland Extract in Enlarged Tonsils and Adenoids.

From dissection of numerous foetuses, Hugh T. Ashby concludes that adenoid tissue is present in all children, while in some it grows to be pathological. In children with enlarged tonsils there is a diminution of lymphocytes in the blood, and an increase in leucocytes. It looks as if enlargement of the tonsils and adenoids were an attempt by Nature to supply a deficiency in other lymphoid tissues of the body. Artificial supply of lymphoid tissues is therefore

suggested, and the author tried administration of lymphatic gland extract in a number of cases. Five grain doses were given three times daily; no bad effects were observed, and all the children have improved materially, snoring having ceased and the tonsils having diminished—*The P. M. Journal*.

Death from Neo-Salvarsan.

The writer's experience at the Royal Prince Alfred Hospital with Neo-Salvarsan has not been happy. Salvarsan was given in some hundreds of cases without untoward symptoms. Its use was abandoned for Neo-Salvarsan and 2 or 3 cases of acute exfoliative dermatitis, obviously from arsenical poisoning, occurred. The first death resulted in a young man of 20, a suitable subject in every way for injection, after Neo-Salvarsan. Neo-Salvarsan is not nearly so active as Salvarsan in removing the early papular syphilides, and other early manifestations. Higher temperatures seem to obtain, and the negative Wassermann takes longer to attain.—*The Medical Review*.

Death from Salvarsan.

T. G. FLEMING.—A robust youth, aged 19, was given at the Adelaide Hospital an intravenous injection of 0.6 gm. of Salvarsan soon after the appearance of a hard chancre and before any secondary manifestations. A slight reaction followed. Two weeks later the injection was repeated, and again a slight reaction followed. He was detained over night and allowed to return home next morning. On the way home he had to lie down in the gutter for 15 minutes owing to giddiness. About 48 hours after the injection he complained of a general feeling of being ill, epigastric pain, and sensitiveness to noises, which all noises sounded like the beat of a drum. He was flushed and sweating. Temperature 101°, pulse about 90. Knee-jerks slightly exaggerated. About 8 hours later he became irrational, and was very frightened. Frequent rigors; pupils equal and active. Bowels had been opened by enema. He was given a hypodermic of morphia and atropine. His condition was not such as to excite any grave alarm. Next morning he was stuporose, having become gradually more dull during the night. He made no response to questions, but reacted to painful stimuli. Pulse was still good, temperature a little over 100. Babinski's sign present; knee jerks exaggerated. Towards evening fits commenced and recurred at varying intervals during the night, altogether he had 18 during the next 24 hours. He vomited 4 or 5

times. He was seen in two convulsions; one was generalised, the other definitely left-sided. Next morning lumbar puncture was performed and yielded 1½ oz. of clear fluid under pressure. The fluid contained blood, excess of cells, no microbes. He gradually became comatose, and died 96 hours after the injection, or 48 hours from the onset of symptoms. No necropsy was allowed.

The writer refers to 9 recorded deaths after the administration of Salvarsan with similar symptoms, in some of which a necropsy was made and showed hæmorrhagic encephalitis. The only point in which his case differs is that the reflexes were increased instead of lost. The patient was one of four who were infected by the same woman on the same night. One other man was treated by two injections of Salvarsan and the other two were not. None of these showed any untoward symptoms. This proves that the symptoms were not due to any special virulence of the virus, as has been suggested. Nor can the death be explained by a peculiar susceptibility of the patient to the virus, for such cases have been observed only since the introduction of Salvarsan. The patient was young and healthy and apparently an ideal subject for Salvarsan. It must be concluded that death was due to a special susceptibility to the drug which set up encephalitis. Unfortunately there is no means of determining the existence of this idiosyncrasy. It is not easy to understand why the symptoms do not arise for 48 hours. Are the benefits to be derived from Salvarsan sufficient to justify the risk of death (small as it is) in patients who almost certainly would not have died under mercury?—*The Medical Review*.

OBSTETRICS AND GYNÆCOLOGY.

Pituitary Extract in Obstetrical Practice.

BY

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It seldom happens that a new drug or remedy comes into universal use in such a short space of time as has been the case with pituitary extract in obstetrical practice. Since it was first used clinically by Blair Bell in 1909 it has been employed in practically every obstetrical clinic throughout this continent, and in Britain and Europe. The result is that in these four years a vast amount of

literature has accumulated on the subject. It seemed to me that a useful purpose might be served in reviewing this literature, and in affording an opportunity for discussion amongst those of us who have used the drug, and have not up to the present put our results upon record.

Any new remedy is apt at first to be used somewhat indiscriminately, and this has been the case with pituitary extract. We can, however, learn a great deal from such experiences, for it is only by a consideration of a large number of cases, and by a study of the good and bad results obtained under different circumstances, that we can arrive at a proper conclusion regarding its sphere of action and its limitations.

Anatomy and Physiology. The pituitary body is situated in the sella turcica, at the base of the skull. It consists of two lobes, an anterior and a posterior, connected by the pars intermedia. The posterior lobe is connected with the floor of the third ventricle by the infundibulum. In the female the body is about one-tenth heavier than in the male (Biedel: *Innere Sekretion*, Berlin, 1910). The weight is always increased during gestation, and while diminishing again post partum, remains greater in multiparæ than in nulliparæ.

The two lobes differ in size, in structure, and in function. The anterior is the larger of the two. It consists of a stroma of connective tissue, containing epithelial cells arranged in a glandular fashion. These cells are of two types, those which stain deeply with the ordinary stains—some being eosinophile and some basophile—and those which stain feebly. It is to the increase in size and number of these latter cells that the increased weight of the gland during pregnancy is due. At the same time they change in character and in staining reactions. The epithelial cells of the anterior lobe produce a colloid substance. Destruction or removal of this lobe in adult animals results in their death. Young animals may, however, survive the operation, and in them marked effects are produced; they take on fat rapidly and sexual development is arrested, the genital organs remaining in an infantile condition. The same results have been observed to follow disease of the gland in the human subject. The anterior lobe therefore has important influences on the development of the genital system and on the maintenance of its functions.

It is, however, more particularly with the posterior lobe that we are concerned in practical obstetrics, for it is that lobe which contains the substance which has such marked effects in uterine contraction.

This lobe has a structure entirely different from that of the anterior. It is developed from the floor of the third ventricle, in distinction from the anterior, which develops from the stomatodæum. It is composed of ependyma, neuroglia cells, and small islets of epithelium. Animals may survive for a long time after its removal. Extracts prepared from it have very pronounced effects on non-striped muscle and on certain of the other tissues of the body.

Action of Pituitary Extract. The function of the pituitary body has been investigated by Herring, by Schaefer and Oliver, Dale, Bell, Otto, Scott, Swale Vincent, and many others. Schaefer and Oliver showed that extracts of the gland produced a marked rise in blood pressure, owing to constriction of the peripheral vessels. They also demonstrated its diuretic action, due partly to a dilatation of the renal vessels, and possibly to a direct action on the kidney cells. The latter observation Merrill failed to confirm. Besides its action on the peripheral circulation it has a direct action on the heart, causing strengthening and slowing of the beat. Dale was the first to demonstrate its action on the uterine muscle. Later Frankl-Hochwart and Frohlich carried out a series of experiments, showing that pituitary extract caused marked contraction of the uterus of pregnant and lactating animals, and rendered it much more sensitive to Faradic stimulation. These results have been confirmed and amplified by other observers (Bell, Cushny, Falta and Fleming, Klotz, etc.). Frankl-Hochwart and Frohlich obtained their results only in pregnant and lactating animals. The results are always most pronounced in the pregnant uterus, but can also be demonstrated in the non-pregnant organ.

The active substance contained in the gland has been investigated by several observers. Fuhrer found that B—imidazolylathylamin (histonin) closely resembled pituitary extract pharmacologically, but he does not believe that it represents the influential constituent. Houssay and Ibanez have isolated from the posterior lobe a crystalline substance which is diuretic; and which has all the effects on non-striped muscle that the whole extract of the gland possesses. They state that it is much more reliable than the whole extract. Herzberg states that the active hormone has been isolated by Meisher Lucius and Bruning. It is put up for use as hypophysin sulphate. He has used a 1 in 1,000 solution in thirty-two cases, and finds that it possesses all the advantages of pituitary extract and is free from bad effects.

Blair Bell, in 1909, was the first to apply in practice the results of the experimental investigations carried out up to that time. He used the extract with good results in cases of post partum hæmorrhage, placenta prævia, and to minimise hæmorrhage in Cæsarean section. After him Hofbauer published his results, and since then records have been rapidly accumulating.

When administered to a woman in labour the extract quickly causes an increase in the strength of the uterine contractions, while the duration of contraction becomes prolonged and the intervals between pains shortened. The first contractions may be somewhat tetanic in character (a point which is taken up later), but very soon they resume their ordinary rhythmic character, and apart from their increased force do not differ from normal. When administered during the first and second stages of labour, results are practically constant. These results are always most apparent if the pains have been previously feeble, and occurring only at long intervals. On the normal contractions little effect may be produced. As regards its action in the early months of pregnancy in the induction of labour and post partum, clinical records are at variance, and to a consideration of these attention will be directed later.

Mode of Administration. Most of the extracts now on the market are prepared from the posterior lobe, a few from the whole gland. It is, however, from the posterior lobe that the active substance is obtained. Pituitrin, pituiatrin, pituglandol, glandiutrine, hypophysin sulphate, vaporal, are some of the names under which it is sold. There seems to be little or no difference in the activity of the preparations put up by different firms. The preparations I have used have been those prepared by Messrs. Duncan, Flockhart & Company, Edinburgh, and Burroughs, Wellcome & Company. Sterilization by heat does not destroy its action, and it is usually put up so sterilized in glass ampules, and is ready for hypodermic, intramuscular or intravenous injection. When administered by the mouth, even in large doses, little or no effect is produced upon blood pressure or uterine contraction (Foges & Hofstaetter). The most convenient way to give it is by subcutaneous or intramuscular injection. The latter is the method I prefer, as it seems to me to act more quickly and powerfully than when given subcutaneously. I cannot help feeling that some of the comparative or complete failures recorded have been due to the subcutaneous method of administration. No pain follows the injection. Hofbauer has used it intravenously, and finds it acts very quickly and powerfully

on the uterus. Certain unpleasant symptoms, however, such as pallor, cyanosis, perspiration and a sense of oppression, sometimes resulted, and in ordinary cases this method cannot be recommended. Where very prompt action is required, as in cases of post-partum hæmorrhage, it might with advantage be employed. Hofbauer warns against leaving any trace of alcohol in the syringe used for administration of the drug, stating that it interferes with its action, but this observation has not been confirmed by subsequent observers. I have taken no such precautions, and have seen no bad results.

Dosage. The dosage is fixed in terms of gland weight. Recently Dale and Laidlaw (*Journ. Pharmacol. & Experimental Therap.*, September, 1912) outlined a method for the standardizing of extracts by using the isolated uterus of the virgin guinea-pig, which gives uniform resistance to successive equivalent doses. One cubic centimetre of the extract, which usually represents 0.2 grammes of gland substance, is generally regarded as the full dose. I have employed as a routine a dose of 10 min. There is no cumulative action of the drug, and large quantities may be given without bad results. Hofbauer has given 7 cc. within twenty-four hours. Bab, in treating cases of osteomalacia, has given 2 cc. in a single dose daily over a period of a month without any bad effect. One of his cases had as much as half a litre altogether.

In animals large doses often result in glycosuria, but this is as a rule only temporary (Miller and Lewis, *Johns Hopkins Hospital Bulletin*, February, 1913). It has been found experimentally in animals that a second dose administered shortly after the first has very little effect in further raising blood pressure, while succeeding doses fail to produce any effect at all.

When given to the patient in labour a single dose produces a marked effect on uterine contractions, usually within ten minutes of administration, and the maximum result is obtained in from half an hour to an hour and a half after. Thereafter the effects gradually pass off, but, in contrast to the results obtained experimentally, a second injection again stimulates powerful contractions. If a single dose has had little or no effect after the lapse of ten minutes, a second injection may produce results.

We shall now take up in detail the different indications for use in obstetrics.

To accelerate Labour when Already in Progress. We take up this aspect of the subject first because the action of pituitary extract is

most certain and attended with the fewest side effects, when given after labour has been in progress for some time, and pains have become feeble and infrequent. Hundreds of such cases have now been recorded, and it would serve no useful purpose to recapitulate them. Nor do I intend to give details of all my own individual cases. I shall content myself with giving the general conclusions arrived at from the study of all these cases, and refer shortly to one or two of special interest, which I have myself observed.

The results are more certain in the second stage than in the first, and the lower the head is in the pelvis the more pronounced the effect of the drug. If the head has been down in the pelvis for some time, and remains there owing to feebleness of the pains, a single injection of 1 cc. or less usually results in its expulsion within half an hour, and very often in a much shorter space of time. Bondy, for instance, found that patients in whom the average duration of labour had been thirty-six hours were spontaneously delivered within an average space of twenty-eight minutes after the pituitary injection. We have frequently observed delivery take place in such circumstances as the result of a single strong pain within five minutes of the administration of the drug. The drug is equally efficacious whether the inertia be primary or secondary. Its timely use in such cases will save many a forceps operation. This is a point emphasized by Voigt. Hamm states that since using pituitary extract forceps were required only twice in three hundred deliveries. In the Strasburg clinic, where his observations were made, forceps were used formerly in 3.9 per cent. of cases. Typical examples may be given, similar to many others in the literature.

Mrs. R., primipara; confined in the Toronto General Hospital, December 6th, 1912. Pelvic measurements normal. The first stage of labour was prolonged, and at the end of twenty-four hours pains were feeble and dilatation incomplete. So morphia (a quarter of a grain) was given. She rested for eight hours, and then pains began again, and in an hour the os was dilated and membranes ruptured. The head was well down in the pelvis, but the pains became more and more feeble, and at the end of four hours no progress had been made. Ten minims of pituitary extract were given. Strong pains began within three minutes, and in five minutes more the head was born. The rest of the labour was perfectly natural. The placenta was spontaneously expelled half an hour after the birth of the child.

ood loss slight; uterus remained strongly contracted.

Equally good results are recorded in cases of delay in the second stage, due to causes other than mere feebleness of uterine contractions, such as size or malposition of the head, face and breech presentation, twin pregnancy, and minor degrees of contraction of the pelvis, conditions which, without the use of pituitrin, would often have called for operative interference.

Persistent Right Occipital Position. Mary R., multipara; confined in Toronto General Hospital at full term on April 12th, 1913. Pelvic measurements normal. R. O. position. Admitted in labour with os fully dilated and head down in pelvis. Had been in labour twenty-one hours. After admission pains were feeble. The head remained in the perineum for two hours. Ten minims pituitary extract were given. Strong pains came on in seven minutes; in half an hour the head was born face to pubes. Perineal laceration of first degree. Rest of labour normal.

Twin Pregnancy. Mrs. M., multipara; confined in Toronto General Hospital at eight-and-a-half months on April 19th, 1913. Patient was admitted in labour. It was noted that the abdominal tumour was large, but the diagnosis of twins was not made. Pains were feeble and ineffectual from the beginning. The os was fully dilated, and the membranes ruptured after thirteen hours. Head quickly came down in perineum, but then pains got feeble, and no progress had been made at the end of two hours. Ten minims pituitary extract were given. Pains became stronger within five minutes, and occurred more frequently. First child born ten minutes later, followed in two minutes by the second child, and in twenty minutes by the placenta. Uterus contracted strongly after, and there was practically no loss of blood.

In patients with *slight contraction of the pelvis* the use of pituitary extract may save a forceps extraction. Hamm records two cases, in which spontaneous delivery occurred after a single injection, and in which, owing to a slight contraction of the pelvis forceps extraction had failed before the patients were admitted to the hospital. Even if forceps should ultimately be required in a narrow pelvis, the more powerful contractions conduced to help the moulding of the head and render extraction easier. If the drug is going to act it will do so within ten minutes, and so no time is lost. There are many cases on record where an injection was given, and forceps were being prepared, but delivery has taken place before the instrument could be sterilized.

In such minor degrees of pelvic contraction Hengge and Grunbaum have had good results. Voigt states that in six hundred cases

in the Dresden clinic, among which were a number with narrow pelvises, forceps were never used. Fries states that a number of times he has seen the entrance of the head into a slightly narrow brim helped by the use of pituitary extract. The contraction must of course be of such a degree as to allow of the passage of the head. The drug has no place in the treatment of labour in a markedly contracted pelvis.

Linzenmeier enters a plea for its use after the operation of pubiotomy. He deplors the discredit into which the operation has fallen, owing chiefly to the tearing of the soft parts and subsequent sepsis, due to instrumental delivery after section of the bone, and records two cases in which he used pituitary extract with happy results. In one the membranes ruptured early, and a hydrostatic dilator was inserted into the cervix and 1 cc. of pituitary extract given. After full dilatation the head failed to engage in spite of the Walcher position. Left-sided pubiotomy was performed and another cc. of pituitary extract given. The child was born spontaneously in thirty-five minutes without any tearing of the soft parts. In another case the child was born as the result of four uterine contractions induced by 1 cc. of the extract given immediately after section of the bone.

When given late in the first stage of labour the results are almost equally as good as in the second stage. If the os is almost completely dilated, and progress arrested owing to feebleness of the pains, a single injection is usually sufficient to effect full dilatation. In such cases the drug is of the greatest service. Under such circumstances the practitioner is tempted to terminate the case by the application of forceps, a mode of interference which is too often attended with extensive cervical lacerations. Pituitary extract does all that is needful, and thus saves the patient from operative interference and from possible ill health afterwards, resulting from extensive tears.

In the earlier part of the first stage the results are not quite so certain, but they are better in multiparæ than in primiparæ. In the latter, if dilatation has only just begun, spasm of the internal os may result and labour be retarded. We shall refer more fully to this when speaking of the bad effects of the drug.

In Post-partum Hæmorrhage. It was in the treatment of post-partum hæmorrhage that pituitary extract was first used by Blair-Bell and later by Foges and Hofstätter. They found it efficient, even in severe cases. Good results have also been reported by Aarous, Eisenbach, Schmidt, Gussew, Herzberg and others. There is, however, a considerable diversity of opinion as to its efficacy in these cases, the

majority agreeing that it is less efficient than some of the ergot preparations. Hofbauer, for instance, found that the results are very uncertain. The mode of administration may have something to do with its failure in the hands of some of these writers. Most of them employed the subcutaneous method, and as we have seen the action of the drug is slower when given thus than when given intramuscularly.

Klotz has treated eighteen cases by the intramuscular method with good results. In two of these ergotin had no effect, but powerful contractions resulted in less than three minutes after the pituitary injection. Schmidt got good results in a case where a subcutaneous injection failed by injecting directly into the uterine muscle through the abdominal wall. In a case of Cæsarean section he induced powerful contractions in a similar way by direct injection. In another case he got a good result by injecting the drug into the uterine wall with a long needle passed through the cervical canal. Gussew, by its use, was able to control severe post-partum hæmorrhage after vaginal Cæsarean section.

A previous injection of pituitrin has the effect of sensitising the uterus, and rendering the action of the ergot preparations more certain (Herzberg). Kroemer has in this way found that it acts well with secacornin.

Personally, I have had no opportunity of using it in a severe case of post-partum hæmorrhage. In hæmorrhages of a minor degree, due to slight atony of the uterus, I have always found intramuscular injection to be followed by powerful contraction, with cessation of the bleeding.

In Induction of Labour. After the effect of pituitary extract on uterine contractions had been demonstrated it was not long before it was tried for the induction of labour, and a considerable number of observations are now on record. The results obtained, however, have not been altogether satisfactory. In the early months of pregnancy its effect is very uncertain, but towards full term better results may be obtained, and at term and in postmature cases a good effect is still more to be depended upon. When given for the induction of abortion in the early months the results are almost invariably negative. Sometimes it has no effect whatever in producing uterine contractions; in other cases contractions are induced, but they have little effect in opening up the cervix and quickly pass off. In others it retards progress by causing a spasm of the os. For the treatment of incomplete abortion also it is not to be recommended. Hale has used it in twenty-

seven cases, giving daily subcutaneous injections of 2 cc. of the extract. Pains were induced in almost all the cases, and in some were quite severe, but twenty-two out of the twenty-seven were failures, and the ovum had subsequently to be removed manually.

Neu reports the case of a woman three months pregnant, whom he treated for osteomalacia with large doses of pituitrin without producing any effect on the pregnancy. Schæfer failed to induce abortion at the third and at the fifth month, even by giving 8 cc. in the course of twenty hours. In a case at the sixth month, after pains had been in progress for some time, two injections resulted in spontaneous expulsion of the ovum. Hamm reports a case in which he gave 1 cc. in order to terminate pregnancy at the fourth month. The cervix was at the same time plugged with gauze. Two further injections were given at intervals of two hours. When the tampon was removed the internal os was found to be firmly contracted in a spasmodic fashion, and only relaxed when the patient was deeply anaesthetized. In another case he tried to induce abortion at the third month in a patient with tuberculosis. She had three injections daily for three days with no result. A tent was then inserted, and another three injections given. Uterine contractions were strong, and the tent was expelled. The internal os, however, was found to be in a stage of spasm, and the uterus in tonic contraction. The ovum was removed only with the patient in deep narcosis, and after multiple incision of the cervix. In another case at the sixth month the cervix was plugged and five doses of pituitrin given. Pains resulted, but he found, on removal of the plug, that the internal os contracted spasmodically during the pains, admitting then one finger only, whereas between the pains it admitted two. Under anaesthesia this spasm relaxed, and the uterus was easily emptied.

Rieck gave pituitary extract in the hope that the placenta, retained after the expulsion of a four months foetus, might be expelled spontaneously. Strong pains resulted, but the internal os became closed, so that it was impossible to introduce the finger. The next day it was soft and easily dilated. Eisenbach reports two failures, one missed abortion at the third month, and the other at the fifth month. Hirsch, in five cases, states that in one only did complete expulsion of the ovum occur without further treatment.

I have myself tried it in two cases of incomplete abortion, with retention of the placenta, between the third and the fourth month. In either of them did spontaneous expulsion occur. Each had two

injections within two hours of each other, but no pains were induced, and no spasm of the internal os was observed.

It will thus be seen that in the early months, whilst uterine contractions may be induced, these are usually insufficient to expel the ovum, and its expulsion is further impeded by spasmodic contraction of the internal os. It should therefore only be given in cases where the os is widely dilated. In septic cases, with retention of the ovum or part of the ovum, it should not be employed, as the stricture of the os may render manual separation more difficult than it would otherwise be.

In the induction of premature labour the results are somewhat better, although by no means uniformly satisfactory. Stern was among the first to employ it for induction, and he succeeded in two cases out of three. In both the indication was tuberculosis of the lungs and larynx, and in each spontaneous delivery occurred. I have used it successfully in a similar case.

Mrs. A., aged thirty-five, primipara. Suffered from phthisis for several years. Was seen in consultation when at the eighth month of pregnancy, when the patient was much exhausted, suffering from night sweats, sleeplessness and general weakness. Termination of the pregnancy was clearly indicated. At 2 p.m. 10 minims pituitary extract were given intramuscularly. Within ten minutes a powerful contraction of the uterus occurred, tetanic in character, and lasting nearly four minutes. This was followed by regular rhythmical contractions. At the end of three-and-a-half hours pains began to pass off, and a second similar dose was given. Thereafter the pains continued regularly, and the child was born spontaneously at twelve midnight. The cervix dilated somewhat slowly, and the doctor in attendance assisted dilatation with the fingers. The child, when born, was asphyxiated, but revived. It died suddenly three days later; cause unknown. The mother also died on the eighth day of the puerperium, the cause of death being pulmonary tuberculosis.

Herzberg reports a successful case of induction one week before term, the indication being the presence of a large umbilical hernia. Two injections of 1 cc. each were sufficient, spontaneous delivery occurring twenty-five hours after the first. In three primiparae, three weeks short of term, he succeeded in inducing regular labour pains as the result of two injections, but the labour did not progress.

Fries was successful in inducing labour at the thirty-sixth and the thirty-eighth week in two patients suffering from nephritis. Goebel

induced labour at the eighth month in a parous patient with a flat pelvis. The first two children had been perforated, and the third delivered by pubiotomy. A hypodermic injection of pituitrin started labour, and spontaneous delivery occurred eleven hours later, the child weighing 3,600 grammes. Hofbauer reports one successful and one non-successful case.

These successful cases are the exception, and a great number of unsuccessful results are recorded. Voigt failed in four out of seven cases. Nagy, Zinussen, Hamm, Hirsch and Schæfer report cases where it failed. In many of these labour was ultimately brought on by means of the bougie or hydrostatic dilator. In some of them difficulty arose from spasm of the os.

At full term and in post-mature cases the results are more certain. Fries was successful in two normal cases at full term. Herzberg also succeeded with two patients, one of them an epileptic, labour lasting ten hours in one case and eight-and-a-half hours in the other. Krakauer brought on labour in an eclamptic at full term.

I can report one such case. Mary T., aged nineteen; last menstruation May 14th, 1912; estimated date of labour, February 21st, 1913; course of pregnancy normal. Pelvic measurements: interspinous, 27 cm.; intercrystal, 28.5 cm.; external conjugate, 17 cm.; true conjugate, 9.75 cm. Vertex presentation; R. O. P. position. Head not engaged in brim. As the pelvis was narrow it was thought undesirable to allow the patient to go beyond full term. On February 22nd she was given 10 minims of pituitary extract intramuscularly at 5.30 p.m. Pains came on within fifteen minutes, and lasted for about two hours. A second dose was given three hours after the first, and the pains again became strong, but passed off at the end of four hours. At 12.30 p.m. the next day she had another 10 minims. Pains again strong becoming feeble after two hours, when another injection was administered. Thereafter the labour went on normally, and the child was born spontaneously at 12.15 a.m. on February 24th, after long rotation of the head.

Stolper was successful in inducing labour in two post-mature cases, one twenty and the other fourteen days over term. In both the cervix was shortened, and admitted a finger with difficulty, but there were no pains. One required three and the other four doses, and in both spontaneous delivery occurred. Both had had prolonged labours previously, but as the result of the pituitrin the one terminated in five hours and the other in six. Hagen had a similar result in a multipara

fourteen days after term. Two doses were required; the child was born spontaneously eight hours after the first.

I can report a successful result in a similar case:—

Mrs. M., primipara, aged twenty-one; last menstruation July 29th, 1912; estimated date of labour, May 5th, 1913; pelvic measurements normal; head presenting; R. O. P. position. On May 27th there was no indication of labour beginning, and the head was not engaged in the brim. At 2.20 p. m. 10 minims pituitary extract was given intramuscularly. Labour pains began after fifteen minutes, and continued strongly until 5 p. m., when they became feeble. At 6 p. m. 10 minims given intramuscularly. Pains again became strong; os was fully dilated at 11.30 p. m.; head came down on to the perineum at twelve midnight, and spontaneous delivery occurred at 1.35 a. m., May 28th.

We were thus successful in inducing labour in three cases in which we used pituitrin, one at the eighth month, one at full term, and one three weeks post-term. Such success is not in accordance with the experience of most other obstetricians, and a number of those who have written on the subject have come to the conclusion that pituitrin ought not to be used at all for the induction of labour. The results, however, are better at full term and after term than in premature cases, and I am sure that a further trial is justified. The important point to attend to is to administer a second dose before the effects of the first have passed off. If the contractions are sufficiently strong to dilate the cervix the rest of the labour usually goes on naturally. If therefore as a result of one dose only a small amount of dilatation occurs, and no second dose is given the cervix may again close and labour pains cease. In post-mature cases it can do no harm, and is certainly worth trying before adopting other means.

For the induction of labour in cases of eclampsia its use may be attended with some danger. Blood pressure, already high, may be raised to a dangerous degree. Fries, however, used it successfully in two cases of nephritis, and Krakauer and St. Antechi and Zakczewski used it in cases of eclampsia, both in the first stage of labour. In the latter's case the pulse was slowed from 160 to 76. Several fits occurred after delivery, but another dose of pituitrin was given, and the fits ceased. Bad results are recorded by Nagy, Schneider-Sievers and Tipfer.

Placenta Prævia. A number of very successful results in the treatment of placenta prævia have been recorded. In the absence

of pains or when the pains are feeble a single injection very often stimulates strong contractions, so that the presenting part is pressed down against the lower uterine segment and hæmorrhage is arrested. Hofbauer recommends that in lateral and marginal placenta prævia, with the head presenting, the membranes be ruptured and pituitrin injected. If the placenta stretches half way across the os, he inserts a hydrostatic dilator. Trapl adopts the same line of treatment, and in a series of sixteen cases had no maternal mortality, and a foetal mortality of only three, and in two of these the child was dead before the pituitrin was given. Five were marginal, ten lateral and one central. Pituitary treatment may also be combined with version in such cases. The strong contractions pressing down the breech stop hæmorrhage, and there is no need to hurry the labour. In the same way the hydrostatic dilator acts more efficiently when a pituitary injection is given. Gall, in a series of nine cases of central placenta prævia used pituitrin in combination with turning in four, and with hydrostatic dilators in four. The hydrostatic dilator was used where the cervix was not sufficiently dilated to admit the hand. In all cases the bag was expelled within fifty-five minutes of its introduction, and turning was then performed, and a second injection of pituitrin given. In all cases birth occurred spontaneously within an hour. In six of the cases the foetal heart could be heard before the administration of pituitrin, and in all of these the child was born alive. In none were there any tears of the cervix. Others who record similar good results are Reik, Fischer, Hirsch, Merkel and Blair-Bell. I can report one successful case:

Mrs. C., aged thirty-three; 2-para; was admitted to Toronto General Hospital in December, 1912, the estimated date of labour being January 12th, 1913. Five weeks previous to admission the patient had vaginal hæmorrhage, which lasted for four days; a week later another hæmorrhage, which lasted for two days. Since then, up to the time of admission, there had been intermittent hæmorrhage, lasting for a day at a time. On the morning of December 9th she had severe hæmorrhage, accompanied by slight abdominal pain. When admitted the hæmorrhage had ceased, and the vagina was full of large clots. The cervix just admitted the tips of two fingers, and the margin of the placenta could be felt just within the os. There were no pains present. The vagina was packed tightly with gauze. The patient had no pains during the night, and there was no more hæmorrhage. When the gauze was removed next morning it was found that the cervix had contracted, so that it only admitted one

finger with difficulty; no pains were present. The vagina was again packed, and 10 minims of pituitrin given intramuscularly. Fifteen minutes later pains came on, and blood soaked through the packing. Half an hour after the injection the plug was removed, and the cervix was found dilated to the size of a silver dollar. Bipolar version was performed and one leg brought down. Strong contractions continued and spontaneous delivery occurred within half an hour. A considerable amount of hæmorrhage occurred afterwards, most of which came from a tear on the left side of the cervix. This was stitched, the uterus contracted strongly, and the patient made a good recovery. The eight months' child was born alive, and left the hospital with its mother at the end of three weeks.

In this case the pituitrin induced labour pains, and enabled turning to be performed much sooner than would have been the case had it not been employed. It accelerated the course of the labour. Tearing of the cervix may have resulted from very powerful uterine contractions, but we know that such tears are apt to occur through the softened vascular cervix in cases of placenta prævia.

In Casarean Section. When given about two minutes before the performance of the operation of Cæsarean section pituitrin has a marked effect in diminishing the loss of blood. A number of operators, among them Foges and Hofstaetter, Hofbaner, Blair-Bell, Herzberg and Kroemer, have used it for this purpose. In the Tarnier clinic it was found to be inefficient in two cases out of four, and in these ergotin gave good results. Fischer injected it directly into the uterine wall, and the uterus at once contracted and all hæmorrhage ceased. Metzger and others hold that ergotin gives better results.

In other conditions in which pituitrin may be used in obstetrical practice mention may be made of osteomalacia. The influence of pituitrin upon the growth of bone is well known. Extracts have been tried in cases of osteomalacia by Kratochivil, Bab and others. It is stated, however, that while it may relieve the pain, it does not effect a cure.

The extract has also been successfully employed as a galactagogue. I have used it in several cases where there seemed to be a deficiency in the quantity of milk. It was difficult to estimate the exact effect produced, but it was noted in all cases that the children, who formerly appeared to be hungry after feeding, were satisfied and quickly gained in weight.

Action on Bowels and Bladder. In post-partum abdominal distension and retention of urine a dose of pituitrin often sets up

peristalsis and stimulates the bladder, so that enemata can be dispensed with and the catheter is no longer required.

Let us now look at some of the bad results which are on record. We shall take up first of all bad effects on the mother.

In some women, more especially elderly primiparæ, the drug appears to have no effect at all. In others it may produce general symptoms, cardiac distress, vertigo, tachycardia, and respiratory difficulty, which have been reported by various writers. The same set of symptoms was observed by Hofbauer after intravenous injection, and it may be that some of those results following subcutaneous or intramuscular injection may have been due to the needle entering a vein.

In its action on the uterus it may set up tonic or tetanic contractions, and may cause a spasm of the internal os. The first contraction after the injection is given is usually a prolonged one. Hamm, for instance, reports a case in which four injections were given. After the second the first pain lasted eight minutes, after the third eleven minutes, and after the fourth seventeen minutes. Schaefer noted in one case that the initial pain lasted for four minutes. After this first powerful contraction the uterine action is usually normal. Voigt noted these prolonged contractions in three cases. Jaeger and Voigt also noted them. Such prolonged contractions usually result in a marked slowing of the foetal heart, but the child is seldom in real danger, as the ordinary rhythmic contractions succeed the tonic opening one.

Mackenrodt observed tetanic contractions after the use of 1 cc., which resulted in the death of the child before forceps delivery could be effected.

When the contractions are very powerful and painful they may be controlled by the administration of an anæsthetic, or by the use of morphia or omnopon. The ordinary scopolamin-morphine method may be successfully used along with pituitrin (Gisel).

Hertz has seen rupture of the uterus occur as the result of pituitary fluid. The patient was an anæmic primipara, with a ricketty and slightly flattened pelvis. Head presentation; cervix far back in the pelvis. When the os was dilated to admit two fingers the pains ceased. 1 cc. pituitrin given. In three minutes pains began, but in twenty minutes they became tetanic in character, lasting from two to seven minutes. An hour after the injection a very strong tetanic contraction was followed by collapse of the patient. Examination showed that the head had come down into the pelvis. In spite of

pantopon excessive contractions continued, and delivery was effected with forceps. It was then found that the anterior part of the cervix had been torn away completely from the vaginal roof, and the descent of the child had taken place through this tear, and not through the cervical canal.

Spasm of the os may occur in cases of abortion, when the drug is given for the induction of premature labour or early in the first stage. We have referred to some of these cases in dealing with the induction of abortion. Heil reports a case where the birth of the second of twins was arrested, owing to spasm of the os following pituitrin injection. Mackenrodt, Patek, Reik and Hamm report this spasmodic contraction of the os after the use of the drug. Nagy had to incise the cervix in one case, owing to spasmodic rigidity. Roemer had to remove the placenta manually in two cases, owing to stricture of the os. White reports a similar case. In a case of sacculated retroflexed uterus, with forward displacement of the cervix, Koch inserted a hydrostatic dilator and gave 1 cc. pituitrin. Strong contractions occurred, but no dilatation of the cervix took place. Apparently there was a spasm of the os. Cæsarean section was ultimately performed, but the child died.

Atony of the uterus post partum. A number of cases have been reported in which pituitrin was given, and in which atony of the uterus occurred after the termination of the third stage. In most of these the last injection had been given a considerable time before the birth of the child. When the last injection has been given within a short time of the birth of the child and placenta, the uterus usually remains firmly contracted. If there is any tendency to relaxation the ergot preparations usually act well, as the uterus appears to be sensitized by the pituitrin.

Bad effects on the child. Any bad results on the child are due to the prolonged contraction of the uterus. In nearly all cases marked slowing of the foetal heart is observed, but usually the child is in no danger. Jaeger has noted in one case a fall in rate of 40 per minute. Lieven found in one case that the foetal heart fell to 82, and was very weak. Delivery was effected with forceps. The child was born deeply asphyxiated, and did not recover for a considerable time. Voigt states that he has noted great slowing of the heart, and has never seen methuenium passed so freely during birth in other labours as after the use of pituitrin. Nagy had to deliver rapidly with forceps in one case in order to save the child, which was born in an extremely asphyxiated

condition. Koch and Spaeth report death of the child in breech presentations after pituitary injections. In both cases delivery was rapid and easy.

Unusual effects have been mentioned in a few cases. There was spasm of the glottis in one case reported by Hamm, and contracture of the extremities, lasting for twenty-four hours, in a case reported by St. Antechi and Zaczewski. It is difficult to say whether these were due to the pituitary or not.

To sum up we may state that :

1. Pituitary extracts have a powerful effect in inducing and in strengthening uterine contractions.
2. The type of contractions induced is similar to that which occurs normally, although at first there may be a tendency to prolongation of the pains.
3. Such prolonged contractions result in slowing of the foetal heart, but the child is seldom in danger.
4. When given in the late part of the first and in the second stage of full time labour the polarity of the uterine contractions is not interfered with, but in early abortions and early in the first stage a simultaneous spasm of the os may occur.
5. Its chief field of usefulness is in the first and second stages of labour, when there is delay due to feebleness of the pains, alone or when combined with other complications, such as malpositions of head, malpresentations, multiple pregnancy, slight narrowing of the pelvis, etc.
6. In the induction of abortion, in the treatment of abortion already in progress, and in incomplete abortion, its action is so uncertain that it is not to be recommended, except in cases where the os is widely dilated.
7. In the induction of premature labour its effects are uncertain, but if sufficient dosage be given they may be good.
8. In the induction of labour at full term and after, better results are obtained than in premature cases.
9. It gives good results in many cases of post-partum hæmorrhage, but is not superior to the various preparations of ergot. It has the power of sensitising the uterus, so as to allow these preparations to act more powerfully, the combination being most effective.
10. It is a useful adjunct in the treatment of placenta prævia, used in conjunction with rupture of the membranes, the use of hydrostatic dilators, or turning.—*The Canadian Medical Association Journal.*

The Treatment of Amenorrhœa.

HOFSTATER records the results of treatment in thirty-three cases, with hypophyseal extract. Cases of amenorrhœa dependent on hyperplasia of the uterus or ovaries, general infantilism, super-involution following lactation, anæmia cachexia and mild adnexal disease. In two-thirds of the cases, bleeding from the genitals occurred after several injections, having every evidence of ordinary menstruation. In one-third of the cases continued injections or tablet administration sufficed to keep up the periods. In those cases in which bleeding did not occur there was a general improvement in the health, which was also observed in cases following removal of the appendages and at the menopause. In very fat women, it is advisable to give thyroid gland in addition.—*The Australasian Medical Gazette.*

The Effects of Pituitrin on the Child.

SPAETH points out the rate of the heart beat is retarded after pituitrin injection. The drug acts harmfully in two ways ; by rapid succession contractions continually compressing the placenta leading to defective aeration of the foetal blood, and by passing directly into the foetal circulation, exerting a cardiovascular action. The author mentions a case of breech presentation in which he gave two injections of .5 cc. within two hours. After the second injection, rhythmical contractions developed, and a normal delivery quickly followed. The child was born asphyxiated, pulsation being very slow and the respiration much retarded, death supervening in half an hour. As the autopsy revealed nothing abnormal, the author concludes that pituitrin was the toxic agent.—*Ibid.*

Fatal Suffocation from Suckling.

J. H. JORT.—The writer can find no record of a case like the following in which aspiration of milk into an infant's trachea induced fatal suffocation.

A healthy infant of 8 days was put to the breast at 10 A.M. Towards the end of suckling, which had been vigorous, the child gurgled, but still continued feeding. It discontinued suckling sooner than usual ; and there was no regurgitation of milk such as often happened at the end of a meal. When put back into the cradle, it did not sleep as usual, but whimpered continuously. At midday the face and hands were cyanosed, and respiration was laboured. An hour later the writer was summoned, and found a well-developed child whose whole body

was cyanosed. The skin was cold, no pulse could be felt, and the heart-sounds were regular but feeble. No respiratory sounds were audible over the lungs, and no muscular rigidity was evident. The throat and mouth were normal. Warm baths and cold douches, alternating with artificial respiration, were prescribed. Camphor was injected, and warm bottles were used. At 2 A. M. on the following night the condition was better, the child sleeping quietly, and the cyanosis being less marked. The pulse could also now be felt, and respiration was audible over the lungs. But an hour later a relapse occurred, and the child died at 4.30 A. M. As the cause of death was obscure, a necropsy was made.

The whole surface of the body was of a purple colour, which was most marked over the head, hands and feet. The skin of the head showed a few punctate hæmorrhages. The umbilicus was healthy. There were no hæmorrhages into the bones of the head, meninges or brain; but all these structures were distended with blood. The heart was normal, and contained dark, fluid blood, but no clots. There were a few hæmorrhages into the pericardium. The lungs contained much blood, and the pleuræ showed numerous, small hæmorrhages. The alveoli contained air, and there was no pneumonic infiltration. All the bronchi, including the smallest, contained a greyish white, viscid fluid. In the trachea the same fluid was frothy; but it contained no solid particles. There was no œdema of the glottis, and the thymus was normal. The liver, spleen and kidneys were distended with blood, but were otherwise normal.—*The Medical Review*.

THERAPEUTICS.

Tincture of Iodine in Ophthalmic Practice.

JACQUEAU.—In spite of the irritation which might be supposed to follow the use of iodine in affections of the eye, recent observations by the writer show that with proper precautions it is of great value in corneal affections and in connection with operations. After numerous trials he was convinced that attempts to combine iodine with an anæsthetic substance were unsuccessful, and that aqueous solutions present no advantage over alcoholic ones as regards tolerance while they are less penetrating and less active. He recommends the tincture of iodine of the Codex with the addition of 0.75 gm. iodide of potassium to 20 gm. of the tincture, which improves its keeping properties and renders it more easy to dilute it with water when required.

As a lotion for the eye a solution of iodine is not to be recommended. Even in dilutions below 1 in 50 it causes irritation and the

benefit is less than from other substances in common use. These observations apply solely to ordinary conjunctivitis as it has not been used in purulent ophthalmia. It is best applied directly to the lesion after anæsthesia with cocaine. In affections of the lids, iodine has long been used though not to the extent it deserves. In old marginal blepharitis with crusts and ulcers a few applications of iodine along the roots of the eye-lashes gives results superior even to those of yellow oxide of mercury.

In traumatic ulcers of the cornea, especially those that from the beginning present the slightly yellowish colour, which is often the prelude to severe infection, the early application of the tincture may save the eye. This method of treatment is of special importance for general practitioners through whose hands many of these cases pass in their earlier stages, when prevention of infection is possible. The technique is simple. The eye is first rendered anæsthetic by instillation of 1 or 2 drops of a 1 to 20 or 1 to 30 solution of cocaine. Then with a few fibres of cotton wool wound round the sharpened extremity of a wooden match the tincture of iodine is applied once or several times to the lesion according to the degree of infection present. No speculum or other instrument is required; the patient is directed to look in a suitable direction to fix the eye in a convenient position and the lids are gently separated with the fingers of the left hand. If the cocaine has been properly applied and the separation of the lids is maintained for a few seconds to allow the iodine to dry without mixture with the tears there is no pain and the action is confined to the part affected without diffusion over the healthy tissues. The match and cotton wool are preferable to a glass rod as the solution is more accurately applied at the proper spot and in the quantity desired. The application may be repeated daily or even twice daily if necessary. In comparing this method with others such as the application of the cautery the writer states that while some corneal infections are so severe that nothing arrests them, the use of iodine will in some cases arrest and in others hinder the rapid progress of an infected corneal ulcer, so that it has the effect of saving the eye from complete destruction.

Tincture of iodine is useful in operations on the eye. While some operations, such as iridectomy with proper antiseptic precautions, may be regarded as free from the risks of infective complications, inflammatory changes of varying severity are not infrequent after operations for cataract. These the writer believes may be almost entirely avoided

by the use of iodine applied as follows before and after the operation. In addition to the usual antiseptic precautions, the ciliary margins of both lids are carefully painted with tincture of iodine the evening before operation or, should the circumstances require it, for several days before. This application is repeated immediately before operation, and after the corneal flap is replaced a little of the solution is applied to the line of incision by means of a match before the dressing is adjusted. This has been tested by the writer in 37 cases of cataract, in none of which has the slightest inflammatory change been observed. The wounds seemed to cicatrize more quickly and painlessly than usual. While further experience is necessary to finally determine its position, the writer regards tincture of iodine thus used as entitled to a place in ophthalmology as high as in general surgery.—*The Medical Review*.

Salvarsan in Ophthalmology.

BY

J. F. SHOEMAKER, M.D.

ST. LOUIS, MO.

GARCIA DEL MAZO says that recent studies show that as soon as syphilis is generalized throughout the organism all the tissues are invaded by the treponema, being found principally in the lymphatic spaces, through which it reaches the brain and spinal cord, producing meningitis, myelitis, etc. The cerebro-spinal fluid is greatly altered and as the optic nerve, the common ocular motor, the external ocular motor, and the acoustic and facial nerves are found in the base of the skull bathed in this fluid, it is natural to suppose this is the cause of the nerve disturbances. The ocular accidents must be considered as neuro-recurrences, as the clinical characters do not look at all like those observed when atoxyl and arsacetin are administered, which, from the beginning are of atrophic type. A fact which shows that there are a number of ocular disturbances due to salvarsan is that we see a great number of patients with paralysis of the eye muscles and ocular disorders which are not very frequent in the first period of syphilis when only mercury is employed. The pathogenic symptoms of ocular disorders are very obscure and there are several hypotheses to explain them: 1. The slight toxic action of salvarsan upon cranial nerves shows a locus minoris resistentiæ and fixing consecutive of the syphilitic virus; 2, the treponema is hastily expelled

from the cutaneous mucous tissues to the nerve centres; 3, a great number of endotoxines, which cause complications, remain free when salvarsan is used; 4, the ocular disturbances are complications of a latent disease in which salvarsan has no influence. Many authors also believe in the influence of the idiosyncrasy upon anaphylaxis, upon hypoalkalization, upon the reaction of Herschheimer, in an excess or defect of the administration of the drugs or in a fault of technic. The author reports the results of a series of cases and finishes by saying that salvarsan does not sterilize the organism; that it does not seem to be dangerous to the healthy eye, and that the results obtained in the treatment of ocular syphilis are not better than those obtained with mercury; therefore "606" must be used only when mercury is not tolerated, and a rapid action is needed.—*American Journal of Ophthalmology*.

The Administration of Emetine by the Mouth in Amœbic Dysentery.

GEORGE C. LOW, M.A., M.D., C.M.—It occurred to the writer to try the effect of emetine administered by the mouth in relapsing amœbic dysentery. The results were very satisfactory. The patient acquired dysentery abroad in Aug., 1912, and had suffered from frequent relapses. On June 9, 1913, blood and mucus were still present in the stools with many amœbæ having the characteristics of *E. histolytica*. He was ordered keratin-coated tabloids of emetine hydrochloride (grain $\frac{1}{2}$), one to be taken on going to bed that evening. If no bad effects followed, he was to take one each evening, to rest as much as possible, and to go on a milk diet. The drug did not cause sickness or upset him in any way. On the day following the first dose he noticed a distinct amelioration of the symptoms, and by the second day they had completely disappeared. Up to the time of writing this satisfactory condition had continued and the patient's words were, "that after battling with the disease for 10 months it seemed almost like a miracle to get rid of it so quickly."

The valuable effect of emetine when given by injection on amœbic dysentery is now well known. It may at times be inconvenient to give it by this method, and if it acts as well by the mouth there is no need for doing so. It seems best to use keratin-coated tablets, so as to prevent the drug getting into solution until past the stomach. If the patient rests in bed the risk of vomiting seems to be slight. There is

the danger of a keratin-coated tabloid not dissolving and being passed unchanged: if the symptoms do not improve rapidly this should be borne in mind.—*The Medical Review*.

The Emetine Treatment of Amœbic Abscess of the Liver.

PROFESSOR A. CHAUFFARD.—A man, aged 21, contracted dysentery in Morocco in August, 1911. He passed 30 glairy and sanguineous stools daily. Under serum treatment and enemata of silver nitrate he improved, but was not cured. In October he returned to France. In March, 1912, he returned to Africa and the disease became active. He improved again but he always had a little diarrhœa. On July 23rd, without any special pain, he suddenly expectorated chocolate-coloured pus. On the following day he brought up about half a litre of this. The expectoration continued, excepting for a remission from Aug. 22nd to Sept. 15th.

He was admitted into hospital, pale and emaciated, with a temperature ranging between 98.6° and 100.4°. The liver extended 4 finger-breadths below the ribs. At the base of the right lung were dulness, diminution of vocal fremitus and almost complete absence of respiratory sounds. Above this were subcrepitant and some sibilant rales. He expectorated about 500 c.c. of pus in the 24 hours of the colour of rhatany, on some days bright red. Skiagraphy showed that the diaphragm on the right side was immovable. The external part was distinct but the inner two-thirds were lost in the base of a triangular shadow. There was no liquid in the pleural cavity. Under rest, diet and rectal injections of dermatol he improved, but he always had 2 or 3 badly formed stools daily, and the expectoration did not fall below 250 c.c. in the 24 hours. The evening temperature was 100.4°. Before having recourse to operation, it was decided to try Roger's treatment. Six subcutaneous injections of 4 cgm. of hydrochloride of emetine were given—1 on Dec. 21st; 2 on the 23rd; 1 on the 24th; and 1 on the 25th. The result was astonishing. On the first day of the treatment, the expectoration fell to 150 c.c. On the 3rd day it was 60 c.c., on the fourth 45 c.c., and on the fifth there were only 3 "crachats"—the last which were expectorated. Moreover, after the second injection the expectoration became less sanguineous, and after that, purulent. On the second day the temperature became permanently normal. Skiagraphy showed that the hepatic dome regained its normal form and position and that the base of the lung became clear.—*Ibid.*

OPHTHALMOLOGY.

Myopia Prevention by Teachers.

W. H. BATES state that "myopia with elongation of the eyeball is incurable. It is usually acquired during school life. Acute myopia, spasm of the accommodation, or functional myopia is an early stage of incurable myopia. The cause of myopia is an effort to see distant objects." In corroboration of these statements he says: "1. Myopic refraction has always been produced in man and the lower animals when regarding unfamiliar distant objects which require an effort. 2. Myopia was prevented in the public schools of Grand Forks, N. D., for eight years by methods which prevented an effort to see distant objects. 3. Myopia was always benefited by treatment suggested by the cause. 4. The cause suggested a method for the experimental production of myopia in dogs, rabbits and cats. 5. Physicians, teachers, and others interested have investigated and confirmed these facts. 6. It should be emphasized that there is but one cause of myopia, an effort to see distant objects. There is no other."

BATES believes the cure for functional myopia, and therefore the prevention of axial myopia, is to have the children look at familiar distant objects. He finds the Snellen test card excellent for this purpose. The letters should be memorized and looked at each day for a short time. The results of the use of this method in a number of the public schools of New York City are given and the author thinks they are most encouraging, over 1,000 pupils with defective sight obtaining normal vision in both eyes.—*The American Journal of Ophthalmology*.

Concerning the use of Tuberculin in Ophthalmology.

W. B. WEIDLER from his observations with the use of tuberculin, offers the following conclusions:

1. The Von Pirquet cutaneous reaction is quite certain in the young and fairly so in the adult, or those over 17 years of age.
2. In the treatment of keratitis or affections of the cornea, with the Von Pirquet positive, the injections of tuberculin never failed to cure the condition.
3. In the case of tubercle of the choroid where the reaction was positive, injections of tuberculin were of undoubted value, as it restored the vision from 5/200 to 20/20, and in the case of uveitis it brought the

vision from 20/70 to 20/30. In both of these cases no other general medication was allowed, nor was it permitted in any of our cases reported in the paper.

4. The evidence collected from his brief study has been such as to make us believe that tuberculin therapy should always be used where there is the slightest suspicion of tubercular manifestation, old or recent. We would also urge the more general use of tuberculin in the ophthalmic practice of medicine.—*The American Journal of Ophthalmology*.

Case of Cataract Resulting from Lightning Stroke.

BY

L. R. CULBERTSON, M. D., ZANESVILLE, OHIO.

Mrs. G. G. H., aged 21, was referred to me by Dr. J. H. Wright, August 13, 1909.

Stated that while telephoning to Dr. Wright, about seven weeks previously, lightning struck the phone and knocked her down, becoming unconscious a short time. On recovering consciousness, her left eye was greatly inflamed. Her family physician treated it for a while.

When she first consulted me, I found intense irido-cyclitis in the left eye. V. each eye about 5/5; Tn in both. Is pregnant three months—about five weeks at time of stroke.

I prescribed atropia, dionin and hot fomentations. Her physician carried out the treatment. She returned to me March 23, 1910, blind in the left eye from soft cataract and nearly blind in the right eye from cataract. Urine was normal. Is nursing her baby. It is interesting to note that her baby's left ear is smaller than its right ear. Whether this is due to the effect of the shock on the mother, or whether a coincidence, I cannot say.

On October 23, 1912, at the Good Samaritan Hospital I did a combined linear extraction on L. E. She was then nursing another baby.

In December, 1912, I fitted her for glasses L. E. V. Rem. was +9. sp. $\odot$ +3.5 cy. 95 = 3/7.5 Prox. + 14. sp. $\odot$ + 3.5 cy. 95 = 1.25/.30 Sn.

TOXICOLOGY.

Morphine Poisoning in an Infant 3 Weeks Old.

H. WASENIUS.—An infant, aged 3 weeks, suffered from fits, intestinal disturbances, and vomiting. The mother gave him, therefore, 4 minims of liquor morphinæ hydrochloridi at 7-30 A.M., after which he quietly went to sleep. At 1-30 P.M. he was cold and pale, and his respiration was slow. Attempts to awaken him were fruitless and induced convulsions, cyanosis, and temporary cessation of respiration. A doctor was summoned, and caffein and sodium benzoate were injected subcutaneously. The infant was also kept awake. Improvement followed this treatment till 4-30 P.M., when convulsions recurred. These soon passed off leaving the infant with half-closed eyelids, and eyeballs slowly moving from side to side. The pupils were much contracted, and the corneal reflexes were marked. The mouth was open and the lips were red. The lower lip showed fibrillary contractions, and the tongue moved freely. But little difficulty was experienced in swallowing, respiration was 24, and the pulse 140, strong and regular. The patellar reflexes were lively, and were evoked on both sides simultaneously when only one side was tested. No ankle clonus was demonstrable, and when undisturbed, the infant became cyanosed, and respiration fell to only 10 or 12. When, however, he was touched by a finger on the pulse, he started, opened his eyes, raised his arms, and respiration temporarily ceased at the end of inspiration. Artificial respiration started the breathing again, the cyanosis decreasing and the pulse improving. During the 2 hours he was present, the writer saw no spontaneous convulsions. The injection of caffein was repeated, and 5 minims of brandy were given every 3 hours. Artificial respiration was necessary from time to time, and a large water enema was given. A warm bath at 40° C. was followed by a douch of cold water at 18° C. By 4 A.M. next day, the infant had recovered sufficiently to take nourishment, though the pupils remained contracted for some time.

An interesting feature of this case was the increased reflex excitability. The reflexes were exaggerated, and tonic and clonic contractions were observed. Similar phenomena always follow the administration of morphine or opium to the lower animals, such as the frog. They occur in man only in early life when differentiation between the grey and the white of the central nervous system is not complete, and the pyramidal tracts, among others, are not fully developed. The newborn infant has not, therefore, the inhibitory mechanism of the adult,

and accordingly reacts in the same manner as the lower vertebrates to opium and its derivatives. The infant in the writer's case was well developed and weighed 3800 grams. The dosage of morphine, therefore, was 2 mgm. to the kilo. For an adult of 75 kilos. the corresponding dosage would be 16 cgm. of morphine, or 5 times the maximum dose. Then again, the susceptibility of an infant morphine is far greater than that of an adult, and it is considered inadvisable to give any morphine to children under 3 years. Tappeiner finds that 1 mgm. of morphine, or 1 minim of tincture of opium, is sufficient to cause dangerous symptoms in the first year of life. At this age, 2 mgm. of morphine to the kilo are sufficient to cause death with but few exceptions.

Atropine has been recommended as an antidote; but Lenhartz, after clinical and experimental studies, concludes that its use is irrational. Besides, it would be difficult to determine the dosage of atropine for a new-born infant. Treatment with potassium permanganate has also been found ineffective by Thomson and Holder. There remain, therefore, in addition to the remedies adopted in the writer's case, only lavage of the gastro-intestinal tract and massage of the heart.—*The Medical Review*.

Fatal Tobacco Poisoning.

EDWIN C. GARVINE, M. D.—A healthy girl, aged 6½ years, who had thread worms, was given by her mother a rectal injection of one pint of water, in which was dissolved 1½ teaspoonfuls of tobacco. The child immediately complained of faintness, inability to stand, and great nausea, and soon commenced to vomit very severely. The bowels also acted and a part at least of the injection was expelled. These symptoms continued for about 15 minutes, then convulsions ensued and lasted about 20 minutes. The child became quiet, and died in collapse about 45 minutes after administration of the injection.

Fatal tobacco poisoning is rare. Tobacco infusion is an old remedy among the laity for intestinal parasites. A practitioner might, in an unguarded moment, give his consent to the use of this dangerous poison.—*Ibid*.

THE ANTISEPTIC.

OCTOBER, 1913.

The Public Services Commission and the Medical Service in India.



THE Royal Commission on the Public Services in India is expected in Madras early in February next. One of the subjects which is engaging the attention of that body this time is the recruitment to the medical service in India. As in the case of every other Indian service the Commission will hear more about the official view of the services. But we believe that the Commission has not come out to India simply to hear and applaud the official opinion on subjects connected with the various public services in India. If that was the only object, the Commission might as well have stayed at Home and sent for reports from various departmental heads. Whether the Commission agrees with it or not, the opinion of the body of men whom that brilliant phrase-maker—Lord Morley—so aptly described as the Independent Medical Profession in India, will be found interesting and worth considering.

We are of that body, and in our opinion the medical service in India at present is constituted entirely on wrong principles. The system of drafting military officers into civil employment during times of peace may be suitable for periods immediately following the conquest and military occupation of a country. But when civil government has been well established and the country is progressing peacefully towards civilized conditions, the semi-military management of such peaceful departments as those of medical relief and sanitation is entirely out of place. We are altogether opposed to the employment of medical men from the military services for doing the duties of civil medical men. Both the military and the civil medical services are likely to suffer by the arrangement. Here we have officers of the Indian Medical Service deputed to do civil duties for 15 or 20 years, and, when they have acquired valuable experience, are compulsorily transferred back to military employment to do the duties of P. M. O. or some other kind of M. O. The civil medical department thus loses the services of the most experienced men and the military medical department gets back in high places men whose qualifications for such posts are that they have been in civil employment sufficiently long to forget all about the little military training that they had.

The greatest drawback to the present system is manifest in the medical colleges in India. The professors of these colleges are now entirely recruited from the ranks of the Indian Medical Service. They are not even retained as professors of subjects which they were first asked to teach, but are shifted about from professorial chair to professorial chair and from professorships to District Medical officer-ships with a rapidity which is most bewildering. To acquire the necessary amount of proficiency in any branch of the medical sciences to enable a man to discharge the duties of a professor in a modern medical college is a work of many years. And once such experience has been gained and such proficiency acquired by any man, to take him away from the teaching of that particular branch and make him do duties unconnected with his speciality is absolute waste of good material. No medical man can become a competent teacher in a medical college at very short notice, and yet that is precisely what is being expected of professors in all the medical colleges in India. Very few members of the Indian Medical Service, to our knowledge, have ever specialised in any branch of medical sciences with a view to qualify themselves to become professors in the Indian medical colleges. Of course any one who is appointed to a professorship will try his best to do justice to the place which he occupies. But even that best, in men who have not been specially trained for the work, may not be much, and institutions which are run on such hap-hazard methods are not likely to be as efficient as Universities and other teaching institutions in Europe where the work of teaching is entrusted to trained and experienced teachers who have made the subject which they teach their life-study. We are, therefore, of opinion that the recruitment of professors for the medical colleges should be from among trained experts wherever they are available. It is not a question of the nationality of the professor but it is a question of whether he is competent to teach the subject or not. We would suggest that for some years to come, at all events, professors of the medical colleges in India should be selected by the Secretary of State for India in consultation with some capable professional body like the General Medical Council in England or the Royal College of Physicians in London or the Royal College of Surgeons in England. Such professors, when selected, must hold the appointment for the full term of their service. The professors in the scientific subjects, such as anatomy and physiology, ought not to be allowed any private practice. Professors on subjects like medicine and surgery may be allowed consulting practice and may also hold honorary appointments in the State hospitals as physicians, surgeons,

&c. These professors ought to be handsomely paid, say from Rs. 750 rising to Rs. 2,000. Their leave, pension and other rules may be those of the professors in other Government colleges. The point that is to be insisted upon is that each professor is to be professor in his subject during the whole time he is a professor.

We will next consider the work of sanitation in India. Here again, the work of sanitation in India is mainly in the hands of the members of the Indian Medical Service, although the large majority of them have never had any special training to equip them for sanitary work. We believe it is a rule in England that the medical officer of a county or borough with a population of more than 50,000 must have a special qualification in public health. No such rule is enforced in India, and the only qualification that most of the medical men who do sanitary duties can show is the qualification of belonging to the Indian Medical Service. Sanitary duties can only be discharged satisfactorily by medical men who have received special training in public health work, and sanitary duties can only be efficiently supervised when they are decentralised. We would, therefore, suggest that sanitary duties should be left entirely to Municipalities and District Boards. Each Municipality and District Board should have a Medical Officer of Health with a special qualification in Public Health except in the case of local bodies whose jurisdiction extends over less than 50,000 inhabitants, in whose case, a qualified medical man without a special qualification in Public Health may be appointed as a Medical Officer of Health. We would further suggest that the recruitment of its own Medical Officer of Health may be left to each local body under the control and guidance of Government. Each Local Government ought to have directly under it one, two or three or more sanitary experts who would supervise, control and advise the medical officers of health of the various local bodies. Their function ought to be more to advise than to order about and harass the Medical Officers of Health. The pay of these medical officers of health ought to range from Rs. 250 to Rs. 1,500 according to the importance and population of the Local Body under whom they are appointed. Their leave, pension and other allowances may follow the Civil Service Regulations.

Then there remains the consideration of finding medical men to manage the various charitable institutions where the poor and indigent sick are to be given medical relief. In a highly civilised country this duty will be discharged by the members of the medical profession

gratuitously. The experience which they gain in hospital work and the professional standing they acquire as members of the medical staff of a large hospital will be sufficient incentive for them to come forward to accept honorary positions on the staffs of hospitals. In this country we have not advanced sufficiently far, nor have we a sufficient number of private medical men to manage all the hospitals in the country. Yet, in the words of Lord Morley, "the time has now arrived when no further increase of the civil side of the service can be allowed, and when a strong effort should be made to reduce it by gradually extending the employment of civil medical practitioners recruited in India. When it is found impossible to obtain a man from outside the Indian Medical Service to fill a particular new civil appointment or one which has not previously been so filled, I will not object for the present to that service being drawn upon; but the vacancy so caused must be filled from outside it, *i. e.*, no appointment must be made in succession which would involve an addition to the cadre of the Indian Medical Service." We have no doubt in our mind that in penning this despatch Lord Morley meant that private civil medical practitioners in India should be given opportunities of serving as honorary medical officers on the staffs of hospitals in this country. We do not think that His Lordship could have meant that private men should be appointed as paid medical officers, for that would have just the opposite result of what His Lordship wanted, namely, the encouragement of the independent medical profession. If the members of the independent medical profession are to be given salaried Government appointments they would all very soon become *dependent* and there would be no independent profession left at all. We therefore think that Lord Morley meant that honorary medical men on the staffs of hospitals should be encouraged as is the practice in England.

It will be a very long time before a sufficient number of competent and qualified men are available to fill all the appointments on the staffs of the hospitals in this country in an honorary capacity. Thus even after the introduction of the system of Honorary Surgeons and Physicians a large number of paid medical officers will be required, particularly in those parts of the country where the private practice available is not tempting enough for medical men to settle down in those districts. Therefore a paid medical service will still be necessary. We would, however, have a service which is purely civil and which is not semi-military. We are afraid the time has not come for doing away with the distinction of an Imperial and a Provincial service. By those terms what we mean is a service recruited in England and a

service recruited in India. Perhaps the time will come when our medical colleges are organized on a high standard of efficiency and we may be able to get as good medical men trained in India as in any other country. But for the reasons we have stated in dealing with the professorship in the medical colleges at present, students cannot get as thorough a training in India as they can in Europe. Hence the necessity, for some time at least, to have one branch of the service recruited in England. We would recruit a certain number of medical men in England for service in the Civil Medical Department in India from among qualified and registered medical men in the United Kingdom who can produce evidence of having worked for at least two years in a recognized hospital in the United Kingdom. We would lay great stress on the latter proviso as it is to the British training and not to the British Diploma alone that we attach great importance. We would also recruit another branch of the service in India from among the qualified medical men in India or Great Britain. We would pay European recruited men a salary ranging from Rs. 500 to Rs. 1,800, and we would pay the Indian recruited men a salary ranging from Rs. 250 to Rs. 800 (the same as those of Deputy Collectors). But we would lay considerable stress on one point. Salaried officers of Government ought not to be permitted to take private practice. To pay an handsome salary to a medical man and to let him loose on the general public to practise as a private practitioner as well is not quite fair. It is fostering unfair competition, and this has been one of the main causes in keeping down the independent medical practitioner in India. A rule which obtains in some of the British colonies such as the Federated Malay States is not a bad one. It is that medical officers after two or three years' experience in the country are allowed the option of drawing their full pay or of taking private practice. We would suggest the same for the paid medical officers in this country. At the end of the first three years of their service they must be given the option of drawing their pay according to the scale we have already mentioned or drawing one-fourth the pay according to that scale with liberty to take private practice. It follows, as a necessary consequence of this rule, that officers who have given up their full pay and are privileged to take up private practice should be posted to localities which are populous and where private practice is available. In the subordinate branch of the service also there are Military Assistant Surgeons introduced into civil employ. We would have them also sent back to the military so that the Civil Medical Service will be so both in name and in reality.

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Original Articles.

*SOME POINTS REGARDING TUBERCULOUS DISEASE
OF THE HIP JOINT.

BY

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PAPER I—SYMPTOMATOLOGY—DIAGNOSIS.



IP disease, or coxitis, during childhood is practically
always of tuberculous origin and occurs in two distinct
pathological types:—

- (A) *Synovial*, comprising roughly 20 to 25 % of all cases.
- (B) *Osseous*, 75 to 80 % of all cases.

(A) In the former type the pathological changes consist in the formation of granulation tissue which covers the interior of the joint capsule and later spreads to the cartilaginous surfaces. The cartilage may subsequently become eroded, even entirely removed, and so open the way for secondary osseous disease to ensue. In this synovial disease, as might be expected, sequestra are rarely met with. Caseation, followed by suppuration, is the usual rule, the processes progressing very slowly. Plastic lymph formation occurs and, under suitable treatment, fibrous ankylosis supervenes. Bony ankylosis, in this form of the disease, is extremely rare.

(B) In the osseous form there is usually a tuberculous infarction in the head of the femur. Spread takes place towards the joint

* Specially contributed to *The Antiseptic*.

through cartilage and synovial membrane. The disease may commence in the Y shaped cartilage of the acetabulum or beneath the epiphysial plate of the femoral head. Two other common sites for its commencement are (1) in the head of the bone near the ossification centre and (2) in the neck of the bone inside the joint-capsule.

Both synovial and osseous types may lead to abscess formation and, if such an abscess is allowed to extend, or treatment is neglected, it may burst through the capsule and get into the surrounding muscles.

Should this occur the abscess will point at one of four situations:—

- (1) In the mid-gluteal region (the most usual site).
- (2) At the inner border of the tensor fasciæ femoris muscle.
- (3) Amongst the adductor muscles.
- (4) In the popliteal space.

The patient, in the early stages of hip disease, attempts fixation of the joint and at the same time holds the limb so that there is least pain present. The muscles concerned, thus kept continually contracted, enter into a condition of spasm which only disappears during sleep or if an anæsthetic is given. As the patient falls asleep the muscles relax and the inflamed and tender parts are again permitted to move on one another; immediately this occurs the child wakes with a scream—the typical “night-cry” of tuberculous joint disease—and the joint is again fixed by muscular spasm. The various positions taken up by the hip joint when diseased are undoubtedly due to this reflex spasm which relieves the pain by steadying the joint, but if uncorrected, would allow healing to occur with the limb in a bad position for subsequent use.

In the early stage of the affection the hip joint is slightly flexed and abducted. As the patient walks on the abducted leg it follows that the opposite (“sound”) leg must be adducted to bring it to a parallel and therefore the leg on the affected side is apparently lengthened. If measurements are made from the anterior superior spine of the iliac bone to the tip of the external malleolus it is found that there is no *true lengthening*, the apparent lengthening being solely due to the abduction and consequent tilting of the pelvis. The flexion at this stage may be obscured by lordosis of the lumbar spine, and in order to judge whether or no actual flexion is present it is essential to have the patient stripped and lying on a flat surface—lordosis can then be observed and the *amount of flexion* determined.

The great majority of cases present such obvious and well defined signs and symptoms that diagnosis is a matter of no difficulty, but one meets from time to time with cases where there is not such a clear clinical picture on which to base an opinion.

One or two further points which help in the investigation of such cases will therefore be of value.

Firstly, with regard to passive movement of the joint. The patient has, for example, some slight limp, complains of a little aching after exercise and yet flexion, extension, adduction and possibly also abduction (though more rarely) can all be performed without discomfort. Rotation should now be tried, externally and internally; if these movements are permitted one can be as definite as is ever possible in a diagnosis, in saying that there is no joint disease. Rotation certainly forms our most searching test movement.

A second point may be illustrated by an example:—A few months ago I was asked to see a little girl who had for some weeks limped a little, especially after much walking. She also complained of occasional pains in the right hip and thigh. A surgeon, who had examined her, had stated that hip disease was present. The parents were very perturbed and inclined to doubt the diagnosis. They, however, kept the child lying down for a week or more by which time she appeared to be so much better that their scepticism was still more increased and they decided to have a second opinion. The surgeon who now saw the child found the pain and limping gone and gave his opinion that the joint was normal. The parents were delighted but, disturbed in mind, they decided to seek a casting-vote by taking a third opinion. When I saw the child there was no limitation of movement except to *rotation* which was especially limited externally. There was no limp. I asked the parents to allow the child to walk each morning and afternoon for the next four days (unless there was much pain) and at the end of that time to bring the child down again for examination. On the second visit there was decided limp; the thigh was a little flexed and abducted and one had no difficulty in making a diagnosis though the condition, as skiagrams subsequently showed, was very little advanced. Only a few days ago I saw a small boy, the condition of whose left hip had been correctly diagnosed as tuberculosis by his doctor. He was put to bed with extension applied and at the end of two months the condition was so improved that the doctor thought he might have been wrong in his diagnosis and so he allowed the child to get up and walk about. The condition rapidly

returned and became much worse and he was brought to see me with marked flexion, abduction and suffering much pain. The only line of treatment to adopt is to make the diagnosis at the outset beyond all doubt and then prepare the parents for the long treatment which will be necessary. Tell them at the beginning that the child will not be allowed to walk *for at least two years* and then they will not be constantly asking if the splint is still needed because the child seems so much better. Now that these cases are receiving better treatment it is becoming less and less common to meet with the advanced stages of the affection. If a careful examination is carried out it is usual to find other signs of tubercle in patients suffering from coxitis and probably also some family history of the disease.

Kuhne says that bone and joint tubercle is *always a metastatic form*—a statement extremely difficult to prove or disprove, but probably it is very near to the truth.

(To be continued.)

* NOTES ON 19 CASES OF PUERPERAL ECLAMPSIA WITH SPECIAL REFERENCE TO TREATMENT.

BY

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Perhaps, one of the most painful and terrible diseases a medical man may be called upon to treat is Puerperal Eclampsia. Having been brought into contact with 19 such cases during a period of over 16 months during which time I was attached to Raja Sir Ramaswami Mudaliar's Lying-In-Hospital as Resident Assistant Surgeon, I thought that a paper based on them might be of some interest and benefit.

In Table I all cases are shown with their leading characteristics. From Table I, three other tables are made, *viz.*, II, III, IV, the last two being mortality tables.

TABLE II.

Frequency.

Different authors give different figures as regards the frequency of eclampsia, varying from 1 in 80 to 1 in 500. Of my 19 cases, 5 occurred in outside practice while 14 were hospital patients and these

• Specially contributed to *The Antiseptic*.

latter were among 1,182 cases of labour, thus showing a frequency of 1 in 84.5

Primiparity.

It is admitted by all that eclampsia is very common among primiparae and my figures go only to show the same. Of the cases 79% are primiparae or roughly 4 out of 5 eclamptics are primiparae.

Age.

It is said that eclampsia is more common among very young or very old primiparae. In India, where early marriage is the rule, it is rare to come across many old primiparae. My figures show that more than 75% are under 20 years of age.

Time of onset of the convulsions in reference to labour.

It is generally said that in a large percentage of cases of eclampsia, the fits start for the first time during labour, especially in the first stage. Further, the percentages of cases that occur during the puerperal period is slightly less than those that occur during pregnancy. My figures show that of 19 cases, 63% occurred during labour, 21% during pregnancy and 16% during the puerperium. The earliest date during pregnancy when the fit occurred was the 6th month and the latest day during the puerperium was 17 days after confinement. Eclampsia generally, however, sets in during the latter months of gestation and rarely after the 4th day of the puerperium.

Frequency of twins among eclamptics.

It is a common finding that the proportion of twin cases among eclamptics is more than that among normal labours. Thus of the 19 cases there was one case of twins, giving a proportion of over 5% whereas in normal labours the proportion is generally 1.8 or 1.4%.

Albuminuria.

All are agreed that albuminuria is a frequent occurrence in eclampsia, though some deny its importance as a causative factor. The latter are of opinion that albuminuria is a result of eclampsia. About 79% of my cases had albumin in the urine to a greater or less extent.

Post partum hæmorrhage.

It is stated by many that this is a frequent complication in eclampsia. None of my cases had hæmorrhage to any extent worth the name, though 2 cases had slight oozing after confinement. It is interesting to note that all my cases were treated on the method adopted by Tweedy wherein no chloroform is used to any extent and labour is not hastened by such measures as 'accouchement force.' It is

probable that the administration of chloroform as a routine treatment causing atony of the uterus, and the practice of rapid or forcible delivery are, singly or together, responsible for such frequent occurrence of post partum hæmorrhage. My practice had been to encourage bleeding to a slight extent in these cases by not supporting the uterus and I found that none of them bled to any extent even then.

Duration of labour in Eclampsia.

It is generally said that the duration of labour in eclampsia is less than the average duration under normal circumstances. My cases, however, do not show any such difference, the average coming to about 18 hours.

TABLES III & IV.

Mortality—Maternal.

Of the 19 cases 4 died and of these 4, two cases were admitted in a moribund or hopeless condition. If these cases are excluded, the mortality among 17 cases of eclampsia comes to about 12 % which is much lower than the published figures in many text-books.

This table, *viz.* III, goes to show further—

- (1) that the mortality is decidedly more among cases where the fits started in pregnancy ;
- (2) that the delivery of the patient is a favourable point in the prognosis ;
- (3) that labour is better allowed for nature to be completed ;
- (4) that the mortality is equally bad among multiparæ as among primiparæ, though it is generally believed that the reverse is the case, and
- (5) that the greater the number of fits, the worse the prognosis.

These observations are in accordance with those of a number of authors.

Infantile Mortality.

17 children were born for 19 cases of eclampsia, for two cases died undelivered and one was an abortion and one a case of twins. Of these 17 children, 11 were born alive: but two of them died within three days, presumably from the same toxæmic condition. Thus 9 children out of 17 were alive, giving a mortality of a little less than 50 %. The plan adopted in the treatment of these cases of not hastening delivery is, in my opinion, largely responsible for such a high foetal mortality.

Treatment.

The treatment of Puerperal Eclampsia at the present day seems to be based on 3 factors, *viz.* : (1) the theory the practitioner believes in as regards its origin, (2) the severity of the symptoms, and (3) the results of previous experience. Without going into the details of the various theories of the origin of eclampsia, it may be said that one most generally accepted is that eclampsia is the result of an auto-intoxication. Hence, the proper treatment is that which aims at the prevention, the neutralisation or the elimination of the poison from the maternal system. In the absence of definite knowledge as to where the poison originates and as to its exact nature, all attempts at the prevention or neutralisation of the poison must only be based on theoretical grounds. Our only rational course is therefore to make all attempts to eliminate the poison from the maternal system through the great channels of elimination. Though the convulsions are of secondary importance, for they are only the result of the toxæmic condition, their treatment demands our first attention, they being of such a terrifying character. Thus the treatment of eclampsia falls under 2 great groups, *viz.* : (1) the arrest of the convulsions; (2) the elimination of the poison. To these a third indication is generally added, *viz.*, the emptying of the uterus. This last is based on the belief that the pregnant uterus is the source of the poison and also on the fact that in at least 50 % of the cases the convulsions cease after delivery. It is still unsettled as to how far this indication is an important one. Anyhow, it is clear, from the statistics that are available, that immediate delivery is not called for. The consensus of opinion, at least among English obstetricians, is that delivery should be effected when the condition necessary for a safe delivery is present, *viz.*, a full or nearly full dilatation of the cervical canal, and that rapid emptying of the uterus by such measures as 'accouchement force' and cæsarean section (vaginal or suprapubic) is neither advisable nor necessary.

After having outlined the principles of treatment, I propose to give the lines of treatment I followed in a series of 19 cases of Puerperal Eclampsia that came under my observation during a period of over 16 months from 1st December 1911 to 13th April 1913.

The following are the views which guided me in treating these cases, mostly derived from the teachings of H. Twcedy and Col. Giffard.

1. The disease is essentially a toxæmia and all efforts should be made in the direction of rapidly removing the poison from the system.

2. (a) It is dangerous to give milk or any food to an eclamptic, even though she can swallow naturally or has recovered consciousness.

(b) Food is the actual exciting cause of eclampsia in a large percentage of cases and the primary cause of the toxæmia. Even the simplest of foods have a harmful effect. This harmful effect, as Tweedy suggests, is due not to its irritating local action but probably to the food particles entering the circulation ununited with, or incapable of uniting with their anti-bodies. Such a condition, he believes, results from a degeneration of the epithelial lining of the gastro-intestinal tract.

(c) Food of any kind should be withheld for long periods even after consciousness is regained.

3. Chloroform is not only of no use in checking the fits in the way in which it is generally administered in such cases, but is distinctly harmful when given in quantities large enough to keep the patient under its control.

4. Morphia is the most reliable remedy for controlling the convulsions.

5. Washing out the stomach and the subsequent introduction of a saline purgative in solution through a tube is a necessary procedure in all cases and should be carried out as a routine measure.

6. The action of the kidneys is to be stimulated, when urine is scanty, by making the patient drink repeatedly small quantities of water when she can swallow, or by saline infusions.

7. The administration of diaphoretics or the adoption of other measures to stimulate the action of the skin is not advisable, in so far as they tend to concentrate the blood.

8. The uterus should be left severely alone and labour allowed to follow its own course, only to be helped by forceps or other measures when the os is fully dilated or nearly so.

9. All other symptoms such as heart failure, etc., are to be treated in the usual way as they arise.

10. Careful and intelligent nursing has a large share in the successful treatment of a case.

It might be well here to describe briefly the plan of treatment of eclamptic patients followed in the above hospital, during my time as Resident Assistant Surgeon, as well as in outside practice. My practice is based on the lines indicated above.

On admission, the patient is given $\frac{1}{4}$ grain of morphia hypodermically: she is put on the delivery couch with some bedding underneath her: the clothes round her are removed and she is covered by a quilt. The stomach is then washed out repeatedly with large quantities of warm water, coloured a little with Potassium Permanganate, till the water returns unchanged. A solution of 6 drams of Sulphate of Soda or 1 oz. of Mag. Sulphate is then poured into the stomach through the tube followed by a few ounces of water to wash the purgative down and the tube is withdrawn. To carry out the washing of the stomach it is not necessary to give the patient chloroform as a routine. Probably, the morphia will have begun to act by this time. If, however, she is conscious or restless, chloroform is always administered before any attempt is made to wash the stomach. Some recommend and carry out the practice of leaving behind a pint of fluid in the stomach towards the end of the process of washing in the hope that it will be absorbed and will then flush the kidneys. This procedure was not adopted by me as it was open to two serious objections as pointed out by Tweedy, *viz.*, (1) the possibility of the occasional regurgitation of the fluid into the mouth and its subsequent going down the larynx if the patient is unconscious; (2) the danger that by its position and weight it might embarrass the heart.

Rightly or wrongly, the "classical remedy"—croton oil—was never used by me for producing purgation. I am glad to note that, in a paper on the Treatment of Puerperal Eclampsia, by Bellingham Smith, Obstetrical Physician in the Guy's Hospital, published in *The Practitioner*, September 1912, the following remarks appear:—

"If the patient is unconscious, the classical remedy is 2 minims of croton oil made up into a pill with some butter and placed on the back of the tongue. I do not advise this. Any one who has seen the intestine after the use of croton oil will have noted the severe irritation produced. Moreover, as often as not, the pill is frothed up in the mouth, most of the oil being lost and possibly some being drawn down into the lungs. A sounder plan is to introduce by means of a tube some Pulv. Jalap Co. or Mag. Sulphate. This has the further advantage that it allows a preliminary washing out of the stomach, a plan followed out at the Rotunda."

After the stomach is washed out, a catheter is passed, with due precautions, and, if necessary with a whiff or two of chloroform, the urine drawn, measured and examined for albumen and the result noted. A vaginal examination is also made with the object of

finding the degree of dilatation, if the patient is in labour. The patient is then turned on her side with the object of enabling the mucus that collects in the mouth to run out.

On account of the difficulty of carrying out the systematic washing out of the bowel, as recommended by Tweedy, for want of a proper staff and assistance, I was obliged to give up that part of the procedure. In private practice, this is a very inconvenient and difficult one to carry out.

The next step is to infuse a quantity of sterile normal saline solution, to which a drachm of Soda Bicarb. was added to a pint in my later cases, the quantity varying with the severity of the case, the quantity of urine and the quantity of albumen. The saline infusion is not practised in the cases which had no albumen in the urine. No attempt was made to encourage diaphoresis by steam baths or other means, except in one of my earlier cases where steam bath was employed. I had to give up this procedure for fear of concentrating the blood. Tweedy recommends a systematic application of linseed meal poultices to the loins in cases where the kidneys are not acting satisfactorily: but, this could not be carried out by me for want of assistance. A nurse—unfortunately a pupil nurse is the only one available—is put in charge of the patient with instructions to wipe the mucus dribbling from the mouth on to the cheek but not to wipe the mucus out from the pharynx for fear of setting up a spasm. The patient is left undisturbed and no food is permitted. If the bowels have not moved for four hours a copious warm water enema is given and with this the bowels generally begin to work freely.

If fits recur, morphia is repeated in $\frac{1}{4}$ grain doses every 2 hours. It is recommended that up to 2 grains of morphia may be given in 24 hours. It was, however, not necessary to go beyond a third injection in most of my cases.

If consciousness is fairly established and if the patient is anxious to drink, she is encouraged to take large quantities of boiled water, hot or cold, and sometimes barley water. Until recovery is complete—and it generally takes from 2 to 3 days—all nourishment is withheld except occasional drinks of barley water.

Labour is not interfered with, but, if there is slow progress and the head low down with the os fully or nearly fully dilated, the forceps is gently used to hasten delivery.

As to the methods of treatment to be avoided, the following come foremost:—

1. Accouchement force. Col. Giffard, in 1908, before the South Indian Branch of the British Medical Association, made the following remarks as regards this method: "I personally do not intend to teach or to practise this form of treatment until I see much better results than have as yet been published."

2. Vapour baths or other measures to promote diaphoresis.

3. The administration of croton oil.

4. The routine administration of chloroform.

Let me now briefly look at the results of such a treatment in the 19 cases under my observation. Of these 19 cases 4 died, giving a mortality of 21%. Of these, 2 cases were in a more or less moribund state and died in a short time after admission. If we exclude these two cases, there remain 17 cases with 2 deaths or a mortality of 12%. I venture to say that the systematic washing out of the stomach, together with starvation for a period of 2 or 3 days, is largely responsible for such favourable results. I do not for a moment suggest that all patients suffering from eclampsia will recover by this treatment. I am equally alive to the fact that a series of 19 cases is too small a number for drawing conclusions from. What I wish to state is that when these results are taken in conjunction with those obtained by others who have followed more or less the same plan of treatment, they will show a decidedly much lower percentage mortality than the average mortality quoted in many text books.

References:—

1. Tweedy and Wrench's 'Practical Obstetrics, 1911.
2. '20 years of Puerperal Eclampsia at the Government Maternity Hospital' by Col. Giffard. Published in the Transactions of the South Indian Branch of the British Medical Association for 1908.
3. *The Practitioner*, September 1912.

TABLE

The following is a tabular statement of the 19 cases

No.	DATE		Para.	Age.	Caste.	Months.	NO. OF FITS AND IN RELATION TO LABOUR.				ALBUMEN.		LENGTH OF LABOUR.			
	Of Confinement.	Of Discharge or Cure.					Before.	During.	After.	Total.	Present.	If so, when absent?	1st stage.	2nd stage.	3rd stage.	Total.
1	3-12-11	12-12-11	1	13	Hindu.	Full	...	5	...	5	Yes +	After 2 days.	36 hrs.	...	15'	H. M. 86-15
2	23-1-12	18-2-12	1	18	Hindu.	8	...	More than 10 before admission, 2 after.	...	12	Yes. Solid on heating.	7 days after.	20 hrs.	...	5'	H. M. 20-5
3	30-1-12	11-2-12	1	18	Pariah.	8	...	4	5	9	Yes; trace.	2 days after.	28 hrs.	...	45'	H. M. 28-45
4	31-3-12	...	1	17	Hindu.	Full.	...	Said to have had 26 fits before admission and 1 on admission.	2	29	Yes; trace.	...	48 hrs.	...	15'	H. M. 48-15
5	1-5-12	9-5-12	1	16	Pariah.	Full.	...	2	1	3	No.	...	12 hrs.	3 hr.	10'	H. M. 12-55
6	9-6-12	...	1	16	Hindu.	Full.	...	Several. More than 20 fits before and 10 after admission.	...	30	Yes; Solid on boiling.	...	Died	undelivered.		

I.

both from hospital records and from private cases.

CHILD.			MOTHER		Temperature.	Pulse.	DELIVERY.		Post-partum hemorrhage.	TREATMENT AND REMARKS.
Born alive.	Born dead.	Died since.	Alive.	Died.			Spontaneous.	Artificial.		
B.A.	...	...	Alive.	...	100°·2	100	...	Forceps.	Nil.	Morphia 2 doses $\frac{1}{2}$ grain and $\frac{1}{4}$ grain. Repeated in 2 hours. Washing stomach and 3 vi Mag. Sulph. put in by the tube after washing. Saline infusion under breast. No food. Side position. Enema. Had 3 fits before and 2 fits after admission. None after second Morphia injection. Discharged on the 9th day.
...	B.D. B.D.	...	Alive.	...	100°·4	122	...	Forceps.	Nil.	General anasarca. No foetal heart on admission. Morphia $\frac{1}{2}$ gr. No more fits on admission. Washing stomach and Mag. Sulph. per tube. Saline infusion under breast. Vapour bath. No food. Side position. Enema. Patient developed Pneumonia, hemiplegia and cystitis; but eventually got over and was discharged on the 24th day.
...	B.D.	...	Alive.	...	98°·4	60	...	Cephalotripsy.	Nil.	Slight oedema. No foetal heart. Morphia. Washing stomach and Mag. Sulph. Saline infusion under breast. No food. Side position. Membranes ruptured prematurely 24 hours after admission. Cervix 3th dilated, but dilatable under CHCL ₃ . Cervix dilated to full extent and delivered. Patient discharged on 11th day.
B.A.	...	...	Dead.	...	98°·0	126 very feeble.	...	Forceps.	Nil.	Patient practically pulseless on admission. Condition for forceps present and hence delivery effected soon after admission. Morphia injection. Washing stomach and Mag. Sulph. per tube. Saline infusion. Side position. Patient died a few hours after admission.
B.A.	...	...	Alive.	...	98°·4	72	Spontaneous.	...	Nil.	Morphia. Stomach washing, whence a large quantity of foul-smelling greenish matter washed out. Mag. Sulph. through tube. No saline. No food. Side position. Discharged on 9th day.
...	...	...	Dead.	...	100°	116	...	...	...	Admitted in an extreme comatose condition. Had a number of fits before and after admission. Not in labour. Cervix admitting one finger. Morphia. Washing out stomach. Mag. Sulph. and Saline infused. Patient died a few hours after, undelivered.

TABLE

No.	DATE		Para.	Age.	Case.	Menses.	NO. OF FITS AND IN RELATION TO LABOUR.				ALBUMEN.		LENGTH OF LABOUR.			
	Of Confinement.	Of Discharge or Cure.					Before.	During.	After.	Total.	Present.	If so when absent.	1st stage.	2nd stage.	3rd stage.	Total.
7	13-7-12	25-7-12	1	19	Hindu.	Full.	...	7	2	9	Yes; $\frac{1}{2}$.	3 days after.	16 hrs.	...	15'	H. M. 16-18.
8	12-9-12	21-9-12	5	30	Pariah.	Full.	...	...	3	3	Nil.	...	20 hrs.	...	10'	H. M. 20-18.
9	14-9-12	1-10-12	1	17	Pariah.	Full.	...	5	...	5	Yes; $\frac{1}{2}$.	3 days after.	20 hrs.	...	10'	H. M. 20-10.
10	8-10-12	25-10-12	2	29	Hindu.	6	...	7	...	7	Yes; $\frac{1}{2}$.	3 days after.	Complete abortion.	...	...	...
11	24-10-12	4-11-12	1	17	Muh.	Full.	...	9	4	13	Yes; Frece.	2 days after.	14 hrs.	...	15'	H. M. 14-16.
12	3-1-13	13-1-13	3	26	Pariah.	Full.	...	2	2	4	Trace.	...	8 hrs.	$\frac{1}{2}$	5'	H. M. 8-35.
13	31-3-13	...	3	24	Christian.	Full.	2	16	...	18	Full.	...	Died undelivered.	...	...	...
14	7-4-13	16-4-13	1	18	Hindu (Mudali).	Full.	...	2	6	8	Yes; $\frac{1}{2}$.	3 days.	Confinement.	...	12 hrs.	...

1913.]

I—(continued).

CHILD.			MOTHER.		Temperature.	Pulse.	DELIVERY.		Post-partum hemorrhage.	TREATMENT AND REMARKS.
Born alive.	Born dead.	Died since.	Alive.	Dead.			Spontaneous.	Artificial.		
...	B. D.	...	Alive.	...	101°-6	102	...	Cranio-tomy.	No.	No foetal heart on admission. Morphia. Washing stomach. Mag. Sulph. through tube. Saline infusion. Enema. Side position. No food. Discharged on 12th day.
B. A.	...	...	Alive.	...	99°-4	78	Spontaneous.	...	Nil.	Morphia. Mag. Sulph. per mouth. Enema. No saline under breast. Discharged on 8th day.
...	B. D.	...	Alive.	...	99°	92	...	Forceps.	Some.	Morphia. Washing stomach and Mag. Sulph. Saline infusion. Enema. No food. Side position. Discharged on 16th day. Patient developed some brain irritability.
...	...	...	Alive.	...	99°	102	Spontaneous.	...	Nil.	Morphia. Washing stomach and Mag. Sulph. Saline infusion. Enema. No food. Side position. Discharged on 17th day as the patient developed an abscess at the seat of Saline.
B. A.	...	...	Alive.	...	99°	86	...	Forceps.	Nil.	Fits very severe lasting 5 minutes. Morphia. Stomach washing and Mag. Sulph. Saline. No food. Side position. Discharged on 11th day.
B. A.	...	...	Alive.	...	98°-4	96	N. P.	...	No.	2 Morphia injections. P. P. Washing stomach and Mag. Sulph. No food.
...	...	...	Dead.	...	N.	102	...	...	...	Admitted with a history of 2 fits outside before admission. On the morning of 31-3-13 was given a purgative (3 vi of Mag. Sulph.) and no food was given. General anasarca. Bowels moved towards evening. Urine rather scanty. Was put on diuretic mixture and Mag. Sulph. as well. Not in labour. Slight pain started on morning of 1-4-13. Patient felt hungry. 1 pint of milk ordered and also barley water. Pains very slow, but towards evening patient started severe fits. Had in all 16 fits. Fits continued despite all treatment. Morphia. Saline. Patient died at 1 A.M. 2-4-13.
B. A.	Died on 3rd day.	...	Alive.	...	99°	92	Spontaneous.	...	Nil.	12 noon, 7-4-13, brought in with a history of having been confined outside at 6 A.M. this day. Labour pains started at 6 P.M. yesterday. Said to have had 2 fits while the child was born. Had 2 fits after confinement and 3 more while the patient was being brought to hospital. On admission conscious. $\frac{1}{2}$ gr. morphia given hypodermically. Urine drawn and tested; contains $\frac{1}{2}$ albumen. Stomach washed and a large amount of decomposing food washed out. 3vi of Sod. Sulph. in solution put in, 1 $\frac{1}{2}$ pints of Saline solution under breast (left). No food. Patient made a good recovery and was discharged on 9th day.

TABLE

No.	DATE		Para.	Age.	Case.	Months.	No. OF FITS AND IN RELATION TO LABOUR.				ALBUMEN.		LENGTH OF LABOUR.			
	Of Confinement.	Of Discharge or Cure.					Before.	During.	After.	Total.	Present.	If so when absent.	1st stage.	2nd stage.	3rd stage.	Total.
15	22-2-12	Out Cases.	1	15	Hindu.	Full.	...	8	...	8	No.	...	18 hrs.	...	20'	H. M. 18-20.
16	12-9-12	...	1	17	Hindu.	Full.	...	5	5	10	Trace.	2nd day.	16 hrs.	1	20	H. M. 16-50.
17	26-10-12	...	1	23	Hindu.	Full.	...	...	39	39	Trace.	...	15 hrs.	...	30'	H. M. 15-30'
18	28-12-12	...	1	15	Hindu.	Full.	...	...	6	6	Nil.	...	13 hrs.	...	20'	H. M. 13-20'
19	28-2-13	...	1	14	Muh.	Full.	...	20	...	20	Trace.	3 days.	17 hrs.	1 1/2 hrs.	1	H. M. 18-40'

* Child developed convulsions and had a temperature of 103°-0 F. Despite all treatment

I.—(continued).

CHILD.			MOTHER.		Temperature.	Pulse.	DELIVERY.		Post-partum hemorrhage.	TREATMENT REMARKS.
Born alive.	Born dead.	Died since.	Alive.	Dead.			Spontaneous.	Artificial.		
...	B D.	...	Alive.	...	99°-8	84	...	Forceps.	No.	One Morphia injection $\frac{1}{2}$ gr. Cervix fully dilated. Forceps applied after urine was drawn. Child born dead. Purgative by mouth. No more fits. Patient made a good recovery.
B A.	...	...	Alive.	...	99°-0	96	Spontaneous.	...	Nil.	Slight oedema of lower extremities. Fits started in the 2nd stage. Before help could come patient confined. Morphia $\frac{1}{2}$ gr. given after confinement as fits continued. Stomach washed. 2 pints Saline given under right breast. 3 i of Mag. Sulph. given by tube. No more fits. Patient continued unconscious for 24 hours. No food for 48 hours. Patient made a good recovery and was well in 10 days.
B A.	...	...	...	Dead.	100°-6°	120	...	Forceps.	Slight.	Patient very anæmic and suffering from general anasarca. Was neglected in pregnancy. Pains started and at 3 P.M., 26-10-12, was seen by me. Cervix fully dilated. Head in cavity. Foetal heart audible. Forceps applied and child extracted alive. Patient had slight fever on 5th and 6th day. Was given Quinine injection 3 times and fever stopped. Lochia became offensive and was better after 2 uterine irrigations. Meanwhile anxiety on the part of the relations made them give the patient large quantities of concentrated food in the form of Bran's Essence of Chicken, Sanatogen, Liqd. Pep., etc. Patient started diarrhoea on the 15th day which was unfortunately checked by opiates. Patient had a fit on the 16th day which was not noticed and was put down for chewing betel nut. Astringent mixture continued. Typical eclamptic fits started on the morning of the 17th day after confinement but, despite all treatment, patient succumbed to the disease in 22 hours after having had about 38 fits or even more.
B A.	...	...	Alive.	...	98°-4°	80	...	Forceps.	Nil.	Patient was delivered by forceps without CHCl_3 and this seems to have told on the patient so much that she refused to see the lady doctor who delivered her. 6 hours later she started in fits. Morphia $\frac{1}{2}$ gr. and repeated in $\frac{1}{2}$ gr. dose once. Stomach washed and Sod. Sulph. put in. Urine passed and contained no albumen. No more fits after 2nd injection, and patient made a good recovery.
B A.	...	Died at 17 hrs.*	Alive.	...	100°-4°	146	Spontaneous.	...	Nil.	Fits started at 12 noon on 28-2-13. Said to have had 20 fits before 5 P.M. when $\frac{1}{3}$ rd gr. Morphia was given. Stomach washed. Nothing special came away. 3 i of Mag. Sulph. put in. $\frac{1}{2}$ pints of Saline put under left breast. Urine drawn 10 ozs. Contained a trace of albumen. Enema given at 11 P.M. Patient confined naturally at 5 A.M., 17 hours after pains started, 12 hours after the last fit.

child died in 17 hours.

Table

I.	14 cases for 1,182 deliveries or 1 in 84.5												
II.	Para. Number.	1 15	2 1	3 2	5 1	= Total 19, of which nearly 79 per cent.							
III.	Age. Number.	13 1	14 1	15 2	16 2	17 4	18 3	19 1	20 1	23 1	24 1	26 1	
IV.	Caste	...	{ Hindus Mahomedans Pariahs			...	12 2 5						
V.	Time of pregnancy.	In 4 of which two were in labour later on.	During labour.				12 of these in 6 fits continued after delivery.						
VI.	Albumen	...	{ Present in 15 out of 19 cases or 79 per cent. Absent in 4 do. 21 per cent.										
VII.	Average number of fits per patient 12.												
VIII.	{ Number of cases delivered Number of cases undelivered		17 2	Mothers died Mothers died		2 2							
IX.	{ Total number of cases delivered Total number of twins among them		17. 1	per cent. 5.8 or 1 in 17.									
X.	Mode of delivery among 17 cases ...		{ Spontaneous 7, of which one was an abortion. Artificial { Forceps 9 Craniotomy 1										
XI.	Treatment	...	Morphia, saline, washing stomach and purgation, no food and side position.		14	All these and in addition vapour bath 1							
XII.	Post partum hæmorrhage. Only 2 cases out of 17 cases delivered had a little hæmorrhage												

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II.

This excludes 5 cases which occurred in outside practice.

are primiparae.

130 = Total 19, of which more than 75 per cent. were below 20 years of age.

Post-partum onset, 3.	Before	2	During and after After	6
	Before, and during	1		3
	Before, during and after	1		
	During	6		Total ... 19

No. of live children 11.
No. of dead children 6.

Morphia, washing stomach & purgation and no food; side position; No Saline 4.

not worth mentioning.

Table

Maternal mortality among 19 cases of Puerperal Eclampsia under 14 of which were patients admitted at Raja Sir Ramasawmy's

Section.	Class.	Sub-section.	Total No. of cases.	Total No. of deaths.	Percentage mortality.
A	General.	All cases	19	4	21.1
B	Cases delivered and undelivered.	Delivered	17	2	11.82
		Undelivered	2	2	
C	Method of delivery among 17 cases delivered.	Spontaneous	7	Nil.	
		Artificial	10	2	20.0
D	Time of onset of fits with reference to labour.	Ante partum	4	3	75.0
		During labour	12	Nil.	
		Post-partum	3	1	33.3
E	Primiparity or Multiparity.	Primiparae	15	3	20.0
		Multiparae	4	1	25.0
F	Influence of No. of fits.	Number of fits ...	1—10 fits.	10 cases.	
		Mortality ...		Nil.	

Table

Mortality among children born of 17 cases of which 1 was an

Section.	Class.	Sub-section.	Total No. of children born.	No. of children born putrid.	No. of children exclusive of putrid.
A	General	All children	17	...	17
B	Mode of delivery	Spontaneous	6	...	6
		Artificial	11	...	11

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THE ANTISEPTIC.

III.

treatment during 16 months, i.e., from 1st Dec. 1912 to 13th April 1913, Lying-in-Hospital, Georgetown, and 5 were outside cases.

No. of cases admitted moribund.	No. of cases exclusive of moribund cases.	Total of deaths exclusive of moribund.	Percentage mortality.	REMARKS.
2	17	2	11.82	This includes 3 cases of post-partum eclampsia.
1	16	12	6.25	
1	1	1	100	
...	...	...	...	This includes 1 case of post-partum eclampsia.
1	9	1	11.1	
2	2	1	50	
...	...	...	...	
...	3	1	33.3	
2	13	1	7.69	
...	4	1	25	21 and above, 3 cases. All died 100 per cent.
11—20 fits 6 cases. 1 death. 16.66 %.				

IV.

abortion and 1 a case of twins, giving thus a total of 17 children.

Total No. of live children.	Percentage of live children.	Total No. of dead children.	Percentage of dead children.
11	64.5	6	35.5
6	100.0	Nil.	...
5	45.4	6	54.6

Our Contemporaries.

MEDICINE.

An Unusual Form of Tuberculous Meningitis.

A. LESAGE.—Tuberculous meningitis occasionally simulates such conditions as tetany, meningeal hæmorrhage, or cerebro-spinal meningitis, and in adults apoplexy or delirium tremens. In a case recently observed by the writer the symptoms so closely resembled those of alcoholism as to mislead him.

A girl, aged 4½ years, was observed by her mother one evening to be strange in manner "as if she had been drinking." She passed a restless night with periods of delirium alternating with returns to consciousness. Next morning she was unable to stand or even to sit erect, being completely incapable of balancing herself. This continued during the day, but the child remained quiet during the night. As her condition remained stationary she was brought to hospital on the following day.

Her symptoms suggested alcoholism. She lay still in bed with her eyes open, but looking dull and haggard and muttering some unintelligible words. She heard what was said to her, but answered questions at random and followed with her eyes the movements of those about her. There was no coma, intelligence being dulled but not abolished. The limbs were relaxed and weak, but there was no paralysis. When a limb was raised it fell slowly as if the child had not the strength to maintain its position. Spontaneous movements were attempted but were weak and undecided. There was loss of equilibrium on attempting to sit up or stand erect, resembling intoxication. The colour of the face was normal. The eyes, though dull and staring, retained their movements, and the action of the pupils was normal. The cutaneous sensibility was somewhat diminished and the *tache cerebrale* was absent. There were no contractures, Kernig's sign was absent, and the knee jerks were weakened and almost abolished. Examination of the viscera was negative, vomiting and constipation were absent. The temperature ranged from 99° in the morning to 99·6° in the evening. The only sign which attracted attention, apart from the weakness and vertigo, was the state of the pulse, which varied from 130 to 140 with slight irregularities occurring 3 or 4 times per minute. The dissociation of pulse and temperature, conjoined with the irregularity of the pulse, suggested tuberculous meningitis. Lumbar puncture yielded clear cerebro-spinal fluid

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though under slightly increased pressure. On centrifugalisation it gave a deposit of lymphocytes without red corpuscles. A few scattered tubercle bacilli were found. A guinea-pig inoculated with the deposit died of tuberculosis in 3 weeks. The patient remained in the same state and died two days later, on the fifth day after the onset of symptoms. A few hours before death the pulse rose to 160 and became much more irregular, but there was no elevation of temperature.

At the necropsy the thoracic and abdominal viscera were found normal except the glands at the root of the lung, one of which was enlarged, caseous, and contained tubercle bacilli. All other changes were present in the brain and its membranes which showed intense redness and acute congestion without hydrocephalus. Careful examination showed tuberculous granulations at the base of the brain and in the fissure of Rolando, thus confirming the diagnosis of tuberculous meningitis made during life by the examination of the cerebro-spinal fluid.—*The Medical Review*.

Post-Mortem Diagnosis of Tuberculous Meningitis.

M. MANDELBAUM.—After prolonged search one or two acid-fast bacilli may occasionally be found in the fluid obtained by lumbar puncture of patients with tuberculous meningitis. But frequently no tubercle bacilli can be detected. Hence other characters of the cerebro-spinal fluid, such as an increase of the lymphocytes and a raised peptolytic index, have been regarded as of more diagnostic importance than the absence of tubercle bacilli. The writer has recently seen a case which suggests that a diagnosis may be possible post mortem even without a necropsy.

A woman had symptoms of meningitis suspected to be tuberculous. But as not a single tubercle bacillus was found in the fluid obtained by lumbar puncture, and there was no increase of lymphocytes the diagnosis remained doubtful. The cerebro-spinal fluid obtained 24 hours before death was clear, and even after prolonged centrifugalisation yielded no sediment. Death occurred and a necropsy was refused. The writer then performed lumbar puncture in the usual way and obtained a large quantity of turbid fluid. The microscope showed that the turbidity was due to numerous large mononuclear cells with an extensive protoplasmic body and a nucleus for the most part situated close to the periphery. These cells were crowded with tubercle bacilli. In addition, the fluid contained lymphocytes and polynuclear leucocytes, the latter of which also contained tubercle bacilli.

A similar condition was found post mortem in each of 6 cases of tuberculous meningitis in adults. In all the large mononuclear cells were present in crowds, though the number of tubercle bacilli varied considerably. Sometimes they occurred in every microscopic field examined; sometimes, though their presence was never difficult to demonstrate, 4 or 5 fields were examined before one bacillus was found. In 3 of the 6 cases tubercle bacilli had been found ante mortem in small numbers, but only after a search lasting several hours. In 5 cases the lymphocytes in the cerebro-spinal fluid were increased ante mortem, and in one case polynuclear cells predominated. But in no case were the large mononuclear cells present in quantities approaching those found post mortem. And in every case the number of tubercle bacilli present post mortem far exceeded that found ante mortem. In individuals who had succumbed to tuberculosis not involving the meninges the cerebro-spinal fluid obtained post mortem was clear and free from cellular elements.

The writer has recently had no opportunity of examining the cerebro-spinal fluid taken during life from children with tuberculous meningitis. In 2 cases in which lumbar puncture was performed post mortem the apparently characteristic large mononuclear cells were present in great numbers, but no tubercle bacilli were found.

The large mononuclear cells correspond to those described by Metschnikoff as macrophages. Their occurrence only post mortem in the cerebro-spinal fluid is probably due to the fact that being capable of amoeboid movements they desert the dying tissues—in this case the lepto-meninges of the spinal cord—and enter the cerebro-spinal fluid.—*The Medical Review*.

Ocular Diseases Occurring in Association with Diabetes Mellitus.

D. MATHESON MACKEY mentions the following condition of the eyes, apparently caused by an associated diabetes: 1. Abnormal refraction and accommodation. Hypermetropia or myopia may develop, generally being temporary and often clearing up in several months or less. Subnormal accommodation or complete loss of accommodation result from the effect of the disease on the ciliary muscles. 2. Changes in the lens, either cataract, or "second sight" due to myopia caused by swelling of the lens. Diabetic cataract is the only form of nontraumatic cataract that is likely to clear up spontaneously. 3. Changes in

the retina, diabetic retinitis. 4. Toxic amblyopia, where the papillo-macular bundle of fibres in the optic nerve is injured by toxic substances resulting from faulty metabolism, similar to the toxic amblyopia caused by alcohol and tobacco. 5. Visual faults due to cerebral lesions. 6. Paralysis of the extrinsic ocular muscles.

A Note on Alimentary Toxæmia

EDRED M. CORNER, F. R. C. S.

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Briefly, the life-history of an individual with regard to alimentary toxæmia may be set forth as follows:—

So long as the foetus is *in utero*, the contents of the alimentary canal are sterile and the physiological processes of digestion are inactive; hence, as no chemical changes are taking place in the alimentary canal, toxins are not produced, and alimentary toxæmia is impossible. But with birth, or soon after, organisms are introduced into the alimentary canal, and the lifelong process of intestinal education is begun! Being unused to the products of the action of micro-organisms, the infant's tissues suffer. This is seen in the very frequent gastro-intestinal irritation of the new-born, breast-fed or artificially fed; perhaps, also, in the secretion of fluid by the peritoneum as seen when a patient processus vaginalis is present as a hydrocele. Should the tissue resistances of the infant overcome the alimentary toxæmia, all will be well. But should the actions of the toxins prevail, the child will get rickets, a result of the action of what may be called alimentary toxins on the growing tissues. Of course alimentary toxins, or toxins absorbed from the alimentary tract, are not the only ones that can produce such deleterious action on growing tissues. Others may be absorbed from the tonsillar region. Still our profession regards the alimentary toxins as by far the most important in the production of rickets. In similar fashion arise other diseases, such as wasting, thrombosis, osteo-arthritis, and so forth. Indeed, by lowering the resistance of the tissues of the child, alimentary toxæmia renders the entrance of organisms to the body easy, and thus disposes to tuberculous, diseased mesenteric glands, and to numerous other diseases.

From this life-long education we learn to endure alimentary toxæmia until a certain degree of it becomes necessary to our well-being; our powers of resistance to the toxins increase and increase until, with mature years, we can overcome with equanimity even such a feast as a "City banquet."

As life progresses, the tissues of the alimentary tract are affected directly, and the rest of the body indirectly. The results of the organisms in the alimentary tract are known to form different chapters, so to speak, in one book of intestinal sepsis. Appendicitis is at once the most frequent and dangerous results of intestinal sepsis. Colitis, and ulcerative colitis are others. Later in life there are gastric and duodenal ulcers. All the affections just mentioned affect primarily the mucous membrane of the bowel. But the sepsis affects more than the mucous membrane. The action of the muscular coats may be interfered with, producing delay in the passage of the intestinal contents, constipation, or, as it has been called, intestinal stasis; and diarrhoea and intussusception may also be explained by the action of toxins on the intestinal musculature; again the peritoneal covering membrane may be irritated, in the young leading to the formation of a hydrocele, and in the older to adhesions. The results and treatment of peritoneal adhesions, and the kinks caused by them have been strongly presented by Sir Arbuthnot Lane. From my own experience, I can certainly say that some patients are vastly improved by such operations as short-circuiting or colectomy; others are neither better nor worse; whilst a small number are made even worse.

What is wanted is a knowledge of how these different groups can be distinguished one from the other; in some cases failure is certainly due to the undue postponement of operation. And this brings me to a point on which I would strongly insist. Alimentary toxæmia is a progressive disease, or perhaps better, the results of alimentary toxæmia are progressive; so that if operative treatment is delayed, more numerous and more severe changes (adhesions, mesenteries, &c.) will be present, and the surgeon will have still less chance of being able to benefit the patient.

In conclusion, I would insist that the terms alimentary stasis and alimentary toxæmia are not synonymous. People may enjoy well-being and perhaps health whilst suffering from intestinal stasis, if the intestinal contents dry, and the micro-organisms consequently die. But where the intestinal contents are moist and organisms are abundant, fermentation must occur, and alimentary toxæmia become sufficiently marked to require treatment. A course of waters and purgatives may accomplish the result required, provided no kinks or other variety of intestinal obstruction is present.

Thus when alimentary toxæmia is recognized clinically, I would suggest that treatment by means of diet and purgation be begun. Whilst this is in progress, let an X-ray examination be made of the

progress of the intestinal contents along the alimentary tract. If any obstruction exists, the surgeon must remove it. But his work "merely makes the paths straight" and afterwards treatment by diet and medicines must be continued.—*The Polyclinic*.

A Case of Malaria Treated With Neo-Salvarsan.

By

CHARLES SHEARD, JR., M. R. C. P. (LONDON).

Malaria is a disease not commonly met with in Canada, and, if the practitioner thinks of it at all, it is generally with the conviction that the administration of quinine and the result of this therapeutic test offers an infallible check on his diagnosis. Possibly on account of these two reasons, and particularly because malaria is not generally met with in Canada, the diagnosis from the examination of the blood does not receive as much attention here as elsewhere.

Malaria is a world-wide disease, and, if the whole surface of the globe were included, is certainly one of the commonest, ranking near the top of the list, along with tuberculosis and typhoid. It is prevalent in many parts of the United States, chiefly in the New England and Southern States, and cases are of common occurrence in and about New York City. In some parts of the world, as on the Gold Coast and in British South America, its prevalence assumes economic importance. In Trinidad, where the water retained on the leaves of the trees affords breeding grounds for the mosquitoes, tertian and æstivo-autumnal malaria have become one of the problems of the island to such an extent that the head of the Royal Commission sent to investigate malaria in Trinidad made the remark, "Man must exterminate the mosquito or the mosquito will exterminate man."

The disease in these proportions is unknown in this country, but with the increased facilities of modern travel and the increase in immigration, cases of malaria are constantly occurring, and a knowledge of its diagnosis becomes of interest.

The administration of quinine as an aid to the diagnosis of malaria is at best unsatisfactory, and, in view of the thorough knowledge that we have of the pathology of the disease, the therapeutic test is a crude way of approaching the diagnosis. Quite apart from its specific action, large doses of quinine act markedly as an antipyretic, and a fall in the temperature following the administration of quinine may lead to the incorrect diagnosis of malaria being made. A case that I had the opportunity of observing in New York illustrates this.

The patient, a young Italian, was running an irregular fever; the spleen was palpable, but beyond this and an indefinite murmur at the apex of the heart, nothing could be made out upon physical examination. Repeated examinations of the blood, as well as splenic puncture, were negative. Quinine was then given, and the temperature fell and continued about 98° for a few days. However, to the satisfaction of those who had reported on the blood examination, it rose again on the fourth day and continued up much as before. Later, a gonococcus was recovered on culture from the blood, a heart murmur developed under observation, and the case assumed the character of an infective endocarditis.

It is clearly in the interests of the patient that a correct diagnosis should be made, and this can best be done by an examination of the blood. This is a more simple matter than most text-books would lead one to believe. For purposes of diagnosis stained smears are best; any of the ordinary eosin-methylene blue stains can be used; Jenner's is possibly not so good as the others, but uniformly good results can be obtained by the use of Wright's. The more elaborate staining methods are quite unnecessary. The smears should be as thin as possible, as it is the red cells that are to be studied, and then stained, following the ordinary technique of Wright's stain. Stain for one minute with the undiluted stain, and then for three minutes with distilled water added until a scum appears over the surface of the smear. It is well to wash in a beaker filled with distilled water until the preparation assumes a distinctly pinkish hue, for overstaining adds to the difficulties. The plasmodia are readily seen inside the red cells—the large presegmentation, mature forms are more obvious than the smaller signet ring hyaline forms, and for this reason it is best to get the blood before or during the chill, to assure that the organisms are well grown. With a twelfth-power objective, the larger forms, staining deeply blue, with coarse black granules scattered throughout their protoplasm, can be readily seen distending the red cells, even if the smear is hurriedly moved about and the focus not always sharp.

That tertian malaria can present some difficulties in diagnosis, and to emphasize the importance of the examination of the blood in suspected cases, a patient admitted to Dr. Anderson's service at St. Michael's Hospital, Toronto, showed. A brief history of this case, and the findings after physical examination, were as follows:

The patient, John McC., a native of the North of Ireland, had been in Canada about six months. Shortly before he was admitted to hospital he had been on a visit to one of the new England States.

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He complained of weakness and was taken into hospital on July 6th. He was found to be running an irregular temperature, as indicated on the chart, and was noticeably anæmic. A marked feature of the case was the slowness of the pulse, which never rose above 60 to the minute. Careful physical examination revealed slight enlargement of the spleen, which was barely palpable at the costal margin. Shortly after his admission he developed an urticaria on his arms and legs, which, however, rapidly faded and was not thought of much moment. There was almost entire absence of chills, only two slight chills being observed, and these occurring during the last few days. On account of the irregular nature of the temperature, which was even more pronounced when the q. 4 h. temperature, was considered, than the chart indicates, the absence of chills, and partly also because of the rarity of the disease here, malaria was not at once thought of. The Widal taken was found to be negative. Infective endocarditis was suggested, but the slowness of the pulse and absence of heart murmurs seemed to oppose this. As the patient remained in hospital the temperature began to assume a more definite intermittent character and examination of the blood revealed the presence of the plasmodium.

In the treatment of malaria quinine has ever taken the first place. That it exerts a specific effect upon the organism of malaria is undoubted, but that the plasmodium has some degree of resistance to quinine also seems likely. In many cases of aestivo-autumnal malaria, quinine appears to have little or no effect, and in tertian malaria, treated by quinine, used over a period of a few weeks, relapses are common, some cases thus treated having regular attacks every spring, resulting eventually in the formation of a considerable splenic tumor. Quinine is generally able to prevent the next chill if taken shortly before the chill is due, and it is likely that its action is largely on the young hyaline forms and that the mature plasmodium is not so much affected by it.

The relationship between the plasmodium of malaria and the spirochæta pallida of syphilis has long been known, as they both belong to the protozoa. It has been suggested by some that, like the plasmodium, the spirochæta pallida may also assume other forms besides the common corkscrew shape, and this may explain the scarcity of spirochætes found in tertiary lesions, such as gummata. Certainly the arseno-benzol preparations possess marked germicidal properties towards the organism of malaria as towards that of syphilis. In this case 0.9 grms. of Neo-Salvarsan were given some six hours before the next elevation of temperature was due, with a view to preventing, if

possible, the paroxysm. Although there was some slight elevation of temperature, 101° , immediately following the injection, this occurred some hours before the chill was due, and may be fairly attributed to the ordinary reaction that often occurs following intravenous injections. No further rise of temperature occurred, malarial parasites disappeared from the blood, and the patient, up to the time of his discharge from the hospital, appeared perfectly well.

It seems likely that Neo-Salvarsan exerts a stronger effect on the plasmodium than quinine. Whether one injection furnishes an absolute cure for malaria can hardly be stated until cases so treated have been under longer observation.—*The Canadian Practitioner & Review*.

Diabetes in Infancy.

J. H. M. KNOX.—A female child was born of a nervous woman and a father with healed tuberculosis of the hip. She had one sister, aged 4 years, in good health, and a brother who died at 4 months from gastro-intestinal disorder. There was no history of diabetes in the family. The child was breast-fed for several months with the addition of one or two bottles of diluted cow's milk. At 4 months she had a severe attack of bronchitis, during which the urine was found to contain pus cells, which, however, disappeared under urotropine. Several examinations of the urine, during the following months, showed it to be normal, containing no trace of sugar. At 5 months the child had some digestive disturbance and was put on malt soup mixture. She thrived for a time and gained rapidly in weight.

She was first seen by the writer at 7 months and appeared to be perfectly well. She was receiving an unusually large amount of malt soup in her milk mixture, certainly over 10 per cent. This was discontinued and a simple milk mixture substituted, consisting of $\frac{3}{4}$ milk, $\frac{1}{4}$ water and 4 per cent. dextrimaltose. She did well for a month and then was seen on May 26, 1912, because she was not gaining weight. Physical examination was negative. The child was bright but seemed rather irritable. Weight 19 $\frac{1}{2}$ lbs. There was no fever. Four days later, the temperature was 101° , and there was a "fruity" odour of the breath. She had lost 1 $\frac{1}{2}$ lbs. The urine contained between 4 and 5 per cent. of glucose and acetone. There was no diacetic acid and but a trace of albumen. She was put on *Eiweiss* milk. The sugar content of the urine diminished to 2 per cent. and 2 or 3 days later to 1.5 per cent. but the general condition was not satisfactory. She apparently tired of *Eiweiss* milk. The amount of acetone in the urine increased

and the diet was changed to a mixture of 82 per cent. cream, albumen and water, the mixture having a composition of about 3 per cent. fat, 4 per cent. sugar and 2 per cent. proteid. She became drowsy and refused nourishment. Increased amounts of acetone and diacetic acid were found in the urine. The cream mixture was changed to a whole-milk mixture to increase the amount of lactose and ward off the impending coma. A sodium bicarbonate 4 per cent. solution was given by rectum and by gavage. She became more and more comatose, respirations were deep and sighing in character, and there was considerable nausea. The temperature rose and there was some evidence of pulmonary involvement. Death occurred after a recognised illness of about 3 weeks.

The necropsy showed a number of scattered areas of bronchopneumonia in both lungs. The pancreas was of normal size, of an ivory-grey colour, and showed no excess of fibrous tissue on cross section. Lobules were homogeneous in appearance. Here and there very small spots were seen, apparently islands of Langerhans. The other viscera showed no macroscopical changes, except that the kidneys preserved their foetal lobulation. The cortex of each kidney was pale in contrast to the pyramidal portion which was much congested.

Microscopic Examination.—Sections of the pancreas showed the lobules to be separated from each other by rather broad septa, which consisted principally of very loose connective tissue. There were many small round cells in the interstitial tissue, which in some places seemed to replace the acini. The connective tissue was increased. The islands of Langerhans were diminished in size and number. The capsule was thickened and in the connective tissue trabeculae were visible.

The diabetes was probably of pancreatic origin. The following points are noteworthy: the rapid progress of the disease; the marked loss in weight: 2 pounds in 5 days; the absence of greatly increased thirst or hunger; the moderate polyuria; the early appearance of acidosis and coma.

The writer has collected from literature 15 cases of diabetes in infants under a year. In 3 the disease was noted within a few days of birth. In 3 a grand-parent or great-aunt had had diabetes. In 6 the disease seemed to have followed an injury to the central nervous system; in 2 a fall. In 2 an injury at birth was possible, as the labours were described as difficult. Three cases were associated with hydrocephalus and one with an encephalus. In 3 cases the symptoms began

after the use of an unusual amount of sugar. One baby was fed on condensed milk; another was given 150 grams of sugar in addition to a litre of milk daily, and in the present case about a litre of milk was given containing 10 per cent. malt soup. At least 3 cases ended in coma. Recovery took place in 3. Thus the prognosis is grave, but not hopeless, except in a severe grade of the disease.

Treatment should be begun early, and, although more difficult in carrying out, should follow the lines most successful in adults *i.e.*, the carbohydrate tolerance should be determined and the sugar content of the diet (milk mixture) correspondingly reduced, the calorific requirements being furnished by fats and proteids. An "oatmeal day" or days should be given at frequent intervals.—*The Medical Review*.

SURGERY.

Cerebral Abscess Discharging into the Mouth.

HAROLD F. RENTON, M.D., B.S.—A man, aged 41, was admitted to the Bradford Union Hospital on April 25, 1913. He had been treated for influenza for a week. He was comatose and bathed in a profuse sweat. The cheeks were flushed, and the pulse full and bounding. The pupils were equal, of medium size, and reacting sluggishly to light; there was no squint and no optic neuritis. There was marked facial asymmetry, the left side showing partial or supranuclear palsy of the seventh nerve. There was no retraction of the head. The left limbs were more flaccid than the right, but the reflexes were normal and equal on both sides. The plantar reflex was flexor in type on either side. The abdominal reflexes were not obtained. The chest was full of moist sounds, but there was no dulness. There was no wound of the skull, and no discharge from the ears or nose. The temperature taken in the left axilla was 101·6°, and in the right axilla 100·4°. A catheter was passed, but no urine was withdrawn. During this operation the patient moved the right arm and leg, but the left limbs remained immobile. Hæmorrhage into the right side of the brain was diagnosed.

Re-examination next day showed that the left pupil was smaller than the right, and that the left nostril moved during respiration, the right being apparently immobile. The patient was able to move the left arm and leg, but not to any marked extent. He attempted to speak, but the sounds were incoherent. Towards night he took a little milk. On April 27th he was quite unconscious and bathed in a profuse sweat. The temperature was hectic, as shown by the 4-hourly

chart. These facts caused the diagnosis of cerebral hæmorrhage to be abandoned. It was thought that he was suffering from a purulent affection of the brain, the nature and situation of which were not clear. Later in the day the nurse reported that a foul greenish discharge "came into the mouth," and necessitated frequent removal. The discharge was very free, and it was impossible to determine by what path it reached the mouth. The chest was carefully examined for empyema, but without success. Examination of the ears and nose, somewhat difficult under the circumstances, revealed no disease. He died the same evening.

Necropsy.—The heart, kidneys, and spleen were normal. The lungs were congested and the bronchi contained a quantity of mucus. There was no empyema. A search was made for signs of suppuration in the pharynx and tissues of the neck, but without success, nor was there any evidence pointing to disease of the air sinuses of the face. There was, however, a perforation in the left tympanic membrane which had not been seen during life, and through which a drop of pus had exuded. The calvarium was normal. There was a large abscess in the left temporal lobe, communicating with the lateral ventricle. The walls of the abscess were roughened and firm, and enclosed a small quantity of pus possessing the same odour and appearance as that of the discharge which was noticed in the mouth shortly before death. Below, the abscess communicated with the left middle ear through the petrous portion of the temporal bone. The communication was very large, measuring $\frac{1}{4}$ in. across, and a probe could be passed through the outer ear into the skull by way of the aperture in the petrous portion of the temporal bone without encountering any resistance. Over the right motor area of the brain was extensive purulent meningitis, but the left cortex was unaffected. There was some plastic exudate upon the base of the brain, but no pus. There was no sign of disease of the right ear or of the right temporal bone. The meningitis upon the right motor area was sufficient to explain the paralysis of the lower half of the left side of the face and of the paresis of the left arm and leg.

The meningitis upon the right side of the brain must have been due to the spread of infection from the left petrous bone, yet, the base of the brain was little affected, and the surface of the left cerebral hemisphere not at all. One would have thought at least that those areas nearest to the primary infection would have been the first to be affected during the spread of the disease. Moreover, the few focal

symptoms were sufficient to warrant a diagnosis of disease of the right side of the brain, yet there was nothing to suggest the presence of the cerebral abscess. The termination of the cerebral abscess was unusual. A close examination of the mouth and sinuses of the face post mortem failed to show the source of the foul-smelling matter which appeared in the mouth. Nor was there any sign of suppuration in the tissues of the pharynx or neck. There can be little doubt that the discharge consisted of the contents of the cerebral abscess, which was found almost empty post mortem. The path taken by the pus in the passage from the brain to the mouth was not very obvious, and it was difficult to explain why no escape occurred by way of the external ear, which did not present any obstacle. It was easy, however, for the discharge to reach the middle ear through the aperture in the petrous portion of the temporal bone. The view was held that it reached the mouth by the Eustachian tube. The text-books do not mention this path though it is well known that a cerebral abscess associated with middle ear disease may discharge through the external ear.—*The Medical Review*.

Abstract of Lecture on Preparation for Anæsthesia.

J. D. MORTIMER, M. B., F. R. C. S.

When time and opportunity allow, preparation for anæsthesia should in a large proportion of cases embrace much more than the customary aperient and fasting. Many general conditions such as diabetes, thyroidism, rickets, anæmia, plethora, obesity, materially interfere with success and safety by causing abnormal effects and after-effects and by contra-indicating positions and anæsthetics suitable to the surgeon's requirements. The same may be said of pulmonary and cardio-vascular disorders. In neurotic persons fright and other emotional disturbances entail risks during induction, and from their effects on vital centres and blood pressure predispose to shock: after-effects are apt to be exaggerated. Alcoholism results in a stormy induction, with risk of overdilatation of the heart, and in exaggeration of reflex disturbances during operation. Excessive smoking results in cough and secretion of mucus which predispose to after-troubles, as do also pharyngitis or rhinitis from other causes, and oral sepsis. When such conditions are present, operations under anæsthetics should be deferred when possible, if there is a reasonable prospect of improving the patient's state by appropriate treatment.

Neurotic and alcoholic patients should have some sedative, such as bromide of sodium, for a few days before operation, and every effort

should be made to lessen mental disturbance. Injections of morphine and atropine as an immediate preliminary are valuable. I have found scopolamine sometimes disappointing, and its depressing effect on the respiration may cause anxiety.

The urine should be carefully examined, and in children it is well to test for acetomuria, and to give glucose for twenty-four hours before operation, also to exclude fats from the diet of rickety, obese children.

Nervous people should receive tactful encouragement. With children difficulties are often caused by the patient having been "kept in the dark," or attempts at deception having been made, although the child's age and temperament should have called for judicious explanation.

In all cases the patient should have a simple diet without much meat for some days before. The common practice of giving an aperient the night before operation and an enema the same morning is objectionable, for there is not always time for effectual clearance and the patient is liable to be exhausted at the moment of operation. The aperient should be given *two* nights before, and the following morning it should be repeated if necessary, and the enema given in the evening.

Except in very young, old, or exhausted patients, and in special cases, no food, including milk, should have been taken for at least six hours, and the last meal should have been a light one. There is no objection to a little drink, such as tea, or a alkaline table water, an hour or two before giving the anæsthetic. Operations on young children are best done at 1 or 2 p.m., allowing a light breakfast at 7 or 8 a.m.

For short administrations of ethyl chloride or nitrous oxide no meal should have been taken for a few hours, the bladder should have been emptied, and the clothing loosened.

Combinations of local analgesia, or of injections of narcotics, with general anæsthesia, are often valuable for other reasons than those stated, but their consideration hardly comes within the scope of the lecture.

Much of the foregoing is no doubt common knowledge, but unfortunately it is knowledge often forgotten or not applied in practice.—*The Polyclinic*.

Cystitis in Women—Treatment of.

The mild cases of this affection will usually clear up under plenty of water and some alkaline diuretic, such as potassium citrate, and hyoscyamus or belladonna. With these it is well to give also hexamethylenamine, in the dose of from 15 to 40 grains (1 to 2.5 gm.) daily. Absolute rest in bed with the bowels kept moderately loose will hasten recovery. Hot vaginal douches during the acute stage are often comforting. If the dysuria and increased frequency are so marked as to interfere with sleep, sedatives should be given freely.

As the acute symptoms subside, irrigations and instillations are valuable. The author irrigates twice daily with a one-half saturated (2 per cent.) solution of boric acid, and adds to this semi-weekly irrigations with 1:5000 silver nitrate solution, gradually increased in strength. For the installations, 2 per cent. protargol or 10 per cent. argyrol are efficient. When there are isolated areas of inflammation, direct topical application through the air cystoscope is valuable.

The condition known as cystitis colli is a mild inflammation about the internal urethral orifice and trigonum, and is probably of gonorrheal origin. Direct applications of 10 per cent. silver nitrate solution once or twice a week are valuable. They should be followed up by alkaline diuretics.

Occasionally severe cases of non-tuberculous cystitis require the formation of a vesico-vaginal fistula, with continuous irrigations for several hours daily in a tub of warm water, before relief is obtained.

Tuberculosis of the bladder in women is almost *prima facie* evidence of tuberculosis of the kidney. After the renal infection has been properly treated, the bladder will tend to clear up. Irrigations of 1:5000 mercury bichloride solution, or instillations of 1:500 or greater strength, silver nitrate in weak solutions, or 10 per cent. iodoform emulsion in glycerin, are helpful. Excision of ulcers or even curettage of the bladder is advisable in some cases. To these local measures should be added climatic, hygienic, and dietetic treatment, with the aid of which the prognosis can be greatly improved. —*Monthly cyclopædia & Medical Bulletin.*

Ethyl Chloride—General Anesthesia with.

After many years' experience with this agent the author is of the opinion that by continuous administration of small amounts of it, using a special but simple technique which he describes, general

ethyl chloride anesthesia may be prolonged beyond the customary short period with any danger. The anesthetizer should have at hand one tube of 50 c.c. or several of 10 c.c. of ethyl chloride, provided with the usual fine spray tips employed for local anesthesia. A compress or handkerchief folded to make 4 thicknesses, broad enough to cover the nose, mouth, and chin, is placed over the face in the form of a conical mask, the margins being closely applied to the skin surface while the center, upon which the ethyl chloride is to be sprayed, is kept a few centimeters from the tip of the nose. The spray tip of the tube is placed over the compress, the tube itself lying in contact with it and its other extremity resting on the patient's forehead. To prevent too rapid loss of the ethyl chloride, another compress is placed completely over the tube, the hand of the anesthetizer holding it, and the first compress. By drawing down the lever at the tip of the ethyl chloride tube the anesthetizer then sprays the anesthetic on the center of the compress, causing it to be inhaled regularly at each inspiration. The spraying is continued until anesthesia supervenes. If the operation is to be performed in the mouth or naso-pharynx, compresses and tube are quickly removed, while if it is to involve other portions of the body, the inhalation is continued as before until the operation has been completed or a short period before this, analgesia often persisting a few minutes after the administration of the drug has been stopped. The amount of ethyl chloride generally used by the authors has been 8 to 30 c.c.; in a few cases 50 c.c. The longest anesthetics attempted were twenty to thirty minutes, and the usefulness of the method is probably limited to operative procedures that can be carried out within this period of time, though Boureau, using larger amounts, has been able to prolong the anesthesia even to forty-three minutes.—*Monthly Cyclopædia & Medical Bulletin.*

Wounds—Tincture of Iodine in Treatment of.

In traumatic surgery tincture of iodine appears to the author to be the best of all antiseptics. In treating with it nearly 1000 patients with incised, lacerated, and contused wounds, dog-bites, compound fractures, traumatic amputations, etc., he has obtained excellent results. The more simple the technique the better. If the area about the wound needs shaving it should be shaved dry. Any loose tags of tissue or foreign body should be removed with sterile instruments, and not washed out. The tincture should be first painted about the wound and allowed to dry for a short time, opportunity being thus

given for penetration. Then with another bit of sterile cotton on a toothpick the wound itself should be painted thoroughly. Dannreuther's method of injecting the deeper recesses of a wound with a medicine dropper is a good one, but should not be depended on entirely in cases of puncture wound where there is a liability of tetanus infection. A sterile compress should then be held firmly over the wound, if it is small, until hemorrhage is stopped, and a sufficient number of sutures applied to approximate the edges of the wound when indicated. In large, lacerated wounds the iodine may be poured into the wound after painting a free area about it. Drainage should, of course, be established when indicated, especially in the badly contused, lacerated wounds, where there is apt to be much oozing and tissue resistance is much below par.—*The Monthly Cyclopaedia & Medical Bulletin.*

Skin Grafting without Dressings.

JOSEPH WIENER, M. D. In Jan., 1907, the writer was asked to see a strong man, aged 43, with extensive osteomyelitis of tibia and fibula following a crush. There had been extensive sloughing of the muscles and skin of the leg, so that, at a consultation of surgeons, an amputation had been decided on. Although there had been a profuse purulent discharge, with septic temperatures for several weeks, and the writer did not feel confident of saving the limb, he advised against amputation.

After he had performed several operations on the tibia and fibula, there was left an extensive ulcerating superficial area extending from the ankle to the knee, and involving about three-quarters of the circumference of the leg. Over this area the skin and some of the muscles had sloughed away. In the centre was a sinus discharging pus from the tibia. In consequence of continuous absorption the general condition did not improve much.

In spite of the discharging sinus the writer covered the entire area, except the sinus, with Thiersch grafts. In the sinus he placed an iodoform gauze packing. The leg was swung from a bed cradle. Had he put any kind of a dressing on the leg, the pus from the sinus would have washed away the grafts. Twice a day the iodoform packing in the bone sinus was changed without disturbing the grafts. In spite of the sinus every graft took and the general condition rapidly improved. He has now a useful leg. There could not have been a more unpromising case for skin-grafting.

The result was so striking that the writer has ever since used this method of open grafting. In several desperate cases he has had the most gratifying results. In some there were discharging sinuses in the area to be grafted; and yet the grafts almost always took. In a case of double amputation of the breasts an ulcerating area was left involving almost the entire anterior surface of the chest. In spite of various forms of dressings, and different local applications for several weeks, there was no sign of healing. The general condition as the result of absorption from this large ulcerating area, was becoming steadily worse. The discharge was so profuse that grafts covered by any dressing would have been unsuccessful. The entire ulcerating area was covered with thin grafts which were left exposed to the air without any dressing. The grafts all took and the general condition rapidly improved.

The technique is the usual one for Thiersch grafting. The grafts are cut as thin as possible and applied in the usual manner. Suppurating sinuses in the grafted area are packed with iodoform gauze. These packings are changed as often as they become saturated with the discharge without disturbing any of the grafts. The grafts will take within a $\frac{1}{2}$ -inch of a discharging sinus. During the first day or two crusts of inspissated serum form between them; these should not be disturbed. For 7 or 8 days, or even longer, no dressing of any kind is applied. Usually after the first day or two, the grafts have become firmly adherent and have a healthy pink color. After 7 or 8 days a week ichthyol ointment is applied over the entire grafted area. Under this dressing the crusts that have formed between the grafts drop off and soon the area assumes a normal appearance.

The writer has found it inadvisable to apply a wet dressing, even a bland one, until at least two weeks have elapsed. If applied earlier, the wet dressing will in some cases macerate the grafts and thus, in part at least, vitiate the operation. It is true that even after the grafts have been macerated by a wet dressing, they will often recover their vitality when the dressing has been removed. But it is better not to run this risk. The writer even prefers to wait almost ten days before applying the ichthyol dressing. During these first ten days that the grafts are exposed to the air, they are steadily becoming more hardy; and nothing is gained, whereas much may be lost by putting on an early dressing.

The Fig. shows how the grafts looked after 5 days; no dressing had been applied since the operation. The necrotic tibia, the seat of

a compound fracture, can be seen about the middle of the leg. In grafts on the extremities the leg or arm is swung free from the bed-cloths. In grafts on the trunk, a cradle to keep off the bed-cloths is all that is required.

The results from this method, even in the most difficult cases, have been much better than those obtained with various methods of dressings. If the details described are carried out, a single trial will convince the most sceptical.—*The Medical Review*.

When to Operate in Appendicitis.

FRANK KIDD, F. R. C. S.—It would be a great gain if we had the power to forecast what cases of acute appendicitis are going to "fulminate" and what are going to quiet down, so that we might operate at once on the former group, and leave the latter for the safer "interval" operation. The following method, employed by the writer, should render it not difficult for the general practitioner to determine what is going to happen.

Every patient with the diagnosis of acute appendicitis that comes into his wards at the London Hospital is at once put to bed on the back in the head-up ("Fowler") position and watched. The directions are: "no food, no drink, no purge, no enema, no opinion." An hourly chart of the temperature, pulse-rate, and respiration-rate is at once started and a mental note is made of the severity of the pain and deep tenderness. At the end of 4 to 6 hours (usually 4) the chart is reviewed, and the abdomen again examined. If the temperature, pulse-rate, and respiration-rate are all falling, and if the pain is less no operation is performed and these patients soon settle down into "interval" cases. But if any one of these 4 things is no better or is worse the operation is at once performed. So far it has shown that the peritonitis is spreading and needs immediate operation.

Let the practitioner try this method directly he is called to a patient with severe abdominal pain, especially if accompanied by fever. Let him at once take steps to call in a surgical opinion, but let him employ the interval before the surgeon can arrive in placing the patient in the Fowler position by putting two kitchen chairs under the head end of the bed, and in preparing an hourly chart. An intelligent mother can easily be taught how to prepare the chart if it is not possible for the practitioner to do so himself. Meantime, while

the surgeon is on his way, valuable time will not be wasted, and when he arrives there will be some definite evidence for him in deciding as to immediate operation or expectant treatment. The writer excludes cases seen within the first 12 hours of their illness, as these are practically the same as interval cases from the operative stand-point, and should always be operated on at once.

A Method of Tonsillectomy.

BY

PERCY B. MACFARLANE, B.A., M.B., HAMILTON.

The operation of tonsillectomy or the removal of the tonsil in its capsule has been written on very extensively, but the writer wishes to describe a method which he has found most efficient and which he has used in a series of 250 cases of removal of tonsils under general anaesthesia.

The anaesthetic used is ether. The patient is put to sleep in the ordinary way either by the gas and ether sequence or by ether by the open method. The anaesthetic is then carried on by the administration of warm ether vapor passed into the mouth through a tube which is attached to the mouth gag. In this way the operation is performed without the interruptions caused by the administration of ether on the mask, and the throat is easily kept clear of blood, so that the "blood-covered field of operation in throat work," described by some writers, is entirely eliminated and every step of the operation can be performed in plain view, not being obscured by blood.

This method of ether administration is also recommended because of its increased safety. The Committee on Anaesthesia appointed by the American Medical Association report that one great danger in anaesthesia is involved in allowing the intensity of the anaesthesia to vary during an operation. An anaesthetic is good in proportion as it is uniform. This committee states that offences against this principle occur most frequently in throat operations. By administering warm ether vapor in the manner mentioned the uniformity of the anaesthetic is maintained and accidents are not so likely to happen as in the ordinary method in which the patient at times comes nearly out of anaesthesia and again is plunged into a profound narcosis.

In commencing the operation itself the tonsil is seized with an ordinary tonsil seizing forceps and is drawn forwards. An incision is

made through the mucous membrane of the anterior pillar at its margin so as to expose the capsule of the tonsil. A separation is then made between the anterior pillar and the capsule. This separation is carried upwards over the upper pole of the tonsil and then downwards between the posterior pillar and the tonsil. By the use of a blunt dissector the tonsil is entirely freed from the pillars and remains attached only by its base. A snare is then slipped over it and, following the line of least resistance, it cuts through the connective tissue, uniting the capsule to the surrounding tissue.

When the tonsil has been removed a gauze sponge is placed in the fossa and pressure may be placed upon it while the other tonsil is being removed in a similar manner. Usually this pressure is sufficient to control the hæmorrhage. If it is not controlled in this way the bleeding point is picked up with a pair of hæmostatic forceps and crushed or a ligature may be passed around it if necessary. Care is taken that all bleeding has ceased and that the fossæ are quite dry when the patient leaves the table.

This method seems to be the best because the operation is easily and quickly performed, the field of operation need never be obscured by blood, there is no danger of damaging the pillars, the amount of bleeding at the time of operation is less than in any other method, and the possibility of post-operative hæmorrhage is reduced to a minimum. In the 250 cases of this series there has been no case which presented the slightest indication of post-operative hæmorrhage.—*The Canadian Practitioner & Review*.

Treatment of Boils and Carbuncles

A. MAUTE—During the last 5 years the writer has had extensive experience of anti-staphylococcic vaccine and has treated about 2,500 cases of boils. While vaccine treatment is the most efficient method either for cure or prevention of recurrence, the comfort of the patient greatly depends on rational local measures.

The local treatment should be as simple as possible. As far as possible operation should be avoided. The total excision of boils or carbuncles is an absurd operation which has recently been revived by some surgeons. It leaves unsightly scars and has no effect on recurrence. Large incisions are equally unsatisfactory even when followed by curettage. Simple puncture with the knife or galvano-cautery is useful only if it relieves pain or hastens the evolution of the boil. Performed early, during the period of induration, it is painful and

the boil runs its course unchecked, while after a fluctuating point has appeared, a puncture made with the fine point of the cautery allows the escape of the pus and only anticipates the ulceration of the skin which precedes the exit of the core. These statements apply equally to localised carbuncles, but the diffuse variety sometimes seen in diabetics or debilitated persons must be treated surgically, though a proper vaccine, if used at once, may avoid the necessity for large incisions. Sir James Paget used a linseed poultice and in the pre-suppurative stage nothing gives so much relief as a hot moist dressing such as oataplasm. Like all wet dressings it has the disadvantage of favouring the infection of the neighbouring follicles. This may be diminished by reducing the size of the dressing so that it does not extend beyond the inflammatory area round the boil. When the boil is situated in a hollow the poultice should be replaced by a small aseptic compress. The dressing should not only be as small as possible, but should not be covered with a thick pad of wool or bandaged. The skin surrounding a boil is covered with staphylococci ready to avail themselves of the points of entrance caused by the friction of such a dressing. It is better to fix the small dressing on the boil by two or three strips of a good zinc plaster so as to maintain it firmly in position. These are less irritating to the skin than a bandage. The remains of the adhesive material should be removed at each dressing with a little ether. As soon as suppuration ceases all dressings should be discontinued. If the boil has been imperfectly emptied it may remain for some time hard and inflamed and may then be treated by covering it for a few days with collargol ointment. When vaccine treatment is used this is rarely required as suppuration is rapid and free from the first. In large boils of slow development Bier's suction cups give good results. In the early stages they allay the inflammation while later they hasten suppuration and aid in the extraction of the core. The patient should be warned against attempting to express the core which is a needlessly painful proceeding. When a crop of boils is situated on a limited surface, occlusive dressings covering the whole area should not be used. It is better to apply a small dressing to each boil separately. The patient should then wear a sterile garment, sleeve, undervest, or drawers, of fine linen, appropriate to the part of the body affected. When on the nape the patient should keep the neck bare.

The skin of a patient suffering from one or more boils is covered with staphylococci even at a distance from the lesions. The disinfection

tion of the hair follicles is difficult, but it is well to wash the surrounding skin with ether, camphorated alcohol or even tetrachloride of carbon containing 1 or 2 per cent of iodine. Although these lotions leave the skin dry it is well to powder it freely with talc mixed with $\frac{1}{2}$ of ectogan. It is well to avoid a general bath, even an antiseptic one, for a week after the last boil has healed. The skin should be kept as dry as possible. A useful measure in confluent furunculosis is to prepare a sachet sufficiently large to cover the affected area. The cutaneous surface of this sachet is formed of linen sufficiently fine to retain the powder and on its external surface made of impermeable tissue. In it is placed a small quantity of powdered trioxymethylene and it is applied directly to the skin after lightly dusting it with talc, and fixed with strips of plaster. The heat of the body is sufficient to set free the vapour of formol and usually after 24 hours' application the skin of the part is sterile. This application may produce a slight burning sensation. It must be applied only when the skin has almost returned to normal or at least when suppuration has ceased, as when moistened it becomes irritating and the formol has a caustic action on raw surfaces. In addition to its powerful antiseptic action formol hardens the skin, which sometimes arrests the formation of a crop of boils till the immunising action of the vaccine can exert itself. The writer does not believe in the existence of an efficient abortive treatment at the stage when the boil presents the appearance of a hard, red swelling. The application of tincture of iodine or a solution of iodine in acetone, often employed for this purpose, is generally useless as it can disinfect only the superficial parts of the follicle, leaving the deeper infection which develops into a true boil untouched. The affections which abort are cases of simple folliculitis.

Although the association of boils with diabetes is commonly accepted, among the writer's cases only about 1 in 100 of those suffering from boils presented glycosuria. It is probable that the presence of an increase of sugar in the blood may favour the formation of boils as the writer has observed their appearance after indulgence in confectionery. It is well to restrict the ingestion of sugar and hydrocarbons in those suffering from or liable to furunculosis.

Antistaphylococcic vaccine is the best curative and preventive treatment. After using vaccines prepared and sterilised in various ways the writer prefers that heated to 45° C., and preserved without the addition of any antiseptic. He also prefers in most cases to use

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an autogenous vaccine, prepared from the stain of organism present in the lesion, which is more effective and in large doses does not cause the pain and reaction frequently seen after using stock vaccines. It is standardised so that 1 c. c. contains 1000 millions of cocci. The effect of the vaccine on the boil is remarkable. In 24 hours there is usually a sharp reaction which hastens evolution, so that suppuration occurs in 2 or 3 days instead of 8 or 10 days and in many cases the boil becomes transformed into an abscess containing creamy yellowish-green pus and without a core. The pus is also more fluid, so that in many cases it may be evacuated by a large hypodermic needle, like a cold abscess. The inflammatory thickenings left by imperfectly evacuated boils suppurate and rapidly heal. These local effects are almost constantly obtained whether a stock or autogenous vaccine is used and whether the dose be large or small. They are the cause of much misunderstanding as to the value of autogenous vaccines and the necessity of an efficient dose being injected. The test of efficiency is not the cure of the individual boil but the prevention of recurrence.

In fixing the initial dose account must be taken of the state of the lesions. If treatment is begun at the end of an attack or if the patient presents only small boils without much peripheral inflammation or lesions intermediate between folliculitis and true boils the initial dose may be $\frac{1}{2}$ c. c. (500 millions), the same dose being repeated 6 days later. If no fresh boils have developed during this period a dose of 1 c. c. may be given 8 days after the second and further injections, to the number of 7 or 8 in all, every 10 days, of amounts ranging from $1\frac{1}{2}$ to 2 c. c. If during the first part of the treatment fresh boils are developed, the third injection should be replaced by 2 injections of $\frac{1}{2}$ c. c. at 5 days interval.

In acute attacks where the boils are much inflamed or accompanied by lymphangitis or glandular enlargement, or again in cases of carbuncle, this method must be modified, otherwise the patient may be suspended rather than vaccinated. In this case an acute outbreak occurs after two or three injections and the treatment may have to be suspended for several weeks. In more acute conditions the vaccine treatment should be divided into two series of injections, a curative series of 3 or 4 injections at intervals of 4 days of doses ranging from 150 to 250 millions which will subdue the acute attack, then the preventive injections should be given in the doses and at the intervals previously described. The only internal treatment used by the writer is the occasional prescription in rebellious cases of 60 to 120 drops of

dilute sulphuric acid per diem to be taken with meals well diluted with water. In 80 per cent of cases treated in this way, the boils cease to appear after the third or fourth injection; in 15 per cent. fresh lesions may appear till after the sixth, when it will be well to make 10 injections. In about 5 per cent. of cases, though the crops of boils become less frequent and severe, the patient is not entirely cured. Such persons usually suffer from severed dyspepsia and present eczematous lesions with pruritis.—*The Medical Review.*

OBSTETRICS & GYNÆCOLOGY.

Pessaries Versus Operations in the Treatment of Uterine Displacements.

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In former days displacements were not treated except by the means of pessaries; and the only question to exercise the mind of the practitioner related to the kind of pessary he was to use. Certainly this was a large question, if we may judge from the number and variety described in the text-books of the day. Most instruments and inventions when obsolete are forgotten altogether; but pessaries appear to be cherished by surgical instrument manufacturers, whose catalogues, when these appliances are concerned, read like a catalogue of museum specimens.

In the last twenty years the ingenuity of gynæcologists has been diverted from the invention of new pessaries to the devising of operations for the relief of displacements. At the beginning of this surgical era the indications for the use of pessaries were numerous, and the indications for surgical intervention were very few. The progress of surgery in the direction of improved technique and diminished mortality has led to a steady encroachment of surgical procedures on the domain of pessaries, and it does not require a seer to foretell that in the course of time the original conditions will be reversed, and the indications for surgical treatment will be numerous and the indications for pessaries will be few.

Of course, I am referring to the attitude of the profession as a whole; for just as, at any given time, there are always some ardent spirits whose ideas are in advance of their day, so there are always cautious and conservative people who lag a generation behind. In

this, as in other matters, we find exemplified the proposition enunciated by the late James Hinton, that "truth lies in the polar union of opposites."

I wish now to define the relative scope of the indications for pessaries and operations from the standpoint to which my own experience has led me. Without entering upon debatable questions of ætiology and pathological anatomy, I shall include under the term "displacements" retroversion and retroflexion of the uterus, prolapse of the uterus and vaginal walls, and procidentia. Moreover, since some backward displacements of the uterus cause no symptoms and are therefore best left alone, I may add that my observations refer only to cases in which symptoms are present from which patients must be relieved.

From the point of view of treatment I recognize three groups of displacements:—

A.—Cases in which there is a clear indication for pessary treatment.

B.—Cases in which there is a clear indication for operation.

C.—Optional cases in which the patient should have both courses explained to her, and be allowed to choose.

Such divergence of opinion as is found on the subject has reference primarily to the position of the boundary lines between these groups.

A. CASES IN WHICH THERE IS A CLEAR INDICATION FOR PESSARY TREATMENT.

In this group I should include the following cases:—

(1) Retroversion of the uterus following confinement. In many of these cases there is a temporary relaxation of the ligaments and loss of tone; and the wearing of a Hodge pessary for a few months will usually bring about a cure.

Let me note in passing that when I speak of a cure in connection with displacements, I mean that the parts remain in their normal position when the pessary has been removed.

(2) Retroversion of the uterus occurring in young and nulliparous women, when the symptoms, of displacement are of recent origin, and the uterus fails to keep up after simple reposition. In such cases I think it is always advisable to try the effect of a Hodge pessary in the first instance, and give it a year's trial if necessary.

(3) Retroversion of the gravid uterus, in the early months; this is the class of case in which the patient often seeks relief on account of impaction of the retroverted uterus and retention of urine. It is usually sufficient for the pessary to be worn for six or eight weeks. This is the only kind of retroversion in which I prefer a ring to a Hodge; the primary necessity is to keep the uterus raised up, for if raised it will not fall backwards. In cases of retroversion of the unimpregnated uterus I have hardly ever known a ring to correct the displacement.

In all cases of backward displacement it is an indispensable condition that the displacement should be corrected before the pessary is introduced.

(4) Prolapse of the uterus, with or without cystocele, when the perineum is sufficiently good to hold a ring well up. If the ring is well borne, and does not readily get rough or set up vaginitis, and if it relieves the symptoms, it may be worn for a considerable time with periodical inspection, particularly if the patient is single, or a widow.

(5) Cystocele with prolapse, with the same proviso as above, that the perineum is sound. Sometimes a ring answers very well; in other cases a specially shaped pessary may be adopted, the upper end of which is like a Hodge, while the lower end is widened and curved forwards so as to lie behind the pubes and above the levatores ani.

(6) All kinds of mobile displacement when the condition of the patient is such as to contra-indicate operation. In this category I should include some cases of displacement in old women, although if the patient's general condition is vigorous, I should not consider age in itself to be a bar. I have had some very satisfactory cases of operative treatment for displacement in women over 70.

Whilst I am on the subject of pessaries I should like to call your attention to a few popular delusions:—

That the vagina was designed by nature as a receptacle for a pessary.

That the introduction of a pessary is good treatment as a placebo when one does not know what else to do.

That a Hodge pessary may be expected to succeed when the retroversion has not been first rectified with the fingers or sound.

That a ring is a suitable pessary for a backward displacement.

That the size and fit of a pessary are unimportant.

I now pass on to my second group.

B.—CASES IN WHICH THERE IS A CLEAR INDICATION FOR OPERATION.

In this category I should include the following:—

(1) All cases of backward displacement in which the uterus is fixed by adhesions, so that its position cannot be rectified. To insert a pessary in such a case is merely to add risk to inefficiency.

(2) Backward displacement complicated by ovarian tumours or inflammatory disease of the appendages. It may be said that in such a case the ovarian tumour or tubal disease and not the displacement is the indication for the operation. With this I quite agree, but the point upon which I would lay stress is that it is futile in such a case to treat the displacement by pessaries; and that when the abdomen is open one should use this opportunity to sling up the uterus if the operative conditions allow of this being done.

(3) Backward displacement complicated by one or more fibroids admitting of myomectomy. Here the fibroids may, in certain circumstances, be considered as the indication for operation; but there are also cases in which the fibroids might not be regarded, in themselves, as calling for immediate interference, and I should then regard the double condition as a clear indication for a combined myomectomy and hysteropexy.

(4) Mobile retroversion associated with torn perineum that requires repair. While the patient is under the anæsthetic it is a simple matter to open the abdomen and deal with the uterine displacement, it does not materially add to the operative risk; it takes very little longer, and the patient is saved from the necessity of subsequent pessary treatment.

(5) Retroversion associated with an atrophic condition of the upper part of the vagina in such a fashion as to render pessaries ineffectual.

(6) Prolapse of the uterus and vaginal walls, when the perineum is so torn or stretched that no ordinary pessary will keep in place.

(7) Total procidentia, with the vagina inverted and the uterus lying outside the vulva; particularly when associated with ulceration of the vagina due to friction of the clothes. In such cases the vaginal outlet is nearly always so stretched that pessaries fail to keep in place; and, moreover, if a pessary can be induced to stay in, it will nearly always cause excoriation and ulceration of the damaged vaginal wall.

(8) All cases of displacement when the patient is going to reside abroad in districts where medical assistance is not readily available.

(9) All cases of displacement in which a pessary rapidly perishes or becomes rough, or leads to profuse and offensive discharges, or causes inflammation or ulceration of the vaginal walls. I have met with such cases, when the patient was absolutely miserable without a pessary, and yet had to do without it at frequent intervals because it was so badly borne. There has then been an alternation of (1) relative comfort, but associated with offensive discharge; and (2) freedom from discharge, but with attendant discomfort and inability to retain urine when walking, coughing, or straining in any fashion.

(10) Cases of displacement in neurotic single women, on whom the concentration of attention on the pelvic organs incidental to the wearing of a pessary, frequent douchings and periodical examinations has a harmful mental and moral effect.

C.—OPTIONAL CASES, IN WHICH THE PATIENT SHOULD HAVE BOTH COURSES EXPLAINED TO HER, AND BE ALLOWED TO CHOOSE.

I place in this group cases of uncomplicated displacements in which a pessary answers quite well as regards keeping the displacement corrected and the patient comfortable, but does not bring about a cure. As soon as the pessary is removed the displacement returns. Consequently there is before the patient the prospect of many years of pessary treatment. Now *a priori* one would expect, and from experience of many such cases I can testify, that to many women such a prospect is abhorrent. They do not want to be constantly reminded of the existence of their internal organs; the periodic examinations are distasteful to them; the constant douching necessary to keep a pessary clean is nothing short of a nuisance; and they accept with surprising alacrity the suggestion that they may undergo an operation to rid them of this great incubus in their life. In this class we find married women of some years' standing, young married women to whom a pessary appears as a barrier between them and their husbands and their hopes of happy maternity; and single women to whom every examination is a veritable ordeal.

I maintain that in the past the requirements of these patients have not been adequately met; they have had to put up with an objectionable treatment, or "grin and bear" their pains discomforts unrelieved. If though we can open to them a door of relief we bar it in their face, we fail in our duty. There is a perfectly fair parallel in the case of

hernia in men. If a man with a hernia came to us and said that he did not wish to wear a truss but preferred to undergo a radical cure, even though he realized the slight risk attendant on this procedure, we should without hesitation put him in the way of obtaining his wish. The wearing of a truss by a man is a far slighter hardship than the wearing of a pessary by a woman.

The only valid argument against operative treatment of displacements as a matter of election would be one that could demonstrate that the operative risk was excessive, or that the results were bad. The risk in these days is very slight. I have published my results fully from time to time. In my first ten years I had three deaths in 64 cases, all from broncho-pneumonia. In the last ten years I have had three deaths in 509 cases, one from diabetes, one from oral sepsis and one from pneumonia. I submit that these figures would compare not unfavourably with any series of 500 cases of radical cure of hernia. As regards the later results of operation, I have reported from time to time the after-histories of my own cases. The latest report was in the discussion at the Royal Society of Medicine, in March of this year, when the total cases traced amounted to 373, a larger number than those reported so far in the practice of any other operator. The figures are large enough to make the deductions from them trustworthy; they showed: (1) That in 90 per cent. of cases the general condition of the patient was much better than before operation; (2) that in 96 per cent. of all the cases, and in 98 per cent. of the later ones, the displacement was permanently cured; (3) that 62 confinements had followed the operation; with two more natural confinements that I have recently heard of, the number is now 64, in none of which has there been any complication that could be attributed to the operation; (4) that the uterus had maintained its good position in spite of pregnancy and labour in 97 per cent. of cases; (5) that the patients had been free of bladder disturbance, or had no more than before operation in 85 per cent. of cases, 20 per cent. having actually improved.

From the facts given it is clear that any argument against the operative treatment of displacements, based on the assumption that the operative mortality was high, or the after-results bad, would fall to the ground.

One speaker in the discussion referred to expressed the opinion that these operations were being done much too frequently. Such a position is as unsound as religious intolerance. The cure of the

patient is the one aim of medicine and surgery; and if one man finds that he gets the best results from one method, and another finds he is most successful using another method, neither has the right to say of the other that he is not justified in using his method, or to impose any limitations as to how often he may use it.

The correct attitude is to keep an open mind, to adopt such methods as appear to be giving the best results, and to abandon those methods whose results are inferior. Success in treatment is the final arbiter in all therapeutic measures, and I am convinced by experience that in the treatment of uterine displacements they will meet with the greatest success who recognize that pessaries, while they have their place, have also their limitations, and are prepared to avail themselves of the resources of surgery in suitable cases.—*The polyclinic.*

Pituitary Extract.

To sum up we may state that:

1. Pituitary extracts have a powerful effect in inducing and in strengthening uterine contractions.
2. The type of contractions induced is similar to that which occurs normally, although at first there may be a tendency to prolongation of the pains.
3. Such prolonged contractions result in slowing of the foetal heart, but the child is seldom in danger.
4. When given in the late part of the first and in the second stage of full time labor the polarity of the uterine contractions is not interfered with, but in early abortions and early in the first stage a simultaneous spasm of the os may occur.
5. Its chief field of usefulness is in the first and second stages of labor, when there is delay due to feebleness of the pains, alone or when combined with other complications, such as malpositions of head, malpresentations, multiple pregnancy, slight narrowing of the pelvis, etc.
6. In the induction of abortion, in the treatment of abortion already in progress, and in incomplete abortion, its action is so uncertain that it is not to be recommended, except in cases where the os is widely dilated.
7. In the induction of premature labor its effects are uncertain, but if sufficient dosage be given they may be good.
8. In the induction of labor at full term and after better results are obtained than in premature cases.

9. It gives good results in many cases of post-partum hæmorrhage, but is not superior to the various preparations of ergot. It has the power of sensitising the uterus, so as to allow these preparations to act more powerfully, the combination being most effective.

10. It is a useful adjunct in the treatment of placenta prævia, used in conjunction with rupture of the membranes, the use of hydrostatic dilators, or turning.—*The Canadian Practitioner & Review.*

THERAPEUTICS.

Salicylate of Iron in Erysipelas and other Affections.

M. C. S. LAWRENCE, in the *Practitioner*, describes the use of a preparation made by adding to a solution of sodium salicylate and potassium bicarbonate in equal amounts the *British Pharmaceutical Codex* liquor ferri perchloridi. For adults the dose generally consists of $7\frac{1}{2}$ grains (0.48 gramme) of the salicylate and the bicarbonate, and $7\frac{1}{2}$ minims (0.46 c.c.) of the iron solution. The resulting violet-colored solution is quite palatable, though, of course, it may be sweetened if necessary. It does not depress or constipate and possesses a well-marked antipyretic and sometimes a diaphoretic action.

In erysipelas the author has found the preparation much more effective than any other remedy tried. The disease never lasts more than ten days, and in most instances is cured in three or four days. All pain is relieved. No deaths occurred among the cases in which it was used. With the patient in bed and on a liquid diet, the author applies warm compresses of oatmeal water to the affected area, aseptically punctures and drains the blebs should these form, and administers the salicylate of iron preparation every three hours. The treatment should be commenced with a purgative, such as calomel. Where there is well-marked delirium, trional is used. When the symptoms abate the salicylate of iron is given at longer intervals and later discontinued. With these measures the temperature becomes, as a rule, normal in twenty-four hours, the disease has ceased to spread, and the patient feels better and is often hungry; solid food is not allowed, however, for the first three days. In cases of great severity the author often adds twice the usual amount of iron to the salicylate solution, thus producing a preparation which is stronger in its action on the disease.

The solution recommended is also remarkably effective in some cases of acute tonsillitis—probably those wholly or partly of strepto-

coccal origin. If, after giving it for three days, there is no marked improvement, it is not worth while continuing with the preparation. Potassium chlorate may be combined with it.

In some cases of cellulitis the iron salicylate solution, used as an adjunct to the ordinary surgical procedures, appeared to do good.—*The Canadian Practitioner & Review.*

OPHTHALMOLOGY.

Ophthalmology—Hydrogen Peroxide in.

The use of hydrogen peroxide in various eye conditions is warmly recommended by the the author. In purulent conjunctivitis, *e.g.*, gonorrheal and membranous, it gives very satisfactory results. In the former case it should be used in the form of a warm douche (40° C. or 104° F.). The peroxide is not decomposed at this temperature, while the gonococci are destroyed. Whereas silver nitrate is contraindicated in corneal ulcerations, hydrogen peroxide is of great use. It disinfects the ulcer and, owing to its peculiar action on the toxins generated, iritis and hypopyon are less frequently noticed in cases of pneumococcal infection.

In blepharitis hydrogen peroxide can be recommended for removing the crusts. In the pannus associated with trachoma or chronic corneal conditions, after the operation of syndectomy has been performed, a probe tipped with cotton-wool and saturated with the drug should be rubbed into the gap from which the conjunctiva has been removed. This measure, followed by the instillation of dionin and the injection, subconjunctivally, of salt solution, has brought about removal of many dense nebulæ.

Lachrymal obstruction and purulent infection of the lachrymal sac are greatly benefited by hydrogen peroxide; indeed, an obstruction that resists everything else will give way before this agent. Should there be much stretching of the sac wall during the syringing, it will be necessary to warn the patient that there may be some puffiness of his eyelids and the inner corner of his eye for from, twelve to twenty-four hours afterward. This disadvantage can be avoided by using as little force as possible in washing out the sac; when much of the fluid has escaped into the tissues, the edema is extensive and may last several days. This does not apply to its use immediately before the operation of excision of the sac, when it is desirable to remove every trace of pus from its interior. *The Monthly Cyclopaedia & Medical Bulletin.*

THE ANTISEPTIC.

NOVEMBER, 1913.

Local Governments and the Indian Factories Act.



HE Government of India proposes; the Local Government disposes. At least, that is the case with the Factory Act in India. The legislative enactments of the Government of India on factories are read with approval in England. But hardly any one in that country takes the trouble to study how these excellent enactments are worked. We propose to demonstrate here the difference between theory and practice in Factory Legislation and Factory Inspection by two examples—one under the Factory Act of 1891 and the other under that of 1911. We take the two examples under two different Acts to prove that although enactments might change, the spirit in which they are worked remains the same.

Now for example No. 1. Previous to the Factory Act of 1891, the age of children permitted to work in factories under the Factory Act was 7 to 12. By the Act of 1891 this was changed and the age for factory children, or half-timers as they are usually called, was raised to 9 to 14. In other words the Act of 1891 expressly prohibited children of 7 and 8 years of age from working in factories and declared the minimum age for factory work to be 9. That was one of the best provisions in the Act of 1891. Let us see how it was worked. In the inspection notes of the Indian Factory Commission of 1907 the following occurs on page 21, Appendix F, of Volume I of the Report of that Commission:—

Inspection Notes of Mill No. 105. "The Commission noticed a very large number of children under 9 (some not more than 6 years old) working as half-timers, and the manager admitted that in this respect the law was not enforced. It was likewise noticed by the Commission and admitted by the manager that a number of children under 14 were working as full-timers. The manager urged that in the event of the law as to child labour being strictly enforced, sufficient previous notice should be given to mills to 'put their house in order'; he said

that when the age of half-timers was raised by the Act of 1891 from 7-12 years to 9-14 years, an endeavour was made at first to enforce the regulation, but this was soon abandoned, and children are now employed exactly as they were when the legal age was 7-12."

The above statement was recorded in 1908 and the Act was passed in 1891. On this remarkable fact the Factory Inspector was examined by the Commission. And we may here remark that what the Commission observed in Mill No. 105 was not an isolated example, but was found fairly generally in all the mills in Bengal. The Factory Inspector, in his evidence before the Commission, said that soon after he assumed the duties of his office he received the following letter:—

"Burdwan, July 13th, 1892. From A. W. B. Power, Esq. I.C.S., Commissioner of the Burdwan Division, to the Magistrate of Hooghly.

Sir,—With reference to the inspection of the India Jute Mills, Serampore, made by the Special Inspector of Factories on the 24th ultimo, I have the honor to call your attention to his remarks that no certifying surgeon has yet 'certified the ages of the children.' I am to request you to point out to the Special Inspector that it is not necessary that the age of every child should be certified by that office but only in doubtful cases, as ordered in paragraph 3 of Government Circular No. 1 G. G., dated the 23rd June 1892, a copy of which was forwarded to you with this office No. 210, dated July 3rd following."

The Circular in question read:—

"The policy of Government in working the Factory Act has been to cause the least interference with manufacturing industries which might be consistent with safeguarding the interests of the children employed. Inspectors, by making the examination of every child compulsory, would give to owners and managers of factories the maximum of trouble and to Government the maximum of expenses, without conferring any compensating benefit on the majority of children employed. The wording of Section 4 of this Act is perfectly clear on the point, that all children whom the Inspector has reason to believe to be under age are to be examined, not that examination is to be insisted on in the case of every child without exception. In the case under notice, therefore, the Commissioner's views of the law and the method of enforcing it were quite correct, while the Magistrate's ideas on these points were altogether incorrect."

And so every child was not examined and the Inspector himself admitted that about 10 per cent. of the children employed in the Jute

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Mills were under 9 years of age. Others thought that the percentage was nearer 25 than 10. The Factory Inspector further said that he "reported the employment of under-age children in the Sihar Jute Mill to the Magistrate, but no prosecution was instituted. The Inspector was asked: "Did you enforce the law as it stood?" No reply was given to that question. Again he was asked: "Did the owners and managers of mills in Calcutta ignore the law, and suit their own convenience in regard to the hours of employment of children?" Again no reply to the question. But the admission of the Inspector that he "did not consider it possible to administer the present Act strictly in Calcutta" was quite enough answer to all those questions. That was the evidence of the Factory Inspector. But when one of the Secretaries to the Government of Bengal came and gave evidence to the effect that he "did not think that the Government were aware of the fact that the rule in regard to age of half-timers was not enforced at all in Calcutta" everybody understood how matters went with regard to the administration of the Factory Act by the Bengal Government. This example we have given here—and it can be multiplied from the Report of the Factory Commission—clearly shows that one of the most important provisions of the Factory Act intended to safeguard the health, growth and development of children under the age of 9 was practically a dead letter from 1891 to 1908.

Then came the Factory Commission and all the exposures in connection with the working of the Factory system in India. This was followed by the enactment of the Factory Act of 1911. Perhaps some of the Local Governments in India did not like the new Act. But all the same it is the duty of every Local Government to administer the Act properly. Let us come to example No. 2.

This time it is in Madras. The Madras Government published in August last the report of the Inspector of Factories on the working of the Factory Act during 1912 with the orders of the Government thereon. One of the non-official members in the Madras Legislative Council moved a resolution in the Legislative Council at the meeting held in November to point out the insufficiency of factory inspection. Among other points it was urged in support of the resolution that in some factories (1) no weekly holidays were given; that (2) in some others, which did not come under any of the exceptions, there was no stoppage of machinery for half an hour after every 6 hours of work and that (3) a number of factories were not inspected by the Inspector at all. We must quote one paragraph from the Factory Inspector's report. It is a gem. It runs thus:—

"Hours of employment. Out of 268 factories 217 allowed an interval of half an hour at least for 6 hours' work, 42 worked by a system of shifts, and the remaining 9 were otherwise worked. Advantage of a holiday on Sunday was taken in the case of 281 factories; 17 substituted another day in lieu of Sunday; 2 were exempted under Section 22 (4) (c) of the Act, and the 18 unaccounted for were otherwise worked."

"Otherwise worked" is distinctly good. It is a mild way of expressing the old Calcutta method of defying the Factory Act. Of these two provisions the compulsory weekly holiday comes from the old Act. It has been a provision of the Indian Factory Act for a long number of years. It is necessary to bear this fact in mind in considering the reply on behalf of the Government. As to the other provision, it was considered a very important one both for giving rest to the overworked factory operatives and also for indirectly limiting the working hours of factories to 12. What are the hours worked by these factories which "worked otherwise" the report does not say. In fact the Factory Inspector does not give any information as to the hours of working of the factories inspected by him. But the defence of the Factory Inspector by a member of the Government was the best part of the whole debate. The Madras Government think that a new Act must not be enforced rigorously all at once. Time must be given to factory owners to get accustomed to the new order of things. The Factory Inspector was quite right in going slowly and dealing gently with the factory owners. And so on and so forth. The Government quite forgot the fact that over one year elapsed between the passing of the Act and its coming into effect. The Act was passed in 1911 and it only came into effect in July 1912, and this long period was given in order to enable mill-owners to make the necessary arrangements to work the new Act. And then, the two provisions we are dealing with, neither of them require any preparation to carry them out. A mill manager can stop his machinery for half an hour after 6 hours' work after 15 months' notice. If he pleads for more time he is a "sweater" and in all probability will never be ready to do it. The compulsory weekly holiday is an old provision. If Madras Presidency mill-owners still want time to get used to that old provision then it shows that they never obeyed the old Act at all. The Inspector did not visit 28 factories at all during the year and his explanation for the decrease in the number of visits is quite good. Here it is: "The number of inspections made during the year was 507 against 710 in the previous year."

The decrease is due to the fact that the rules under the present Act require a smaller number of inspections than under the old Act." But surely the rules under the new Act do not provide for the Inspector to leave any factory unvisited during the year? On the contrary the rules direct him to visit every factory (except seasonal ones) once every six months. The working of the new Factory Act in Madras is as bad as the working of the old one in Calcutta. And the whole attitude of the Local Governments in India towards the Factory Act displays the incapacity of a bureaucratic system of Government to sympathise with the labouring classes. It has been the same everywhere. As Mr. Walker, the political economist, says, "the working classes, unless protected in an unusual degree by political franchises, by the influence of public education, and by self-respect and social ambition, show a fatal facility in submitting to industrial injuries." That is true of the working classes in some of the countries even more advanced than India. The following account of the condition of the working classes in Japan will be found interesting in this connection:—

The terrible conditions under which young girls have to work in some of the Japanese factories were described in a speech by Mr. Shu Ishiwara, *Igakushi*, delivered at a recent meeting of the National Medical Association. He spoke on the subject of "Tuberculosis among Factory Girls," and made the following statements:—

"There are 500,000 factory girls in this country, and of this number, 300,000 are under the age of 20, and 400,000 are employed in spinning and weaving factories, principally making cotton and silk thread and cloth. Of these latter, 70 per cent. live in dormitories, established partially with a view to their detention. The girls in filatures work on an average 13 to 14 hours, and those in weaving factories 14 to 16 hours, leaving about 9 hours for bathing, hair-dressing, and rest. Naturally, their physique does not develop. Their health is generally defective, as the result of lack of rest and the fact that they work in insanitary workshops. Bad health is conspicuous in girls under the age of twenty.

COTTON MILLS.

"In cotton mills, girls are placed in the night shift every other week. When they work at night for seven days, they lose weight by 170 momme and they recover only 69 momme in the week they are put on the day shift. Then they have to go back to night shift, to add to the loss of their weight. In a little while, therefore, they become totally emaciated, and because of the hard life most of them run away

within a year after they enter the factories. A factory that employs 1,000 girls has to engage 800 new girls every year to maintain the number.

"Food is comparatively good in the girls' dormitories, but only one lot of bedding is supplied to two girls, and the same bedding will cover six or seven girls in turn in a year, and is never exposed to sun-light. Should there be a consumptive in a factory, the disease will soon spread endlessly. Since this fact has become known, the factories find it more and more difficult to obtain girl employees, and it is stated that the supply of factory girls in Japan will be exhausted within three years.

FACTORY GIRLS.

"The number of factory girls nearly recruited every year is 200,000 of whom only 80,000 go home; the remaining 120,000 never return. They go from one factory to another, or go into other occupations, never thinking of going home.

"Of 80,000 who go home, 12,000 or 13,000 are sick, one-fourth of the number suffering from tuberculosis. These are spreading the disease all over the country.

"Tuberculosis mortality in the factories, officially reported, is 8 in 1,000 and that among the factory girls who have gone home is 80 in 1,000."

"What," he asks, "is the State going to do about this national calamity?"

"That is the condition of factory girls in Japan. It used to be fairly bad even in England. What can more eloquently describe the life of the factory girls in England in years gone by than the pathetic poem entitled "Factory girl's last day"? We make no apologies for quoting a few stanzas of this poem which, although it may describe a state of affairs which no longer exists in England, yet may be an apt description of the conditions of factory life in India in this Year of Grace 1913!

'T was on a winter's morning,
The weather wet and wild,
Three hours before the dawning
The father roused his child;
Her daily morsel bringing,
The darksome room he paced,
And cried, 'The bell is ringing,
My hapless darling, haste!'

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THE ANTISEPTIC.

'Father, I am up, but weary,
I scarce can reach the door,
And long the way and dreary—
Oh, carry me once more!
To help us we've no mother;
And you have no employ;
'They killed my little brother
Like him I'll work and die.'

Her wasted form seemed nothing;
The load was at his heart;
The sufferer he kept soothing
Till at the mill they part.
The onlooker met her
As to her frame she crept,
And with his thong he beat her
And cursed her as she wept.

At last the engine ceasing,
The captive homeward rushed;
She thought her strength increasing—
'T was hope her spirits flushed.
She left; but oft she tarried;
She fell and rose no more,
Till, by her comrades carried,
She reached her father's door."

Such melancholy instances are not known in England at the present day, thanks to the rise of the power of industrial democracy in that country. The day is far distant when the working classes in this country will be able to protect their own interests against the forces of capitalism and officialdom. For a long time yet to come the working classes in this country must look to the British Labour Party to look after their interests. And considering the injury inflicted on the health of the masses of the people by the uncontrolled pursuit of modern industrialism, we think that it is the duty of the members of the independent medical profession in India to interest themselves in the welfare of the poor and helpless factory operatives. With a Government that is pleading for time to acclimatise factory owners to the provisions of the Factory Act, and with an ex-Boiler-Inspector in entire charge of

the sanitary condition of factories, we cannot say that the factory operatives in this presidency have too much attention devoted to them. We hope that the British Labour Party will not relax their attention to Indian industrial questions because a new Factory Act has been enacted but continue to watch with vigilance the evolution of Indian industrialism and see that the Indian labourers are not absolutely crushed in the process.

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Original Articles.

* SOME POINTS REGARDING TUBERCULOUS DISEASE OF THE HIP JOINT.

BY

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(Continued from page 602, Vol. X, No. 11.)

PAPER II—TREATMENT.

 THE first principle in the treatment of tuberculous coxitis in the early stages is that of removal of pressure from the joint—the patient must not be allowed to attempt walking or even standing on the affected limb, and, until suitable apparatus has been applied, the recumbent position must be the rule. Fixation of the joint is the second principle, and for two chief reasons; firstly, fixation stops the pain, and secondly, it permits the reparative processes to take place. Extension is almost universally used, but it is very questionable if it is really necessary in a great many of the cases in which it has formerly been employed. In most patients extension does not, as has been stated, separate the joint surfaces. The proof of this is seen by examining the X-ray photographs of extended joints. Dollinger of Buda Pesth has also conclusively proved this point in Mikulicz's clinic. In the cadaver extension certainly will separate joint surfaces, but the rule does not apply to the living. The pain of hip disease is not relieved by extension but by fixation. A further proof of this is made clear by the facts that if an acute tuberculous joint, which is kept extended, is moved, pain occurs, whereas if the same joint is fixed (without the application of extension) the pain is relieved. The treatment of this condi-

* Specially contributed to The Antiseptic.

tion should be mainly ambulatory, that is to say, suitable fixation must be arranged and the patients allowed to get about in good surroundings with plenty of fresh air and good food. Amongst a large number of cases of tuberculous coxitis, particularly in children, one has found the most generally useful apparatus to be a well fitted Thomas's hip splint; the plan of Lorenz of applying a large Plaster of Paris case from ankle to iliac crests has been tried in a few cases, but whilst it is less costly than a Thomas's splint, it has the disadvantage that one cannot inspect the joint if, as does happen in some cases even with perfect fixation, an attack of pain, more or less severe, occurs.

It is the writer's practice in very few cases to keep hip-disease cases in bed, but in the following circumstances such treatment is indicated:—

(1) At the onset of the disease whilst the splint is being made to the correct size and shape.

(2) If there is any febrile temperature.

(3) In cases which have not been seen at the first onset where flexion is present; in these cases weight-extension is applied in the line of the flexed limb, i.e., with the leg raised on an inclined plane. After 3 or 4 days' extension it will be found that the limb can be lowered a little (brought more to the straight line with the trunk); then every 2 or 3 days a little more can be done in this direction until the limb is quite extended by which time the hip-splint is ready and can be applied. To enable the patients to walk about, a patten of 4 inches in height is applied to the boot on the sound side of the body and a pair of crutches of suitable length are provided. After this has been accomplished it is a rare occurrence to find anything further to be required in the way of treatment beyond the monthly inspection of the limb and joint and the reapplication of the splint.

The splint should be worn day and night for the first eighteen months; it is then the writer's practice to allow it to be taken off at night and replaced during the day time. This should go on for another 6 months, careful examination each month having shewn that no harm has come from the omission of the splint at night.

At the end of six months, i.e., 2 years after the first onset, the splint may be left off altogether but the patten and crutches retained for a further period of six months. At the end of that time, providing all has gone well, the patient may be allowed to use the affected limb again. The parents of the patient should be told, at the commencement of the treatment, of its probable duration—it is best to say 2½ years providing all goes well.

Operative interference is rarely called for if the procedures detailed above are carefully observed, but there are certain indications for operation:—

(1) *Abscess formation.* Fluctuation is detected over the hip joint, the temperature not being raised and no other constitutional disturbance being present:—The indication here is to aspirate the abscess, using, of course, the greatest care and all aseptic precautions. After aspirating some surgeons inject an emulsion of Iodoform of 10 per cent. strength whilst others simply cover the puncture with Collodion, having injected nothing. Personally, I favour the latter procedure. Such an abscess may become secondarily infected with septic organisms either by blood or lymph stream and give rise to much constitutional disturbance with pain, high temperature, &c. In such circumstances the abscess should be opened by an incision and the cavity washed out with saline solution, as little as possible being done in the way of scraping or other interference. Should a fistula persist there is probably a sequestrum present, the removal of which will be followed by healing.

(2) *Sinuses.* In old-standing, neglected cases where abscesses have formed and been allowed to burst and sinuses communicating with the necrosed femoral head and acetabulum remain, the operative measure called for is excision of the diseased portions with gouging away of necrosed acetabulum. The best incision is the one known as the anterior incision which commences a little below the anterior superior iliac spine and runs downwards for 4 inches on the inner side of the tensor fasciæ femoris. The muscles as the sartorius are separated and deeper down the rectus femoris and glutei are separated, thus giving good access to the anterior surface of the hip joint. If after excision sinuses still persist and the shaft of the femur is affected, the question of amputation must be considered, especially if lardaceous disease threatens.

Excision and amputation, however, will become increasingly rare as surgeons come to recognise the value of early fixation and conservative measures such as are here advocated.

*SCOLIOSIS IN CHILDREN.

BY

L. A. PARRY, M. D., B. S., F. R. C. S.

Assistant Surgeon, Children's Hospital, Brighton.

* Lateral curvature of the spine is by no means an uncommon affection in children, and although a large number of the slighter cases

get quite well without any special treatment, yet others undoubtedly progress from bad to worse, leaving marked and permanent deformity, which is incurable. It is therefore essential that all these cases should be treated properly, and that the treatment should be continued till the child is perfectly cured.

The first procedure is to carefully examine each case, and keep a record of the condition found, so that one may be able to see what amount of improvement is taking place. The child should be stripped, and the spines of the vertebrae marked out with a carbon pencil. A slight deviation will then be noticeable. This will be seen more plainly if the child is made to lean forward with its arms folded on its chest. Any difference in level of the anterior superior spines of the ilium is next looked for, as it is essential for correct treatment that any obliquity of the pelvis should be remedied. The child is then suspended, either by lifting it up under the arm-pits, or if it is too heavy, by making it hang by the hands from a horizontal bar. This is important for prognosis: if the curve is obliterated, or lessened, one may conclude that proper treatment will do as much. If no improvement in the curve is obtained by suspension, all that one can expect from treatment is to prevent the curve from getting worse. The deformity is probably due to bony change which exercises, etc., will not be able to alter.

In the treatment of this as of every other illness, the first thing to do is to remove any possible cause of the condition. If there is inequality of the length of the limbs this must be remedied by a high boot or some surgical operation. Any attitude which is a bad one, and is constantly assumed by the child, must be corrected. Lolling sideways in a chair or bending forward to read are examples. Nasal obstruction due to large tonsils or adenoids must be cured.

There are a few drugs which are of importance. Iron for anæmia, Gention and Soda for dyspepsia, etc., are of great use. A carefully regulated diet and plenty of fresh air should be ordered.

A question which always arises is this: Is the child to take exercise or no? The answer is sometimes difficult. On the one hand it is important not to let the child do too much. On the other hand it is equally important that it shall have a certain amount of healthy out-door exercise. All children with lateral curvature should have two hours a day lying flat on the back, one preferably after doing the exercises referred to later. An additional help is massage of the muscles of the back for ten minutes twice a day.

Another question which is frequently raised is that of spinal supports or not? In the enormous majority of cases all surgeons are now agreed that they are not only unnecessary but that they are actually harmful. They should only be used in those rare cases in which the curvature steadily increases in spite of careful treatment, or in which the weakness of the spinal muscles is very marked. I myself have only had one case in which I considered that I was justified in ordering a spinal support. The best of these is a spinal brace which should not be worn at all times but only at intervals, so that the muscles of the back may have some work to do.

The special exercises which are so essential in the management of this affection must be regularly and systematically carried out. At first it is best that the surgeon himself shall teach the child the exercise with the mother or some responsible person present. The movements commence with quite easy ones lasting only for a few minutes: the time is gradually increased as the back becomes stronger and the exercises more difficult, to as much as half an hour twice a day. They should be carried out slowly with frequent intervals of rest so as not to tire the child, at first in the supine position, later standing up, and later still using light dumb-bells, not exceeding one pound in weight. I do not propose to describe the exercises in detail, as I attach a great deal more importance to the regular, persistent and systematic carrying out of a scheme, than to any particular variety or plan. Briefly they consist of a series of movements which bring into play the muscles acting on every part of the body, the limbs, the head and the trunk, by flexion, extension, abduction, adduction, and circumduction. In early cases the curvature will disappear in a month or six weeks. The treatment must, however, be continued for some weeks or even months after this.

Special exercises have been designed for the treatment of particular varieties of curvature. For example for a dextrodorsal curve the following is an excellent movement. The right hand is placed on the ribs as high up and as far back as possible, with the thumb forwards. The left forearm is placed on the head so that the fingers touch the right ear. All the body above the right hand is now bent as far as practicable to the right, and whilst in that position a few deep inspirations are taken. The symmetrical position is then resumed. For a lævo-dorsal curve, the exercise is reversed, left being substituted for right, etc.

I conclude by repeating that by taking the treatment of an early case in hand at once, and carrying out the directions given above, one

can almost always perfectly and permanently cure a case. Even in those cases in which there is already some bony deformity before the case is seen, one can, with this treatment, prevent this extending, and the child from becoming a permanent cripple. There is nothing in the treatment that cannot be carried out by the practitioner himself, especially if he obtains the co-operation of an intelligent mother in supervising the various details.

Our Contemporaries.

MEDICINE.

Hysteria Complicating Uræmia.

ENGELIN.—A woman, aged 38, was admitted to hospital with the diagnosis of apoplexy and uræmic symptoms. There had been an "apoplectic seizure" followed by convulsions. During the last 5 years she had had chronic nephritis. Two years before admission she had suffered from typical hysterical convulsions, which had ceased after a sojourn of 3 days in a hospital for nervous complaints. Since then she had felt completely well in spite of persistent albuminuria.

In hospital she was much exhausted, but she responded readily to painful cutaneous stimuli. There were laboured respiration, bronchitis, and fever. The right arm and leg were paralysed; on this side Babinski's sign was positive. The contracted pupils did not react to light. Clonic contractions, characteristic of hysteria, involved the left arm and leg. Her theatrical gesticulations, pulling at her hair, attempting to scratch violently, and throwing away the bed clothes, were suggestive of hysteria, all the more because the attacks were more frequent and violent in the presence of doctors and nurses than at home. She executed definite movements such as striking and scratching at persons who attempted to hold her limbs. Treatment by suggestion was accordingly adopted, and she was ordered peremptorily not to move her legs and arms, and to go to sleep. The convulsions instantly ceased, and she slept for several hours. Next day she was more somnolent, and the voluntary component of the convulsions had practically disappeared, for treatment by suggestion was almost ineffective. Coma speedily set in, and the convulsions ceased shortly before death.

The unilateral convulsions were evidently due to involvement of the pyramidal tract, either by a hæmorrhage or localised œdema. The patient who came of healthy stock, evidently suffered from

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hysteria of toxic origin. Uræmia sometimes induces certain psychoses, of which mania, delirium, and profound melancholia are the most common. The writer does not state whether a necropsy was made or not.—*The Medical Review*.

A Sign of Acute Pancreatitis.

C. E. TODD, M.D.—The writer has had a good many cases of acute pancreatitis under care in the Adelaide Hospital in the last few years. All were sent in with a diagnosis of acute intestinal obstruction. The text-books draw attention to the doughy feel of the abdomen, to the persistence of acute pain and extreme tenderness in the mid-abdomen above the umbilicus without muscular rigidity, but there is one sign which has not received attention—absolute dulness in both flanks unaltered by any change of position. This sign existed in every case under the writer's care. It is due to a collection of coagulated and partially digested blood in both kidney pouches.—*The Medical Review*.

Bronzed Diabetes or Hæmochromatosis.

BY

DONALD E. CORE, M.D., M.R.C.P.

Hæmochromatosis or bronzed diabetes is a rare disease which was first described by Hanot and Chauffard in 1882. Only 60 cases have been recorded. It is associated with 3 symptoms—cirrhosis of the liver, diabetes mellitus, and the deposition of pigment in the viscera, and in the great majority of cases in the skin also. This pigment may or may not be iron free, its nature varying according to the situation in which it is found. Two types are therefore distinguished—hæmosiderin, which contains iron, and hæmofuscin, which is iron free.

The writer reports the following cases:—

CASE I.—A stevedore, aged 56, had been steadily losing weight and strength for 3 months. The first symptom that he noticed was unaccountable weakness while at work. Soon he became persistently thirsty, and one month ago he began to pass large quantities of urine. During the 3 months the skin had been steadily darkening. The previous health had been good, but he had suffered from occasional pains in the back for some considerable time.

He took beer in moderate quantities, and there was no history of venereal disease. The family history was exceptionally good.

He was slightly-built, alert and very intelligent. There was a slaty-grey pigmentation uniform over the face and extremities, but over the abdomen and that part of the thighs which corresponds to Scarpa's triangle, in addition to the uniform greyish pigmentation there were several darker freckle-like spots. These spots were circular, of the diameter of a lentil, and were not found above the margin of the ribs. There were a few over the lumbar region. The tongue was clean and there were no signs of pigmentation in the oral cavity.

The liver was enlarged, firm and tender. The spleen was palpable as a firm, rounded mass on inspiration. The heart was normal. The arteries were soft. The lungs showed diminished air entry most marked at their bases, but no signs of organic disease. The knee-jerks were sluggish, and at times difficult to obtain. The left retina showed moderate pigmentation. The average amount of urine passed daily was 115 ounces. It contained sugar varying in quantity between 2,000 and 3,700 grains per day. Blood examination showed a practically normal condition. The blood pressure was low, never exceeding 115 m.m.

He remained in this condition for the whole of the period of stay in the hospital, except that diacetic acid appeared in the urine some 2 months after admission. The weight improved under the rest and treatment. At his own request he was sent to a convalescent hospital. After 8 weeks he was re-admitted. He had lost weight, and complained of severe epigastric pain. The quantity of urine passed daily varied between 120 and 170 ounces, and of sugar between 3,000 and 4,000 grains, the diacetic reaction was persistently present. He died comatose 6 weeks after re-admission. During the last week the abdominal pain became more severe.

The temperature during the first period of treatment was continuously subnormal. During the second period it was usually subnormal, but showed a well-marked periodic rise and fall, ascending in a step-ladder manner to 99°, and then gradually descending to 97°, the whole period lasting as a rule for a week. During the last week of life the temperature manifested nocturnal elevations to 100° and 101°, falling to normal in the mornings. During the last 3 days it rose to 102° and remained at that level.

While the patient was under treatment a piece of skin was removed from the abdomen for microscopic examination. This gave a definite iron reaction with hydrochloric acid and potassium ferrocyanide, and microscopically pigment granules were readily detected in

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the lower layers of the cutis vera. Those granules in relation to the sweat glands were coloured blue.

A necropsy showed hepatic cirrhosis; hypertrophy of the kidneys; perisplenitis; fibrinous peritonitis; aortic and coronary atheroma. The viscera were pigmented.

On microscopic examination the pancreas showed moderate overgrowth of fibrous tissue. The majority of the parenchymatous cells were crammed with light-brown pigment granules. The cells of the islands of Langerhans also showed this appearance.

CASE 2.—A bricklayer, aged 50, gave a 6 weeks' history of progressive weakness, with attacks of giddiness. For 4 weeks there had been a tendency to sleep at all times, and epigastric pain coming on an hour after meals, with vomiting of yellowish sour fluid. For 3 weeks there had been intense thirst and polyuria.

He was emaciated, dull and drowsy, dropping off to sleep as soon as he was left to himself. There was faint pigmentation, of a light-bronze colour, on the arms and legs. The liver was enlarged, with a firm definite edge. The spleen could not be felt. There was slight tenderness in the central epigastric region. The tongue was dry, reddened and fissured, and the breath smelled of acetone. The bowels were constipated. The knee-jerks were sluggish. The urine averaged 104 oz. in the 24 hours and contained 2,400 grains of sugar. Diacetic acid was also present.

The temperature remained subnormal except before death when it rose to 100.2°. The patient remained in a semi-comatose state. On the tenth day he became delirious and vomited. On the twelfth day he became completely comatose, and on the thirteenth day he died.

The necropsy showed hepatic cirrhosis, atheroma of the coronary arteries and pigmentation of the viscera. There was fibrosis of the pancreas. The parenchymatous cells showed disintegrative changes, but few nuclei had disappeared.

These two cases showed the features of hæmochromatosis. Of the three symptoms—pigmentation of the skin, hepatic cirrhosis and diabetes mellitus—the most constant is cirrhosis of the liver, for cases have been recorded in which cutaneous pigmentation and glycosuria were absent. In all cases, however, pigmentation of the viscera has been found post mortem, and a certain amount of pancreatic fibrosis. Pigmentation of the skin is important from the point of view of diagnosis during life, but it is not by any means an invariable symptom

It has been stated that this pigmentation is generally uniform, but it is not always so as Case I shows. The colour of the skin in a definite case is not so much brown as grey; in Case 1 it closely resembled the colouration seen in argyrosis. In Case 2 the pigmentation was slight and more of a yellowish-brown. In neither case was the pigmentation especially marked in normally pigmented areas, nor over those areas subjected to the pressure of clothing. The pigmentation may occur late in the disease. Diabetic symptoms are as a rule very prominent, the patients generally coming under treatment for thirst, polyuria and progressive weakness. Cirrhosis of the liver is always present, although, curiously, the patients appear to suffer little, if at all, from the usual symptoms of this disease.

The post mortem appearances are still more characteristic. Pigmentation of the viscera is invariable; in most cases the liver and pancreas are of a rusty-brown colour. The cirrhosis of the liver in the majority of cases is associated with an increase in the size of the organ, but cases have been recorded in which there was diminution. Fibrosis is almost always present in the pancreas, and in the event of this affecting the islands of Langerhans, there is glycosuria. The pigment, which is so important and interesting a factor, was first accurately described by v. Recklinghausen, who differentiated two substances—hæmosiderin and hæmofuscin. Hæmosiderin contains iron and is found in the cells of the liver, pancreas, kidney and sweat glands, while hæmofuscin is deposited more in the connective-tissues and smooth muscle cells. Lately the idea has gained ground that these two bodies are varieties of the same substance, and that a sharp demarcation between them cannot be made. Granules of hæmosiderin have been seen lying beside those of hæmofuscin in the same cell. These two substances are probably representative of different stages in the metabolism of some common substance.

The pathogeny of the disease is unsettled. The following are the views brought forward:—

1. The diabetes is primary and produces the pigmentation.
2. The hepatic cirrhosis is primary.
3. Hepatic cirrhosis and symptoms of diabetes are both secondary and dependant on the action of some unknown toxin.

The first view was held by the French school, but is now discredited. Diabetic symptoms are a terminal event in hæmochromatosis; there may be no glycosuria at all. Pigmentation is almost always present before any evidence of glycosuria.

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The theory that hæmochromatosis is the result of hepatic cirrhosis is ably supported by Potter and Milne. They point out that in most cases the cirrhosis is of long standing, and that in ordinary cases of cirrhosis of the liver there is frequently a deposition of pigment in the liver. Also that in 2—4 per cent. of cases of cirrhosis of the liver there is glycosuria. They consider that in rare cases of hepatic cirrhosis one of the metabolic products that escapes destruction possesses hæmolytic properties, the result of which is the deposition of pigment in the viscera and ultimately in the skin. Thus hæmochromatosis is a more evolved process than ordinary hepatic cirrhosis. There are objections to this theory, such as the rarity of glycosuria in cirrhosis of the liver apart from the disease under discussion. The absence of signs of hepatic insufficiency is certainly striking in hæmochromatosis. Also hæmochromatosis is rarely associated with signs of blood destruction.

It is becoming more and more probable that the glycosuria and hepatic cirrhosis are the result of pigment deposition in the pancreas and liver, the fibrosis of these organs being to a certain extent analogous to the pigmentary cirrhosis of the lungs in pneumoconiosis. The difficulty now is to assign a cause to the deposition of the pigment. The fact that much of the pigment in question is iron containing, indicates the blood as its source. Hæmosiderin is found in the lungs in cases of prolonged passive congestion, and around the borders of old extravasations of blood in the brain. Now many, if not most, of the recorded cases of hæmochromatosis are associated with a normal blood count, so that excessive blood destruction can hardly be assumed to have existed. It seems more probable that the presence of hæmosiderin in the cells of the liver and pancreas is due to a defect in these cells which alters their normal manner of dealing with blood pigment. According to Moreshima, Beattie and Dixon, the iron of the blood is used again and again in the process of blood formation. Opie considers that in hæmochromatosis a toxin is generated which influences certain parenchymatous cells in such a way that the soluble blood pigment brought to them is converted into the insoluble hæmosiderin. The pigmentation of these organs results ultimately in an overgrowth of fibrous tissue; Beattie considers that this fibrosis may be also due to the direct action of the primary toxic agent. Finally, when the pancreatic cirrhosis destroys the islands of Langerhans glycosuria results.

The nature of the primary toxins is unknown. Adami considers it to be bacterial, and probably of intestinal origin. In this connection it is interesting to recall the existence of the condition known as

enterogenous cyanosis (See "REVIEW". 1906, p. 126). Its cause may be closely similar to that of hæmochromatosis. Indeed, when the pigmentation of hæmochromatosis has been in existence many years enterogenous cyanosis may have been the first stage of the disease.—*The Medical Review*.

Absence of Pupillary Reaction in Alcoholism.

R. MESS.—Nonne, in 1908, first claimed that reflex immobility of the pupils (Argyll-Robertson pupil) might occur in chronic alcoholism as well as in locomotor ataxy and general paralysis of the insane. As until 1911 he had not excluded the possibility of parasyphilitic diseases in his cases, many authorities disputed his conclusions. But in 1911 he reported 3 cases of Argyll-Robertson pupil in chronic alcoholism, in which the Wassermann and other syphilitic reactions were negative. The following case supports Nonne's views:—

A pedlar, aged 53, was admitted to hospital on Nov. 15, 1912. His father was said to have been subject to convulsions and to have died of cardiac dropsy. Six brothers or sisters and 6 of his own children died in infancy. He had always been healthy until 4 years before admission, when he began to suffer from fits—at first several weekly, and later about one every month. He had been a heavy drinker and had frequently been sent to an infirmary as an incorrigible drunkard. Venereal disease was denied. For some time he had suffered with formication in the legs and a difficulty in walking. He had become irritable and was losing his memory.

The heart was of normal size. The blood pressure was 135 mm. of Hg. The liver was somewhat enlarged and hard, but otherwise the organs, including the kidneys, appeared normal. There was myosis. The pupils were equal and did not react to diffuse daylight, artificial light, or local illumination. The consensual reaction was absent on both sides. The lid-closing reaction was present on the left side and absent on the right. Both pupils reacted feebly but distinctly to convergence. Atropine caused slight but equal dilatation of several days' duration. The optic discs and retinae were normal; Romberg's sign was positive, but not marked. The gait was unsteady and somewhat ataxic. Sensibility was normal, though there was subjective paræsthesia. The knee-jerk was normal on the right side, but feeble on the left.

The Achilles reflex was absent on both sides. Babinski's sign was negative. Wassermann's reaction was negative both with the

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blood and cerebro-spinal fluid. As Hough states that a positive reaction may become negative during several days after indulgence in alcohol, the test was repeated after 8 weeks' abstinence with the same result.

Thus in a confirmed alcoholic there were signs of typical peripheral neuritis and alcoholic epilepsy. The combination of the absence of Achilles reflex and unilateral diminution of the knee-jerk with the failure of the pupils to react to light suggested locomotor ataxy or some allied parasyphilitic affection. But the negative Wassermann reaction combined with a negative Nonne-Apeit (phase 1) reaction, no increase in the cellular elements in the sediment of the cerebro-spinal fluid, and no increase of pressure in the cerebro-spinal fluid excluded syphilis. For the alcoholic origin was the fact that the epileptic attacks invariably ceased during abstention from alcohol. By exclusion it must be assumed that the pupillary symptoms were of the same origin as the neuritis and epilepsy. The case is of special interest as it shows that alcoholic pseudo-tabes may simulate parasyphilitic tabes dorsalis even as regards the pupillary reactions. A diagnosis is only possible by serological investigation.—*The Medical Review*.

SURGERY.

Two New Methods of Skin Grafting.

We are all familiar with the difficulty involved in covering large granulating areas with epithelium, especially those chronic ulcers which remain after extensive burns. One therefore welcomes any new suggestion that holds out some prospect of cure in these cases.

MacLennan, in *The Practitioner* for July, 1913, describes two new methods which he calls "tunnel" and "caterpillar" skin grafting. They are designed to eliminate some of the difficulties one has so often met with, and certainly appear to be an advance on previous attempts. In MacLennan's hands they have yielded excellent results. The granulating surface is rendered as clean as possible by frequent dressings. The part chosen for removal of the skin graft is washed with soap and water, followed by spirit, then an 8 per cent. scarlet red ointment is applied for 24 hours. After a final wash with spirit a long strip of cutis without fat is removed. The strip is as broad as is compatible with easy closure of the wound. From the strip are now cut narrow slips one-quarter inch broad and one to two inches long. Tunnels are then made in the ulcer with sinus forceps down in the fibrous layer below the granulations and the slips of skin inserted. A thread of

horse hair is also passed through the tunnel and knotted above so as to indicate the site of a buried graft. Otherwise many grafts are lost and are eaten up by the phagocytic action of the granulation tissue. After five to seven days the granulations overlying the grafts are removed and the edges around them are bevelled down.

By the "caterpillar" method long strips of healthy skin can be planted right across the ulcer. A long strip of skin is cut running right up to, but not entering the ulcer. The flap is then doubled on itself at its attachment close to the ulcer, and its free apex stitched in its new position. A piece of gauze is inserted to prevent the surfaces of the flap adhering. When the flap has acquired a firm hold the incisions are prolonged across the ulcer, the granulations raised, and the skin strip walks across the ulcer with arched back like a caterpillar. The flap should be an inch broad and not more than five inches long.

MacLennan figures some interesting illustrative cases, and also clearly portrays the meaning of the text with diagrams.—*The Canadian Practitioner & Review*.

Treatment of Profuse Renal Hæmorrhage by Injection of Epinephrin into the Renal Pelvis.

H. L. KRETCHMER.—A woman began to suffer from hæmaturia during the sixth month of her first pregnancy, 17 years ago. It was intermittent, lasting only a few days or a week at a time, and disappeared with the termination of the pregnancy. It appeared in the second month of her second pregnancy and occurred irregularly as before. It recurred in other pregnancies. After the sixth she was perfectly well until June, 1911, when hæmaturia began. This continued until Feb., 1912, and then stopped. It began again in July and continued until September, when she suffered from severe pain in the left lower quadrant of the abdomen after micturition.

On examination there was marked anæmia, the hæmoglobin was 50 per cent. Cystoscopy was negative. Double ureteral catheterization was done. The catheters entered the ureteral orifices and passed into the pelves of the kidneys without any obstruction. The urine from the right ureter, was clear, contained a few red blood-cells, albumin, no sugar and no casts. The urine from the left ureter contained practically pure blood. Examination of the urine for tubercle bacilli was negative. Röntgen-ray examination was negative.

Because of the patient's bad general condition and her refusal of any eventual surgical measures, it was decided, if possible, to stop or

control the hæmorrhage by injecting into the pelvis of the left kidney through the ureteral catheter epinephrin (adrenalin) solution. Five c.c. of a solution consisting of 50 per cent. epinephrin and 50 per cent. salt solution were injected into the left renal pelvis and the patient was put to bed. Next day the amount of blood in the urine had materially diminished. Three days later the left ureter was again catheterized, and 5 c.c. of 50 per cent. epinephrin in salt solution were injected as before. The hæmaturia markedly diminished. Four days later there was still some blood in the urine and another injection of epinephrin was given. Next day the urine was perfectly clear.

Hæmaturia of renal origin during pregnancy has been reported at various times. Most of these cases showed inflammatory changes in the kidney. Occasionally the kidney has been removed because of the hæmaturia. This has also been done in other cases of profuse hæmorrhage without apparent clinical cause for the hæmaturia.

The simple treatment now described has obvious advantages. The condition of the urine may be studied when it is free from large quantities of blood. If there is severe anæmia from the hæmorrhage general tonic treatment may be instituted until the improvement is such as to render operation safe. Possibly nephrectomy may be avoided. The treatment is not applicable in every case of hæmaturia—for example when this is due to tuberculosis or calculus—but it might be applied as a temporary measure until a positive diagnosis can be made.—*The Medical Review*.

Progress of Treatment of Venereal Diseases.

(1) *Gonorrhœa*. In the past decade the treatment of gonorrhœa has not undergone any radical changes. In the acute stage, potassium permanganate and preparations of silver are the best local applications, the most important part of the treatment consisting in rest and diet. In the later stages the balsams, especially in the form of gonosan or arrheol, are useful. Prof. von Zeissl has abandoned attempts to abort the disease by strong silver solutions. The result was usually intense irritation of the urethral mucosa with occasionally the formation of a stricture. The only novelty is the treatment of the complications of gonorrhœa—arthritis, prostatitis and epididymitis—with vaccines, as to the utility of which it is too early to pronounce a final judgment.

(2) *Syphilis*. Prof. von Zeissl is a strong supporter of the salvarsan or neo-salvarsan treatment. It acts favourably on all forms of syphilis

and more rapidly than either mercury or iodides. In cases in which mercury is not well borne, salvarsan is indispensable. In the early stages before Wassermann's reaction has become positive syphilis can be aborted by salvarsan or neo-salvarsan. In 31 cases so treated and kept under observation for from 21 to 30 months there has been no sign of general symptoms, and Wassermann's reaction has remained negative. In most of the 31 cases the injections of salvarsan were followed by a course of mercury.

The nervous symptoms—especially diseases of the optic and auditory nerves—observed after salvarsan, are, in Prof. von Zeissl's opinion, due to syphilis and not to salvarsan. It is important to avoid too large doses. The write never exceeds 0.5 gm. of salvarsan or 0.75 gm. of neo-salvarsan in males, and 0.3 to 0.4 of salvarsan and 0.45 to 0.6 of neo-salvarsan in females. With these doses and with intervals between the injections of not less than 8 days there have been no complications. At the most during the 24 hours succeeding an injection there may be a slight rise of temperature, sweating, and salivation.

Of the preparations of mercury used in conjunction with salvarsan, the writer prefers the soluble salts to the insoluble for hypodermic injection, but regards innunctions of mercurial ointment as the best routine treatment. "Mergal" and "Merjodin" give good results when administered per os. Simultaneously with mercury he orders iodine either as sodium iodide or sajodin. When it is not tolerated by the stomach it may be given as an enema or as jodvasogen or jodipin hypodermically.

The opinion long held by the writer that gummata are infectious has been confirmed by the discovery of the spirochaeta pallida. In practice the degree of infectivity depends on the length of time which has elapsed between infection and the appearance of the gumma. A gumma which appears 8 or 9 months after infection is infectious, but one in which 10 or 12 years have elapsed may be incapable of infecting a healthy person. Probably even papular or roscolous eruptions which appear more than 20 years after infection are no longer infectious.

As to the utility of salvarsan in locomotor ataxy and general paralysis of the insane opinions differ. The writer has seen cases of the former diseases in which lightning pains and gastric crises became less severe after its use, but has never detected any improvement in general paralysis. Paralysis and headache left by apoplectiform

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attacks of syphilitic origin may disappear permanently after salvarsan. Some patients with syphilitic periostitis were free from pain only while taking iodides. If iodides were discontinued the symptoms regularly recurred. But after an intra-muscular injection of salvarsan the symptoms permanently disappeared.—*The Medical Review*.

Migration of a Fractured Rib.

MOLCO.—A stout woman was knocked down by a carriage which passed over the right side of the body. When admitted to hospital on the following day she complained of pain in the abdomen, the anterior wall of which showed extensive echymoses. There was no peritonitis or evidence of visceral injury, and the thorax and its contents appeared normal. On careful palpation of the abdomen some days later a foreign body was felt close to the right anterior superior spine, and $\frac{1}{2}$ in. above the crest of the ilium. This was a hard rectangular object 3 or 4 cm. in length, situated in the subcutaneous fat, its long axis being in the direction of a line joining the pubis and the right lower ribs. It could be palpated and moved about without causing pain. On cutting down on this body it was found to consist of a fragment of rib 3 cm. long and was easily removed. A more careful examination of the chest showed that the right twelfth rib was shorter than the left, and appeared more freely movable. The mechanism by which this unusual displacement was produced is obscure, but the writer suggests that the fracture was produced by the first impact of the wheel of the carriage, and the fragment lying with its long axis in the line taken by the wheel in passing over the body of the patient, the portion of bone was driven before it through the subcutaneous fat on the abdominal wall to the place where it was found.—*Ibid.*

OBSTETRICS AND GYNÆCOLOGY.

The Pathology and Treatment of Uterine Hæmorrhage.

BECKWITH WHITEHOUSE, M.S., F.R.C.S.—It is frequently difficult to ascertain the cause of uterine hæmorrhage. But if this is not done treatment can be only empirical, & is rarely successful. After the failure of ergot or hydrastis curetting is often performed without further consideration. If the bleeding is due to retained products of conception, mucous polypus, or localised or diffuse overgrowth of the endometrium, benefit or cure may be obtained. If not, there is little or no benefit, or harm is done. The writer does not now discuss hæmorrhage the

result of abnormal pregnancy or abortion. Its cause is usually obvious, and cure is effected by the removal of the retained products of gestation. Also, when hæmorrhage is caused by a neoplasm, such as a fibroid or carcinoma, the diagnosis, as a rule, is made without great difficulty. In the cases which give trouble the physical signs are practically *nil*, and yet bleeding is so prolonged or excessive as to undermine health. Consider the various conditions that give rise to uterine bleeding, without producing gross enlargement of the uterus.

The uterus is the one organ from which bleeding is normal. The first problem, therefore, is to distinguish between physiological and pathological hæmorrhage. Often this is difficult, as the one merges gradually into the other. As a general rule, bleeding is not pathological unless it is affecting health. Many plethoric women menstruate profusely for a whole week, but never show any symptoms. Others, however, soon become anæmic, lose weight, and suffer from palpitation, dyspnœa, debility and hysteria. It is sometimes stated that the normal menstrual loss is what is habitual, but, occasionally, the habitual loss is greater than the economy can spare.

Take first the alarming hæmorrhage attendant upon puberty. It is not by any means rare, especially in large cities. The most probable suggestion as to its cause was brought forward by Dr. Fothergill at the meeting of the British Medical Association in 1912, *viz.*, that it is due to an error of development in the uterus. Menstruation seems to be produced by an internal secretion or hormone elaborated in the ovary. Circulating in the blood, this reaches a certain concentration and then stimulates the vasomotor centre which controls the uterine vessels. Engorgement and rupture of the capillaries occur. That there are other factors is shown by the fact that menstrual blood is rich in calcium, and that fibrin is absent.

What next is the factor that checks menstrual loss? Probable uterine contractions are all important. If then, there is a tardy development of the uterine musculature, the organ will not have power to control the bleeding established by the normally functioning ovaries. Therefore, precocious development of the ovaries or slow maturity of the uterus will lead to uterine hæmorrhage. These hæmorrhages, although sometimes profuse, are hardly, if ever, fatal, and the majority tend to natural cure. Sooner or later, the uterus develops and the bleeding becomes less and less.

Absolute rest in bed during the period is essential. This will frequently check the bleeding. Between the periods the child should

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have as much fresh air and exercise as possible, and, if circumstances allow, she should be sent away to the country and to a high altitude. The latter often results in complete cure. If this is impossible, and the hæmorrhage is profuse, curettage is justifiable. It frequently fails, however, and may have to be repeated. In the cases that are cured, relief is probably effected by the stimulation of the uterus to develop. Ergot is usually of little or no avail, as the pathology explains.

Uterine hæmorrhage before puberty is sometimes seen. Here the question of some gross pathological lesion must always be borne in mind. Thus, in some cases of ovarian sarcoma, hypernephroma, etc., precocious uterine hæmorrhage has been noted. Some blood diseases also give rise to hæmorrhage from the uterus, but this is usually only part of the hæmorrhagic diathesis.

A child, aged 7 years, had daily uterine hæmorrhage of 3 months' duration. On questioning the mother, it was found that bleeding had also occurred from the nose and gums, and upon the trunk and limbs crops of minute purpuric spots were present.

A young woman may have menstruated regularly and normally for a few years from the commencement of the function, and then without accountable reason, the periods become profuse and long, and rapidly make her anæmic. The usual uterine hæmostatic drugs often fail, and it is essential that the cause of the bleeding should be found. If the patient is obviously anæmic and suffering from the repeated bleeding, a thorough general and local examination should be made. In some cases the bleeding is the result of a systemic disease, and unless this is treated no amount of topical applications or curetting will effect a cure. Here is an example:—

A girl, aged 20, complained of irregular uterine hæmorrhage. Severe bleeding occurred every 14 days and lasted for about 4 days with the passage of clots. She had had rheumatic fever 5 years before, and had suffered from chorea about the same time. Auscultation revealed mitral regurgitation. Pelvic examination was negative. The hæmorrhage was the result of the cardiac lesion, and was treated accordingly.

If some cases no general disease is found, and the cause lies in the uterus. If the patient is unmarried, and the usual treatment with ergot, hydrastis, or styptol, has failed, the writer examines under an anæsthetic upon the first day of the menstrual period. After careful bimanual palpation of the uterus and appendages, he sterilizes the vagina and

lower inch of the cervical canal with iodine, and then collects the uterine blood through a bent glass tube. It is usually unnecessary to draw the blood into the tube by means of the syringe attached, as it flows in by capillary attraction. After collecting a sufficient quantity the tube is withdrawn and closed at each end with sealing wax. The blood is then submitted to a careful bacteriological examination. In married patients an anæsthetic is not necessary, but in the unmarried it is advisable in order to avoid contamination of the cultures. Organisms occur within the uterus, as they do within the female bladder, and curettage is liable to open up lymphatic channels and inoculate these germs into the tissues. In a case of menorrhagia in a single woman, aged 34, the writer found the *B. coli* in the menstrual blood, and in the sections of endometrium removed by curetting. Menorrhagia was the only symptom, and it appeared to have a direct relation with the organisms.

Curettage in the presence of germs converts an endometritis into a metritis. Here is a typical instance:—A married woman, aged 24, was seen on November 22, 1912. Curettage was performed in September for profuse and irregular menstrual periods associated with some pain. Since the operation the pain had been much worse. On bimanual examination the uterus was felt to be slightly enlarged, hard, and tender, the characters of chronic metritis.

If the uterus is sterile, curetting may safely be performed, and will do good when the bleeding is due to such lesions as an adenomatous polypus or diffuse overgrowth of the endometrium. This latter condition, frequently called polypoid endometritis, is better designated "diffuse adenoma" or "adenomatosis." It is essentially an overgrowth of both elements of the endometrium, but especially of the uterine glands. It may occur in young women. Its cause is obscure. The diagnosis can be made only by the curette, but frequently the bleeding returns, and in some cases it is necessary to remove the uterus.

Take next hæmorrhage occurring at or about the menopause. Putting aside carcinoma which, at this period, always claims first attention, there remains a large group of cases of profuse hæmorrhage in the absence of all physical signs. The cause usually falls under one of the following headings:—

1. Arterial degeneration;
2. Increased arterial tension;
3. Portal obstruction.

1. Hæmorrhage due to arterial degeneration is not uncommon, and is comparable to bleeding from ruptured, degenerated vessels in

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the brain. Indeed "uterine apoplexy" is an excellent term for it. The naked eye, a uterus removed from a woman, aged 48, on account of repeated and dangerous hæmorrhage, showed little; it was small, and the endometrium was smooth. However, under the microscope, the walls of the blood vessels were found much thickened, some hyaline degeneration was present, and blood cells were found in the interstices between the muscle fibres. When rupture of such a vessel occurs blood is dispersed between the muscle fibres, and finds its way to the endometrium. But arterio-sclerosis also produces uterine hæmorrhage in another way; it leads to degeneration of the muscle fibres, and their replacement by fibrous tissue; contractility being lost, the uterus bleeds. At puberty, therefore, hæmorrhage occurs because the muscle is not developed; at the menopause, because the muscle is degenerated.

The relation of syphilis to arterio-sclerosis must be remembered. Undoubtedly, the menorrhagia that occurs in so many syphilitics is due to degeneration and fibrosis, secondary to obliterative endarteritis. In two syphilitic patients, seen for severe uterine hæmorrhage, ergot failed, but potassium iodide soon effected a cure. This drug probably acted by reducing the arterial pressure. It cannot be expected to exert any influence upon the damaged vessels and fibrotic uterus. "Fibrosis uteri" or "chronic metritis," is the end-result of uterine degeneration, produced by arterio-sclerosis. The latter may have a syphilitic basis, but is also the result of hard work, alcohol, and other causes.

2. Hæmorrhage, due to increased arterial pressure, is also not uncommon about the menopause. An increase in vascular tension naturally occurs at the cessation of menstruation, and it is not surprising that sometimes it finds an outlet in "flooding," at intervals of 2 or 3 months. This condition can be diagnosed by the type of bleeding, the fact that it is frequently preceded by marked "flushes" and headaches, and by taking the blood-pressure. The treatment is obviously not by ergot, but by drugs which will reduce arterial tension, such as purgatives, nitro-glycerin, etc., and a suitable diet. Amyl nitrite capsules are sometimes an extremely valuable adjuvant in checking the hæmorrhage. However, it is sometimes beneficial, and need not be controlled.

3. In a case of obscure uterine hæmorrhage always examine the liver. Upon more than one occasion, a patient has been sent to the writer for severe bleeding, thought to be due to carcinoma, and the hæmorrhage has ceased like magic on thorough depletion of the portal circulation by free purgation.

Blair Bell has shown the important part that calcium plays in the metabolism of the uterus. The organ, in fact, excretes calcium, and some authors have even traced an analogy between this phenomenon and the production of the shell upon the ovum of birds. Menstruation depends to a large degree upon calcium metabolism, and if, from any cause, the amount of calcium circulating in the body is altered, the change is reflected in the catamenia. If the calcium content in the blood is deficient, the coagulability of the latter is defective, and hæmorrhage results. Such a patient presents no physical signs as a rule, and the only method of diagnosis is the estimation of the calcium index, or the cure of the hæmorrhage by the empirical administration of calcium salts. The only indication that the writer has observed of calcium deficiency as a cause of menorrhagia is its occasional association with urticaria.

Intimately associated with calcium excretion, is the function of the thyroid gland. The close connection of this organ with the uterus is well known. Bell suggests that one of the functions of the thyroid gland is to stimulate calcium excretion. In exophthalmic goitre, the writer has noted severe uterine bleeding, which may be the result of excessive production of the calcium "stimulant." Occasionally, uterine hæmorrhage can be checked by the administration of thyroid gland and calcium salts together when each given singly fails.—*The Medical Review*.

Massage of the Pregnant Uterus.

The case is reported of the induction of abortion by a quack, by means of vibratory massage. The hand is introduced into the vagina, lifting the uterus forward while the abdomen and incidentally the uterus are massaged. This repeated several days resulted in the miscarriage of a two months' pregnancy. Sippel warns against such manipulation of a gravid uterus and wishes to gainsay the recommendation of Hoffa who advocates the massage of a gravid uterus in the face of threatening abortion.—*American Journal of Surgery*.

On the Use of Pituitary Extracts in Obstetrics.

Pituitary extract is of great value in cases of weakness in uterine movements after the soft parts are well dilated. Failure in these cases is rare, probably less than 1 per cent. The later in labor, but before delivery, the more striking the effect. The danger to the child and mother is very slight. As an addition to some mechanical method, e.g.,

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the Champetier de Ribes bag, it is of great value in bringing on premature labor or abortion. In the former case, it may be sufficient in itself, but there is some risk of tetanus of the cervix, or of the uterus, especially when repeated injections are required. For delivery of the placenta its use is accompanied by the dangers of tetanus uteri and retention. In post-partum hæmorrhage a considerable percentage of failures may be expected.—*American Journal of Surgery*.

THERAPEUTICS.

Treatment of Malaria with Salvarsan.

MEMMI and CAUTIERI report their experience in the use of salvarsan in malaria in 1910-1912. Their own patients were eight in number, aged from 19 to 35 years, and had all taken prophylactic doses of quinine. Salvarsan was given during apyrexia in three, during the febrile period in five. In two other cases Billon's arsenobenol was employed. Of the eight patients, three were in first attacks, five in relapses; six had aestivo-autumnal, and two spring tertian malaria. The authors found that salvarsan did not cut short the pyrexia, and did not prevent its recurrence; examination of the blood showed that the drug was not an efficient parasiticide. In some of the cases it seemed to lessen the predisposition to subsequent relapse, particularly in the case of aestivo-autumnal fever. It did not influence the general condition of the patient in any way. The combination of salvarsan with small doses of quinine was not more effective than the salvarsan alone.—*The Australasian Medical Gazette*.

Petrol—A suggestion by a General Practitioner.

PETROL is undoubtedly a most useful product, and one is constantly finding out some new application of it. The following description of an operation may serve to introduce yet another use for this volatile hydro-carbon. The operation was for a large fatty tumour of the right labium major in a woman of fifty.

I took the instruments from the drawer and, instead of boiling them, soaked them well in petrol. At the house the only preparation previous to our arrival consisted of the shaving. I then bathed the site of operation with petrol; and after the incision, extraction, and sewing were completed I bathed the part once again and applied dry wool. Notwithstanding the daily soiling, by the application of petrol after each micturition, the wound healed by first intention. With a

wound situated in such an awkward part it is impossible to keep on an orthodox dressing, and the ease of application by an unprofessional attendant made the petrol a most valuable dressing.

At my suggestion, in several of the metal works of this district small wounds are now treated at once by spraying petrol on them, and with splendid results. My idea is to render the half-destroyed cells non-poisonous by interfering with their surface tension. These small metallic burns are very difficult to heal on account not only of the dirt, but also of the enzymes which are set free from the half-burnt cells. The enzyme products poison the wound and prevent the surface of the wound taking on a healthy appearance. By means of petrol the surface tension of the enzymes is so affected as to render them quite inert, and as a consequence the wound is allowed to remain clean and unpoisoned. Under such conditions healing is much more rapid. From the patient's point of view this is of value, for as these metallic wounds are generally on the feet the man, although on compensation, is not able to get about and enjoy himself. From the employer's point of view the early return is a matter of considerable saving.

To motorists petrol is not only of value as a propelling article, but also in case of accidents it affords the best means of cleaning a wound. In cases of irregular wounds, such as scrapes or grazes, petrol affords a ready and a non-irritating means of cleansing, so that all that is required besides is cotton-wool for dressing the wound.

The non-irritating quality of petrol gives it a ready advantage over all the other antiseptics, especially those of the coal-tar group. Its one great disadvantage is that it is so inflammable; and unless operations or applications can be made away from a fire its use is contraindicated.—*The Hospital*.

Atropine in Sea Sickness.

J. FISCHER.—If physostigmine is given to healthy young people in doses of $\frac{1}{4}$ to 1 mgm. symptoms greatly resembling those of sea-sickness, *viz.*, salivation, nausea, retching, occasional vomiting, vertigo, headache, pallor, and a cold moist skin, sometimes appear. They are accompanied by slight lowering of the blood-pressure. This suggested to the writer that sea-sickness was due to stimulation of the vagus or the sympathetic system. If this is true, atropine, which paralyzes the vagus, should relieve or cure sea-sickness and persons with an irritable vagus should be predisposed to sea-sickness.

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The writer has treated 52 persons for severe sea-sickness by the injection of atropine—1 mgm. (about $\frac{1}{4}$ gr.) in males and $\frac{1}{2}$ mgm. in females. In almost all, the symptoms of sea-sickness rapidly subsided after the injection. And in all persons with an easily excited vagus, sea-sickness was severe and appeared early in the voyage.

Salivation disappeared and vomiting usually ceased within half an hour. The face regained its normal colour and the pulse became full in spite of the roughness of the sea having increased. Even in the worst cases with complete apathy a single injection of atropine usually sufficed, though exceptionally a second injection was given. In one cabin containing 8 persons, all were treated with atropine; in the next cabin a similar number were left untreated. In the first all but 2 were quite well the following morning, and the 2 were greatly improved. In the second all were suffering as much as on the previous day. It was remarkable that the cures were permanent, no relapses being observed. To exclude suggestion, injections of distilled water were also given, but without effect.

The vagus controls the normal peristalsis and also, in the case of cerebral vomiting, antiperistalsis of the stomach. Stimulation of the vagus frequently produces gastric hypersecretion and hyperacidity. Pharmacologically stimulation of the vagus produces salivation. The centre for gastric antiperistalsis can be excited by psychical influences. Hence the occurrence of sea-sickness on a smooth sea or in harbour. Sea-sickness is always accompanied by constipation. And vagus stimulation is a frequent case of spastic constipation. It also explains the shivering, bradycardia, irregularity of the heart, the lowered blood-pressure, and the moist skin occasionally found. The vagus possesses vasomotor functions, which are not confined to the sympathetic nerves. Hence the pallor of the face. The tachycardia sometimes observed during vomiting is, however, due to sympathetic stimulation.

Excitability of the vagus is according to Eppinger and Hess most often found in nervous and hysterical persons, especially women and Jews ("vagotonic subjects"). As regards age they are usually young or about middle life. Least often are infants and old people vagotonic. This corresponds exactly to the predisposition to sea-sickness.—*The Medical Review*.

Treatment of Corns and Warts by Ionization.

H. LEWIS JONES, M.D., F.R.C.P.—Even severe corns on the sole yield satisfactorily to ionization with zinc. The procedure is simple,

and consists in using first a zinc positive needle for the centres or foci of the corn, and following this up with ionization of the whole affected area with a zinc plate and a pad moistened with a zinc salt. It is usual to prescribe a compress of zinc sulphate of a strength of 1 per cent. to be applied for some hours before the ionization, which the horny epidermis may imbibe, so far as this can be accomplished by simple diffusion.

For ordinary warts transfixion with a zinc needle, with a milli-ampere of current for a minute suffices. If large, the transfixion is done twice, crucially. A little more current or a longer time may be desirable. When warts are numerous, small and close together, ionization with a pad and zinc solution is quicker than needling of the individual ones. For some warts magnesium answers very well, especially for the flat multiple warts of the backs of the hands and of the face. The branching, coral-like warts of the chin and scalp are easily removed by the use of a zinc needle. Warts of the penis, can be removed by simple zinc ionization from a pad of zinc sulphate.—*The Medical Review*.

Important Discovery in Radium Therapy.

From the Radium Institute, which has now been working for 2 years, an important discovery in radium therapy is announced. The Institute has in its possession 4 grammes of radium which at the present price is of the value of £80,000. The chairman of the Executive Committee, Sir Frederick Treves, thinks that is more than all the radium in the world used outside the Institute for therapeutic purposes. A large proportion of that sold is of half strength or less. The scientific committee of the Institute have demonstrated that the gas or emanation given off from radium has exactly the same properties as pure radium and is as efficient as pure radium for curative purposes. Use has been made of this fact by the invention of hollow plates of varied forms into which the emanation is forced by pumping. The emanation is also stored in small glass tubes. Supplies in plates or tubes are sent to practitioners in any part of the country.

Thus the whole aspect of the curative use of radium has been changed. If a practitioner, for example, wants 200 milligrammes of radium for use upon a patient, its cost, £4,000, probably would be prohibitive. But the Institute can supply for a comparatively trifling sum a plate containing radium emanation which will have the same effect. Radium gives off the emanation constantly and itself is not

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destroyed. However, the activity of the emanation, when fixed in a hollow plate or tube, decreases, falling to one-half strength in $3\frac{1}{2}$ days. One gramme of radium is devoted wholly to producing emanation for distribution in plates or tubes.

Another branch of the activity of the Institute is the supply of water impregnated with radium emanations for consumption by sufferers from certain afflictions. Remarkable improvement is brought about by drinking radium water strong enough to be luminous. Radium emanation solution is supplied of a strength of from one to two millicuries per litre—a strength far exceeding that of water, whether natural or artificially produced, obtainable anywhere else in the world. It has been tried in cases of arthritis deformans, and in 40 per cent. marked benefit has followed, while one-half of the remaining cases have benefited in varying degrees. Usually a patient drinks about a half-pint of the emanation water daily for 6 days in each of 6 weeks. After an interval the course is repeated, if necessary.—*The Medical Review*.

Urinary Antiseptics.

J. W. THOMSON-WALKER, F.R.C.S.—Most antiseptics and disinfectants act by their affinity for the proteins of bacteria, and therefore their efficacy is reduced by the presence of large quantities of protein. In the diseased urinary tract the bacteria are suspended in a protein-rich medium, and the bactericidal substances combine more readily with the protein outside the bacteria.

A urinary antiseptic is peculiar in that it passes through two selective organs—the intestine and the kidneys—and for a time circulates in a powerful oxidizing agent, the blood, before finally appearing in a solution of uncertain concentration at the seat of bacterial growth. The ideal urinary antiseptic should be readily absorbed from the intestinal tract, non-irritating at the point of absorption, so stable as to remain unchanged in the blood, excreted entirely, or in large proportion, by the kidneys, non-irritating to these organs, and, finally, exert an antiseptic action on the bacteria commonly found in the urine and not irritate the urinary passages. Such a perfect drug we do not at present possess.

The table shows the properties of the principal drugs used as urinary antiseptics.

Drug.	In Circulation.	Excreted by.	Excreted as.
Hexamethylenetetramine, urotropin (condensation product of ammonia and formaldehyde)	In large part unchanged; small amount of formaldehyde has been detected.	Largely by kidneys, also excreted in bile, pancreatic fluid, saliva, secretions of nasal sinuses and middle ear, cerebrospinal fluid, synovial fluid.	Decomposed in acid urine and formaldehyde liberated.
• Benzoic acid, ammonium benzoate, sodium benzoate.	Combined with glycol to form hippuric acid.	Kidneys.	Hippuric acid, small amount as benzoic acid.
† Boric acid, boric acid, sodium borate (borax)	—	Kidneys.	Over one-half the quantity excreted in 12 hours; after that in traces for 5 days.
‡ Salicylic acid, salol	Some oxidation takes place; combines with glycol to form salicylic acid; probably circulates as sodium salicylate.	Kidneys, skin, breast, liver.	Salicylic acid and sodium salicylate.
Sandalwood oil, containing santalol and nital	Some oil partly oxidized, rest unchanged.	Kidneys, small amount by lungs.	Some oil unchanged, the rest in combination with glycuronic acid.

* No advantage in combining benzoates with sodium

† Four per cent. is saturated

‡ If much protein present the salicylic acid

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Antiseptic and Disinfectant Action.	Effect on Re-action of the Urine.	Selective Action.
Antiseptic action depends upon production of formaldehyde, which takes place only in acid urine. Formaldehyde added directly to urine stops putrefaction in strength of 1 in 10,000; the growth of typhoid bacillus and streptococcus inhibited in solution of 1 in 20,000; 1 in 5,000 destroys typhoid bacillus and streptococcus in 24 hours. <i>Bacillus pyocyaneus</i> in 48 hours, colon bacillus in 4 days; <i>Staphylococcus aureus</i> alive after 7 days, but destroyed in 48 hours by 1 in 2,000.	Acidity slightly increased.	Typhoid bacillus and streptococcus most sensitive; <i>Staphylococcus aureus</i> most resistant.
Benzoic acid 1 in 2,000 inhibits putrefaction; 1 in 400 prevents multiplication of pus cocci; sodium benzoate 1 in 100 has slight retarding influence on growth of bacteria; alkaline benzoic urine has no antiseptic action.	Increased acidity; benzoic acid not more effective than ammonium benzoate.	<i>Bacillus coli</i> grows very sparsely in benzoic urine; staphylococcus quite unaffected.
Disinfectant action very feeble; antiseptic influence distinct; 2½ per cent. prevents development of bacteria, but exposure to 4 per cent. solution for 24 hours does not prevent subsequent growth.	No effect.	—
As a germicide equals, if it does not surpass, phenol; 1 in 1,500 prevents development of bacteria in organic mixtures; 1 in 3,000 to 1 in 4,000 kills bacteria; 1 in 5,000 kills <i>Bacillus coli</i> in 10 minutes; the neutral salts of salicylic acid are not germicidal in 1 in 4,000 solution; the form in which the benzol derivatives are excreted by the kidney is generally much less irritant and antiseptic than those in which they are administered.	Acidity slightly increased.	Fermentation and growth of staphylococcus in urine delayed; <i>Bacillus coli</i> growth hardly affected.
Slight retardation of putrefaction of urine, and bacterial growth somewhat retarded.	—	<i>Bacillus coli</i> growth practically unaffected; putrefaction not delayed; growth of staphylococcus delayed 6 or 7 times the normal period; the gonococcus may grow readily in culture media made up with sandalwood oil urine instead of water.

acid phosphate with a view to increase acidity of urine (Jordan).
 Solution used in surgery.
 preparations are less efficient than phenol.

1. THE FORMALDEHYDE SERIES OF URINARY ANTISEPTICS.

By far the most important of these drugs is hexamethylenetetramine or hexamethylenamine (generally known under the proprietary name of urotropin). It has no antiseptic action so long as its constituents, ammonia and formaldehyde, are in combination. It is rapidly absorbed from the intestine without causing irritation, even in large doses. In the blood it circulates as urotropin, although a very small amount of formaldehyde is split off. The greater part of the drug is excreted by the kidneys, but it has also been found in the bile, pancreatic secretion, sputum, and the secretions of the nasal sinuses and middle ear, the cerebro-spinal fluid, and synovial fluid.

In the urine urotropin is split and formaldehyde is given off, and to this the antiseptic power is due. The administration of 5 or 10 grains of urotropin thrice daily will give a solution of about 1 in 5,000 or stronger of formaldehyde in the urine. The solution of formaldehyde thus obtained may be sufficient to prevent the development of bacteria. I have seen pronounced bacilluria develop in a case of stricture where the patient was taking 30 grains of urotropin daily, and formaldehyde was being freely liberated in the urine.

After a dose of 10 or 15 grains of urotropin formaldehyde can be detected in the urine in about an hour, but is frequently delayed for 2 or even 3 hours. The excretion is at its maximum during a period of from 4 to 8 hours after administration. After about 12 hours the excretion is still going on in small quantities. I have detected formaldehyde in the urine 17 and even 22½ hours after a single dose of 15 grains of urotropin. It would thus be possible, by taking 2 doses of 15 grains in 24 hours and micturating as seldom as possible, to keep the urine in the bladder continuously mixed with a strong solution of formaldehyde.

In diseases of the bladder, in which frequent micturition is a symptom, the period during which the bladder is under the influence of formaldehyde urine is reduced to the time during which the drug is being excreted in quantity by the kidneys, and this may be a much shorter time, probably about 6 or 8 hours. In such cases small doses frequently repeated (5 grains every 4 hours), will be more effective in giving a continuous antiseptic action.

Dosage.—5 or 10 grains thrice daily is the common dose. An increase in the dose to 15 or 20 grains thrice daily will increase the

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output of formaldehyde in the urine. In a number of cases the writer found that no formaldehyde was produced in the urine when the patient was taking 5 or 10 grains, but there was abundance of formaldehyde with doses of 15 or 20 grains, or when the formaldehyde reaction was feeble with the smaller doses, it became powerful when the dose was doubled or trebled.

There is a limit to the increase in dosage, which in some persons is quickly reached. Urotropin itself is non-toxic, but the liberation of a high percentage of formaldehyde in the urine causes irritation. Irritability of the bladder, frequent micturition, and eventually strangury may occur. Hæmaturia has been recorded in a fairly large number of cases. These symptoms have been known to follow small doses (2½ grains) in certain individuals, but this idiosyncrasy is fortunately uncommon. Most patients can take 15 or even 20 grains thrice daily without any irritation. On the whole I am inclined to prescribe larger doses than is customary, especially in infections of long standing. A powerful antiseptic action for a short time is better than a feeble action spread over a long time. The symptoms of an overdose are, after all, not of a very alarming or a permanent character, and can be quickly controlled by stopping the drug and giving an alkaline mixture. Twenty-five or 30 grains repeated every 4 or 6 hours for 24 or 28 hours may suffice to cut short an infection which will drag on for weeks or months with smaller doses. But it is well to ascertain first by giving smaller doses if the patient has any idiosyncrasy in regard to urotropin.

II.—THE EFFECT UPON BACTERIAL GROWTH OR UPON THE ACTION OF URINARY ANTISEPTICS OF THE REACTION OF THE URINE.

The normal acidity of the urine is due to the presence of acid sodium phosphate. There is seldom any difficulty in lowering the acidity of the urine and giving it a moderately alkaline reaction. The drugs commonly used for this purpose are potassium citrate and acetate and sodium bicarbonate. The latter drug is the most powerful.

It is a much more difficult matter to turn an alkaline urine acid. Two types of alkaline urine are met with. One is faintly alkaline and deposits phosphates, but apart from the change in reaction, is normal in other respects. The second is powerfully alkaline with ammoniacal decomposition and abundant growth of bacteria, and other

abnormal constituents, such as mucus, pus and blood. Mineral acids (hydrochloric, sulphuric, phosphoric) have an extremely slight action in increasing the acidity of the urine. Organic acids (tartaric, acetic, citric, and lactic) have a slight but distinct action. Benzoic and boric acids have no action. Dr. Robert Hutchison recommended acid sodium phosphate for increasing the acidity of the urine, and this drug has proved of great value. Ammonium benzoate in doses of 15 or 20 grains thrice daily in some cases may render a strongly alkaline ammoniacal urine acid after a few doses, when acid sodium phosphate in doses of 30 grains thrice daily has failed.

The reaction of the urine may either affect bacterial growth directly, or interfere with or aid the action of urinary antiseptics.

1.—*The Effect of an Alkaline Urine upon Urinary Infection.*

The treatment of urinary infection by alkalis has been especially used in the pyelitis of childhood. It has also been extended to the pyelitis of pregnancy, and is occasionally advocated in adult pyelonephritis. The pyelitis of childhood is an infection of the renal pelvis with a pure culture of the *Bacillus coli communis*. Potassium citrate and potassium acetate and sodium bicarbonate are the drugs usually given, in doses of from 24 to 48 grains in 24 hours. After a few doses the urine becomes alkaline, or it does so in 2 or 3 days, and the symptoms subside. If the treatment is discontinued there is a tendency for the symptoms to reappear. Resumption of the alkaline treatment is again followed by their disappearance. Eventually the alkalis may be discontinued without recurrence of the symptoms. When alkalis are not given recovery takes place, but the cases tend to run a long course, with frequent relapses and often with spread of the infection to the kidney.

The impression appears to have arisen that the development of the *Bacillus coli communis* is inhibited or destroyed by the action of alkalis, and this view has obtained support from the observation that when the urine is decomposing and ammoniacal, the *Bacillus coli* is either not the infecting agent, or, if present, occupies a subordinate position. Bacteriologists, on the other hand, deny that any disinfectant, or even antiseptic action is exercised by alkalis in strengths such as can be developed in the urine. The following case throws light on the matter :—

A woman, aged 28, was admitted to hospital on April 19, 1913. Since April 3, there had been increased frequency of micturition and

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scalding. She had been constipated. The urine was thick and red-dish. The temperature was 101°, and there was herpes labialis. The muscles of the left side of the abdomen were rigid, and the left kidney was large and tender. The urine showed a pure growth of *Bacillus coli*.

She was ordered a mixture of potassium citrate and potassium acetate (15 grains of each every 8 hours), alternating with urotropin (15 grains). During the next ten days the left kidney diminished, and the right was no longer palpable. Sodium bicarbonate was substituted on May 2. On May 9 the temperature was normal and the kidney less in size. On May 13 the urine was faintly acid, contained a few pus-cells, and many masses of pure *Bacillus coli*.

I saw the patient on the 28th, and found the left kidney slightly enlarged and tender, but all the symptoms had disappeared. The urine contained some mucus, and there was well-marked bacilluria. I suggested omission of the alkalis and the administration of urotropin alone in increasing doses. Twenty grains were given thrice daily. On the 27th the urine became acid, and on the 28th shewed a few pus cells and a few colonies of *Bacillus coli* in culture. On June 6th the urotropin was increased to 25 grains thrice daily, and after a few days the urine became continuously acid. A few days later the urine was found sterile, and it has since remained so.

Thus under alkalis the symptoms rapidly disappeared, but the bacilluria persisted. It then was rapidly cured by large doses of urotropin. Here is an explanation of the disagreement of the clinician and bacteriologist. The action of the alkalis in pyelitis appears to be a neutralization of the acid toxæmia produced by the *Bacillus coli*. Therefore the proper treatment in acute cases of pure *Bacillus coli* infection is the following: First, give a course of alkalis and keep the urine alkaline for some days after the symptoms have disappeared. Then stop the alkalis and give urinary antiseptics in increasing doses. If the urine remains alkaline after the alkalis have been omitted, sodium acid phosphate or ammonium benzoate should be given to render it acid and cause the breaking up of urotropin. The antiseptic course should not be commenced too soon, lest there be a recurrence of symptoms.

2. *The Effect of Alkalis upon the Efficacy of Urinary Antiseptics.*

It has long been recognized that urotropin acts more powerfully in an acid than in an alkaline urine, that its combination with sodium acid phosphate assists its action, while combination with alkalis

retards it. With the recognition that urotropin acts only by the production of formaldehyde, the question of efficacy has turned upon the splitting of urotropin in an alkaline and in an acid urine. A good deal of discussion has waged around this point. One of the chief difficulties has been the lack of an accurate test which will distinguish formaldehyde from urotropin. Burnham's modification of Rimini's test is the best. The following 3 solutions are used: (a) Phenylhydrazine hydrochloride, 0.5 per cent.; (b) sodium nitroprusside, 5 per cent.; (c) sodium hydrate, saturated solution. Three drops of each of the first two solutions are added to the urine, and a few drops of the sodium hydrate solution poured along the side of the test-tube. If formaldehyde is present, a deep greenish black colour passes down through the urine and clouds the fluid. This rapidly changes to green, and fades through bright green to orange and pale yellow. The urine and the sodium hydrate solution should be warmed to slightly above body temperature. This test will detect formaldehyde in urine in a dilution of 1 in 150,000, but does not show the reaction with urotropin. There is an intense dark blue colour, changing to green in solutions of 1 in 20,000 or stronger, and in solutions of less strength the first colour is an intense green. If these tests for formaldehyde are negative, a fresh sample of urine should be boiled after the addition of a few drops of sulphuric acid. The test is then applied, and if the formaldehyde reaction is now present the urine has contained urotropin.

Turning now to the question as to whether formaldehyde is split off from urotropin in an alkaline or neutral urine:—

(a) There is in the first place the question as to whether urotropin is effective when prescribed with an alkali. After administration of 15 grains of urotropin to a normal person, with a sterile, slightly acid urine, formaldehyde appeared in the urine in 2 hours. Twenty grains of sodium bicarbonate were then administered. Half an hour later the urine had become alkaline and formaldehyde was no longer present, although urotropin was being excreted. Forty grains of sodium acid phosphate were given, and a further dose of 20 grains 2 hours later. Three and a half hours later the urine was again acid, and formaldehyde was present in quantity. Thus by a single dose of urotropin, the urine was made positive to formaldehyde, negative to formaldehyde, and positive to formaldehyde again by changing the reaction. That the administration of an alkali, with urotropin, will prevent the liberation of formaldehyde is illustrated by the following case:—

A man had undergone prostatectomy, and cystitis was present. He was taking 15 grains of urotropin and the same amount of

ammonium benzoate, and the urine was acid, and formaldehyde was freely produced. The urine suddenly became alkaline, and formaldehyde disappeared. On inquiring for a possible cause I found that his doctor had given a cough mixture containing sodium bicarbonate. When this was omitted the urine again became acid, and formaldehyde was liberated.

Another patient was suffering from malignant growth of the prostate and cystitis. Suprapubic prostatectomy had been performed a year before, and a urinary fistula remained. The urine was strongly acid, contained a mixed infection in which the *Bacillus coli communis* predominated. There was great vesical irritation. Under 10 grains of urotropin thrice daily, formaldehyde was freely liberated in the urine. When 20 grains of potassium citrate were added the urine became alkaline and ammoniacal, and formaldehyde disappeared from the urine although urotropin was still present. On omitting the alkali, the urine became acid, and formaldehyde again appeared in the urine.

These cases show that the prescription of an alkali with urotropin destroys its antiseptic action. Any action that may be obtained from this combination is due to the alkali and would be equally well and at much less expense produced by the alkali alone.

(b) Take next the administration of urotropin alone when the urine is already alkaline. A normal person who is taking urotropin regularly may produce formaldehyde at one part of the day and fail to do so at another. This is due to the varying acidity of the urine. The morning urine is the most acid, and always shows formaldehyde, but the urine taken after meals, during the alkaline tide, may show urotropin but no formaldehyde. On increasing the dose or on adding an acidifying drug, such as ammonium benzoate, formaldehyde is continuously present in the urine.

Phosphaturia in a mild form is extremely common and it is not confined to brain workers and individuals of a nervous temperament. It occurs without other disease and is of no importance in itself, but these patients do not liberate formaldehyde. Sodium acid phosphate or ammonium benzoate must be combined with urotropin before any formaldehyde is produced.

In the second type of alkaline urine, that due to bacterial decomposition of urea, the same holds good. No formaldehyde appears in the urine, and therefore no antiseptic action is obtained. The whole question of urinary antisepsis turns upon our ability to render the

urine acid. If we are unable to do so an antiseptic action cannot be obtained with the formaldehyde series of urinary antiseptics.

The degree of acidity necessary for the splitting of urotropin appears to vary somewhat. With the ordinary litmus paper-test a faint tinge of red will practically always mean a negative formaldehyde, and a well marked red reaction will be definitely positive.

Some combinations of hexamethylenetetramine are claimed to have advantages over the original form of the drug. There are two types:—

1. *Combination with an Alkali.*—Hexamethylenetetramine with sodium acetate (cystopurin). This combination is claimed to have a diuretic and sedative action combined with an increased action of hexamethylenetetramine. No formaldehyde is liberated during the administration of this drug unless the acidity of the urine is sufficiently high to neutralize the sodium acetate with which it is combined. As an antiseptic this combination has therefore no action. The sodium acetate would act quite as well as an alkali without the addition of hexamethylenetetramine.

2. *Combination with Acidifying Drugs.*—Hexamethylenetetramine formaldehyde, and citric acid (helmitol). The antiseptic action this drug is obtained by the production of formaldehyde. It is claimed that formaldehyde is liberated more easily than from urotropin, and that the drug will act as an antiseptic in alkaline as well as in acid urine. I have tried it in a number of cases when the urine was infected and alkaline, and when urotropin alone, or in combination with moderate doses of sodium acid phosphate or ammonium benzoate, had failed to liberate formaldehyde. Formaldehyde was not detected in these cases. In the neutral or mildly alkaline urine in cases of phosphaturia the same change took place as under urotropin alone—namely, the urine became acid and formaldehyde was liberated and the phosphatic cloud disappeared from the urine. The citric acid has a recognized action in increasing the acidity of the urine, and this is a distinct advantage in neutral or faintly alkaline or in faintly acid urines. This, with the additional formaldehyde present in the drug, leads to ready liberation of formaldehyde. But the acidifying action is feeble, and if the urine is distinctly alkaline the addition of sodium acid phosphate is necessary (ammonium benzoate is incompatible) in the same way as in giving urotropin.

Dioxybenzol-hexamethylenetetramine—a combination of urotropin with resorcin (hetraline)—is claimed to act with equal efficacy whether

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the urine be acid, alkaline, or neutral. The resorcin acts as an acidifier and thus facilitates the liberation of formaldehyde. Here, again, the drug prescribed alone may offer a slight advantage over urotropin in the type of case the writer has indicated, but when sodium acid phosphate is used to acidify the urine the writer has not been able to detect any special advantage in this drug over urotropin.

III.—THE CAUSES, APART FROM THE REACTION OF URINE, WHICH INFLUENCE THE EFFICACY OF URINARY ANTISEPTICS.

(a) *Idiosyncrasy.*—In 230 cases 10 grains of urotropin were given thrice daily; 79 (33·8 per cent.) were negative to the formaldehyde test. Of these urotropin was being excreted but not split in 64, and 15 were negative both to the formaldehyde and urotropin tests—that is, urotropin was not being excreted. The reaction of the urine was alkaline or neutral in 52 of the 64 formaldehyde negatives, and acid in 12.

Of the 52 alkaline negative formaldehyde cases, 28 became positive when the urine was made acid. In 23 the urine did not turn acid under treatment, and they remained negative to formaldehyde. In one the urine turned acid, but the formaldehyde test remained negative. Thus the alkalinity of the urine was the dominating factor which prevented the splitting of urotropin.

There were 12 cases of acid urine with negative formaldehyde. Of these 4 were faintly acid, and became positive when the acidity was increased; 4 were faintly acid, but there was no opportunity of increasing the acidity; 3 were faintly acid, but were cases of renal inefficiency, and the acidity could not be increased; one was distinctly acid and negative, the urine being foul.

Passing to the 15 cases in which no urotropin was excreted. In 8 a small dose was being given (5 or 10 grains), and when this was increased urotropin appeared in the urine. Three cases, with similar doses, could not be followed up. There was one case of advanced renal inefficiency and one of profuse polyuria, with very dilute urine. In 2 cases no cause for the absence of urotropin could be found. Certainly not more than 5 cases could be ascribed to idiosyncrasy in regard to the drug; 3 that did not split urotropin in an acid urine, and 2 that did not excrete urotropin at all.

(b) *Renal Inefficiency.*—Urotropin is given in many cases of advanced disease of the kidneys in the simple faith that excretion of urotropin and liberation of formaldehyde will go on as if the kidneys were

healthy. Experience as to other drugs, such as potassium iodide, opium, methylene blue or indigo carmine, would indicate the contrary. Urotropin fortunately is non-toxic, and its accumulation in the blood if the kidneys are too diseased to excrete it has no serious effects. The following case is an example:—

A woman, aged 30, had multiple calculi removed from both kidneys five years ago. The kidneys were found septic and extensively diseased. During a slow convalescence anuria occurred. There were dyspepsia and flatulence but no uræmic symptoms. The urine drawn by catheter from the kidneys was feebly acid, of s.g. 1010, and contained a trace of albumin, urea 0.7 per cent. and a deposit of red blood discs and a few granular casts and leucocytes. The *Bacillus coli communis* and the paracolon bacillus were present.

The administration of urinary antiseptics gave the following results:—

1. Urotropin 10 grains thrice daily—urotropin faint reaction, no formaldehyde.
2. Urotropin 15 grains, ammonium benzoate 15 grains—urotropin faint reaction, formaldehyde absent.
3. Urotropin 20 grains, sodium acid phosphate 30 grains—urotropin faint reaction, formaldehyde absent.
4. Helmitol 10 grains, sodium acid phosphate 20 grains—no urotropin, no formaldehyde.

Thus little urotropin was being excreted, and this was not split into formaldehyde.

By increasing the dose of urotropin it may be excreted in quantity and if the urine can be rendered acid will be split up.

In a man of 33 suffering from bilateral calculus hydronephrosis, I removed a calculus from one ureter and short-circuited the ureter into the lower pole of the kidney after nephrolithotomy on the other side, in order to circumvent the obstruction. The urine was neutral and pale, with a s.g. of 1006 and a trace of albumin. Urotropin, 10 grains given thrice daily, produced a faint urotropin reaction, but no formaldehyde. On increasing the urotropin to 20 grains and adding ammonium benzoate, the urine became decidedly acid, and a strong formaldehyde reaction was obtained.

These and other similar cases show that there are two factors which reduce the efficacy of urotropin as a urinary antiseptic in advanced disease of the kidneys—diminished excretion of the drug

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and the condition of the urine. The urine is neutral or faintly acid and copious, and it is difficult to increase its acidity.

IV.—HAVE URINARY ANTISEPTICS A SELECTIVE ACTION? Urinary antiseptics act under peculiar limitations in regard to the strength of the antiseptic solution produced in the urine, so that it is well to take full advantage of any affinity, however slight, in regard to the bacteria commonly found in the urinary tract. Formaldehyde is an all-round antiseptic of great power. The exact percentage found in the urine during the administration of urotropin has not been fully determined, but it is probably about 1 in 5,000 in patients taking 5 or 10 grains of urotropin thrice daily. Formaldehyde has its most powerful effect upon the typhoid bacillus and the streptococcus. Burnam states that a solution of 1 in 5,000 destroyed the typhoid bacillus and streptococcus in 24 hours, the *Bacillus pyocyaneus* in 48 hours, and the colon bacillus in 4 days. The *Staphylococcus aureus* was the most resistant, being alive at the end of 7 days. It was completely destroyed in 48 hours by solution of 1 in 2,000.

Jordan says that the action of sandalwood oil against putrefaction is feeble and that the *Bacillus coli* is practically unaffected. With the staphylococcus, however, there is a marked antiseptic effect in both alkaline and acid urines. The value of sandalwood oil against the gonococcus is well-known and would be explained if we assume this selective action to extend to all cocci.

Benzoic urine delays putrefaction and the development of the *B. coli*, but has no effect on the staphylococcus.

CONCLUSIONS.

1. The most effective treatment in acute pure *Bacillus coli* infection is, first, to neutralize the poison with alkalis, and when the symptoms have subsided to turn the urine acid and give urinary antiseptics in progressive doses.

2. In subacute and chronic cases of infection the drugs used should be dictated by the re-action of the urine. If the urine is acid urotropin should be given alone; if it is alkaline or neutral urotropin should be combined with sodium acid phosphate or ammonium benzoate.

3. In persistent infection the dosage of urotropin should be raised until symptoms of formaldehyde irritation commence to appear.

4. The test given above should be used in every case treated by urotropin or other formaldehyde-producing drug. Without it the

physician is completely in the dark as to whether formaldehyde is being liberated or not.—*The Medical Review.*

TOXICOLOGY.

Veronal Poisoning.

WILLIAM HENRY WILLCOX, M.D., B.Sc., F.R.C.P.—The dose of veronal is given in the British Pharmaceutical Codex for 1907 as 5 to 15 grains; while in the latest edition (1911) it is 5 to 10 grains, an indication that the potent action of the drug was not fully recognised in 1907. The Bayer Company in a recent pamphlet give the dose for an adult as 5-10-15 grains, but state that "in ordinary cases of insomnia the 5-grain dose is quite sufficient for an adult, and the dose should only be repeated after a reasonable interval." A single therapeutic dose usually produces sleep within an hour or so, and the sleep lasts for several hours.

Toxic symptoms may be the result of: (1) idiosyncrasy; (2) an excessive dose; (3) repeated small doses, as in the veronal habit. The toxic symptoms which occur after a single large dose are drowsiness, headache, and sometimes ataxy accompanied by a reeling gait. The patient falls into a deep sleep from which he can be roused with difficulty. In severe cases the sleep deepens into coma, and the patient becomes cyanosed with rapid and often stertorous breathing. In this stage a rise of temperature, even to 103° or more, is common and an examination of the lungs will probably show areas of dulness on percussion, increased vocal resonance, bronchial breathing, and moist sounds—all the signs of pneumonia. These signs will be accompanied or followed by those of a general oedema of the lungs, such as moist bubbling rales all over. Severe veronal poisoning is frequently mistaken for pneumonia. When deep coma and pulmonary symptoms develop recovery is uncommon. Sometimes a condition of coma and high temperature will last for as long as 4 days before death supervenes, but after a very large dose death may occur in less than 24 hours.

It is said that digestive disturbances, nausea, and vomiting occur. They undoubtedly do in chronic veronal poisoning (veronal habit) but are uncommon when a single large dose is taken. Erythematous rubecoliform or scarlatiniform rashes may occur; occasionally urticaria with extreme pruritus and oedema of the face.

In chronic veronal poisoning (veronal habit) visual hallucinations are common, and also delusions may occur; the whole mental balance

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may be upset and a sort of double self exist subjectively. Tremor and marked ataxy are common, and the condition may resemble cerebellar disease. Speech is often affected and thick and indistinct and disturbances of sight may occur. The gait is reeling, like that of a drunken person. The veronal habit, like the morphia and cocaine habits, causes a loss of moral sense.

In case of renal disease veronal is much more toxic. If the drug is being given frequently constipation should be avoided; otherwise toxic symptoms may develop. In these conditions a cumulative action may result from therapeutic doses given continuously.

Fatal dose.—Death has been recorded after such small doses as 10 grains. Probably other factors were present, and death was not entirely due to the drug. In a healthy adult a dose of about 50 grains would be dangerous, and may be regarded as an average minimum fatal dose. Much larger doses have been taken without death resulting, but serious symptoms such as deep coma occurred, and there has been grave danger. On the other hand, fatal cases are recorded from doses of 15 grains. But the patients have often been the subject of some disease, or other form of poisoning, such as alcohol, morphia, etc., and the veronal may have not been entirely responsible. Moreover, in fatal cases it is usually almost impossible to say what was the dose taken, since the early onset of coma usually prevents information being obtained from the patient.

Tolerance may be established but a great tolerance comparable to that in morphia and cocaine takers does not occur.

Treatment of acute veronal poisoning.—If the patient is seen soon after taking the drug—i. e., within 4 hours—pass a soft stomach tube to which is attached a piece of plain rubber tubing about 3 feet long, in the end of which is a glass funnel. While the tube is being passed the mouth should be kept open by a gag, and the passage of the tube down the oesophagus is readily brought about by first guiding the end with the left forefinger placed in the mouth. About 20 inches of tube should be passed beyond the teeth, the tube being gently pushed down with the right hand. During this process the mouth should be in the mid-line of the body, the head not being rotated. When the tube is in the stomach no air will issue from its funnel end. Some warm water should now be placed in the funnel, and the funnel raised, so that the tube becomes filled with water. Before the funnel is empty it is quickly depressed, and this will start a syphon action, so that the contents of the stomach can be syphoned out. These should be reserved for future analysis. When the stomach has been emptied as completely

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as possible, wash it out thoroughly by introducing about 2 pints of warm water and then syphoning this off. This washing out should be repeated 3 or 4 times and the stomach emptied as completely as possible. Before withdrawing the tube about 1 pint of hot strong coffee with some milk in it, and an ounce of castor oil or other suitable aperient, should be introduced and left in the stomach.

After 6 hours or so from taking the poison most of it will probably have passed from the stomach into the intestine, so that washing out of the stomach is not likely to be of much avail. Unless the patient is *in extremis* the stomach tube may often be passed with advantage and rapid washing out performed, strong coffee being introduced as described above.

Cardiac stimulants should be given, such as strychnine hydrochloride gr. 1/80, with digitalin gr. 1/100 every 4 hours. Warm normal saline should be given subcutaneously, and also rectal injections of normal saline containing 4 per cent. of glucose should be given in amounts of 15 oz. every 4 hours. If there is much cyanosis oxygen should be given. When the pulse is feeble the oxygen may with advantage be passed through a wash-bottle containing absolute alcohol, since the combination of oxygen and alcohol vapour is a valuable cardiac stimulant. During the comatose state attention must be paid to the bladder, the urine being drawn off by a catheter if necessary. Any urine passed must be preserved for analysis. If urine is not being excreted freely injections of the hypodermic solution of caffeine may be given every 4 hours. Other stimulants that may be given if necessary are camphor and pituitary extract hypodermically.

In acute veronal poisoning the coma which comes on soon after taking the drug may last several days. It will therefore be necessary to feed the patient. Warm milk, and milk and coffee may be given every 4 hours, either by the stomach tube or by a nasal tube carefully passed.

Post-mortem appearances.—Marked cyanosis is often present at death and may persist after it, there being bluish discolouration of the lips and face, and also of the finger-nails. Post-mortem staining is usually well marked. The heart usually shows marked dilatation, more marked in the right cavities. The great veins are full and the blood is often fluid. The air passages are congested and contain mucous exudation. The dependent parts of the lungs almost always show marked hypostatic congestion and œdema, and commonly sink in water. Frequently patches of pneumonic consolidation are present with lymph on their pleural surface. They may be extensive, and are to be distinguished from the general hypostatic congestion and œdema mentioned. The brain and abdominal viscera usually show marked congestion. Thus the post-mortem signs are not characteristic. They are those of death from gradual heart failure, complicated by œdema and hypostatic congestion of the lungs. They may be commonly found in death from natural causes.—*The Medical Review.*

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The Medical Registration Bill.



We publish below the report of the Select Committee on the Medical Registration Bill together with the bill as amended in the Select Committee. Some important alterations have been made in the bill, but the alterations only bring the bill more into line with the English Act. The greatest controversy is round the constitution of the Medical Council. There is a great deal of misconception on this point. At present we offer no remarks on the subject. We prefer to wait and see what the honorable member in charge of the bill has to say on this point. In the meantime we give here the constitution of the General Medical Council of Great Britain & Ireland for purposes of comparison of the principles on which the Councils are constituted.

The constitution of the General Medical Council of Great Britain & Ireland, after the Medical Act of 1886, is as follows:—

5 persons nominated by His Majesty with the advice of his Privy Council, three of whom shall be nominated for England, one for Scotland and one for Ireland.

1 person chosen from time to time from each of the following bodies:

The Royal College of Physicians of London.

The Royal College of Surgeons of England.

The Apothecaries Society of London.

The University of Oxford.

Do. of Cambridge.

Do. of London.

Do. of Durham.

The Victoria University, Manchester.

The Royal College of Physicians of Edinburgh.

The Royal College of Surgeons of Edinburgh.
 The Faculty of Physicians and Surgeons of Glasgow.
 The University of Edinburgh.
 Do. of Glasgow.
 Do. of Aberdeen.
 Do. of St. Andrews.

The King's and Queen's College of Physicians, Ireland.
 The Royal College of Surgeons, Ireland.
 The Apothecaries Hall of Ireland.
 The University of Dublin.
 The Royal University of Ireland.

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- 3 persons elected from time to time by the registered medical practitioners resident in England.
- 1 person elected from time to time by the registered medical practitioners resident in Scotland.
- 1 person elected from time to time by the registered medical practitioners resident in Ireland.

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Among the new clauses introduced is clause 21 which is practically the same as Section 21 of the Bombay Act which again is taken from the British Act—Section 19, Part III, of the Medical Act of 1886.

Another new addition is the power of Government in consultation with the Medical Council to permit of the registration of persons who do not come within the terms of the Schedule.

This again is practically Section 13, Part II, of the Medical Act of 1886. Then again the restriction of registration of Colonial and Foreign Degrees to those of countries which recognize the Indian Medical Degrees is an adaptation of Section 17, Part II, of the Medical Act of 1886.

We have only indicated some of the changes made by the Select Committee. Our readers can study the others fully from the report we publish below. The members of the medical profession in this Presidency will await with a good deal of interest the debate on the final stage of the Medical Registration Bill.

Bill introduced into the Council of the Governor of Fort St. George for making Laws and Regulations.

The following Report of the Select Committee on the Medical Practitioners' Registration Bill, 1918, together with the Bill as amended by the Committee, is published for general information.

TO THE HONOURABLE THE COUNCIL OF THE GOVERNOR OF FORT ST. GEORGE FOR MAKING LAWS AND REGULATIONS.

WE, the members of the Select Committee appointed at the meeting of the Council on the 11th November 1918 to report on the Bill for the registration of medical practitioners, have the honor to submit our report thereon to the Council.

2. We have received no representations from the public regarding the provisions of the Bill.

3. The following paragraphs indicate the important points we have discussed and the conclusions we have arrived at.

4. One of the chief points we discussed was the best way of making it clear in the body of the Bill that it excluded the *Ayurvedic*, *Unani* and other indigenous systems of medicine from its purview. The Bill proposed to gain this object by defining the words, "hospitals, asylums, etc.," as those in which the methods of treatment carried on were those recognized by the General Medical Council of Great Britain and Ireland. We believe this provision to be sufficient for the object in view; but consider it preferable to substitute the expression "the Council established under this Act" for the words "the General Medical Council of Great Britain and Ireland."

5. We have omitted sub-clause (2) of clause 4 as redundant. Medical practitioners are already exempt under the provisions of the Criminal Procedure Code from serving on Juries and the system of holding inquests by means of a Coroner's jury is not in vogue in this Presidency.

In the former sub-clause (3) we have added some words empowering the Government in special cases to permit unregistered practitioners to hold appointments in the institutions referred to therein. The absence of such provision might, we think, occasionally give rise to difficulties.

6. The constitution of the Council has been substantially altered. We consider it advisable that there should be a bare majority of Government nominees in the Council and that the number of electoral

bodies should be reduced. We have classified all registered practitioners into three classes—

- (1) those registered under the British Medical Act,
- (2) graduates of the local University, and
- (3) all others.

We give one representative to the first class, three to the second and two to the third. We have raised the strength of the Council to the old number of fifteen and provide that eight members including the President should be nominated by the Government. We think that the vice president should be elected by the Council.

7. In clause 6 we make express provision for the first appointment of the Council.

8. Clause 8 has been amended and amplified so as to enumerate all the cases in which a member may vacate his seat in the Council.

9. We consider that every one appointed to the Council should hold his seat for the full term of five years. This will tend to secure continuity of practice and will avoid complete change in the *personnel* of the Council once every five years. We have amended clause 9 accordingly.

10. We omit the provision in the clause 10 regarding appeals to the Government by a registrar in the event of his removal by the Council. We prefer to give the Council full powers regarding the appointment, control and allowances of all its servants.

11. In clause 11 we have inserted a provision declaring the medical register to be a public document within the meaning of the Indian Evidence Act and describing how it may be proved in courts of law.

12. In clause 12 we have fixed the quorum at a meeting of the Council at seven instead of eight.

13. The proviso in clause 13 had the effect of rendering conviction for any cognisable offence a bar to registration. We think this is somewhat too wide and have provided that only convictions which indicate a defect of character shall disqualify a practitioner. We have added a new proviso enabling the Government, after consulting the Council, to permit the registration of persons who do not come within the terms of the schedule. This is intended to meet the case of individuals holding colonial or foreign degrees who would not otherwise be registrable.

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14. Clause 15 has been re-cast so as to provide expressly for an appeal to the Council from the orders of the registrar. We have also inserted a provision as to the period within which such appeal must be made.

15. In clause 16 we have omitted the proviso as unnecessary and have inserted words enabling the Council to restore to the register a name once removed from it.

16. The original clause 17 requiring registrars of deaths to report deaths of registered practitioners has been omitted as we consider it impossible to give effect to it in practice. We have inserted a new clause 17 providing an appeal to the Local Government from the decisions of the Council under section 18 and section 16. We consider that the Government should have an opportunity of reviewing the decision of the Council. This is particularly necessary in the case of public servants in whose case removal from the register might mean removal from the public service.

17. We have inserted a provision (clause 18) to prevent the civil courts from questioning any acts of the registrar, the Council or the Local Government done by virtue of this Act.

18. Another new clause (clause 19) gives power to the Government to alter the schedule at discretion, following the provisions of section 20 of the Bombay Medical Act. This was contemplated in the Bill but not expressly provided for.

Following the usual practice we have restricted registration of colonial and foreign medical degrees to those countries which recognize British Indian degrees.

19. We have amended clause 18 of the original Bill in order to meet the case of refusal by a university or medical college or school to allow the Council proper means of ascertaining the system of medical education adopted by such institutions.

20. We insert a provision (clause 21) on the model of section 21 of the Bombay Act giving power to the Government to carry out the duties of the Council whenever it may neglect to do so or abuse or exceed its powers.

21. A new clause has been inserted giving power to the Council to summon witnesses for the purpose of any enquiry it may hold, and requiring such witnesses to speak the truth.

22. On such matters as the convening of meetings or the conduct of business thereat and the control of the establishment employed, we

give power to the Council to make by-laws with the approval of the Government. On other matters we reserve power to the Government to make rules.

23. We have amended the schedule so as to make the diplomas and certificates granted by the Government of Ceylon registrable under this Bill.

T. M. NAIR.

J. N. ATKINSON.

W. B. BANNERMAN.

A. BUTTERWORTH.

N. S. BRODIE.

F. H. M. CORRIET.

M. RAMACHANDRA RAO

(Subject to a minute of dissent).

VENGAYIL KUNHIRAMAN NAYANAR.

and December 1913.

ZYNULABIDEEN

(Subject to a minute of dissent).

Minutes of Dissent.

I have signed the report subject to the expression of my views on some points in the Bill. The Bill does not make any provision for a form of trial at enquiries by the Medical Council under clauses 13 and 16. I consider this omission a serious defect in the Bill. The removal of a medical practitioner from the register entails very serious consequences and in the case of a person in the service of the Government would lead to a forfeiture of his appointment. At present an officer in the service of Government has certain statutory rights under the Public Servants Enquiries Act (XXXVII of 1850) designed to secure a fair trial in cases of misconduct or misbehaviour. Sections 4 and 5 of that Act make it obligatory on the part of the prosecutor to reduce all imputations made against a public servant into distinct articles of charge which, together with the list of documents and witnesses, must be communicated to him before the date of hearing. The person arraigned has also the right to produce evidence both oral and documentary and is entitled either in person or by pleader to cross-examine the witnesses produced against him. Other forms of legal procedure in vogue in courts of law in regard to the manner of recording evidence, the compulsory attendance of witnesses and the right of opening the

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case and the right of reply are all adopted in the Act with a view to give full scope to the person concerned to effectively defend himself (sections 11 to 19 of Act XXXVII of 1850). Apart from these provisions of the Indian Act, an enquiry by the General Medical Council in Great Britain is not devoid of all legal formalities and is not, as has been suggested, much the same as a departmental enquiry in this country, freed from all the shackles of legal trial. In all disciplinary enquiries by the General Medical Council a great deal of legal procedure for securing a fair trial is observed. Where the information is a complaint by a person alleging infamous conduct against a medical practitioner it must be put in writing and supported by one or more of the statutory declarations made, presumably in the same way as a complaint under the Code of Civil Procedure. A preliminary sifting of the complaint is first undertaken by a committee of the Council with the help of a solicitor on the facts. If, after this, the Council resolves that an enquiry should be held, a notice in writing is served on the practitioner specifying the nature of the charge and the day on which the enquiry is to be held and asking him to answer the charge in writing and to attend before the Council on the day of trial. Either party to the enquiry (the complainant or the practitioner) is entitled to be supplied by the solicitor to the Council with copies of the declarations or other documents given or sent to the Council. On the date of hearing, the complainant or his counsel may state his case and produce his proofs in support of it. The practitioner is then invited to state his case by himself or through his counsel and produce his proofs in support of it. He may address the Council once either before or at the conclusion of his proofs. If the practitioner produces his evidence, the complainant has a right of reply. Witnesses produced by either party may be cross-examined and the Council may refuse to admit any statutory declaration in evidence unless the declarant submits himself to cross-examination. The President and any member of the Council to all these forms of a judicial trial, the General Medical Council is also guided at the enquiry by a judicial assessor, a person presumably trained in law, who is associated with the Council in the trial of medical practitioners. The form of trial adopted by the General Medical Council in Great Britain is therefore more or less akin to the procedure adopted in civil proceedings in this country.

I have mentioned all these details as there seems to be some impression that the Medical Council constituted under the Bill should

avoid as far as possible all forms of legal procedure. Such a course is extremely undesirable and I consider that some form of trial which would secure a fair hearing to all parties concerned should be settled and the essence of it, such as that contained in the Public Servants Enquiries Act, 1850, should be incorporated in the Bill. Unless the Indian Oaths Act, 1873, and the Indian Evidence Act, 1872, are made applicable to enquiries under clauses 13 and 16, it is not possible to secure an effective trial. As it is, the Bill does not make any provision at all in this respect. The only provision made in clauses 13 and 16 is that the practitioner will be heard either in person or by pleader.

2. Clause 18 of the Bill which completely ousts the jurisdiction of civil courts is, in my opinion, altogether unnecessary. In the decided cases under the British Medical Acts it has been held that the General Council constituted under the Medical Acts are the sole judges of professional misconduct. Section 29 of that Act which corresponds to clauses 13 and 16 of the present Bill assigns the jurisdiction in regard to professional misconduct to the General Medical Council and no other court can question or revise their proceedings. The General Medical Council can only be proceeded against in civil courts where they do not conform to the rules of natural justice or to the particular form of enquiry settled for their guidance. In other respects the Medical Council are the sole judges of the matters assigned to them by the Medical Acts and the publication of their proceedings is also privileged. The Medical Council under this Bill is exactly in the same position as the British Medical Council except that an appeal against its decision is provided to the Local Government (clause 17). On general principles such a provision as clause 18 would be superfluous and I fail to see the necessity of it in the Bill. Apart from this, even if such a clause was necessary, the language of clause 18 is far wider than is warranted by the circumstances and confers an absolute immunity contrary to precedents in regard to acts done under the provisions of the Bill. The removal of the word "due" before enquiry in clause 13 in which the language of section 29 of the British Medical Act has been adopted is also a matter for regret.

3. I am unable to agree with my colleagues in regard to the necessity of clause 20 of the Bill so far as it concerns Indian Universities referred to in clause 1 of the schedule. The clause empowers the Medical Council constituted under the Bill to call upon the Universities to furnish reports, returns and other information as the

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Council may require, to enable the Council to judge of the efficiency of medical instruction and also to provide facilities to a member of the Council to be present at the examinations held by such Universities and refusal to comply with such demands will enable the Local Government to remove such University from the schedule. This clause makes the Medical Council a supervising authority over the Universities in the matter of medical instruction and education. It appears to me that, under the present circumstances, it would be somewhat incongruous that a Medical Council such as that constituted under the present Bill should be permitted to sit in judgment over the courses of studies in regard to medical instruction prescribed by the Universities in India. I believe that these courses are settled by a body of persons at least as well informed as the Medical Council constituted under the Bill and it would be impolitic to confer on another body powers of scrutiny of the course of study prescribed by responsible bodies like the Universities and not to recognize Medical Degrees of an Indian University as a sufficient guarantee for efficiency. It is therefore neither desirable nor necessary to place the medical education provided by the Universities under the check of the Medical Council constituted under the Bill. The Universities are already under the control of the Government and a further control by the Local Government through the Medical Council is altogether undesirable. There is also a possibility of conflict between the Universities and the Medical Council, and the language of clause 20, as it stands, would empower the members of the Medical Council to examine the courses of study not only of the Madras University, but also those of Allahabad, Bombay, Calcutta and Lahore. The proposal for inspection of the courses of study contains all the elements of friction without any corresponding advantages. I am therefore inclined to the view that the medical degrees of the Indian Universities should be accepted without the Council being empowered to scrutinize their efficiency. It may, however, be pointed out that the General Council of Great Britain and Ireland exercises similar functions and that under the Bombay Act also similar powers were conferred on the Medical Council. The Council of Great Britain is not only a council of medical registration but of medical education, and the constitution of the British Council is altogether different and has been designed to secure co-ordination in medical education and instruction throughout Great Britain and Ireland. Twenty of the thirty members of the Council represent the various colleges of physicians and surgeons and the medical faculties of all the Universi

ties. They are therefore in a position to superintend medical education and instruction with which they are in daily touch. In the Council constituted under the present Bill, there is not even a representative for the Madras Medical College and the University of Madras has been given one representative. It is possible that all the seven Government nominees may be medical men, but even then I am not able to see how the Medical Council constituted under the Bill will be a better body than the medical faculties of the Universities. Altogether I am against the proposal in the Bill, which should, under existing circumstances, be strictly confined to medical registration.

4. In regard to the recognition of foreign and colonial diplomas my colleagues have recognized the principle of reciprocity under appropriate safeguards. I would add a further restriction that the medical degrees, diplomas, certificates granted in any British colony or foreign country which has placed restrictions on the immigration of Asiatics as such should not also be recognized for registration under the Bill. The principle of reciprocity in the matter of recognition of medical degrees is a method of retaliation independently of the inherent merit of the degrees or diplomas and, if that is accepted, I do not see why this proposal also should not be embodied in the Bill. It will be as much or as little effective as the other and I am of opinion that no statutory recognition should be afforded in this province even to medical men coming from colonies and countries who have set their faces against Asiatics as such.

5. Finally I am not satisfied that sufficient provision has been made in the Bill for the representation on the Medical Council of the independent medical profession. There is a feeling which found expression in the opinions of the medical men to whom the Bill was referred that a large majority of the practitioners who would go on the register are men in the service of the Government and that private medical practitioners would not have any chance of serving on the Council. It seems to me therefore that separate representation should be permitted to medical men who are now outside the Government service. Some of them, no doubt, will come under sub-clause (d), clause 5, of the Bill and some under clause (c). But I consider that they should have a separate electorate by themselves as it is fairly certain that the men in service registered under those two clauses will preponderate largely and that a private man will have very little chance of being returned as a member of the Medical Council. I see no reason for such a large representation, by nomination, and election,

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of medical men in the service of Government. The main object of the creation of a Medical Council is to bring into existence a disciplinary body in professional matters and the recent policy of the Secretary of State in regard to the growth of an independent medical profession in India and the anxiety expressed to foster it is another reason in favour of my view. On the whole, I think there is no ground for such a large preponderance of Government nominees and that the number of seats to be filled up by nomination may be reduced by two and these may be allotted to the independent medical practitioners.

M. RAMACHANDRA RAO.

4th December 1918.

I regret to say that the Bill even as amended by the Select Committee retains something of its original characteristic of doing injustice to the *Ayurvedic* and *Unani* systems of medicine by ignoring their existence altogether. I believe that no Indian Medical Registration Act intended to register those who practise the western methods of treatment can succeed in not injuring those who practise the *Ayurvedic* and *Unani* systems unless it says explicitly that the latter class of medical practitioners are beyond its scope. It was the realization of this fact which led the Honourable the Surgeon-General to undertake at the last meeting of the Legislative Council after consultation with the Hon'ble Dr. Nair and with the approval of Government that an alteration be made so as to make it quite clear that the terms "qualified" and "unqualified" should apply only to those trained in western methods. It is true that the words "qualified" and "unqualified" have been dropped in the amended Bill, but it has not been made quite clear that the registration and non-registration are intended to apply to western practitioners only. This result cannot be attained unless it is explicitly stated that the Bill and the distinction of "registered" and "unregistered" which it creates do not apply to those who practise *Ayurvedic* and *Unani* systems. In the absence of such an explicit statement, the Bill must remain a partial and defective measure.

ZYNULABIDEEN.

8th December 1918.

[Note.—1. The alterations made by the Select Committee are printed in clarendon type

2. The figures in square brackets on the margin indicate the clauses of the Bill as introduced.]

No. 4 of 1913.

A Bill for the Registration of Medical Practitioners.

(As amended by the Select Committee.)

WHEREAS it is expedient to provide for the registration of medical practitioners in the Presidency of Madras; It is hereby enacted as follows:—

1. (1) This Act may be called the Madras Medical Registration Act, 1914.

(2) It extends to the whole of the Presidency of Madras.

2. The provisions of section 4 shall come into force on such date as the Local Government may notify in this behalf. The rest of this Act shall come into force at once.

3. In this Act unless there is something repugnant in the subject or context,

(1) "the British Medical Act" means Statute 21 & 22 Victoria, Chapter 90 (The Medical Act), and any Act amending the same;

(2) "Council" means the Medical Council established by this Act

Medical Act, 1858.
21 & 22 Victoria, Chapter 90.

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(8) "hospitals," "asylums," "infirmaries," "dispensaries," "lying-in hospitals" mean institutions the methods of treatment carried on in which are those which are approved by the Medical Council established by this Act;

(4) "prescribed" means prescribed by rules or by-laws made under this Act;

(5) "registered practitioner" means any person registered under the provisions of this Act.

4. Notwithstanding anything to the contrary in any enactment, rule, by-law or any other provision of law—

(1) no certificate required by law to be signed by a medical practitioner or officer shall be valid unless signed by a registered practitioner.

(2) Except with the special sanction of the Local Government, no one other than a registered practitioner shall be competent to hold any appointment as physician, surgeon or other medical officer in any hospital, asylum, infirmary, dispensary or lying-in hospital not supported entirely by voluntary contributions or as medical officer of health.

5. (1) A Medical Council shall be established for the Presidency of Madras and shall consist of fifteen members including a president and a vice-president to be

Section 37, British Medical Act, 1858.

Section 11, Bombay Act VI of 1912.

Section 3, British Medical Act, 1858.

Section 2, Bombay Act VI of 1912.

appointed in the following manner:—

(a) The president nominated by the **Local Government**;

(b) one member elected by the medical faculty of the Senate of the University of Madras;

(c) **one member** elected by the registered practitioners **who are** registered under the British Medical Act;

(d) **three members** elected by the registered practitioners **who are** graduates in medicine of the University of Madras;

(e) two members elected by all **other** registered practitioners;

(f) **seven members** nominated by the **Local Government**.

(2) The vice-president shall be **elected** from among the members of the Council **in the prescribed manner**.

6. No person shall be eligible to be a member of the Council unless he is a registered practitioner. **Provided that** in the case of first appointments made under this Act the persons electing the members under clauses (c), (d) and (e) of subsection (1) of section 5 and the members appointed shall be persons who are qualified to be registered under this Act.

7. (1) The members of the Council shall hold office for a term of five years and shall be eligible for re-appointment.

Section 8, Bombay Act VI of 1912