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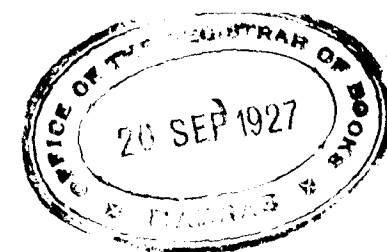
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THE MADRAS MEDICAL JOURNAL

JUNE—AUGUST 1927.

ORIGINAL ARTICLES.

THE 'ANTIMONY-SERUM' TEST FOR THE DIAGNOSIS OF KALA-AZAR.

(CAPTAIN J. CHRISTODOSS DAVID, M.B., B.S.)

Under the title "A New Serum Test for Kala-azar," Chopra, Gupta and David (1927) have described a simple and quite an efficient method of diagnosing this disease. It is a non-specific test in the sense that it does not depend on any reaction of the causal organism. The aldehyde test described by Napier is also non-specific in the same way. This new test depends on a bio-chemical or a physio-chemical reaction between the pentavalent organic derivatives of antimony and the serum of a Kala-azar patient.

The pharmacological action of antimony and its derivatives on the blood has not been definitely worked out as yet. From the analogy of the action of arsphenamine it is thought that antimony salts are precipitated in a state of fine division in the smaller capillaries especially of the lungs, causing vascular obstruction. Clinical and experimental evidence for this are adduced from the common phenomenon of severe cough and respiratory distress observed after intravenous injections of antimony salts and from the most striking rise of the Pulmonary blood pressure that is obtained in cats when intravenous injections of these salts are given. Chopra (1927) has discussed

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these points in a paper on "An experimental investigation into the action of organic compounds of antimony." These interesting facts led to an inquiry into the action of these compounds on the blood; and it was found that when a 4 per cent. solution of any one of the pentavalent organic compounds of antimony such as are commonly used in the treatment of Kala-azar, is added to a few drops of the patient's serum in a small test tube, a thick flocculent white precipitate occurred at the junction almost immediately. While further researches were being carried on to find out the cause of this precipitation, more tests were done to see if this phenomenon was peculiar to the serum obtained from Kala-azar patients or whether such a precipitate occurred with all kinds of sera; and these showed that only with Kala-azar serum such an interaction occurred; therefore it appeared that here was a phenomenon that could be utilised in the clinical diagnosis of this disease. More than 120 cases have thus been tested and the utility of this test as well as its advantages over the aldehyde test are becoming more and more apparent. Sera from cases of Leprosy, Malaria, Filaria, Syphilis, Skin diseases, etc., have been subjected to this test and have given negative results.

Solutions of arsphenamine do give such precipitates, not only with Kala-azar serum but also with other sera, with this difference that the precipitate settled down earlier and was redissolved whereas in the case of antimony compounds the precipitate did not disappear even after 24 hours and in some cases was even thicker than when newly formed. Colloidal gold solutions give a brownish turbidity; but the reaction with antimony was clear cut and definite.



All the different preparations now in use in the treatment of Leishmaniasis were tried. Though this reaction seemed to be peculiar to the urea compounds of antimony, novostiburea did not produce any precipitate or at the most produced just milkiness of the solution. Von Heyden's compounds, No. 471 (Stibosan) and No. 693 gave variable results. They also produced in a few cases similar precipitate with non-Kala-azar sera but the precipitate produced with Kala-azar sera was quite thick and flocculent. Antimonyl tartrates did not give any precipitate whatever. Solutions of amino stiburea, urea stibamine and stiburea as well as stibamine glucoside or neostam invariably gave the typical reactions with Kala-azar sera and no precipitate with non-Kala-azar sera.

It is a matter of common knowledge that antimony tartrates among the trivalent, and novostiburea among the pentavalent compounds are the least effective in the treatment of Kala-azar. It is interesting therefore to note that these two do not give the typical reactions of this test, while the urea compounds which are very efficient against the disease give prompt reactions. There seems therefore, to be some sort of unexplained relation between the therapeutic efficiency and the reacting power of these compounds. This test may even be a means of gauging the curative property of any other synthetic preparation of antimony that may be put on the market in the future! Further research along these lines will be required to explain these curious phenomena.

Though we mostly employed the solutions in the same strengths as are used for intravenous medication, i.e., 2 per cent. in the case of the tartrates and 4 per cent. in the case of the other organic compounds, weaker strengths

also gave the precipitate 0.5 to 1 per cent. solutions also produce a precipitate the precipitate becoming more thick in course of time. Even a 0.002 per cent. solution that showed only a milkiness to start with produced the characteristic precipitate within 24 hours. If the serum happened to be a day old the reaction was seen to be quite clear cut even with dilute solutions while fresh serum required a stronger solution of antimony to give as good results especially in every case. Up to a certain limit the precipitate increased with the proportion of serum used.

As there is no point in waiting for twenty-four hours when a simple and quick method of diagnosing a case is required, instead of using the minimum strength of solution that will produce a precipitate in twenty-four hours a stronger solution, i.e., one between 1 per cent. and 4 per cent. say 2 per cent. may be used. If economy is not a factor desired, 4 per cent. solutions may be used with advantage as an immediate and well marked reaction is obtained with this strength. The antimony solutions need not be made fresh as old solutions react as well. We kept a solution of stiburea in a stoppered bottle for fifteen days and even after this period we got quite satisfactory results.

The following technique may be adopted:—Blood is drawn into a Wright's tube from a pricked finger as is done for the Widal's test and kept aside till the serum separates. The test itself is done with convenience in a small Dreyer's tube. When more than one sample of serum is to be tested, the Dreyer's tubes can be arranged on a small block of wood imbedded in plasticine. A few drops of the sera are pipetted out into the tubes and then about 1 or 2 c.c. of the antimony solution, say, 4 per cent. of stiburea or

amino stiburea is slowly put into the tubes so as to form a layer on the top of the sera. Almost immediately a thick flocculent white precipitate occurs at the junction of the two fluids in positive cases.

The usual methods of clinching the diagnosis of Kala-azar are by spleen or liver punctures and the cultivation of the flagellates. But the aldehyde test has so far held the field for simplicity and efficiency. It is now obvious that the new "antimony test" is bound to supersede even this. The aldehyde test was done side by side for every sample of serum and gave corresponding results. In some cases, where the aldehyde test was negative, the antimony reaction was definitely positive. Napier's test depends on the formation of an opaque gel but this is rarely immediate. But in this new test the results can be read off almost at once after bringing the solutions together. A very small amount of serum is necessary. A needle prick will provide the quantity needed. Very early cases of the disease in which the aldehyde test is rarely positive give a precipitate after a few minutes, more marked after a few hours. In one case in which the duration was less than a month, about 18 days, a clear cut positive result was obtained. In most cases, when a 2 per cent. solution of the antimony compound is used, no waiting is needed, the result being *spectacularly immediate*. As already mentioned a fresh solution of urea stibamine, which has the double advantage of giving a very typical reaction and being the most accessible compound, need not be made every time as a solution once made with proper aseptic precautions keeps fresh and is quite good for the purpose of this test even after twenty days.

A simple Blood Test :—Further observations on the above test has shown the way to a much simpler, yet as efficient, test for the detection of cases of Kala-azar. This consists in bringing together an oxalated solution of blood and the solution of antimony compound. A similar phenomenon occurs, a thick precipitate forming at the junction in the case of positive blood which tends to settle down at the bottom of the tube in a few hours. This test is exceedingly simple and can be performed with the minimum of equipment and training by any practitioner in any out of the way place, and has therefore great possibilities. The technique described is as follows :—Two drops of blood obtained by pricking the patient's finger is allowed to mix with 0.25 c. c. of a 2% solution of Potassium oxalate and to this in a Dreyer's tube is added some 4% solution of one of the urea compounds of antimony. The heavy antimony solution sinks to the bottom and the characteristic precipitate is formed at the junction and sinks to the bottom in a few hours' time. This test is as specific for Kala-azar as the serum test described above. It should be noted that, for about two drops of blood, just 0.25 c.c. of the oxalate solution is sufficient and that a stronger solution of oxalate produces a precipitate with antimony even in the absence of the blood.

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THE TREATMENT OF THE INFLAMMATORY CONDITIONS OF THE UTERINE ADNEXA.

(By DR. P. VENKATAGIRI, M.B. & C.M.).

From a clinical view point, treatment mainly depends upon the causation of the inflammatory condition of the adnexa. A glance at the cause will undoubtedly give you a clue to the best line of treatment.

The Gonococcus is said to be responsible for about 75% of the cases. Next in the order of importance comes the infection of tubes and varies after labour or abortion. Post-operative infections, either after instrumentation or after operations on the uterus and the vagina may be mentioned as the next important factor in the causation of this condition. Diseases of the bowels—vermiform appendix, the peritoneum and cæcum (tubercular)—easily come in as the next factor. General Systemic infections as typhoid, Small-pox, etc., may be said to form another less important group of causes. Lastly, one should not forget the non-infective cases of tubo-ovarian inflammation—result of extra uterine gestation, tubal hæmatocele and extensive hæmatoma arising from diseased corpora Lutea.

Broadly speaking treatment may be classified under three main heads :—

- (A) Preventive and prophylactic.
- (B) Expectant, palliative, symptomatic and conservative.
- (C) Surgical—operative or radical.

A. PREVENTIVE AND PROPHYLACTIC.

Much can be done in the preventive and prophylactic methods of treatment in cases of Gonorrhœa, infection

after labour or after abortion, or post-operative infections by taking proper and timely preventive and prophylactic measures. But all said and done, cases will occur in spite of advice, prophylaxis and due care. Warnings regarding the gonorrhoeal infections are as ancient as the disease itself and so long as "hot passions leap over cool judgments," the benevolent advice of the family physician or the Social reformer is not cared for much, and almost count for nothing. So long as the men and women remain wicked as the majority of them unfortunately are, the harvest of the gynecologist is abundant, and he will be called upon to treat many a case in every day practice. Puerperal and post-operative infections will become less and less as the modern aseptic methods are well understood and practised. But so long as obstetrical and gynecological studies are neglected by the average practitioner, so long also there will be a large number of cases to be treated.

(B) EXPECTANT, PALLIATIVE, SYMPTOMATIC AND CONSERVATIVE TREATMENT.

Here no heroic plan of action is undertaken. You try to interpret prominent signs and symptoms and adopt suitable conservative methods as occasion arises.

1. *Rest.* To prevent further complications and relieve pain, you keep the patient absolutely at rest in bed preferably in Fowler's position. It is said that the pelvis is the cesspool of the abdominal cavity. All the inflammatory exudate will settle down and collect in the most dependant part of the pelvis and nature will try to screen it off from the general peritoneal cavity by the formation of protective adhesions which are beneficial in the process of conservation and repair.

2. *Application of cold.*—In the acute stage especially in the first three days of inflammation topical application of cold by means of ice-bags is said to be beneficial.

3. *Application of heat.*—Heat as a therapeutic measure for the relief of pain, for promoting eucytosis and the absorption of the exudate and also for softening the adhesions is strongly recommended. In the form of hot vaginal douche—copious and repeated,—it is the favorite method of application. Many antiseptic lotions such as perchloride of mercury 1 in 2000, the Chloramine—T. 5 % Tr. Iodine 3i to a pint, Carbolic lotion 1 in 80, Lysol 3i to a pint, Eusol, normal and hypertonic saline can be used. In the acute and subacute inflammations, turpentine Stupes, linseed poultices, or hot boric compresses are not only well borne by the patient but help in arresting and localising the inflammatory process and absorbing inflammatory products. Hot water bags, hot antiphlogistine on lint, the application of ichthyol-glycerine and belladonna to the lower abdomen are useful in the chronic stage to relieve pain and help absorption of the inflammatory-mass. Now-a-days heli-therapy is practised by some for the same purpose. Various forms of light treatment, blue light, diathermy, are practiced by others who claim to have effected many a cure. There are others who expose their patients to the curative action of the X-Ray and the radium and claim to have cleared the pelvis without operations. The pento-stat and the multostat claim to have relieved many an ache, from the back ache to pelvic neurasthenia—remote result of chronic salphingo-oophritis.

4. *Drugs.*—For combating pyrexia and also relief of pain, many antipyretic and analgesic drugs are used. The most common are Aspirin, Phenacitin, Caffeine citras

and Pyramidon. Bromide of Potassium, Chloral, Luminal, Veronal are used as sedatives and hypnotics.

As special sedatives for the uterus and uterine adnexa. Tr. Belladonna, Liquor Sedans, Liquid extract of Prune Leaves and Heroin Hydrochloride are also used by many. Salicylate of Soda and Hexamine are also used for their various virtues on the pelvic organs. Thyroid gland extract is used by some for its detoxicatory action. Calcium in its various forms is exhibited in chronic cases. Its local action is doubtful but may help by its well known general metabolic virtues. This drug is especially indicated in those cases of chronic tubo-ovarian inflammation accompanied by menorrhagia.

5. *Vaccine and Serum Therapy.*—In gonorrhœa, in the subacute and chronic stages, the gonococcal auto-vaccine will be found useful in properly regulated doses. In mixed infections, the mixed infection phylacogen is considered useful by some. In Streptococcal infections especially puerperal a prophylactic dose of 10 cc of the antisera has done great service. Large doses of the serum in the acute stage—10cc. every 4 hours may have to be given until the temperature falls down. If the temperature and the pain still persist in spite of the injections there is no use of continuing the injections.

The help, the co-operation and the guidance of a competent bacteriologist should be sought in all serious cases. The transfusion of immunised blood from a suitable donor is on its trial. Vaccine therapy is also useful in chronic leucorrhœa.

6. *The intravenous injection of antiseptics.*—Iodine and preparations of iodine stand first in its importance.

In the form of colossal Iodine 5—10 cc. injections every 24 hours for 3 or 6 days is very useful. Acroflavine 20 to 30 cc. daily, 4 to 6 injections, or one large dose of 150 cc. .5 per cent. solution, intravenously is found useful in gonorrhœal Salphingo-oopheritis. Injection of Arseno Benzol group of drugs especially the Sulfars nal is found to be very useful in cases of recurrent Salphingo-oopheritis.

7. *Glandular therapy.*—For restoration of function, the regulation of the menstrual cycle, and their general tonic effects, such glandular preparations as Hormotone, mixed glands female, etc., can be used with advantage.

8. *Watering places and hip baths.*—The richer class of patients in South India can derive great benefit from making use of such watering places and health resorts as Courthallam, Thirukalki undrum, etc. Those who cannot afford these, can resort to hip bath at home.

(C) SURGICAL.

Do not carry the conservative treatment too far. If some cases are lost by too early interference as curetting and laparotomy, many cases are rendered hopeless by too much caution with a view to conserve the uterine adnexa. If the condition points to the formation of pus either in the tube or the ovary or both, operate and let out the pus. If both the tubes contain pus, remove both. Conserve the uterus if possible in the young but perform partial hysterectomy in the old, i.e., in a subject approaching menopause. If there is a tubo-ovarian abscess on one side remove that only. Sometimes it may be possible to conserve the ovary of one side and the tube of the other. It is dangerous to save tubes full of pus; conservation of totally diseased tubes is not only bad surgery but also dangerous to the life of the patient.

In chronic cases after thorough preparation by douching and energetically treating old foci of infection curette the uterus as a preliminary procedure. Then open the abdomen, separate the adhesions from the tubes and ovaries as gently as possible and if they can be conserved save them; but if they are utterly damaged removal of both tubes and ovaries are indicated together with partial hysterectomy. If tubes are not badly damaged, separate the adhesions, examine the patency of the tubes by passing a probe up the fimbria and fix up the uterus. Only remove the portion of the ovary that is diseased and whenever possible try to keep back some portion of the ovary. Now-a-days investigations as to the patency of the tubes or otherwise can be carried out without opening the abdomen either by Bonny's tube testing apparatus, or better still by X-Raying the uterus and the tubes after injection of the same by Lipiodol (a special preparation of iodine 4 per cent. in poppy seed oil) by a competent Radiologist. Collection of pus in the Douglas' pouch may be opened up and drained by performing posterior colpotomy. Pelvic abscess may also be drained by the abdominal route.

PREVENTION OF DISEASE AND PUBLIC HEALTH.

(RAO BHADUR DR. M. KESAVA PAI, M.D. & C.M.)

The importance of prevention of disease in the welfare of nations has been recognized from ancient times and formed part of the duties of ancient sanitarians. In fact the word Hygiene is derived from Hygeia, the Greek goddess of health who presided over the national health. Sanitary laws in some shape or other existed in all ancient civilizations. In ancient India, Egypt, Greece and Rome, preventive medicine formed an integral

part of the laws of the land. Preventive medicine of modern times dates however from the 18th century when the spread of epidemics like plague, cholera, etc., whose infectious nature was definitely recognised was sought to be prevented by laws of quarantine. In 1796 the first great advance in the artificial prevention of bacterial disease was made by Jenner's discovery of vaccination and towards the end of the last century the memorable researches of Pasteur, Koch and others laid the foundation of the modern methods of the prevention of infectious diseases by the recognition of the bacterial origin of infection.

The rôle played by sanitation and preventive medicine in the importance of the public health has been decidedly proved by the figures of disease incidence and mortality of all modern countries where the laws of public health have been in force for some decades. The public health administration of England was put on the modern basis just half a century ago and vital statistics have already shown a very appreciable improvement both in the incidence and in the mortality from various diseases. The general death rate which was 21.4 per 1,000 in 1875 was 11.6 in 1923, a reduction of about 50 per cent. The figures for a number of diseases are highly interesting. Scarlet fever killed 7 out of every 10,000 in 1871-80, but was responsible for 1 death in 50,000 in 1923, a reduction of nearly 97 per cent. Similarly Typhus which carried away 1,500 victims per year in 1871-80, killed only 7 in 1923. The mortality from Enteric was 1,500 annually in 1871-80, but 450 in 1923. The mortality from Tuberculosis of the lungs fell from 50,000 to 30,000 per year and infantile mortality from 150 to 69 per 1,000.

Sanitation and public health are still in their infancy in India. In fact, excepting in the larger cities and municipalities there is no public health administration worth the name and conditions in India at the present day cannot compare with those of western countries even during the last century. The only administrative departments which are now under fair sanitary control in India are the army and the jails. The effect of health measures in both of these has been well marked. The mortality amongst British troops in India has fallen during the last three decades or so from 69 to 4.59 per mille, that amongst Indian troops from 20 to 4.39 and amongst prisoners from 82.7 to 19.7 per mille.

The importance of public health measures in a tropical country like India is evident when we consider the fearfully high mortality from certain diseases in this country. As many as 1 million die annually from malaria, and a quarter of a million from cholera. As many as 12 million persons have died of plague since the outbreak in 1896. The urban mortality in India varies from 30 to 70 per mille, as contrasted with that of 10 to 14 per mille in England. Tuberculosis is known to kill about one million persons every year in this country and disable another 10 to 15 million. The mortality from other infectious diseases like Small-pox, Enteric, etc., is also very high when compared with that of England and other western countries.

The adoption of the methods of prevention of diseases has been the direct result of the discovery of their causation consequent on the laborious research work done by eminent scientific men from time to time. Thus the world owes a great debt to men like Pasteur, Koch,

Kitasato, Ross, and a host of others in different countries. To mention a few instances, it was the discovery that the causative organism of rabies which is present in the saliva of the rabid animal is transmitted through the bite of the affected dog, that made the British Government pass the famous muzzling order which has resulted in the complete stamping out of rabies and hydrophobia from the British Isles. Similar preventive measures, viz., the quarantine on dogs have kept the whole continent of Australia free from the disease even after decades of continued commerce with other countries where rabies is prevalent. Leprosy which was highly prevalent in Europe especially in Scandinavia in olden days is now practically non-existent there, as a result of the laws of segregation which were enforced to prevent its spread. Malaria which was known to prevail to a great extent in the Fens of Lincolnshire and in the marshes around Edinburgh has now been completely rooted out by proper drainage and prevention of the propagation of the mosquito which so far as we know is the sole carrier of infection. The discovery by Ross that this insect is the carrier of malaria has led to the extinction of this disease in several places like Ismailia, etc., where it was formerly rampant. The memorable work done by Gorgas at Panama and in Havanna has made these territories, once the hot bed of yellow fever, a safe and healthy home for humanity. The discovery that cholera, typhoid, and intestinal diseases are conveyed by water has resulted in the protection of water supplies and of water purification which has enabled large communities all the world over to minimize the mortality from these diseases. The discovery of the part played by the rat and the rat flea in the conveyance of plague

infection has produced the various measures of town-planning, road making and house construction and has considerably reduced the mortality from the febrile disease, which has thereby been shorn of its original horrors. The practical extinction of small-pox once a general epidemic disease all the world over, has been due to Jenner's genius in the discovery of vaccination. Coming to more modern times, the knowledge of the part played by the louse in the spread of typhus, trench fever, etc., by the tse-tse fly in the spread of sleeping sickness, and by the common house fly in the spread of intestinal infections has led to the adoption of sanitary measures primarily to destroy the insects concerned and secondarily to root out the disease. The triumph of modern sanitation in the reduction of a disease like tuberculosis which owes its spread to social, hygienic and economic factors favouring infection with the causative organisms has been so very evident in the life of modern communities, which have shown a decline in the mortality from this disease of about 50 per cent. in 50 years. Need it be doubted that with the further advance of public health and sanitation one can safely look forward to the day when tuberculosis will be a disease more of historic interest than of current clinical importance?

It will be of considerable interest to recount the various ways by which disease is combated in modern times. The cure of disease has no doubt its own importance because one cannot yet hope to clearly visualize the millenium when the prevention of disease will have so far advanced that sickness will be the exception and good health the rule with humanity. But not only from the point of view of personal suffering but from

the national economic standpoint the prevention of ill-health, disability, and premature mortality has been found to be of far greater value literally and metaphorically than the cure of disease. In the long run both for the individual and for the race disease prevention is of considerably greater value than its cure.

The notion of the part played by meteorological and miasmatic influences on the production of disease on the same lines as famines, floods, etc., has long vanished in favour of more rational conceptions of the ætiology and epidemiology of disease. The discovery of the pathogenic germ has been the foundation of the modern methods of warfare against infectious diseases and the tracing of the source and method of conveyance and propagation of the germs has enabled the modern sanitarian to deal effectively with epidemics. Where water has been found to be the vehicle as with enteric, cholera, dysentery, etc., the protection of water supplies has minimized the dangers and where the agency of disease transmission is the insect, *e.g.*, the mosquito in malaria, filariasis, yellow fever, etc., the house fly in food infections like infantile diarrhoea and dysentery, measures adopted to deal with the breeding grounds and the propagation of the insects have successfully lessened the incidence of the respective diseases. Where animals have been the source of infection as the rat in plague, the dog and wild animals in hydrophobia, the cow in tuberculosis, etc., effective measures either in the way of destruction, prevention of bites or sterilization of the milk or segregation of calves from infected mothers has been mainly responsible for the lessened incidence or even disappearance of the respective diseases. Thus the cities of Bombay, Poona, Bangalore,

etc., at one time highly infected with plague have by general measures been produced comparatively free from the epidemic. The British Isles are free from rabies as a result of Mr. Long's muzzling order and Denmark is remarkably free from tuberculosis as a result of the segregation and destruction of tuberculous bovines. In the case of diseases caused by insufficient vitamins in the food like scurvy and beri beri, food regulations and the supply of the natural vitamins in foodstuffs has greatly reduced the incidence and mortality from the respective vitamin diseases. The prevention of bacterial infection by Listerism has markedly reduced the mortality in the surgical wards of hospitals from gangrene, sepsis, tetanus, etc. The artificial production of immunity against bacterial diseases has been largely availed of in recent times. Vaccination has been most effectively employed in the prevention of small-pox. Bacterial vaccines have been used in preventing a host of diseases like enteric, cholera, plague and anthrax in animals. Serum therapy has been vastly applied to the prevention, and cure of diphtheria, tetanus, septicaemia, erysipelas, dysentery, purpural sepsis, and cerebro-spinal fever. Last, but not least, come diseases like tuberculosis which though bacterial in origin, are really produced and propagated by malnutrition and defective social, economic, sanitary and housing conditions. Such diseases have been dealt with by general measures of public health rather than by selective methods as in the other infections. Tuberculosis is increased by deficient food and milk supply, bad housing, poor industrial conditions, low wages, overwork, vices, and above all insufficient

care of the infants and children who are highly susceptible to the infection.

Though the doctor is primarily a healer there are a number of ways in which he could prevent disease in the ordinary routine of his medical duties, especially when he is a family medical man. For instance if the doctor is called very early during the onset of a disease like rheumatism he can, by prompt treatment, prevent the cardiac complications, which, if they set in, will not only permanently disable the person but may cut his life short. By curing throat diseases early, deafness may be prevented and prompt attention to slight affections of the vital organs like the eye can avert permanent deformities. We are all aware what trachoma, an eye affection easy to cure in its earliest stage, can lead to disaster, when its later complications have set in. The family doctor during his constant visits to the family can impart a great deal of instruction to every individual especially to the mother regarding maternity and the welfare of the child. By vigilant notification he can help the local sanitary authorities in enforcing measures for the prevention of the spread of infectious diseases. The doctor ought to be a healer as well as a teacher.

The health of a nation is its wealth, both literally and metaphorically. The different public health acts constituting the sanitary administration of different modern countries have added directly to the good health and longevity of the citizens and indirectly to their prosperity and wealth. Though curative medicine has held sway till now, preventive medicine has already begun to assert itself. The maternity and child-welfare clinics

which have been set up in different countries have had their educational and health maintaining effect not only on the mother but on the coming generation. In fact they have the remarkable effect of looking after the health of the baby during its development in the womb of the mother and of improving and sustaining it after its birth. It is study and continued observation that has a much more lasting effect than occasional inspection with the idea of healing. It has been humorously but truthfully said that the best way of producing a strong and virile race is to overhaul every individual 75 times during his life time. This overhauling begins in the prenatal clinic, is continued soon after birth in the child welfare clinic, and is frequently repeated in the school, where periodic medical inspection keeps a close watch over the school-going child. This is followed by home visiting in connection with tuberculosis and other diseases where the health visitor not only carries instruction into the home but virtually overhauls the individual in his domestic surroundings. At the factory the workman is under the close inspection of the factory medical officer. All the above combined with the constant supervision and teaching by the family doctor conduces to the healthy growth of the individual and the production of a strong and virile race.

Betterment of industrial and labour conditions, advancement of education especially on the subjects of disease-prevention, improvement of the social life of the community and of housing conditions, close inspection of the milk and food supply, lessening of infantile mortality through the education imparted at the maternity and child welfare clinics, each and all of these will

It is common in the Philippine Islands and is believed to have been introduced there from Japan about the middle of the 17th Century. It is related that the Emperor of Japan sent a ship of 150 Lepers, there to be looked after by the Catholic priests and from this focus it spread like wild fire till thousands of the inhabitants became infected.

In Australasia it is particularly common being rife in Tahiti and the Fizi Isles.

In Australia itself it is somewhat rare, being met with chiefly among the Chinese population in New S. Wales, Queensland, Victoria.

In South America, it is prevalent in British Guiana, Brazil, Venezuela, Ecuador and Mexico. It is rife in the West Indies but there owing to segregation the numbers are being greatly reduced.

In U. S. A. it is rare.

In Africa it prevails in Egypt, Abyssinia, Madagascar, Central and East Africa.

In South Africa, it is a comparatively recent disease, believed to have been introduced during the early days of the Dutch colonisation by Malays imported from the Dutch East India. It is apparently increasing in recent times, the increase occurring both among Europeans and Non-Europeans. The principal Leper Asylum in South Africa is the well-known penal and Leper settlement at Robben Island.

ETIOLOGY.

The *Bacillus Lepra* of Hansen is now generally recognised to be the specific cause of the disease.

Until recently the micro organism was believed to be one of the *Schizomycetes* or fission fungi, but the

clathrothrix arrangement and the branching filamentary forms, met with while cultivating, point to its belonging to the Streptothrix class.

Its exact classification is still under discussion, and until this is settled it will be advisable to retain its old name of *B. Lepra* rather than the newer title of *Strep tothrix Leproides*.

The *Lepra Bacillus* is a rod shaped acid-fast bacterium, which so closely resembles the *Tubercle Bacillus*, both in its morphology and staining reactions, that certain observers regarded them at one time as identical.

It is said to be less curved and more pointed at the ends than the *T. B.* They have a tendency to appear in clumps, like bundle of cigarettes. It has also been found that the *Lepra Bacillus*, when stained with carbol fuchsin, more readily loses the stain when heated with 20 per cent. Sulphuric acid or Alcohol, than the *T. B.*

The main distinction between the two organisms is that while *T. B.* can be comparatively easily cultivated on artificial media, and successfully inoculated in certain lower animals, the *Lepra B* is exceedingly difficult to grow, and attempts at inoculating it, in lower animals have not been quite successful.

In addition to the typical short rods, other forms such as coccoidal and club forms have been detected in smears from nodules of leprosy, while on cultivation several eminent observers have obtained, branching mycelial filaments and typical rods, which were subsequently found to be phases of the streptothrix type, pointing to the acid fast rod being simply one phase in the life cycle of an organism of which the parent phase is probably the branching mycelium.

By special staining methods Unna found that he could differentiate 2 types of *B. Lepra*. (Victoria Blue and safranin, "stain some bacilli blue and others yellow"). This difference in staining, he regarded as due to certain of the bacilli being young and alive, while others were old and dead.

He found that a large proportion of bacilli in leprosy lesions were dead and this observation has been put forward as an explanation of the difficulty of cultivating the micro-organism.

MODE OF INVASION OF THE BACILLUS.

Up to the present time the manner in which the *Lepra bacillus* gains entrance has baffled research.

Obviously there are various ways in which the invasion might take place such as by the skin, alimentary tract, nose, respiratory passages and genital organs and we will consider these seriatim.

SKIN.

That the inoculation can take place through the skin is borne out by a certain amount of definite evidence.

For example there is a case on record of a medical man who became inoculated through a wound in the finger while confining a leprosy woman, and there is another case of a sister of charity who became infected after pricking her finger while sewing a leper's clothes.

There is also a number of authenticated instances in which the virus appears to have been introduced through vaccination—bacilli having been found in the vaccine pustules.

ALIMENTARY TRACT.

This mode of infection seems improbable owing to the extreme delicacy of the *lepra bacilli*, and the

likelihood of its being destroyed by the digestive fluids and the evidence in its favour, is wholly inadequate as nothing suggestive of an initial lesion producing definite symptoms has ever been found in the alimentary canal, nor has the bacillus, been detected in any form of food stuff, or in water.

Many articles of diet have been blamed in the past for causing it, such as rice, pork, fruits, salted-fish. Of these, the one which has attracted most attention has been the last, namely salt-fish, chiefly, through the influence of late Sir Jonathan Hutchinson quite a number of observers believe that the disease is propagated by the eating of dried, decomposing fish.

Without going into the arguments for or against this theory, it will be sufficient to point out that there is no evidence of a scientific nature in corroboration of it and until the Lepra B. has been found in decayed fish, the theory cannot be regarded as other than a more hypothesis unsupported by scientific fact.

NASAL MUCOSA.

Another path of infection and one which is more probable, is the nasal mucous membrane, and the upper respiratory tract.

This is suggested by the frequency with which nasal symptoms form early manifestations of the disease, such as rhinites chr. coryza ozcena, epistaxis, and also the comparative ease with which lepra bacilli may be found in the nasal discharge especially in the periodic exacerbations or after doses of Iodide of Potassium. Out of 98 nodular cases 70, showed bacilli in their nasal discharge and in 40 out of 136 cases of maculo-anæsthetic cases, bacilli were found. Should inoculation take place by the

nose, the most likely manner in which it might occur would be, through an abrasion in the mucosa caused by pricking it.

So for lepra bacilli have not been detected in the air and they have only been found in a few instances in dust and earth. If the bacilli were capable of being transmitted through the air the disease would be more infective than it is.

GENITAL ORGANS.

The genital organs are a possible means of entrance of the bacilli.

If infection does take place in this manner, it must be due to the presence of some infective sore such as a leprosy ulcer, in one or other of the genitalia, and not to the secretions, as the uterine discharges and the semen, even though the testes may be diseased, do not contain bacilli unless secondarily contaminated.

TRANSMISSION OF LEPROSY FROM MAN TO MAN.

At the second International Conference on Leprosy held in Bergen in 1909, the first resolution that was passed is as follows:

"Leprosy is a disease, which is contagious from person to person, whatever may be the method by which this is effected, and every country, in whatever latitude it is situated, is within the range of possible infection by leprosy, and may therefore usefully undertake measures to protect itself."

Anyway leprosy is transmissible from man to man.

Until about the middle of last century leprosy was almost invariably regarded as contagious, and the most stringent measures were enforced to isolate the leper.

quence the insect is attracting considerable attention among leprologists as a possible carrier.

Certainly the manner in which the disease is spread, favours the possibility of the bug being capable of transmitting it, for the close contact, which seems essential for infection and the tendency for the disease to affect unclean people who are careless in their habits, than the hygienic, point to the carrier bring a creeping rather than a winged insect.

Goodhue of the Molokai Leper Settlement, Honolulu, found acid-fast bacilli in bed bugs, which he believed to be lepra bacilli.

Long also found them in bugs that had bitten lepers and Sandes in a series of experiments in which he fed 75 bugs on leprosy sores found acid-fast bacilli in 20 of them, in the alimentary tract, in smears made from the tissue juices, and in the macerated head and proboscis of the insect.

PREDISPOSING CAUSES.

The precise conditions necessary for infection to take place, are at present imperfectly understood but there are certain factors which seem to have a predisposing influence on it, and of these the most important are the following.

i. *Unhygienic surroundings.*—Leprosy is essentially a disease of the unclean, and is met with chiefly in association with surroundings of squalor, poverty, overcrowding and insanitation.

ii. *Malnutrition and Anaemia*, form a suitable and fertile soil and it is a remarkable fact that about 75 per cent of lepers are infected with hookworm.

iii. *Sex.* Men for some reason or other seem to be more often attacked than women in about the proportion of 3 : 2.

iv. *Age.* The disease is not met with in infancy, but it may appear in early childhood as children are more liable to infection than adults, partly from the delicacy of their tissue and partly being in close contact with leprosy parents or attendants. It is rare for it to begin after middle life.

v. *Heredity.* There is no evidence of congenital leprosy and the disease has never been met with in the newly-born of leprosy patients, though a considerable proportion of the offspring of lepers, develop the disease sooner or later. In one or two instances in which P. M. examinations have been made on still born children of lepers, neither the Lepra Bacilli, nor any lesions suggestive of its presence have been detected.

The placenta of leprosy woman have been examined for bacilli, but with negative results.

DESCRIPTION.

INCUBATION PERIOD.

Until the exact manner in which infection takes place has been ascertained the incubation period must remain uncertain. So great is the discrepancy in the length of the incubation period given by different observers, that it proves the precise duration to be at present unknown.

In some cases only a few weeks seemed to have elapsed between the presumable time of infection.

INVASION.

In a considerable number of cases, the disease develops insidiously the first indication of it being some form

of cutaneous lesion ; in others the invasion is marked by prodromal symptoms suggesting a general intoxication, such as progressive anaemia, vomiting, intermittent or irregular febrile attacks, mental depression or drowsiness, pains about the back and joints, a marked tendency to perspiration, either local or general, epistaxis, and frontal headache.

These are more or less vague symptoms and none is sufficiently constant to be of diagnostic value. They may precede the eruption by a few weeks or months or be present for years before it appears. They are explainable as the result of the dissemination of the bacilli and their toxins throughout the system.

VARITIES.

After the prodromal septicæmic phase, local troubles develop, either in the form of cutaneous lesions, or of peculiar sensations over certain areas such as pricking, pain, hyperaesthesia, or itchiness according as the bacilli find a suitable soil, for their growth in the skin or nerves.

It was on this account that Danielssen and Boeck distinguished two varieties, namely Nodular or Cutaneous Leprosy and Nerve Leprosy.

In addition to these two main groups, cases of mixed leprosy are met with, in which nodular and macular anæsthetic lesions occur together.

Still the distinction Skin and N. Leprosy is purely arbitrary and is only useful in emphasizing the prevailing features of an individual case.

At present, the precise conditions which determine that a case shall pertain to this variety or the other, are not understood. Various theories have been advanced to explain it such as—

1. That it is a result of *quantitative* difference in the bacilli, nodular leprosy occurring when the bacilli are numerous, and maculo-anæsthetic leprosy when they are sparse.

2. That it is due to a *qualitative* difference in the virulence of the bacilli, virulent bacilli causing nodular leprosy, and bacilli of low virulence giving rise to the maculo-anæsthetic type.

3. That nerve leprosy is the result of an immunity in certain individuals, which renders the skin an unsuitable soil for the propagation of the bacilli while the nerves remain suitable for their growth.

NODULAR LEPROSY OR LEPRA TUBEROSA.

The first cutaneous evidence of Nodular Leprosy is the appearance of erythema, diffuse or more usually in patches, distributed chiefly on the face, extensor aspects of the arms, backs of the hand and feet, and usually associated with a rise of temperature.

These lesions either disappear, when the temperature declines, or become definitely, raised indurated, and transformed into nodules from a cellular infiltration of the deeper parts of the skin and subcutaneous tissue.

New nodules or "lepromata" tend to come out, either singly or in crops, at varying intervals, either preceded by erythematous lesions or arising on apparently healthy skin each outbreak being accompanied by a rise of temperature, known as "leprotic fever," lasting for a day or two.

The nodules have a smooth surface, are round, oval, or irregular in shape, vary in size from a dhall gram to an almond, having a well defined border.

They may occur anywhere on the cutaneous surface but are most common on the face, especially about the forehead, malar prominences, cheeks, nose, lobes of the ears and chin, are less frequent on the forearms and thighs and very rare on the scalp, palms and soles.

At first they are hyperæsthetic but later tend to become anæsthetic. The hairs fall out, wherever they occur, the eyebrows and eyelashes are generally lost, but the hairs of the scalp are unaffected as "lepromata" are rare in that situation. On the face, the nodules and infiltrated patches give rise to the characteristic disfigurement, which suggested, in the past, such names for the disease, as "Leontiasis," and "Satyriasis."

In a typical case, the forehead is irregularly thickened, studded with nodules, and broken up by deep horizontal fissures, the supraciliary ridges, are hairless, nodular and prominent, the alæ of the nose are thickened, the bridge depressed from ulceration and breaking down of the cartilage, and the whole nose coarse and flattened, the lips are thick and everted, and the ears nodular, irregular and the lobes swollen.

The lepromata may persist for a considerable time, unaltered but tend to involute eventually. Sometimes they become hard and fibrous and may persist indefinitely, but as a rule they break down like superficial gummata or undergo ulceration.

These ulcers may heal eventually giving rise to irregular, sometimes hypertrophic scars leading to contractures, or they may burrow deeply, into the underlying tissues causing more or less severe destruction, denuding bones and tendons, and even ending in gangrene and sloughing.

In association with the skin lesions, the glands are usually affected especially those of the neck, throat, axillæ and groin.

They have a tendency to break down and to give rise to discharging fistula.

In the majority of cases of nodular leprosy the eyes are attacked. At first they become suffused, painful and the lachrymal secretion is increased. The conjunctiva and cornea next become the seat of small lepromata or diffuse leprous infiltration. Occasionally the lepromata take the form of minute whitish specks on the cornea, when the condition is known as "Keratitis punctata leprosa."

The eyelids themselves are a common site for lepromata, and when they ulcerate and heal, cicatricial changes result causing ectropion, and the exposure of the bulb to infection by septic micro-organisms, and possibly to injury.

The mucous membranes usually become invaded by the leprous infiltration. Lepromata are frequent in the nasal and buccal mucosa.

In children the development of the genital organs is retarded. In females the menstruation is delayed or even prevented, and where the disease has appeared later, it may become irregular, and the menopause may be premature. In males an imperfect development of the testes takes place, which generally renders them impotent, and consequently few children are born to nodular leprosy, while those that are born do not usually live long.

BLOOD.

Blood changes are not characteristic. In old standing cases there is some anæmia and a diminution of R. B. C.

Eosinophilia has been observed. Bacilli have been found both in the plasma and leucocytes.

As the disease advances, the face becomes more and more deformed and covered with nodules, ulcers, cicatrices. The borders of the flattened nose become purulent, and crusted, and the discharge from it emits a singularly pungent fætid odour, which renders, nursing and treatment a painful duty. The eyes are destroyed, the sense of smell and taste are lost and only hearing remains.

More or less severe pains set in, owing to the involvement of nerves. The internal organs such as the liver and the spleen become implicated and derangements of digestion, abdominal pains, and diarrhœa supervene. In spite of this all, the brain in many cases, remains unimpaired, and even where almost every other organ is affected, the mind may remain clear, though it has been frequently noted that the patient becomes curiously, sensitive and peevish, and difficult to manage.

The prostration gradually increases and the human wreck dies in a state of inanition, or from some inter-current disease.

Sometimes instead of steadily progressing, the disease may become stationary for a prolonged period and then possibly as the result of a chill or some other depressing influence, may undergo a marked exacerbation, leading rapidly to a fatal issue.

MACULO-ANASTHETIC OR NERVE LEPROSY.

This type is the more common especially in countries where the disease has long been endemic. In it the lepra bacilli invade the nerves, and by setting up a lepromatous hyperplasia in the connective tissue about

the nerve fibres, cause at first irritative lesions, and finally anasthetic and trophic lesions from destruction of the nerve by compression.

In the irritative phase, the area of distribution of the nerve affected is the site of sensory disturbances such as hyperæsthesia, pricking, burning, itching. Sometimes there is perversion of sensation of heat and cold, or errors of localisation such as sensation being referred to a point outside the area excited. Not infrequently shooting or neuralgic pains may be felt along the nerve.

Twitching of the muscles has sometimes been noted especially when the face is involved. As the irritation continues vesicles or small bulla may develop, the contents of which are serous at first and purulent later, and which may give rise to superficial ulcers.

Erythematous or pigmented macules next appear.

These vary in size, and are slightly raised, well defined, smooth or scaly and tend to involute in the centre giving rise to circinate lesions, the borders of which, though slightly raised are not definitely indurated and may be scaly or occasionally dotted over with small vesicles. In the centre of the patches, the hairs are lost, the sweatglands atrophy, and the skin becomes curiously dry and wrinkled.

By this time the compression on the nerve has been sufficient to produce anæsthesia, which may not be confined to the patches, but may occur along the whole distribution of the nerve usually beginning in the case of the ulnar nerve, at the tip of the little finger. The patches become insensitive to heat, cold and pain, so that the point of a knife may be dug into them, or a burn may occur on them, without the patient being aware of it.

Where the patches are large some fibres of the nerve, supplying them may escape with the result that small areas of sensibility may be present. The affected nerve may be uniformly thickened but more often presents fusiform swellings upon it.

Not only do the pathological changes in the nerves cause sensory disturbances in the areas supplied by them, but atrophic changes supervene in the muscles, accompanied by a proportionate loss of muscular power.

At first the reflexes are exaggerated in the affected muscles, but latter when the creations of degeneration set in they become diminished, and eventually disappear. The paresis of muscles is especially noticed on the face and extremities. The muscles of the eyelids are frequently involved, especially the Orbicularis palpebrum leading to ectropion, eventually causing it to become, dry, and shrivelled and rendering it liable to injury and septic infection.

The muscles of the eye itself may become implicated and diplopia or strabismus result. The Orbicularis oris is often affected causing the mouth to droop and saliva to dribble out. Paresis of the facial muscles may occur giving rise to distortions of the face or to a staring expressionless look. Owing to paralysis and atrophy of the extensors of the fingers a condition of permanent flexion of the middle and distal phalange is frequently present with the production of the characteristic "Main en Griffé" or leper claw. While the involvement of the antero-external muscles of the limbs prevents the extension of the foot, causing drop foot, and giving rise to a peculiar gait owing to the patient having to lift the foot high in walking, to avoid injuring the toes.

Trophic changes occur also in the skin and ulcerations are common in the anæsthetic areas. On the foot especially about the ball and heel perforating ulcers are not infrequent as the result of pressure or injury, and when they occur are liable to extend far down into the tissues, and even causing destruction of bone.

In advanced stages of this variety of leprosy necrosis and absorption of bone is of common occurrence and leads to the loss of fingers or toes, leaving small soft stumps which generally present the remains of the nail at the tip. This may spread up and involve the bones of the leg or forearm. In some instances dry gangrene supervenes, and fingers or toes or portions of limbs may undergo spontaneous amputation.

In maculo-anæsthetic lepers the sexual power is retained much longer.

This type of leprosy runs a long course and may go on for 30 years or more. In many cases it tends to become arrested and but for the anæsthesia, paralysis and mutilations, might for practical purposes be regarded as cured although bacilli have been found about the nerves, even during the periods of quiescence.

When death occurs it is frequently the result of some intercurrent disease such as tuberculosis or amyloid disease of the kidneys.

MIXED LEPROSY.

This name has been applied to those cases in which lesions of the nodular, and maculo-anæsthetic type co-exist. Some cases, may be mixed from the first, others commence as nodular cases, and the involvement of the nerves and the appearance of maculo-anæsthetic lesions

occur as late phenomena, while more commonly maculo-anæsthetic lesions may be present first and nodules added subsequently.

The term Para-Leprosy, has been applied by Zambaco and Gluck to various lesions occurring in descendants of lepers, such as thickenings of nerves, paralyses of muscles, and certain trophic changes, such as loss of the phalanges, which they believe to be hereditary.

PATHOGENESIS.

After gaining entrance into the tissues the bacilli lie at first in the lymph spaces, and owing to their presence induce, a mild inflammatory reaction. The bacilli are then disseminated through the system either by the lymph stream, or by the blood and may be found in the nodules or lepromata in the skin, eyes, mucous membranes, lymphatic glands, viscera and peripheral nerves, but not in the muscles, bones or joints. According as the bacilli show a special predilection for the peripheral nerves, or the skin and viscera, so the two great types of the disease are produced.

HISTOPATHOLOGY. STRUCTURE OF LEPRIMATA.

Lepromata wherever they may be situated have the same histological architecture. At first the infiltration is non-distinctive consisting of round and spindle-shaped connective tissue cells, lymphocytes, mast cells, and occasional poly-morpho-nuclear leucocytes, should pyogenic micro-organisms be present. So for the situation of the bacilli is mainly extra-cellular. As they multiply they form colonies and the infiltration begins to show the presence of plasma cells around the blood capillaries. A certain number of bacilli become intracellular, and large characteristic cells containing vacuoles, one or more badly

stained nuclei, and bacilli, singly or in clumps may be noted. These are the so called "Lepra cells." Certain of these cells are enlarged and contain several nuclei forming a type of giant cells, differing from the giant cells of tuberculosis in that it has neither the peripheral arrangement of the nuclei nor the necrotic centre.

The cellular infiltration leads to obliteration of the capillaries, so that the leproma is poorly supplied with blood and does not show any tendency to fibramatosis but rather to retrogressive changes and absorption.

In the maculo-anæsthetic cases, the cutaneous lesions are not due to the presence of the bacilli in the skin, but are indirectly caused by the action on the peripheral nerves supplying the affected area. The lepromatous infiltration forms in the connective tissue sheaths of the nerve fibres, compressing the nerve tissue and leading to its eventual degeneration. The nerves may be similarly involved in advanced cases of nodular leprosy, but to a less extent.

The first indications of the involvement of the nerve is the presence of a cellular infiltration about the vessels of the perineurium and endoneurium, the bacilli lying in the connective tissue cells, plasma cells, or free in the lymphatic spaces. They have been observed in the neurilemma and sheath of Schwann, but not in the axis cylinders of the nerves.

DIAGNOSIS OF PREDISPOSING CAUSE.

It seems certain that as in tuberculosis so, in leprosy mere infection with the bacillus is not sufficient to bring about the disease. Some predisposing cause or loss of natural resistance must also be present to change the tissues of the human body into a medium fit for the

growth of the lepra bacillus. Such predisposing causes may be temporary due to *acute diseases*, like enteric, Influenza or due to chronic ailments, as dysentery, colitis Syphilis, recurring attacks of Malaria, Hookworm, etc., or due to unhealthy and insanitary surroundings, lack of sufficient exercise, or unsuitable diet. Predisposing causes might be multiplied, but the above are indications to guide the physician in his search. *Failure in treatment is frequently due to failure to search and eliminate the predisposing cause.*

DIAGNOSIS.

The diagnoses of a well-marked case of leprosy, whether of the nodular or the maculo-anæsthetic type presents no difficulty to anyone who has once seen the disease. The two cardinal points in diagnosis are (1) the *finding of lepra Bacilli* in the skin type and (2) the presence of *Anæsthesia* in the nerve type.

FINDING LEPROSIA BACILLUS IN THE SKIN OR MUCOUS MEMBRANE.

As bacilli are not found in the epithelium, microscopic examination of the skin is as a rule useless. A clip, the size of a nail, paring 2 m.m. in depth, should be taken preferably with a pair of medium sized scissors, curved on flat. The cut surface of this piece of skin is pressed or rubbed on a slide, and the smear is dried, and fixed by rapidly passing through the flame of a spirit lamp and stained by Ziehl Neelsen's method.

It is useless to take a clip from a superficially anæsthetic patch of skin as lepra bacilli are seldom found there. It is best taken from the nodules, wherever they are situated.

ANÆSTHESIA IN NERVE CASES.

There are so many varieties and degrees of anæsthesia, that it is well to choose a standard. The following is the one recommended by Dr. E. Muir of the Calcutta School of Tropical Medicine, and it is in general use at our Skin clinic, and found to be thoroughly reliable.

The patient is stripped as far as practicable and blind-folded. A folded piece of paper is used for testing sensation. The patient is asked to point out with his finger, the exact part of the skin touched by the piece of paper.

Where there is anæsthesia he will fail to point out the area. Sometimes he will point, not the exact part touched, but to a part outside the suspected patch of skin. This indicates paræsthesia.

After repeating the same process, several times to avoid error, the anæsthetic patches may be marked out.

When either acid-fast bacilli are found or anæsthesia is present, a diagnosis of leprosy is almost always justified unless there has been some local injury to the nerve caused mechanically.

In its early stages, however, when the skin lesions are slight and the prodromal symptoms absent or unrecognised, its diagnosis may be difficult and sometimes practically impossible. It is in the maculo-anæsthetic variety that the greatest difficulty in diagnosis occurs and in these cases the disease may have been in existence for a considerable period before its true nature is discovered.

In the absence of the above-mentioned two cardinal signs, a combination of two or more of the following, lead

one to a strong suspicion of leprosy but not to a clear diagnosis.

(1) *Deep analgesia, without superficial anæsthesia.*—This is sometimes found, when the leprosy infiltration has affected a deeper layer of the corium.

(2) *Loss of the sense of heat and cold.*—This is often the earliest sign of nerve leprosy and may be found in the area round a spreading patch of anæsthesia. It may be tested for, with test-tubes containing hot and cold water.

(3) *Hyperæsthesia.*—Also often precedes anæsthesia.

(4) *Depigmentation.*—This is a very suspicious sign especially where the history shows contact with leprosy. It is also met with in Syphilis and Pityriasis Versicolor.

(5) *Erythematous patches* are often the first sign of leprosy, though they are common in other diseases. Wide spread erythema will seldom be present in leprosy without one or other signs of diagnostic importance.

(6) *Thickening of the superficial nerve trunks.*—The peripheral nerves most commonly found thickened are, in order of frequency, the Ulnar, Peroneal, Great Auricular, Radial, Ext Saphenous though any of the superficial nerves may be affected. If the thickening is well marked, there is a strong presumption in favour of leprosy.

(7) *Parakeratosis* with glossiness of the skin, thickening of the skin, especially in the palms of the hands and the soles of the feet is very characteristic of nerve leprosy.

(8) *Anhydrosis* is another early sign. Circular patches of skin are found dry, while the surrounding skin

sweats freely, or there may be anhydrosis of the limbs beginning distally and spreading proximally, with compensatory hyperidrosis of the trunk.

(9) *Dry rhinitis* with ulceration and occasional epistaxis are symptoms suspicious of leprosy.

(10) In an endemic area *irregular pyrexia* accompanied by vague *Nerve pains*, should be remembered as an early sign in leprosy.

(11) *Trophic blisters* and later *trophic ulcers.*—These do not contain bacilli, but they are found almost invariably in the midst of anæsthetic areas.

The presence of one or more of these subsidiary signs, should be considered a sufficient reason for keeping a patient under observation.

As a rule if the case be one of leprosy, one of the two important signs will soon establish itself and clear up the diagnosis.

Of the two cardinal symptoms, the finding of lepra bacilli is a simple matter in the skin type as numerous bacilli can generally be detected by a skin clip or in the nasal secretions, when lepromata are present in the mucous membrane. In order to increase the chance of obtaining them in the nasal mucosa, resort is made to administer good doses of Pot Iodide.

In maculo anæsthetic cases the sheet anchor of diagnosis is only anæsthesia as bacilli cannot be found in the cutaneous lesions, very rarely in the nasal mucosa. They can however be detected in the nerve thickenings. Agglutination tests have been attempted in connection with diagnosis of leprosy, but so far with imperfect success as all acid fast, micro-organisms tend to clump when brought into contact with indifferent sera.

Attempts have been made also to obtain a cutaneous reaction by vaccinating with extract from nodules or other leprosy tissue, but with negative results.

DIFFERENTIAL DIAGNOSIS.

Syphilis.—In nodular cases the diagnosis has to be chiefly made from syphilis and tuberculosis. From a secondary syphilide, the nodules of leprosy differ *in presenting* a more shiny appearance, as if they were oiled; *in distribution*, for while in syphilis the lesions are distributed indiscriminately, the lepromata are situated chiefly on the face and extremities; *in causing loss of the hair* on the eyebrows and eyelids, which does not occur in syphilis.

In doubtful cases, the therapeutic test may establish the diagnosis, since leprosy does not react beneficially to such antisiphilitic remedies as Mercury, Salvarsan, or the iodides.

The Wasserman reaction has also been employed, but too much reliance must not be placed upon it, in this connection, as a positive reaction has been obtained in certain cases of non-syphilitic nodular leprosy. It must not be forgotten that leprosy and syphilis occasionally occur simultaneously.

From tuberculous lesions of the skin as Lupus Vulgare the diagnosis is comparatively easy—the absence of Anæsthesia and the presence of the tubercle bacilli is generally sufficient to establish the diagnosis. Though neither of these may be present at first in the suspected lesion one or other will not remain absent for long if the lesion persists and the case is one of leprosy.

Psoriasis.—The radially spreading lesions of Psoriasis often superficially resemble those of leprosy as both may

have a spreading margin which is raised. The absence of anæsthesia and the negative bacteriological test however settles the diagnoses in most cases.

Occasionally ringed, maculo-anæsthetic patches may resemble ringworm, but the anæsthesia and the absence of ring-worm fungus in scrapings serve to differentiate them.

Prognosis.—For declaring a correct prognosis, the type and stage of the disease must be clearly distinguished. The course of a typical case of leprosy may be illustrated graphically by a curve, the vertical line indicating the number of bacilli in the body and the horizontal the duration of the disease.

The less virulent the bacilli in proportion to the natural resistance of the patient, the flatter will be the curve and reversely the greater the virulence and less the resistance the more abrupt will be the rise of the curve. After reaching a certain height the curve again descends towards the base line, the bacilli having all died out of the body. In other words Leprosy is a self-healing disease, only its course is so protracted often occupying a large number of years, that this fact is often lost sight of.

The fewer the number of bacilli in the body, the more is it confined to the peripheral nerves. As the bacilli increase in number the nerve signs become proportionately less. It is thus convenient to term the lower part of the curve the “Nerve” or A area, and the upper one “B” or the “Skin” area. This means that all cases are nerve cases to begin with and may be diagnosed clinically, from nerve signs, before the numbers of bacilli have increased to such an extent that they can be found on bacteriological examination.

Again during the descent of the curve, skin cases tend to show more nerve signs as the number of bacilli become less. While in the early ascent, the nerve signs are chiefly connected with patches and macules, in the descending passage through the nerve area the nervous manifestations are connected with trophic signs, such as perforating ulcers, deformities, etc. Many cases follow a course represented by a flat curve for a certain time, and then, due to a sudden lowering of the resistance, the number of bacilli increases rapidly and curve passes on abruptly to the skin area.

It will be convenient for purposes of prognosis to divide the nerve area as A_1 and A_2 according as the case is a primary or a secondary one.

B cases may also be divided as B_1 , B_2 and B_3 according to the amount of bacilli present. B_1 are cases, in which only a few of them are available.

Now for prognosis—

When a definite predisposing cause which can be effectively remedied, is found, the prognosis is favourable. For example when a strongly positive Wasserman Reaction is rendered Negative by antisyphilitic treatment, an accompanying rapid improvement in the leprotic condition may be confidently predicted.

The prognosis is undoubtedly best in A_1 cases, and when such cases are treated effectively for a sufficiently long period we may expect total disappearance of all active signs of the disease, and the continued absence of such signs, unless from some cause or other, the resistance is considerably lowered.

LEPROSY AND ITS TREATMENT

In B_1 cases, the prognosis is fair, though not quite so good as in A_1 and as a rule the treatment need to be more prolonged.

In B_2 & B_3 cases, on the ascent, the prognosis is least favourable. If definite predisposing causes can be found and remedied, the further rise of the curve may be arrested and especially if the patient walks about 15 miles a day or takes its equivalent in other forms of healthy exercise, he may be able to stand large doses of injections and make rapid progress toward recovery.

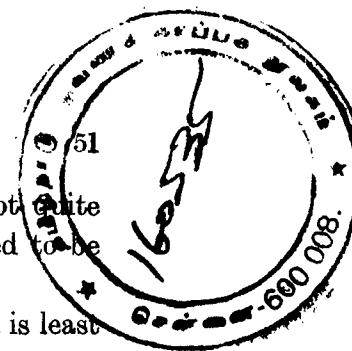
In B cases on the descent, more or less rapid amelioration and even recovery may be expected, but it must be remembered that the journey is a long one, and that huge numbers of bacilli have to be eliminated, and that several years of treatment may be required to bring this about.

In A_2 cases, the disease is tending to die out as far as infection is concerned and the higher the curve from which they are descending, the less is the chance of there ever being a recrudescence of active signs.

The object of special treatment is the removal by destruction of the lepra bacilli and not the restoration of destroyed nerves or crooked fingers.

Indeed trophic conditions may become worse under such treatment as the granulomatous condition of the Nerve sheaths is succeeded by fibrous contraction pressing on the axis-cylinders, just as deformity is caused not by burns but by the fibrous contraction which takes place on the healing of burns. Such deformities must be avoided by suitable exercise and massage.

The greatest hope, therefore, of a favourable prognosis lies in early diagnosis and early treatment especially of A_1 & B_1 cases.



TREATMENT.

The first great essential in the treatment of leprosy is the elimination of the predisposing cause or causes. It is obviously useless to apply special anti-leprosy treatment while the resistance is being lowered by the co-existence of much more remediable factors, such as Malaria, Hook-worm, Syphilis, Diabetes.

Diet, Exercise, Skin, bowels, should all be attended to and the hygienic and social conditions must be enquired into. These matters are of even more importance than the administration of special treatment.

I don't think I have time enough to enumerate all the various drugs and forms of treatment, which have been used and are being used in the treatment of leprosy.

I shall restrict myself to a single line of treatment, which after many controlled experiments, has been found to be the best by Dr. E. Muir of the Calcutta School of Tropical medicine.

INJECTIONS OF HYDNO CREOL.

There seems to be a general agreement among those who have had most experience that hydno carpus and chaulmogra oils, and their derivatives, are the most effective remedies. It is also agreed that the most effective method of administration is by injection into the tissues of the body.

It was found that these Crude oils when injected caused considerable pain and local reaction, and for this, solutions of the sodium salts of the fatty acids were used and later, the esters prepared from these oils. But more recently it has been found that this pain and irritation are caused by oil extracted from seeds which are obtained in

the market, and which are not fresh, *i.e.*, seeds which have undergone a certain amount of oxidation ; and that the oils obtained from fresh seed, cause considerably less pain, and are more quickly absorbed than even the twice distilled esters obtained from this oil. This has been proved by experiments on animals and all patients, who have been injected with esters and such oils agree that the oils are much less painful.

In India we find that the cold drawn oil obtained from the fresh seeds of *Hydnocarpus wightiana* is the best, and special preparations made expressly for injections are available and the great advantage of this drug is its cheapness.

Extensive tests are being made at the Calcutta school of tropical medicine, of the oil against esters, the full results of which are not yet ready but there is every reason to believe that the oil will prove to be the more useful of the two.

At our own clinic, here at Tanjore all the patients show a decided appreciation of the oil, so much so it is invariably used for all cases.

The oil is prepared for injection by adding 4 per cent. of doubly distilled creosote and sterilising it by placing it in the auto clave at 120° centigrade for not less than half an hour. If undue pain is caused by these injections, it will probably be due to impure oil or oil extracted from Oxidised seeds.

PREPARATION OF ESTERS.

For those who desire to use the esters, there are two methods recommended for their preparation.—The hot and the cold methods.

Both of them involve some laboratory requirement and technique, and in as much as there is the much easier way—the pure oil method—available, I don't think it is worth while spending, time, labour and money for preparing these esters. In fact, during the earlier period of our activities, we used to prepare esters here, and use it as a rule for all our lepers. Now it has been superseded by the pure oil, with equal results if not better.

METHODS OF INJECTION.

These are two in number Intramuscular or subcutaneous infiltration. The latter one is the most suitable for general out-patient work and care should be taken to avoid all veins and nerves. The injections cause but little pain if a fine smooth sharp needle $1\frac{1}{2}$ -2" long is used.

Avoiding the face, soles of the feet palms of the hands and tibial surfaces of the legs, infiltrations are generally made under the lesions, in a fixed rotatory order. The advantages of the infiltration method are.

(1) The drug being distributed over the large area is quickly absorbed.

(2) Local Counter-irritation is applied to lesions.

(3) Abundant sites for injections are always available.

As two injections a week or eight injections a month have to be given, it is well to divide the external and posterior surface of the limbs into eight areas which are infiltrated in rotation, returning to the first area infiltrated after the expiry of the month. In this way there is no danger of any area being injected a second time before the drug previously injected has been absorbed.

DOSAGE.

As the tolerance is not known in any one case, it is well to begin with a small dose and gradually work up to the largest dose that the individual patient can stand. The fewer the bacilli in the body the larger the initial dose that may be given, the more the bacilli in the body, the smaller the initial dose and the more slowly and carefully the dosage be increased.

As a general rule, we start adults, on $\frac{1}{2}$ cc. dose, and go up to the maximum dose of 10 cc. increasing 0.5 cc. each time; and keep the patient on the maximum dose, till all signs of active Nerve lesions have been absent for a period of at least 6 months.

For children:—The same principle by which we regulate their dosage holds good here also.

EXTERNAL MEDICATION.

It may be convenient to divide the treatment of the local lesions under the following heads.

I. Baths.

II. "Friction accompanied by inunction. Both of these have for their object the flushing of the skin, the strengthening of the muscle tissues, and improvement of the general health of the body, while they probably tend to set free minute doses of toxins and produce a certain limited amount of immunity.

3. Caustics.

4. Surgical measures.

1. *Baths.* The first indication is to keep the patient scrupulously clean by means of daily warm baths, to which Permanganate of Potash or Boric Acid or any

other mild antiseptic may be added when suppurating sores are present. Alkalies, notably Sodium Bicarb, are frequently added to the baths.

At the Hawaiian Leper settlement, a large grove of Eucalyptus trees bear mute testimony to the faith certain physicians have in the use of a bath made of a weak decoction of the aromatic leaves of these trees.

2. Friction accompanied by inunction daily with Ol chaulmogra preferably on the patches, combined with its internal administration starting at 5 ms. T.D.S. up to dr. i per dose.

Ol chaulmogra is really of much therapeutic value in the treatment of leprosy and is superior to any other known remedy or reputed cure for leprosy, but it has to be pushed vigorously for a prolonged period.

Unfortunately it is particularly liable to cause digestive troubles and may have to be stopped on that score.

A refined preparation of oleum chaulmogra has been introduced under the trade name of "Anti-leprol." which may be given by the mouth starting with 15 m. T.D.S. up to m. 80 per dose.

A colossal chaulmogra has been also prepared, I believe, and is on trial.

Caustics :—Many remedies have been used to cause that useful, though difficult to explain, condition called counter-irritation. Pure Carbolic Acid, Carbon-Dioxide, snow, various juices of plants, even thermo-cautery, have been used with a greater or less amount of benefit; while the natives of some of the south sea Islands burn the skin around the lesions with a burning cigarette end; in fact, the number of counter-irritants, which have been used, is practically innumerable.

Recognising that there is a certain amount of benefit to be derived from counter-irritation, however it may be brought about, an extensive and fair trial was given, by which it has been found, that the most effective and the most easily controlled to be Acid Trichloracetic, dissolved in water. We apply it in 3 different strengths.

(1) A 1 in 1 solution which is applied to the centre of a large Thick nodule.

(2) A 1 in 5 solution for painting on the face, so as to avoid all danger of Over-Cauterisation.

(3) A 1 in 3 solution, which is the most generally useful and may be painted on to all lesions depigmented patches or thickened infiltrated skins, etc.

Cotton-wool on a glass rod is generally used as a brush, and care should be taken that too much of the fluid is not carried in the Swab. The solution is painted rapidly over the lesion or lesions, and allowed to dry. As drying takes place a slightly white appearance should be seen as if the surface of the skin had been sprinkled with a white powder. If this does not appear on the drying of the solution, a second painting is required or even a third, but it is necessary to wait each time until the solution has dried.

Care should be taken that either too strong a solution or too much of it (by having the swab too wet) is not applied to the wound, as this may be followed by ulceration or by keloid formation.

If the right amount and strength of solution has been applied, the white powdery appearance will give place in a few hours to a black discolouration, and the black burnt epithelium will separate in a few days, leaving a

red surface which soon shows either hyper-pigmentation or depigmentation followed by hyper-pigmentation.

This application may be repeated after ten days. It causes a burning sensation for about two minutes. In spite of this, patients who have seen the results produced, insist on having it done.

How it acts, it is difficult to say, but it seems to light up a local reaction, which causes the formation of granular forms of the bacilli and also diminution in the numbers of or of complete disappearance of the bacilli. The great advantage of this form of application is that it can be absolutely regulated, more of the acid is required, if the patient's skin is more alkaline or more oily, but the powdered white appearance described above is in every case sure index to the amount of application required.

SURGICAL PROCEDURE.

Ulcerating surfaces should be bathed with Condy's lotion and dressed with Friar's balsam, when a mild stimulant action is required; Silver Nitrate solutions when there are extensive granulations, and carbolated Zinc Oxide Ointment when a soothing application is required.

Amputations of hopelessly necrotic feet, sloughing digits, the removal of sequestra from bones of the hand or of the foot, and the performance of tracheotomy for the relief of laryngeal stenosis, should be undertaken whenever indicated.

Antiseptic nasal douches and gargles are indicated where the nasal secretion is profuse or ulceration is present in the mouth.

It needs no saying before this assembly, that the normal secretions of the nasal cavities are alkaline and of a

higher specific gravity than water. Hence the use of the latter alone as a detergent is painful and irritating to the mucous membrane. Any liquid used for this purpose should at least possess the alkalinity and specific gravity represented by 1 drachm of Sodium Chloride to one pint of water. As a wash the following can be confidently recommended :—

Ry.

Borax.	
Sodium Bicarb	aa 3 s.s.
Glycerine	3 ii.
Aqua	ad z 16.

SURGICAL TREATMENT OF NODULES AND REDUNDANT SKIN.

Removal of Early Nodules :—In cases in which there are only one or two nodules and no other marked lesions in the body, it is well to remove the nodule with the knife. This may generally be done with local anæsthesia. Even though the whole of the infection is not removed the plastic process set up by the operation causes entire disappearance of the lesion, only a scar being left; this is of course, provided that the general resistance of the patient is good, otherwise such procedures, have little chance of arresting the disease.

TRIMMING THE AURICLE OF THE EAR.

The nodular, pendulous, elephant-like ears of the advanced leper are well known; the disfigurement is very characteristic. But this condition can be improved by a simple surgical procedure. A curved clamp is applied to the auricle so that the part removed is external to the convexity of the clamp. If a shape slightly different from the curve of the clamp is required, this may be attained

by pulling slightly upon the auricle before tightening up the clamp. Before applying the clamp the ear is cleansed and iodine applied. When the clamp has been carefully applied and tightened, the projecting skin is removed either with a knife or a pair of scissors, and the raw surface is painted with pure carbolic acid. The clamp may be removed at once and dry cotton wool applied and bandage if necessary.

Due to the deep analgesia of the part, it is seldom necessary to use any anæsthetic. Here again, the benefit is not limited to the amount of redundant skin, which has been removed; the plastic process causes progressive improvement for some days after the operation, and the whole appearance of the patient is often changed for the better.

SURGICAL PROCEDURE IN ACUTE LEPROUS NEURITIS.

There are few conditions more painful in leprosy than acute neuritis, which often accompanies a reaction during the course of the disease, especially when the patient has had his general resistance lowered. When the pain is confined to one nerve, as it very often is, a simple surgical procedure will remove the pain, cause considerable reduction in the swelling of the nerve, and marked lessening of the anæsthesia and other nerve symptoms in the parts supplied by the nerve.

After applying local anæsthesia by subcutaneous, infiltration with $\frac{1}{2}$ per cent. Eucaine or Novocaine with a small quantity of Adrenaline, an incision is made 3 or 4 inches in length over the affected nerve, and the sheath is isolated from the surrounding tissue to the extent of about 2 inches anteriorly and one inch behind the nerve.

The wound is then sewn up and dressed. If the operation is done in the arm which is the most common seat of this condition the arm should be kept in a sling.

There is immediate cessation of the agonising pain, reduction in the size of the nerve and to a certain extent restoration of the function of the nerve. (I.M.G., May 1926, Dr. Muir).

It would serve no useful purpose to dwell on the other remedies, like Leprolin, Nastin, Anti-Leprotic Serum, Anti-Venine, etc., which have been introduced as specifics; the continued use of which has shown that they have no claim to that distinction.

No specific has, as yet been discovered, to cure leprosy. But at present the above detailed special treatment, coupled with the intelligent help of the patient for carrying out a general treatment on ordinary medical principles, will be of the greatest service in staying the progress of the disease, and rendering the life of the patient more bearable.

In the first place the nutrition of the leper must be seen to suitable generous dietary of fresh vegetables, plenty of fruits, fresh dairy produce as milk, butter and eggs, all in a raw state preferably, various peas, beans, should be ordered.

Tinned, salted, and preserved foods, over cooked, highly spiced or stale foods, and alcohol should be condemned.

Excessive or hurried eating is decidedly harmful. A short rest before and after meals is advantageous.

Such tonics as Cod Liver oil, Strychnine and Arsenic may be prescribed in order to improve the general health and increase the body resistance to the bacillus and its toxins.

There is considerable evidence that the Ancient Order of Froth Blowers is likewise being promoted by the brewers for their own purposes. Sir Alfred Fripp, a Vice-President of the Fellowship, is one of the prominent leaders of the new organization. It is a sign of recognition of changing conditions that the brewers and the distillers have begun to camouflage the organizations that they promote for opposing Prohibition and fooling the public. They realize that statements known to emanate from the trade itself are suspected by the public; so they present their statements through organizations that will not be recognized by every one as their mouth pieces.

The Ancient Order of Froth Blowers sounds like an organization of drinking men for their own protection and pleasure. The name doesn't suggest a trade conspiracy to control public opinion and oppose the public welfare but such it is. And in this case the brewer-promoters have not been content to camouflage their identity by assuming a misleading name but they have dressed the organization in the robes of charity and are attempting to win favour for it by claiming as the primary purpose of its existence support of the "Wee Waifs" charities.

The New Campaigner points out that the balance sheet of the A. O. F. B., issued last April, shows receipts of £76,620 and expenditures of £49,934 of which only £2,093 had been disbursed on charities. When one thinks of the "wee waifs" who would be prosperous had the liquor trade not reduced their fathers to poverty and uselessness it isn't possible to give the brewers and their friends, the Froth Blowers, much credit for their ostentatious spending of \$2,093 for charity.

FIGHT AGAINST PROHIBITION DEFEATS GOVERNMENT.

Recognition by the public of the benefits of Prohibition has often interfered with the schemes of officials who, for one reason or another, have been willing to serve the liquor interests by espousing the sale of liquor. The latest instance brought to our attention has occurred in Prince Edward Island. For twenty-five years this small Canadian Province has profited by a law prohibiting the sale of intoxicating liquors. Following the recent decision in Ontario to authorize the sale of liquors under Government control, the Government of Prince Edward Island was persuaded to adopt a similar policy and to appeal to the electorate on the issue. The Liberal party loyally supported Prohibition. The Conservative Party was in power with 26 seats against only 4 for the Liberal opposition. The election was fought on this one issue. It resulted in the overwhelming defeat of the pro-liquor Government, leaving them with only 6 seats against 24 for the anti-liquor Liberals.

This news was not telegraphed to India. Had the election gone against Prohibition it would have been reported by cable and given wide publicity. The discriminating reader realises that there is a reason for the anti-Prohibition propaganda that is so prominent in most of the liquor-advertising newspapers and makes note of the suppression therein of news that is favourable to Prohibition.

THE NEW GENERATION IN JAPAN CALLS FOR PROHIBITION.

Sentiment for Prohibition is growing rapidly in Japan. The young people are foremost in challenging the right of the liquor trade to live. College students are taking a prominent part in this movement. They have organized

many study circles to consider the influence of the liquor trade upon national welfare and these study circles are producing groups of convinced Prohibitionists. It is clear that the hope of the liquor trade in every country is imbedded in the possibility of keeping people from thinking about its effects. Impartial consideration of the facts about the trade makes the average citizen eager to abolish it in his country.

The drink evil in Japan is very serious. The total expenditure on drink in 1923, the latest year for which statistics are available, was 1,510,410,875 yen or approximately 116 crores 18 lakhs of rupees. This is just about the size of the total budget for the Imperial Government of Japan for the year 1923-24 and is in excess of the total value of all imports into Japan during 1923.

Nothing is clearer to thinking men than that Japan cannot afford this huge expenditure on drink. The elder Statesmen have tolerated it because their power to act has been paralysed by a belief that nothing can be done to prevent drink, but the younger citizens, now travelling toward power, have a hopeful outlook and are determined to suppress the trade and save the country.

RETIRED JUDGE DECLARES DRINK GUILTY.

That 95 per cent. of the murder cases in India are due to drink is the belief expressed by Sir Sadasiva Iyer, retired judge of the Madras High Court. Sir Sadasiva presided over the annual meeting of the Nilgiris Temperance Federation and stated that his belief is based on an experience of over sixteen years dealing with criminal cases. His conclusion is that Prohibition ought to be enforced and that if the Government cannot find revenue to replace its income from drink, it ought to borrow funds in order to close the drink shops and free society from their curse.

Europeans and Indians, who suppose that residence in this country qualifies them to speak on any subject that concerns the country without looking into the facts, often say that drink is not a serious evil in India. We heard an Englishman of good character make such a statement a few years ago. He amplified it by saying that Indians never get drunk and Anglo-Indians seldom do. He undoubtedly thought he was right, but we were told that within a half mile of his house was a *mohalla* where drunkenness was an every-day occurrence in dozens of homes and innumerable crimes had been committed under the influence of drink during the period of his residence there.

Alcohol has never been king in India as it has in many Western countries. The controlling elements in the population have never acknowledged its dominion. The Indian drink trade has possessed little political influence. There are in India no equivalents of the beer barons of Britain or the brewer bosses that America had to overthrow in order to write Prohibition into her Constitution. Travel in India has never been organized on the basis of the drink trade as in Western countries where the public house and the hotel, with the licensed bar, have provided in many places the only refuge for travellers. But India has had and is now having sad experience with drink. The depressed classes are in large measure what drink has made them. Disease and poverty and crime are traceable to drink here as in the West. India needs Prohibition and needs it badly.

IN WET QUEBEC.

In Quebec, the wettest of Canada's Provinces, there were in 1923-24, 3,823 investigations of alleged illicit operations in the liquor trade. In 1924-25 the investigations

numbered 5,142. It seems clear that illicit distillation and sale of alcoholic beverages was increasing rapidly under license. If any Province under Prohibition had shown such an increase, or even a tithe of such an increase, the facts would have been sent to all parts of the world by cable, newspaper, letter post and pamphlets.

AN ABSURD PROPOSAL.

MINISTER OF REVENUE URGES LICENSE AND TOTAL ABSTINENCE.

A few weeks ago the Baroda Legislative Assembly registered its dissatisfaction with the policy of licensing the drink trade by adopting a resolution in favour of applying Prohibition in the Amreli District. The Minister for Revenue opposed the resolution and the new Dewan suggested propaganda for total abstinence as an alternative to Prohibition but the Assembly held to its belief that the State ought to try the policy of Prohibition in at least one Civil District.

It is strange how frequently total abstinence is urged as an alternative to Prohibition. It is not a real alternative. Prohibition makes total abstinence easy and the drink trade encourages drinking. To advocate total abstinence and the drink trade is an absurdity. One might as well advocate building houses and living outdoors or preparing four meals and fasting all day.

The liquor trade never restricts itself to meeting a demand for intoxicating liquors. It endeavours, by many means and methods, to enlarge existing demands and create new ones. Therefore to license the liquor trade is to grant, for a money consideration, facilities for inducing people to drink. Consistency, if it be a consideration at

all, must surely demand that those who favour a campaign for total abstinence shall not at the same time license the trade to work against total abstinence. It would be at least as reasonable for the State to institute a campaign for house-building and to license a wrecking crew to tear down new houses or for a father to teach his sons personal purity and to license a prostitute to come into the home to seduce them. Supporters of the license policy are supporting the evils of the liquor trade for a money consideration and if they want to support total abstinence they ought in decency to change their attitude toward license.

FALSE STATEMENTS IN LEGISLATIVE COUNCIL DEBATES.

Legislators Victims of Liquor Propaganda.

During discussions on Prohibition in the Legislative Council of Burma in September 1926 and February 1927 a number of statements were made by opponents of Prohibition to which the W. C. T. U. of Burma have given attention with results that should serve as a warning to legislators who think of relying upon and using in public, speeches the information they get in the propaganda of the liquor trade.

One of the speakers in the first-mentioned discussion quoted Abraham Lincoln as saying "Prohibition will work great evil to the cause of temperance." Investigation shows that President Lincoln never made any such statement. It was forged by a Col. Goodwin during a local option campaign in 1887. He was in the employ of the liquor interests. No one has ever been able to trace the statement back of Col. Goodwin and no one has seriously argued against the evidence that proves the statement a forgery, but the unscrupulous liquor trade and its henchmen continue to make use of it and to represent it as

a statement made by the great Liberator and President. As a matter of fact President Lincoln was a convinced and ardent Prohibitionist and had his life not been cut short by a drunken assassin's bullet he would probably have put himself at the head of a national movement for Prohibition shortly after the Civil War.

In the same discussion the claim was made that the late President Harding had declared against Prohibition. Mr. Harding gave several ringing speeches in favour of Prohibition just before his death, and spoke of the benefits of the law even before his election. As a Senator he several times voted for Prohibition legislation.

In the discussion in February an anti-Prohibition speaker quoted General Lincoln C. Andrews who, as an Assistant Secretary of the Treasury, was at that time officially related to Prohibition enforcement as saying that "the one measure to make Prohibition effective was to legalize the sale of beer." This statement was made in a discussion on a resolution recommending the closing of the shops in which rice-beer (Hlawza) is sold.

The W. C. T. U. believed the statement to be false and sent the following cablegram to General Andrews.

"Did you state that the legalizing of beer was the one measure to make prohibition effective."

In reply the following message came by cable.

"Not advocating change in law."

Signed, "Andrews."

The same speaker in the Legislative Council tried to use the name and influence of the American Federal Council of Churches as against Prohibition, referring to an unfavourable report said to have been prepared by a special

Committee. The report in question was in fact written by one man and not by a special Committee and the Administration Committee of the Federal Council of Churches put itself on record as follows. "The Committee would emphasize its unequivocal support of national Prohibition.

"We declare our strong conviction that the policy of Prohibition is the deliberately and permanently established policy of the nation, and that this policy has not failed but on the contrary has yielded results which fully justify its adoption."

"This declaration was made because of misrepresentations of the spirit and point of view of the report in certain quarters."

REVIEWS AND REPORTS.

Malaria—Its investigation and control with special reference to Indian conditions by Major R. Knowles, I.M.S., Professor of Protozoology, Calcutta School of Tropical Medicine, and Dr. Ronald Senior-White, Malaria Research Officer, Central Malaria Bureau, Government of India—First edition—1927—Published by Messrs. Thacker Spink & Co., P.O. Box 54, Calcutta. Price Rs. 7-8-0.

This is an excellent and timely publication on a subject of first rate importance to all interested in Public Health (and who is not)—especially in Malaria-hidden countries like India. The authors, being masters of the subject, both in its theoretical and practical aspects, have succeeded in giving to the world, in a short compass of six chapters and four appendices what is contained in many volumes of reports, journals and other authoritative publications. The first two chapters are devoted to a lucid description

of the malaria parasites; there are also a number of excellent colour-plates showing various phases of the life-cycles of the parasites. Chapter III is of special value to laboratory workers while Chapter IV gives a very helpful account of the treatment of malaria including the most recent methods. At a time when the prevailing fashion is medication through the syringe and needle, the observations contained in pages 99 to 103 are very very timely. The last two chapters deal with anti-malarial surveys and operations on which one of the authors is easily an authority. The first three appendices contain valuable notes on the breeding places and distribution of the Indian Anophelines as also keys for identifying their adults and mature Larvæ. Appendix Four is a specification for construction of under-drainage issued by the Public Works Department of Federated Malay States. No medical or public health worker in India could afford to be without a copy of this admirable publication.

The Indian Materia Medica by K. M. Nadkarni, P. O. Box 3558, Bombay 4 D-C 1670—1420 pages—1927. Price Rs. 11 (or S. 18)—Postage extra.

The work under review is the author's "Indian plants and drugs" of eighteen years ago re-incarnated in a new and fuller form. Considering the extensive additions and improvements to the earlier work, the present publication may well be considered as an entirely new treatise. It is a very comprehensive work dealing with as many as 1,158 drugs, arranged according to their source under three classes, viz., the Vegetable Kingdom (1,053) the Mineral Kingdom (54) and the Animal Kingdom (51). The drugs are all arranged in alphabetical order for easy reference and each drug is dealt with under the following

headings: The botanical name and its equivalent in Sanskrit, Arabic and the various vernaculars of India, habitat; parts used; the chemical composition and the chief constituents; therapeutical actions; medicinal preparations and uses. There are also a number of valuable appendices added at the end which are well calculated to help the student of Medicine greatly in his choice of specific drugs, dealing as they do with the following topics: drugs arranged in their physiological and therapeutic actions and uses: Indian substitutes for imported foreign drugs; Composition of dietetic articles; Vitamines; principal form of Ayurvedic medications and their methods of preparation; therapeutic agents with their classification and definition; and important natural orders with their distinguishing features and a few typical examples. Finally we have an exhaustive index of diseases and their remedies followed by an excellent general index. The amount of valuable information contained in this volume is truly prodigious; it is easily the best of its kind so far published and the author is to be most warmly congratulated on his excellent publication. We strongly recommend this book to every Medical Practitioner in India, no matter to what school of practice he belongs. No Library—private or public—should be without at least one copy of this publication.

REVIEW.

A treatise on Hygiene and Public Health with reference to the tropics by B. N. Ghosh—6th edition, 1927—Published by Scientific Publishing Company, Post Box 7890, 9, Taltolla lane, Calcutta. Price Rs. 6, or 10 shillings net.

This is a publication admirably suited to be prescribed as a text-book on "Hygiene and Public Health" to

students of medicine in India. It is written by one who has first hand and intimate knowledge of Indian conditions and is ever on the alert to make the usefulness of the publication grow from more to more with every new edition, as evidenced, for example, by the very useful additions in the chapters on "Water," "Air," "Ventilation," "Food," "Diet in India," "Climate and Meteorology," "Restraint of Infection," "Preventable Diseases," etc. The book is well worthy of being most heartily recommended to every student of Medicine in India.

The Prescriber's Companion by M. P. Dikshit—Revised Edition—1927—Published by the author, Kurwar, Sultanpur District.

This is a very compendious and useful publication, containing as it does over 3,300 prescriptions under different heads of diseases alphabetically arranged to facilitate references and all compressed within the small compass of 756 octavo pages; moreover, it is much more than a mere book of prescriptions; for it also contains very helpful notes on Urine-testing, Incompatibility and treatment of Poisoning as also a number of useful tables as, for example, those on Food values of various articles of Diet given under "Diabetes." It is really a mine of useful information specially valuable to the busy practitioner.

BOMBAY MEDICAL COUNCIL.

The following summary of the proceedings of the Bombay Medical Council is published in the medical press for information.

1. At a meeting of the Bombay Medical Council held on the 25th February 1927, Sir Norman Walker, M.D.,

F.R.C.P., Representative of the General Medical Council of Great Britain, and Col. R. A. Needham, C.I.E., D.S.O., M.D., F.R.C.P., D.P.H., who accompanied him on his tour through India, were present by invitation.

2. Captain Narayan Hari Kulkarni, M.C.P.S., B.M.S., took his seat as an elected member of the Bombay Medical Council, *vice* Mr. Krishnaji Govind Lohokare, Hospital Assistant, deceased.

3. The following Resolution was then passed:—

"That the Council place on record their sense of loss at the untimely demise of Dr. K. G. Lohokare, B.A., EX-M.L.A., who was an elected member of the Council from 1920 to the time of his death;

and that a copy of this Resolution be communicated to the members of his family."

4. The case of Mr. Balvantrai Naranji Desai, practising at VadiFalia, Surat, was concluded, and it was decided that his name be struck off the Register, for unprofessional conduct, *viz.*, advertising, the purport of the advertisement in leaflet form being as follows:—

Remedy for cent. per cent. cure of Hydrocele.

By Balvantrai N. Desai, L.M.S.

An application from Mr. Narayan Moreshwar Bhagwat for permission to be registered under section 7(3) of the Bombay Medical Act, on the ground that he had been working as a medical practitioner for the past seventeen years, was rejected as the applicant had not completed a course of training in any medical institution.

6. An application from Shaikh Abdul Kadir for permission to be registered under section 7(3) of the Bombay

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Medical Act was also considered, and taking into consideration the services rendered by him during the War and his training at the Grant Medical College, his application was favourably considered as a special case.

7. The name of Muhammad Sahib Bakshubhai was erased from the Register, owing to his conviction for a cognizable offence.

8. The following decisions of the Royal College of Physicians and Surgeons, Edinburgh, were communicated to the Council :—

(a) Edalji Jamsedji Treasurywala, L.R.C.S.E. (Triple) 1894 (alleged advertising). Diploma be recalled and declared void ;

(b) Kaikhushru Edalji Master, L.R.C.S.E. (Triple) 1895 (alleged issue of incorrect medical certificate). Diploma be suspended *sine die*.

9. A revised Code of Medical Ethics was adopted, and it was resolved that copies be forwarded to all registered medical practitioners for information and guidance.

10. The meeting closed with a special vote of thanks to the President, Major-General A. Hooton, C.I.E., I.M.S., in view of his impending retirement before the next meeting.

ASSOCIATION NOTES.

CLASS A.—LIST OF RESIDENT AND NON-RESIDENT MEMBERS.

RESIDENT MEMBERS.

1. Khan Bahadur Dr. Md. Azizullah Sahib Bahadur,
B.A., M.B.C.M.,
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ASSOCIATION NOTES

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6. Dr. G. Devasigamani, L.M.S.,
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10. Dr. H. S. Hensman, M.R.C.S.,
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Kilpauk, Madras.
11. Dr. Rao Bahadur G. V. James, M.B.C.M.,
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Medical College, Madras.
12. Dr. Md. Jamalluddin Sahib Khan Sahib,
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Port and Marine Dispensary, Madras.
13. Dr. K. Koman Nair, L.M.S., L.R.C.P. & S.,
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14. Dr. H. Krishnan, B.A., M.B., B.S.,
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15. Rao Bahadur Dr. M. Kesava Pai, M.D. & C.M.,
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16. Dr. D. Kanakasabesan, L.M.S., L.R.C.P. & S.,
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17. Dr. P. K. Koshi, B.A., M.B.B.S.,
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18. Dr. P. Kesavasawmy, L.M.S.,
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19. Dr. A. P. Kuriappan, M.B.B.S.,
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20. Dr. S. Kanthimathinathan, L.M.S.,
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22. Rao Bahadur Dr. A. Lakshmanasawmy Mudaliar, B.A., M.D.,
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23. Dr. P. F. Mathias, B.A., M.B. & C.M.,
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24. Rao Bahadur Dr. K. Madhava Menon, L.M.S.,
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25. Dr. B. S. Mallayya, M.B. & C.M., M.L.C.,
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28. Dr. N. Mungesh Rao, M.B.C.M.,
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31. Dr. S. R. Pandit, B.A., M.B.B.S., B.S.SC.,
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32. Dr. A. R. Parasurama Mudaliar, L.M.S.,
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36. Dr. M. K. Ramasawmy Iyer, L.M.S.,
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37. Rao Sahib Dr. T. Sundara Reddi, L.R.C.P., L.R.C.S.,
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38. Dr. T. Seethapati Iyer, L.M.S., etc.,
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42. Dr. K. S. Subramanyam, L.M. & S.,
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47. Rao Sahib Dr. S. Venkatasubba Rao, L.M.S.,
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48. Dr. C. A. Venugopal, L.M.S.,
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49. Dr. Y. P. Vasudevan, M.B.B.S.,
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51. Dr. B. T. Krishnan, B.A., M.B.B.S.,
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52. Dr. (Miss) P. Samuel,
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53. V. C. Govinda Menon, L.M.S., L.R.C.P. & S.,
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Royapuram, Madras.
54. G. I. Benjamin, L.M. & S.,
X Ray Institute, Govt. General Hospital,
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LIST OF NON-RESIDENT MEMBERS.

1. Dr. Md. Abdul Kalique, L.M.S.,
Asst. Dist. Medl. Officer,
Bellary.
2. Dr. C. J. Alexander, L.M.S.,
Medical Officer, Tinnevely.
3. Dr. E. Atchyutha Menon, L.M.S.,
Lecturer, Medical School,
Tanjore.
4. Dr. Md. Abdul Allam Sahib, L.M.S.,
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5. Dr. U. Anantayya, M.B. & C.M.,
Medical Officer, Municipal Hospital,
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6. Dr. K. M. Ananthan, M.B.,
King Edward VII Memorial Hospital,
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7. Dr. C. N. Anantharangarao, L.M.S.,
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9. Dr. N. Alagasingari, B.A., M.B.B.S.,
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11. Dr. K. Balasimharao, B.A., M.B.C.M.,
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21. Dr. G. R. Dinker Rao, M.B.B.S.,
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22. Dr. P. V. Francis, B.A., M.B.B.S.,
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36. Dr. S. A. Jayaroyan, M.B.B.S.,
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39. Dr. M. A. Kamath, M.B. & C.M.,
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41. Dr. C. Krishnasawmy Pillai, L.M.S.,
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49. Dr. C. Krishna Menon, L.M.S.,
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50. Dr. S. Kumaraswamy Pillai, L.M.S.,
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51. Dr. R. Kanakasabapathy Nayagar, M.B.B.S., B.Sc.,
Dt. Health Officer,
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52. Dr. V. Krishnamurthi, L.M.S.,
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53. Dr. K. N. Krishnan, B.A., M.B.B.S.,
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54. Dr. G. Lakshmuikantarao, B.A., L.M.S.,
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56. Dr. M. S. Mangapathi Naidu,
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58. Dr. G. Madhava Prabhu, L.M.S.,
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59. Dr. A. M. Muhiuddin Sahib Bahadur, M.B.,
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60. Dr. K. M. Mathullah, L.M.S.,
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61. Dr. Mugazeth, L.M.S., M.B.E.,
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62. Dr. N. B. Morris, D.P.H., ETC.,
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63. Dr. K. Madhava Nayak, L.M.S.,
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64. Rao Bahadur Dr. T. M. K. Needungadi, L.M.S.,
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65. Dr. K. Narayanaswamy Ayyar, L.M.S.,
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ASSOCIATION NOTES

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75. Dr. L. W. Pereira, L.M.S.,
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76. Dr. G. C. Pothan, M.B.C.M.,
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77. Dr. C. M. Phillip, L.M.S.,
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78. Dr. G. J. Pacheco, L.M.S.,
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Medical Officer, Tiruvallur,
(Chingleput Dt.)
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94. Dr. P. K. Raman Nambiyar, L.M.S.,
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Medical College, Vizagapatam.
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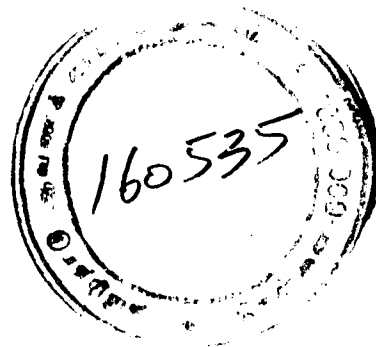
125. Dr. B. Tirumala Rao, L.M.S., F.R.C.S.,
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140. Dr. R. R. Williams, B.A., M.B.C.M., L.R.C.P. & S.,
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Tuticorin
141. Dr. (Miss) G. Samuel,
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Women and Children Hospital, Cuddalore.

BIRTHDAY HONOURS, 3rd JUNE 1927.

Hearty Congratulations to the following members of our Association who were the recipients of the Honours noted against their names :—

- | | | | | | |
|-----|--------------------------------|----|----|----|--------------|
| (1) | Dr. K. D. MUGASETH | .. | .. | .. | M.B.E., |
| (2) | Dr. RAO SAHIB K. MADHAVA MENON | .. | | .. | RAO BAHADUR. |
| (3) | Dr. T. S. TIRUMURTI | .. | .. | .. | RAO SAHIB. |

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