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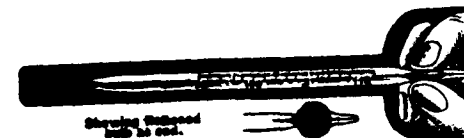
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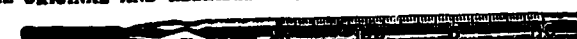


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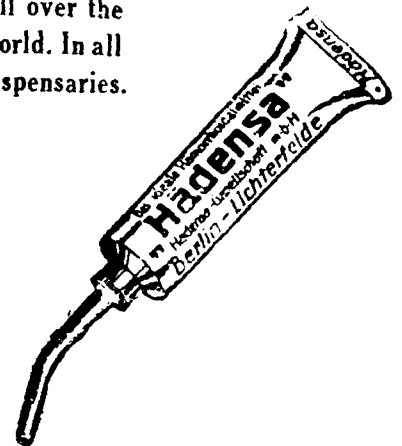
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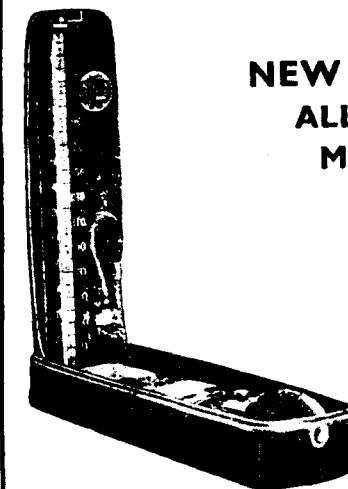
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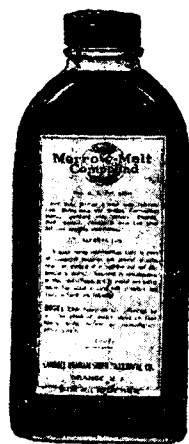
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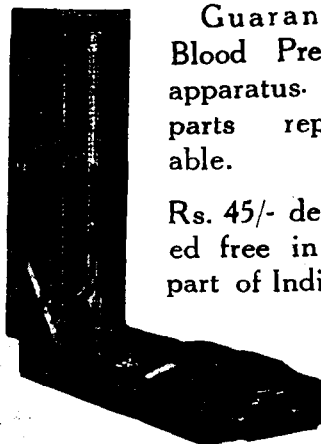
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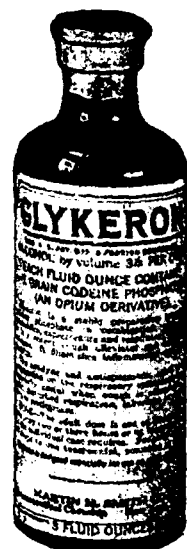
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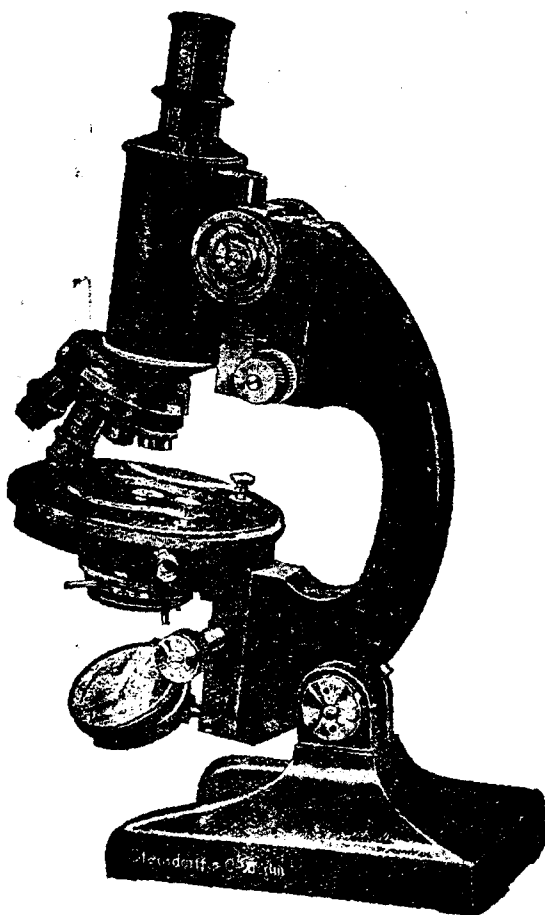
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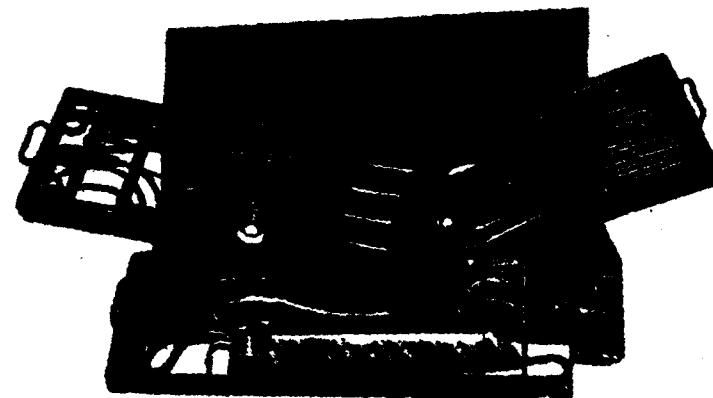
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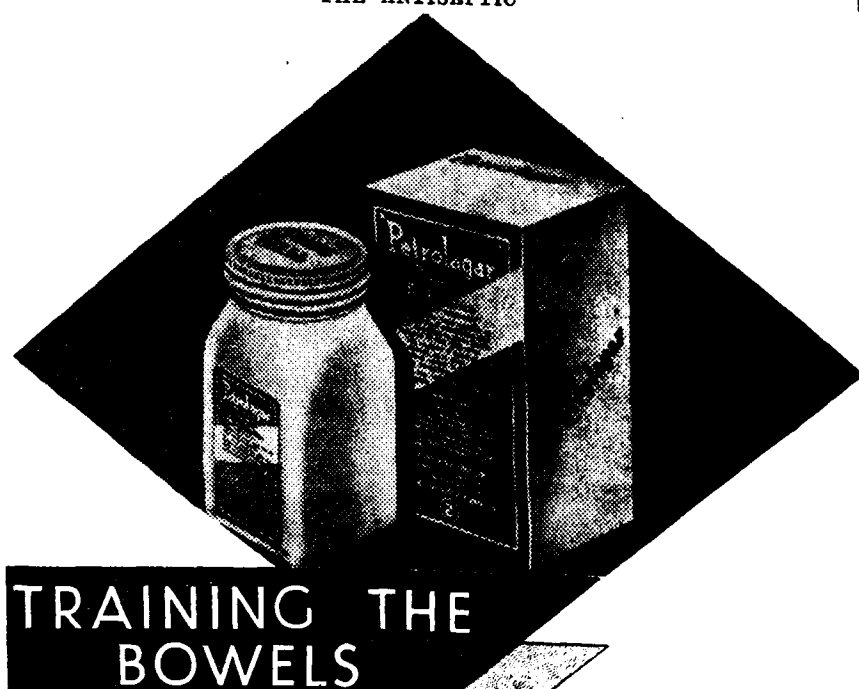
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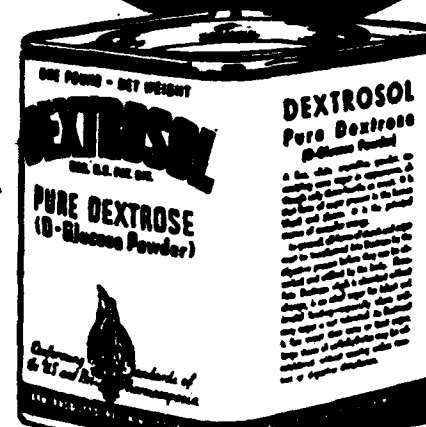
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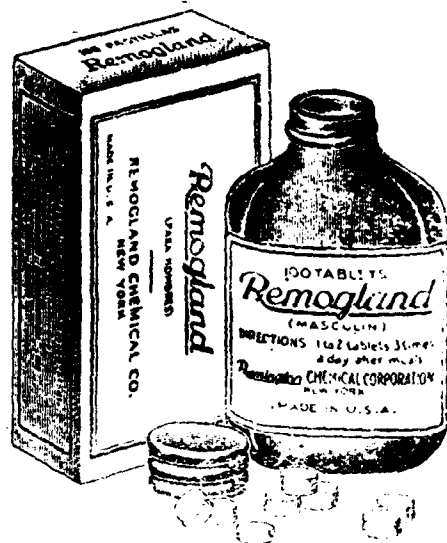
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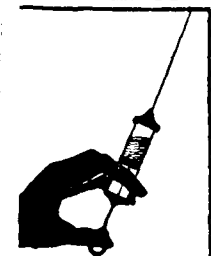
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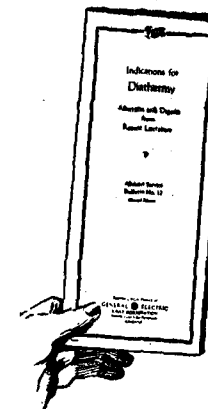
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ON LEPROSY

(A review of the Year's Literature for 1934.)

BY

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Epidemiology

FURTHER studies in different parts of the world where leprosy has been observed to exist in the native population, have only tended to confirm the previously observed fact that climate, altitude, rainfall, and nature of the soil, have no direct influence either on the incidence of the disease or on its transmission, but that these factors influence the course of the disease, by affecting the natural resistance of the individuals or the community exposed to infection. Poverty of the soil leads to defective or malnutrition; and unfavourable climatic factors adversely react on the natural resistance. Thus, as in many other bacterial diseases, the emphasis is being more and more (and rightly so) laid on the study of the natural resistance factor, of the individual or the community exposed to infection.

The part played by "contact" in the transmission of the disease, is being realised in an increasing measure; and the importance of the age factor in determining the transmission of the disease and its subsequent development in the individual exposed to infection, has been stressed upon by several workers. There seems to be a consensus of opinion among all experienced leprosy workers that (i) children are more susceptible to infection because

of their naturally undeveloped general resistance, (ii) most of the highly infectious cases in adults are the results of childhood infections or pre-adolescent infections, and (iii) such of the infectious cases in adults that have been definitely proved to have contracted the disease after the adolescent stage, were probably very much debilitated when they were exposed to infection, the intensity and duration of which was long, resulting in the transmission of massive doses of the inoculum from the infecter to the infectee.

Muir 1934 ⁽¹⁾ as a result of his study of the leprolin test concludes that three factors (a) Age, (b) Hyper infection with *m. leprae* and (c) Debility, are important and these determine the transmission as well as the type of the disease in the infectee after contact with the infecter. Young age and Hyper infection in the infectee or debility in the case of adult infectees, cause the appearance of cutaneous type of lesions while adult age and Hypo-infection with fairly strong resistance cause the appearance of the milder neural type of the disease. Contacts who have strong natural resistance or who develop immunity by subliminal infections escape from the disease. The same author, elsewhere, Muir 1934 ⁽²⁾ puts forward definite hypotheses by which he draws attention to the importance of the three factors enumerated above, in the transmission of the disease and in producing the "open" or more advanced cutaneous types of the disease in the infectee after contact with the infecter, and he has adduced irrefutable evidence from his studies into the family histories of the affected persons together with the results of the leprolin test in them as well as in their contacts, in support of his hypotheses.

Cochrane 1934 ⁽²⁾ emphasises the importance of taking into consideration the existence of "abortive" cases of leprosy, and shows how these cases may influence the prophylaxis against the disease and cautions against basing Public Health measures exclusively on the reported gross incidence of the disease in any area without ascertaining the number of "open" cases, the age of the sufferers and the proportion of children that show the "open" (infectious) type of the disease. As in malaria, the emphasis seems to be more and more (and rightly so) laid on the proportion of children affected in any endemic area as it furnishes an important criterion of the activity or otherwise, of the transmission of the disease. Recognition of the existence of abortive cases and watching them by periodical examinations, confining the special treatment to only actively neural or cutaneous cases of the first two degrees, effective isolation of the highly infectious advanced cutaneous

cases who could not be rendered non-infectious by our special treatment in any reasonable time, in suitable "Homes" or in huts outside their own villages, and the provision of out-patient treatment centres to deal with the active neural and mildly infectious cutaneous cases that could not be isolated in suitable "Homes", are all the measures advocated by him. He deprecates the attempts made by clinicians to treat every case of leprosy irrespective of whether the disease is active or arrested or shows only abortive lesions, in out-patient clinics; and shows how such cases (abortive and arrested cases) tend to lessen considerably, the value of our present day special treatment. Public Health authorities and administrators who have to deal with leprosy in any endemic area, would do well to study and digest this article of Dr. R. G. Cochrane, before they plan their anti-leprosy campaign and the writer regrets he cannot do full justice to this outstanding and thought-provoking contribution in this short review.

Atkey 1934 ⁽³⁾ after a study of the incidence of leprosy in nomadic Arabs, settled Arabs, and Negroes concludes that:—(1) if at all there is any single common factor that might reasonably be held to account for the high or low incidence of leprosy in a given population, it is the absence or presence of an adequate number of cattle, sheep, and goats, and the inclusion or non-inclusion of their milk in the dietary of the people and (ii) altitude, temperature and other climatic factors do not seem to directly influence the incidence of the disease.

Lowe 1934 ⁽⁴⁾ estimates the sex incidence of leprosy from a review of the literature on the subject as being more common (on the whole) among males than females, the actual ratio being placed at 2:1. In childhood both sexes seem to be equally affected, while at puberty and child-bearing periods, the female-sufferers preponderate over the males; whereas between the ages of 30 to 50, the males again out-number the females. Due to the comparatively greater longevity of women, the female lepers again preponderate over the males in the age-group 50-70 years.

With further experience of the special treatment with Chaulmoogra derivatives, their therapeutic limitations are being better understood, and the possibility of relapses even in adequately treated cases, is admitted. For example when cases of leprosy are adequately treated in special institutions and rendered apparently healthy and sent back to their former environments in which they originally contracted the disease, they relapse again within a short time and show active signs of the disease. This serves to emphasise the importance of "Environment" using this word in its

broadest sense, (i) in the transmission of the disease, (ii) in influencing the course of the disease after transmission, and (iii) in causing relapses after apparent recovery under adequate treatment. It is noteworthy that this is quite analogous to what happens in Tuberculosis.

Pathology

Wade (1934)⁽⁵⁾ describes the clinical features and histology of the lesions of a type of leprosy which he calls "Tuberculoid", a term which has already been in use, to designate a particular histological picture. According to him the essential feature of this lesion, as observed by a study of the specially stained serial sections taken from South African cases, is an epithelioid focus surrounded by a zone of round celled infiltration of varying degrees with or without the presence of giant cells of the Langerhans type and rarely, slight necrosis of the cellular elements. As a result of this study and from a study of the cases of nerve abscesses which are peculiarly common in India, Wade 1934⁽⁶⁾ opines that even these so-called nerve abscesses represent the tuberculoid type of lesion affecting the perineurium. Further, in Wade 1934⁽⁷⁾, the same author describes the clinical features and the histological changes met with in the same Tuberculoid type of lesions, in the "Reacting Phase". The present writer has also seen several typical cases of the Tuberculoid type here in Purulia, as well as in Calcutta and Cuttack; and therefore entirely agrees with Wade in his opinion that these cases constitute a separate class more allied to the neural type than to the cutaneous, although clinically, cases presenting such lesions have been wrongly diagnosed sometimes as "Cutaneous", by inexperienced workers here in India. That such Tuberculoid lesions may pass on to the cutaneous type during or after a reaction, is probable, but the finding of a few acid fast bacilli in reacting Tuberculoid type of lesions, should not, Wade contends, necessitate a change of the type of such cases from neural to cutaneous; and with this opinion, other workers will find it difficult to agree now, since, the finding of a few acid fast bacilli in any skin or mucous membrane lesion has been construed, by many workers, to mean that the case is an infectious (open) one, and as such it cannot be regarded as a neural one, irrespective of the underlying Histological picture.

Marchoux 1934⁽⁸⁾ gives an interesting account of his study of the analogous disease of rats known as "Rat leprosy", and concludes that the disease is due to an acid fast bacillus which is

rather delicate, dies on drying or on heating to 60°C for 15 minutes, but can be kept alive even for as long as 51 months under refrigeration in a strongly glycerinated medium and can resist the action of Ziehl's Carbol-fuchsin or 15% Sulphuric acid or anti-formin. The bacillus chiefly parasitizes the macrophages in rats and spreads from place to place by rupture of the containing cells. Genital infection in rats is possible. But transmission in rats takes place chiefly by juxtaposition of an infected ulcer with a recent wound. Good food and hygienic surroundings eliminate a mild infection. Two types of the disease can be recognised in rats; the one affecting the superficial Lymph nodes only and the other invading the whole organism.

Peschkowsky 1934⁽⁹⁾ concludes that the blood picture indicates the type of inflammatory reaction of the Reticuloendothelial system of the organism to the introduced leprosy infection; thus, a monocytosis, he regards as unfavourable, while lymphocytosis is considered favourable, in keeping with the clinical condition of the cases from which the material was taken for study. A polymorphonuclear leucocytosis, he says, runs parallel with the intense exacerbation of the process in lepromata resulting in suppurative inflammation of lesions with destruction of the bacilli. The clinical course of the disease corresponds closely with the pathological anatomical substrate as revealed in the blood picture.

The vexed question of the cultivation "*in vitro*" of *M. leprae*, is still far from settled. The hopes raised by the contributions of Mackinley and Soule referred to in the last year's contribution by the present writer, (Vide Antiseptic, Annual Number, June '34, p. 419), have not been fulfilled so far, as other workers equally competent, have failed to cultivate the bacilli following the same technique. Duval and Holt (1934)⁽¹⁰⁾ record their failure to culture the *m-leprae* by Wherry's gaseous method and the latter author records failure with chick embryo tissue cultures, and opines that as the rod-shaped pigment of the retina of chick embryos, resembles the globi of leprosy nodules, the former might have been mistaken for the latter, which, however, could be distinguished by the Ziehl-Neelsen's stain.

Two Japanese workers Masao Ota and Saburo Sato 1934⁽¹¹⁾ claim to have succeeded in cultivating the bacilli but their claim has yet to be substantiated. Salle 1934⁽¹²⁾ claims to have isolated a non-acid fast diphtheroid, and an acid fast bacillus, by tissue culture methods; and further suggests that the non-acid fast diphtheroids represent probably, a phase, in the life-history of the organism, and are therefore identical with the *M-leprae*. Similar

claims have been made by other workers in the past, and in view of the failure to substantiate their claims by other competent workers, it is wise to wait and see.

Denney 1934⁽¹²⁾ describes the forms of the M-leprae, as seen in different lesions in the different phases of the disease. Leprous nodules of the male genitalia are described by Fox and Knott 1934⁽¹⁶⁾ and though rare these lesions are occasionally seen in India. Moiser 1934⁽¹⁷⁾ describes massive cervical adenitis, and enlarged Thyroids in nodular cases of leprosy; and the present writer has seen one case of massive cervical adenitis in a highly advanced nodular case here.

Stein 1934⁽¹⁴⁾ has studied the skin temperature in leprosy, and concludes that in the cutaneous type of lesions, over the neural macules, and over the reacting lesions, the temperature is higher than that of the normal skin; and in anæsthetic areas and atrophied parts, the temperature is lower than that of the healthy skin. In nodular leprosy, the skin temperature is generally higher than normal.

Gass and Rishi 1934⁽²⁰⁾ record positive findings from their examinations of the Bone marrow, for M-leprae in all cutaneous and mixed cases, but negative results from that of purely neural cases.

Diagnosis

Gomez 1934⁽¹³⁾ describes a complement fixation reaction devised by him, with a view to help in the diagnosis of incipient cases of leprosy, and to ascertain the value of treatment as well as the state of immunity of the patient. No serological reaction that could give undoubted help in arriving at a diagnosis of the incipient cases, specially in contacts, has so far been discovered; and Gomez's reaction, if tried by other workers and found useful may come to prominence like Kahn or Wassermann.

M. Ota and T. Ishibasi 1934⁽¹⁵⁾ opine that antigens consisting of Ether-soluble fractions of acid fast bacteria with the addition of suitable substances, can be made to yield higher percentages of positive reactions in leprosy but not in other conditions.

Muir 1934⁽¹⁸⁾ draws attention to the difficulty in diagnosis caused by a new disease called "Dejerine Sotta's disease" or "Hypertrophic Interstitial neuritis", which, clinically resembles neural leprosy; but the former is very rare and it affects also, the anterior horn cells of the spinal cord. Similarly, another disease "Bernhardt's syndrome" or "Neuritis of the Lateral, Femoral

cutaneous nerve of the thigh, which produces superficial anæsthesia of the lateral aspect of the upper part of the thigh, may cause difficulty in diagnosis; but in this disease, there is usually a history of some injury; and the absence of other signs of leprosy will distinguish it from leprosy.

Treatment

The routine special treatment still consists chiefly of injections, by any route, of either the 4% creosoted Hydnocarpus oil or the ½% iodised or 4% creosoted Ethyl Esters, once or twice weekly; and despite the vigorous attempts made by Research workers to find better remedies, the Hydnocarpus still holds the field as the only remedy that has stood the test of time. But, with further experience of its use on a large scale, the limitations to Hydnocarpus therapy, have been better understood. The opinion is gaining ground that the best therapeutic effect is obtained with the Hydnocarpus derivatives, only in cutaneous cases of the first two degrees or in the maculocutaneous cases. With regard to the influence of these Hydnocarpus derivatives on purely anæsthetic cases, there is a sharp divergence of opinion. Some writers hold that the Hydnocarpus has no beneficial effect on the anæsthetic cases, while others equally competent, assert that it is in such cases that the best results of treatment with Hydnocarpus, are obtained. The truth, as it often happens to be, probably lies midway between. So far as the personal experience of the writer is concerned, the best results with the Hydnocarpus are obtained in early neural and early cutaneous or maculocutaneous cases; and it is very difficult or rather well nigh impossible, to render the highly advanced nodular cases, completely negative, by Hydnocarpus treatment alone.

Anderson and others 1934⁽²²⁾ report on pharmacological studies carried out with a view to ascertain (a) the probable toxicity (b) the type and mode of action and (c) the relative efficacy of the different Hydnocarpus derivatives; and conclude that the Ethyl Esters of chaulmoogra (Hydnocarpus) stand first, then comes "Alepol" (Sodium salt of a selected fraction of the Fatty acids of Hydnocarpus) and lastly the other more complex compounds.

Lara and Samson 1934⁽²³⁾ are of the opinion that it is the iodine contained in the iodised ethyl esters that is chiefly responsible for the marked therapeutic activity, the ethyl esters simply serving as a vehicle, and this opinion they base on comparative studies conducted with the iodised and un-iodised ethylolate.

Ryrie 1934⁽²¹⁾ reports on the use of Fluorescein (in leprosy)

which, of all the aniline dyes, he says, gives the most stable results and is of the opinion that it is the phthallic acid fraction in Fluorescein that is therapeutically active: and therefore recommends a six week's treatment with it, between courses of chaulmoogra treatment, as an alternative. But the writer's as well as his colleague's experience in India does not lend full support to Ryrie's opinion. Fluorescein undoubtedly helps to bring down a lepra reaction, presumably by an anti-pyretic or anti-allergic effect, but it has no influence on the sedimentation index and therefore on the natural resistance.

Paget 1934 (²⁵) and his co-workers conclude that "Lactonic acid" formed as a result of exposure to air and light, is the cause of irritation in Hydnocarpus oil or the Esters. Muir 1934 (³¹) concludes that undistilled esters are less irritating.

Nolasco 1934 (²⁶) points out the importance of the intradermal method of treatment in dealing with the local lesions as well as in concentrating the drug in the lymphatic system, thus helping to mobilise the mononuclear leucocytes and thereby increase the local defensive mechanism against the M-leprae.

Emerson and Anderson 1934 (²⁷) conclude from their studies on the toxicity of the dyes, Fluorescein, Eosin, Erythrosin and Trypan blue etc., that these dyes are highly toxic and dangerous to human beings, their reported concentration in the lesions of leprosy constituting a blocking action on the Reticulo-endothelial system, which may seriously affect the life of the treated human beings. The probability of the synergizing effect of sunlight on these dyes in the Reticulo-endothelial system by a "Photodynamic" action may jeopardise life. With these conclusions the writer is inclined to agree from his own clinical observations made earlier.

Muir and Chatterji 1934 (²⁸) recommend sub-conjunctival injections of a 0.1% solution of Grubler's Trypan Blue in normal saline, just sufficient to balloon up the conjunctiva, for the leprosy eye lesions. But the writer's experience is that it is not uniformly successful in all cases, probably owing to difference in individual response.

Chatterji S. N. and S. P. 1934 (²⁹) conclude that thyroid extract "*per se*", has no effect on leprosy and does not ameliorate even the clinically recognisable signs of hypothyroidism shown by some cases; and the writer's experience is identical.

Christian 1934 (³²) discusses the efficiency of institutional treatment for leprosy, and opines that adults respond to treatment better and can be discharged from institutions even if they show

one or two bacilli in 4 or 5 fields, after prolonged treatment; but children ought not to be discharged before they pass the age of puberty (14 to 16 years). Exercise, diet and personal hygiene of the patients are important.

Ryrie 1934 (³³) advises intravenous injections of 10 c.c. of a 2% solution of Fluorescein in Normal Saline twice weekly, for Lepa Reaction, after a few days of Hospital regime. But the writer's and his colleague's experience is that though Fluorescein is valuable in controlling the temperature, it has no influence on the sedimentation index and therefore possesses no advantage over P. A. T. (Pot-antimony Tartrate).

Roy 1934 (³⁴) discusses the surgical aspect of the treatment of leprosy, a subject that has hitherto received very scanty attention. He advocates the removal of necrosed bones, specially the meta-tarsals and the meta-carpals, from the dorsal aspect, bearing in mind that the provision of adequate drainage, complete removal of necrosed tissues, avoidance of injury to the adjacent healthy structures and the avoidance of strong antiseptics are the chief principles of any operative treatment in leprosy cases. He further draws attention to the importance of concomitant infections e.g., Hookworm, which, by debilitating the patient may retard recovery. The operation of "Canthorraphy" (anchoring the upper lid to the lower at the lateral canthus with a view to narrow down the rima and thus protect the cornea) for the relief of Lagophthalmos (Ectropion) has not proved to be an un-mixed blessing; because in crippled cases who cannot keep their eyes clean a septic pocket results which ultimately nullifies the good results of the operation.

Chatterji, S. N. 1934 (³⁰) describes the operation known as "Decapsulation" or opening into the sheath of thickened nerves so as to free the nerve-fibres from the granulomatous sheath as well as adhesions (if any); and shows how beneficial this operation is in affording relief from pain and deformities in the earlier stages, in selected cases.

Results of Treatment

Rodriguez 1934 (³⁵) concludes that chaulmoogra preparations are of real value in leprosy treatment, but our knowledge concerning the proper indications for the treatment, its limitations and its action in the human body, is still far from complete. Chaulmoogra derivatives do not seem to be as effective in incipient leprosy cases as in the more advanced cases with lesions showing acid fast bacilli. Rose 1934 (³⁶) reviews the results

of chaulmoogra treatment in his cases, and concludes that as relapses generally occur within two years after arrest of the disease, the treatment should be continued for 6 years after reaching the stage of "arrested"; and special attention should be devoted to childhood infections. With this opinion every experienced worker agrees.

Prophylaxis

In the absence of a specific for leprosy, when the causative organism has resisted all attempts at cultivation "in vitro," and no susceptible laboratory animals are available; and when our knowledge of the exact mode of transmission of the disease is based chiefly on epidemiological and clinical observations, the only scheme of rational prophylaxis that could be adopted widely can be summarised as follows:—(1) Ascertain the incidence of the disease by an accurate expert survey noting the proportion of children affected and the severity of the disease in them as well as in adults. (2) Start Propaganda cum Treatment clinics to disseminate knowledge concerning the disease and to treat all able-bodied and otherwise healthy non-infectious cases in such clinics. (3) Isolate all infectious cases effectively, (a) in their own homes if it could be done properly or (b) in suitable "Homes" and "Hospitals," and treat them with a view to render them non-infectious or at least less-infectious, or (c) if untreatable, isolate them in specially provided huts outside their own village. (4) Isolate children of infectious leprosy parents preferably at birth or as early as possible thereafter. (5) Sterilise by vasectomy, infectious leprosy cases, if no satisfactory provision can be made to isolate the offspring of such infectious cases. (6) Start "After care Homes," on a self supporting basis, to provide work and healthy surrounding for the "Disease-arrested" and "symptom free" cases who are able-bodied but at the same time cannot stand the strain and stress of life like the non-leprosy affected individuals. (7) Special colonies for the care of the crippled and otherwise deformed non-infectious arrested cases—the so-called "Burnt-outs" who need only good homes and clean surroundings. Occasional skilled medical and surgical attention for the rest of their lives, are also necessary.

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SOME ASPECTS OF RHEUMATIC CARDITIS

BY

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ONE would like, at the very outset, to offer an explanation why such a somewhat uncommon subject like the above has been taken up for discussion and what is its importance. When we look to some foreign writers of no mean position saying so late as in 1915 "that it is extremely unlikely that either Rheumatoid arthritis or Rheumatic fever ever occurs in the tropics,"⁽¹⁾ [Major Buchanan wrote "upto the moment we have no reliable statement to justify the belief that Rheumatic fever has been met with in the tropics"⁽²⁾], most queerly similar statements also occur in such standard systems on medicine as the one edited by Tice⁽³⁾. It is this type of misunderstanding that made me open up this subject for discussion in a gathering of Medical men and students. One was surprised to find that the prevailing idea was that rheumatic heart affections were not common in the Tropics as is stated by observers of cold countries. Such a view, namely, that rheumatic fever plays a very insignificant part if at all in the production of carditis in the tropics is certainly untenable when one takes into account the very typical and unmistakable cases of rheumatic fever leading to heart involvement. But it must be admitted, however, that rheumatic fever and consequent heart affections are

not at all so widespread in India as it is in European countries, specially in England⁽⁴⁾,⁽⁵⁾. But, none the less, there is no doubt that the greater proportion of cases of heart trouble in young persons in India following or associated with endocarditis is undoubtedly rheumatic in origin.

Now, while discussing some aspects of the subject proper, one has confined himself to the more or less important but not very well and widely known points in rheumatic heart disease. The discourse here is the result of analysis of fourteen cases of rheumatic carditis of different degrees of severity and of the perusal of modern literature on the subject.

In Etiology and contributory factors, the outstanding points appear to be focal infections either in the nose, throat or anywhere in the body with sensitization by a streptococcus of low virulence; seasonal recrudescence, hereditary special susceptibility, subjects below the age of twentyfive years; in our series of fourteen cases the average age was twelve years, with a predominance in females specially when the question of Chorea is taken into consideration. What part chill, damp, and poverty play in the spread of the disease, it is difficult at present to say.

Bersaques⁽⁶⁾ thinks that there is a rheumatic diathesis and an endogenous or exogenous intoxication helps in the development of the symptoms in persons having a peculiar faulty action of the liver. He has done some experimental work on diet and glycogenic function of the liver to prove his contention. According to him patients who suffer habitually from migraine and constipation are often Rheumatic patients also. Further work only will prove or disprove his contention.

Llewellyn⁽⁷⁾—believes that this rheumatic state is the outcome of thyrosuprarenal toxicosis affecting cardio regulatory or vasomotor system, which ultimately makes the carditis comparatively easy, as in some cases of exophthalmic goitre there is a toxic condition of the heart.

Pathogenesis.—Besides the question of bacterial infection—allergy—the relative resistance of the individual or virulence of the bacteria an important one is why the mitral valve is chosen first as the site of mischief in such an overwhelming proportion of cases and why endocarditis goes on progressing in ambulant persons whereas it does not progress or even does not develop in rheumatic fever patients who strictly lie down in bed?

Has the strain of the erect posture, specially when the patient strains himself to move about, has got anything to do with it? This appears probable when one notices that the lesions frequently

start along the line of closure of these mitral valves and thus suggest that the snapping together of the valve edges might mechanically injure the already inflamed delicate endothelial lining of the endocardium and may be the starting point of the whole mischief.

Modern technics reveal that the valves are much more vascular than they were formerly supposed to be. The experimental work of Rosenow in particular, lent a great support to the theory of embolic occlusion of the blood vessels of the valves leading to gradual changes till partial necrosis to various degrees of sclerosis occurred. But the recent idea seems to favour the possibility of lodgement of bacteria in minute vessels in or near the line of closure but not in the sense of clumped masses as in Rosenow's (?) experiments. It is quite reasonable to assume that factors such as relative susceptibility, virulence, altered tissue reactivity due to allergy of a previous infection—trauma of strain and movement and the particular line of treatment adopted might be the influencing, determining and modifying agents of a particular case of carditis.

The argument of Howitt and Van Meter that the deposit of organisms in and about the joints is due to poor circulation is equally true with the heart valves, whose frequent involvement can be explained on this ground, quite as well as on that of organismal selectivity. The predilection of rheumatic lesions for heart valves, vessel walls and periarticular structures harmonizes with this proposition. Probably, the local or general tissue susceptibility of younger people make them more easy victims to rheumatic carditis than the comparatively grownup individuals who have got more resistant tissues, hence, do not get the carditis so frequently as the younger people. There might be other factors too.

The question of allergy has been very thoroughly gone into by Swift (*) and his co-workers. (3) They showed that a single injection of their rheumatic streptococcus was not capable of producing the lesions of Rheumatic fever in experimental animals. Following previous inoculation the animals became sensitive to those otherwise harmless doses of streptococci, inducing lesions somewhat resembling rheumatic changes.

Applying the extensive studies done by himself and those of others, he concludes: "The theory is advanced that the pathogenesis of Rheumatic fever can be explained by the existence in certain individuals by a condition of hypersensitiveness to streptococci resulting from repeated low grade infection or the persistence of foci of infection in the body, when under suitable conditions

streptococci or their products are disseminated to the tissues, these tissues overact and the characteristic picture of the disease results".

The experiments of Clawson are in support of Swift's theories and experiments. The idea of Mester (19) is also akin but is slightly more on the line of nonspecificity. But this idea has got further support from the work of Semaroth and Koch who showed that if animals are sensitised with the injection of horse serum an endocarditis can be produced in them by Typhoid Bacilli and even staphylococci. These studies seem to unhinge the ideas of specificity from the back ground. As for the present the theory of altered tissue reactivity is an attractive and apparently sound explanation of the pathologic, bacteriologic and clinical phenomena observed. It is only time, by seeing further work, will test the truth of this idea.

Special importance of Rheumatic Carditis.—It appears that the description of rheumatic fever in the average text books is derived from the adult type of cases, where joint pain forms the dominant feature of the case. If one expects to diagnose rheumatic fever in children by joint symptoms then one is bound to say that there is practically very little chance of diagnosing the condition specially the lesion of the heart in its very early stages when treatment is likely to be most effective.

Three of our fourteen cases all of whom were below twelve years of age complained of pain in the præcordia and palpitation about four to seven days earlier to the appearance of even mild joint pains, the latter was of a vague character. In two of our ambulant cases endocarditis supervened without any history of joint trouble. The younger the patient, the greater is the chance of the absence of any joint troubles in rheumatic fever in children. It is a very sad thing to notice in practice that often the diagnosis of endocarditis is missed in its early stages to be confirmed when the valvular damage and the cardiac change is so hopelessly advanced that there is practically no hope of a useful future left to the patient. Another important point is that the heart is damaged in the young by rheumatic infection in about 90% of all cases.

The following points are singularly important in any infection likely to be of rheumatic origin in children :—

- (1) Rheumatic fever in children is mainly cardiac and the arthritic manifestations may be singularly conspicuous by their absence.
- (2) In a rheumatic infection of even a very mild and

insidious type the heart lesion might usher in long before any joint troubles are manifest.

- (3) Any vague pain in the body in a child specially with any septic focus anywhere having a slight rise of temperature should prompt the doctor to examine the heart daily and pretty carefully with a view to exclude any endocarditis even at its earliest.

- (4) With the appearance of rashes on the body or with the history of tonsillitis or any septic focal infection or pain in the abdomen which cannot otherwise be accounted for in children, the heart should be examined daily and carefully too.

In a female child of four years in our series endocarditis followed shortly after rashes in the body and pain in the abdomen.

Diagnosis.—It might be a matter of great difficulty. In the course of an attack of rheumatic fever however mild in adults or in the grownup, in children even with the suggestion of rheumatic fever with or without any evident septic focus anywhere having any extra rise of temperature or increased pulse rate with or without irregularity should lead to a very careful examination of the heart, specially when these symptoms persist after the obvious toxæmia is over. Along with such fever if there is either a tumultuous action of the heart or enlargement in size or palpitation or præcordial distress or any other suggestive subjective symptoms then again the heart requires a scrutinising examination. If in such a case one finds either a rough or prolonged or slapping first sound in the apex or rarely in the aortic area then a very strong but reasonable suspicion of endocarditis should lurk in the mind. Any intermission or irregularity of the pulse, excluding sinus arrhythmia, is highly suggestive, unless proved on the contrary, to be an evidence of myocardial change. Tumultuous apex beat is more suggestive of early pericardial than any endocardial mischief.

Though a somewhat harsh systolic murmur at the apex is suggestive, yet a soft systolic bruit developing in the course of an attack of rheumatic fever however mild or insidious should never be taken lightly. An aortic systolic murmur though suggestive and worth a closer attention, a pulmonary systolic murmur specially in children can often be neglected, unless something congenital is there. The existence of definite subcutaneous

nodules (Aschoff bodies) pericardial friction, heart block generally all mean definite changes in the heart.

The murmurs heard in our heart cases in the wards of a hospital, more often than not, are in advanced stage of valvular damage and are though easy to diagnose usually hopeless or crippling enough from the stand point of the patient.

Blood changes, electrocardiogram, blood pressure etc., are only helping agents in the diagnosis.

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THE ADMINISTRATIVE ASPECTS OF TUBERCULOSIS PREVENTION

BY

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THE various factors in the epidemiology of tuberculosis have now been generally recognized and understood. Though as an immediate result of the discovery of the Bacillus of Tuberculosis by Koch undue importance may have been attached at one time to the infection factor, the later experience of clinicians and epidemiologists has confirmed the view that the social and economic conditions bearing on nutrition are the real predominant factors in the causation of tuberculosis. The knowledge gained by the public health administration and statistics of all modern countries has now proved, beyond question, that the first stage in the urbanization and industrialization of all countries with a lowering of the social, economic and nutritional conditions of the populations has a direct bearing on the prevalence of tuberculosis, increasing it to a greater or less extent and that an improvement in these conditions by the combined efforts of the State, public health authorities and peoples' organizations under the influence of education has led to a steady decline in the mortality from tuberculosis.

Though accurate figures are lacking, it can be taken as fairly correct that tuberculosis mortality has been increasing in India during recent years. This is naturally to be expected in a developing country where industrialization, urbanization and progressive communications combined with defective social and economic conditions have lowered the standard of nutrition of the masses and very likely increased the degree of infection or tubercularization. The efforts that are now being made by Government through the agency of the King George V Thanksgiving fund are undoubtedly in the right direction as they are laying the foundation of tuberculosis prevention which, let us hope, will lead to a steady and progressive decrease in the tuberculosis mortality by counteracting the deleterious effects of the various conditions that have led to its increase during recent times.

During the last 75 years the tuberculosis mortality in Great Britain has fallen from 4 per 1000 in the middle of the last century to less than 1 per 1000 at the present day *i.e.*, by more than 75%. The mortality in certain areas of the United States of

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America has similarly fallen by about 80 to 90% during the same period. If the laws of public health and vital statistics could be trusted, it is not difficult to imagine that by the end of the 20th century tuberculosis like leprosy, will be extinct in many of the advanced countries of the West.

It is not the object of this paper to discuss the methods of improving the economic conditions of the people in India. This falls within the duties of the State and depends on the progress of the masses on educational and general lines in co-operation with the Government. The development of agriculture and of cattle breeding, the organization of co-operative credit to help the poor ryot and agriculturist, the development of the natural resources and of the industries to increase the purchasing power and improve the bodily nutrition are all anti-tuberculosis measures that do not really come within the scope of this paper.

From the standpoint of public health administration the prevention of tuberculosis can be effected by

- (1) Early diagnosis.
- (2) Education of medical officers and practitioners and medical students in tuberculosis.
- (3) Legal measures
- (4) Notification
- (5) Medical Inspection and health education in schools.
- (6) Organization of social workers and societies.
- (7) Institutional preventive measures
- (8) Food inspection.
- (9) Co-ordination of all the above, by propaganda especially in nutrition and by the formation and growth of public opinion.

Early Diagnosis.—If there be any disease where early diagnosis is of greater importance both from the public health, preventive and curative points of view it is tuberculosis. It is well known that the vast majority of infected individuals make a natural recovery. The infection rate in different parts of India probably varies between 75 and 95%, the morbidity rate between 3 and 5%, and the mortality between 0.3 and 0.5%. There can be no doubt that the morbidity and mortality rates can be considerably reduced, if there were facilities for early diagnosis and detection. It is the unfortunate fact that the physician sees the patient for

the very first time in an advanced condition that partly accounts for the high mortality from tuberculosis. The individual either from ignorance or from the false fear of detection avoids the doctor until he finds it impossible to do so any longer *i.e.*, till he reaches a stage when the arrest of the disease becomes practically impossible. The economic waste resulting from late diagnosis and prolonged disability added on to the loss of timely information as to the incidence of the disease and the conditions conducing to its spread make it highly essential that every attempt must be made to detect cases early and provide for medical advice and treatment. This involves a close and co-ordinate touch between the health authorities on the one hand and medical officers, school doctors, private practitioners and family doctors on the other.

Education of Medical Officers, practitioners and medical students in Tuberculosis.—This should constitute one of the most important items on the anti-tuberculosis programme. It is unfortunate that considerable ignorance still prevails in India amongst the medical men and women as regards the early detection of tuberculosis. It is the common experience of tuberculosis hospitals and sanatoria to find very advanced cases of tuberculosis coming for treatment either undiagnosed or wrongly diagnosed as influenza, bronchitis, pneumonia, enteric etc., atleast in the earlier progress of the disease. A large number of medical men especially those lacking in facilities for a laboratory or X-ray examination do not diagnose the disease till it has reached a late and incurable stage *i.e.*, a stage in which the patient not only has foregone his chances of recovery but has perhaps grossly infected a large number of contacts. This fact makes it highly important that medical men ought to be taught how to diagnose tuberculosis in the earliest possible stage. A special course in clinical tuberculosis has now been made a compulsory part of the curriculum of the medical Colleges in India and under the auspices of the Thanksgiving Fund facilities are now given in Madras and perhaps in other provinces as well for post graduate courses in tuberculosis. It ought to be made a policy in the medical department of every province in India to train a sufficient number of the young medical men and women freshly recruited for a period, say of 3 years in clinical tuberculosis before being posted to district head quarter hospitals and mofussil hospitals and a special course in clinical tuberculosis ought to be made compulsory for medical appointments in schools, factories, rural and urban areas and in private institutions. Such clinical courses ought to be given free

at the main Tuberculosis Hospitals and Institutions of the province.

Legal measures.—These no doubt constitute the most difficult aspect of the antituberculosis question in this country at the present day. The Sarda Act has been passed after considerable opposition. The age limit of 14 years is undoubtedly low but public opinion let us hope will ripen in the years to come. Early and frequent motherhood involving a drain on the mother and insufficient attention to the children constitutes a very important factor in the incidence of tuberculosis. It is probably too early to penalize spitting in the country at large, but attempts must be made ere long in the larger cities and towns to penalize the noxious habit which is responsible to some extent to a spread of the disease in crowded areas. Housing Laws in municipal areas, improvement of the slums by institution of improvement trusts or otherwise and enforcement of housebuilding enactments, the promotion of thrift and sobriety amongst the slums by social work and co-operative movements, the sanitary construction of schools on open air lines, each and all of these measures should be enforced by the State and by local bodies.

Notification of phthisis though compulsory in municipal areas has not been practised in this country so far. There is considerable misapprehension not only in the minds of the patient and his relatives, but in that of the doctor in attendance in notifying the disease. It should be impressed upon all of these that neither the patient nor his people will suffer any disability by such notification, that these notifications are confidential being intended for statistical purposes only and that no interference with the home life or occupation of the patient is intended. Voluntary notification can be promoted by a cordial co-operation between the health officers, medical officers and private practitioners and by educating the public, so that they can understand that its object is not to harass the patient or his family but to obtain correct information regarding the conditions of living with a view to remedying the defects leading to dissemination of the disease. By a system of such voluntary notification and by avoiding compulsion, and by a tactful co-operation between the health authorities on the one hand and the private practitioners and the public on the other it has been found possible in all modern countries to obtain correct figures for the prevalence of phthisis and apply the knowledge obtained to preventive measures against the disease.

Medical Inspection and Health Education in Schools constitute perhaps one of the most important measures in the anti-tuberculosis

programme of any country. The value of the teaching of hygiene and the elementary principles underlying the causation and prevention of diseases especially of the infectious diseases, and the value of educating the child on the subject of nutrition and correct feeding and the part it plays in the prevention of diseases in general and of tuberculosis in particular cannot be over estimated. Every child before it passes from the high school into the University ought to be equipped with a sound knowledge of the elementary laws of health, nutrition and the causation and prevention of disease. At the same time there ought to be a compulsory system of medical inspection enabling the school authorities to detect the pretuberculous condition by constant and periodic medical inspection with the idea of arresting the infection before it progresses into active disease. The parents of the pretuberculous child ought to be duly warned immediately a defect is noticed in the child so that a correction of the nutrition and other timely measures will prevent the onset of the active disease. It must be remembered that open tuberculosis is rare at school going age and, that tuberculous infection at school is a negligible factor in the dissemination of the disease, the main object of medical inspection in schools being the prevention of the active disease in adult life. Scout movements, girl guide movements and the constitution of University Training Corps which encourage healthy open air lives amongst the pupils constitute important items in the programme of tuberculosis prevention.

The prevalence of latent lesions especially in the hilus glands of the children of school going age is much greater than is considered to be the case. Systematic skiagraphy of infants and children in apparently normal health has revealed the presence of a very high percentage of active, healing and fibrosed hilus lesions, which considered alongside of the prevalence of tuberculin reactions and the general domestic and living conditions of the children leave no doubt regarding their tuberculous nature. Skiagraphy will no doubt be employed in the years to come for obtaining a more correct index of infection than the allergic test, as it affords the means of estimating not merely the infection rate, but the nutritional and other factors leading to the latent and pretuberculous lesions in a community. It was only in the post mortem room that such conditions were possible to be judged in the pre-rontgen days.

No medical inspection could be complete unless it includes a scrutiny of health conditions in the pupil's home and advice given to the parents or guardians in the matter of correct feeding and

personal hygienic attention, as also a medical examination of the teachers and caretakers at school and in the boarding establishment to eliminate possible sources of infection. It must be understood that the formation of a sound health opinion at school constitutes the foundation of the public health opinion of the coming generation and health education and health inspection in schools is therefore an item of considerable value in tuberculosis prevention.

Social Organisations and Effort.—It is perhaps far too early in India to rely much on social effort for the prevention of tuberculosis. Social Care Committees and Boards of Guardians which play a very prominent part in the life of the west in relieving distress and promoting the public health by co-operating with local bodies are unfortunately yet unknown in this country. Propaganda work in the shape of health associations and anti-tuberculosis associations are still in the early stages of organization. It ought to be the duty of the State to try and rouse private social and philanthropic effort by liberal grants and encouragement in other ways and to stimulate such activities in the right direction. India is after all a poor country depending for most of its activities on the financial assistance of Government, but organizations like the Thanksgiving Fund with the leading and guidance of Government or the heads of Government and with encouraging grants to supplement popular effort ought to be able in the years to come to take the place of the Care Committees of the West. It is the unfortunate experience in this country at present that such encouragement to private effort is half-hearted. The part that Care Committees ought to take in measures of segregation of the open cases, relief to the suffering family and provision of treatment to the active cases go a great way towards lessening the tuberculosis mortality and encouragement should be given by the State to the formation of such organizations.

Health Insurance as is found in Europe is perhaps a far cry in India and I need not therefore discuss it here.

Institutional Prevention.—The important part that tuberculosis Institutions play in the prevention of tuberculosis has been duly recognized in all modern countries, though opinions have no doubt differed on the question whether the amount of money invested in these is commensurate to the value received. A tuberculosis Institute or diagnosing and advising clinic, formerly wrongly styled a Tuberculosis Dispensary, ought to be established at every district head quarters instead of at the Presidency towns alone as at present. This will not entail any appreciable extra

expenditure as two or three days of the week can be utilized in the out-patient department for such work, separate registers being maintained for the work. It is presumed that the medical officer in charge of this work has had the training in tuberculosis referred to already and is able to cope with the district work in addition to his other medical duties. This medical officer ought to be in constant touch with the local health organizations and medical associations wherever these exist so that he can obtain the active co-operation and help of the medical and health workers of the district in obtaining early notification and rendering all the workers his best help in early diagnosis. Every tuberculosis Clinic ought to have its small laboratory with a microscope, as all district hospitals in the provinces are at present equipped and sputa and discharges must be examined here free of charge for the public. The district officer in his capacity of tuberculosis officer ought to give his services free at the dispensary for purposes of diagnosis, whether the request comes from the patient himself or from the doctor in charge. In the near future every district head-quarters hospital ought to have its X-ray plant in charge of one of the staff as his part time work for the diagnosis of the early lesions in the lung that escape physical examination and bacteriological investigation. Clinical experience has now shown that the Rontgen ray can detect a far higher percentage of the earliest lesions of pulmonary tuberculosis than the most careful clinical examination. The X-ray plant will moreover be of considerable value in the treatment of pulmonary tuberculosis by artificial pneumothorax etc. Every effort should be made to have a health visitor attached to the tuberculosis clinic, more than one being necessary at the presidency town. The health visitor is perhaps the most essential factor in early detection and in the adoption of curative and preventive measures. Health Schools are now functioning in most of the provinces and there ought to be no difficulty in obtaining a sufficient number of health visitors at a comparatively modest cost and getting them trained in tuberculosis work as well before employment.

This will be the best way of early diagnosis and collection of correct statistics both of which are of value in the control of the morbidity and mortality.

The great importance of tuberculosis institutions like hospitals, Sanatoria, colonies, settlements and preventoria cannot be over-estimated. The provision of these in India is unfortunately extremely poor. Most of the advanced countries of the world

can boast of at least one bed for 100 consumptives but we have not even 1 bed for 2000 in this country. It is quite incorrect to consider that these institutions are mere treatment centres. As such they do not touch the fringe of the anti-tuberculosis question. The saving of perhaps two to five thousand lives a year by treatment in institutions will do no appreciable good to the country. The importance of these institutions lies in their educative value. Every patient treated in an institution means at least one family educated on lines of tuberculosis prevention. The rapid spread of knowledge of the causation and prevention of tuberculosis can be effected far more successfully through these treatment centres than by mere propaganda work. The practical training that the patient gets in the institution as regards habits and modes of life whereby he is enabled not only to be a safe person in the home but a teacher of the family is of far greater value than the personal benefit obtained by him with regard to his own health. The practical methods of disinfection, personal hygiene, correct feeding and habits of life are studied and understood better in these treatment centres than by lectures and reading. The only objection to them is their cost. The required number of Hospitals and Sanatoria run on Government lines may no doubt be outside the sphere of practical politics in the present financial conditions of the country, but every effort must be made by the State to give financial and other aid to private effort. The success of institutions now run by the Xian Missions in this country with State grants, of which the Sanatorium at Madanapalle is a glorious instance ought to be a guide for future policy. Every effort must be made by the State to encourage private effort in this direction as the actual running of the institutions as completely State institutions may not be practicable. In this connection it would be appropriate to mention that it ought to be possible to construct hospitals and sanatoria on modest lines and one might copy the example of the Sanatorium at Arogyavaram in the way it has been economically and gradually developed. It is not possible for one or two tuberculosis hospitals to meet the needs of a province. It is essential that a special ward of every district hospital should be reserved for the treatment of tuberculosis cases. Roughly 10% of the accommodation should be for cases of tuberculosis and the member of the staff who has had the special training could take charge of this and the outpatient clinic as a part of his duties no extra cost being thus incurred. India has not a twentieth of the bed accommodation necessary for the treatment of tuberculosis

cases and it is no good to try and construct hospitals on costly lines if an effective and prompt move is to be made in providing tuberculosis beds. Voluntary and honorary workers will no doubt be forthcoming before long.

A dental clinic should constitute an adjunct of the tuberculosis unit, a foul mouth with bad teeth being often the forerunner of active tuberculosis and an impediment to recovery.

I do not wish to go into the thorny question of the institution of Birth Control Clinics. Personally, I have no hesitation in saying that at the present stage of the country's development, birth control will have a most decidedly beneficial effect on the tuberculosis incidence. Being a nutritional disease, there is no doubt in my mind that birth control will have a direct effect in improving the domestic economy and thereby the bodily nutrition so essential for controlling and preventing tuberculosis. Working in combination with maternity and childwelfare centres both of which are very important anti-tuberculosis institutions, the birth control clinic will cost comparatively little in money, but will certainly have a decisive influence in preventing tuberculosis in the years to come. Early marriage, frequent motherhood, and large families are no doubt a most fertile field for the ravages of tuberculosis and birth control ought to prove an efficient sterilizer of the soil.

Food Inspection.—I do not consider it necessary to stress this subject much. Bovine tuberculosis does not perhaps play any important part in the causation of human tuberculosis in India. There is perhaps no definite evidence of any wide prevalence of bovine tuberculosis in India. It is possible that in the years to come with a greater number of dairy farms coming into existence bovine tuberculosis may become a menace, but no specially vigorous measures are probably essential as regards milk and meat at present for tuberculosis prevention.

Co-operation and Co-ordination of all measures.—The many sided preventive activities outlined above involve a combined effort in several directions. It is therefore very important that there should be no overlapping or waste of labour, energy or money and that the maximum benefit should be obtained from the minimum effort. A close co-operation is therefore essential between the various agencies working with the tuberculosis officer as the central figure. His dispensary or Institute ought to be the clearing office or central office through which the various activities should be directed. These should include intensive propaganda work by broadcasting and by lectures and demonstrations with lantern

slides, cinema films, posters, pictures, exhibitions etc., which should be carried into the villages through existing health or social organizations. The importance of hygienic living and sound nutrition by right methods of feeding of infants, children and adults ought to form an important part of the propaganda programme, combined with instruction on the subjects of infection, disinfection, segregation, and institutional care and education.

With the development of the above outlined scheme and of the resources of the country through the efforts of the State, tuberculosis ought to wane steadily as it has done in many of the advanced countries of the world.

Summary

1. Tuberculosis is at present increasing in India due to urbanization, industrialization, increasing tuberculization and deterioration in the nutrition of the masses due to defective economic and social conditions.

2. The remedy consists in a combination of measures aiming at early diagnosis, education and prevention by legal and social enactments.

3. A regular course in clinical tuberculosis ought to be made compulsory for medical and health officers in public service and under local bodies.

4. Medical students, medical and health officers and practitioners should be given free facilities of making an intensive study of tuberculosis with the idea of diagnosing the disease early and accurately.

5. Tuberculosis clinics must be established at all district head quarters for diagnosing and treating cases of tuberculosis, free advice being given there and bacteriological examinations being made free for the public. X-ray equipment must be supplied to district hospitals for the diagnostic work.

6. Elementary hygiene and elementary instruction in the causation and prevention of tuberculosis and other common diseases, together with lessons on nutrition and correct feeding must be taught in all high schools and in training schools and colleges.

7. Spitting should be penalized in the public places of cities and towns.

8. Late marriage should be encouraged, by legal enactments if necessary.

9. Slums should be improved or replaced by Improvement

Trust buildings and open spaces and parks should be instituted in all towns and cities.

10. Notification of Tuberculosis must be enforced in cities and towns at first and later in the villages. Voluntary notification should be encouraged in all areas before compulsory notification is enforced.

11. Medical Inspection of Schools must be made compulsory.

12. Health Associations should be started all over the country and in the districts in which medical and health officers and social workers should combine and do propaganda work with lantern slides, cinema films, posters, pictures, exhibitions etc.

13. Tuberculosis Institutions on a small scale in the shape of tuberculosis clinics and tuberculosis wards should be started in connection with district hospitals with small laboratories and X-ray plants attached, free facilities being given there for diagnosis. Grants and gifts of land etc., should be given to private bodies for starting Sanatoria and Hospitals as these have a highly educative and preventive value.

14. Birth Control clinics, if carefully started and run under strict supervision will help the control of tuberculosis.

15. Food and milk inspection are probably of comparatively little value at present, but may have to be enforced later on.

16. Thorough co-operation and co-ordination of the various measures are essential to prevent overlapping and economize resources and effort.

17. From the practical standpoint and as an immediate advance in such work, the initiation of the following measures are suggested as has been done in Madras during the last few years, especially after the Thanksgiving Fund Committee started their work.

- (a) The training of a sufficient number of doctors, health officers, health visitors, and practitioners in tuberculosis work, as is being done in Madras, free of charge in the Presidency Hospital and Institute and at the Arogyavaram Sanatorium.
- (b) The dissemination of propaganda work in the districts for preventing the spread of the disease, through the agency of district health associations under the auspices of Thanksgiving Fund at Provincial Headquarters, obtaining the co-operation of the medical and health officers of Government in the districts and

the Health Associations either existing or to be started.

- (c) The very early development of tuberculosis clinics in the districts with cheap equipment and cheap buildings, the expenditure being diverted more towards early diagnosis and prevention than towards treatment of advanced and hopeless cases. Such work should be done free of charge.
- (d) A more or less detailed tuberculosis survey in the rural areas with the help of the existing medical and public health staff, supplemented with as many health visitors as are available or could be secured without much additional cost. The Red Cross Sub Committee of Madras is in fact initiating this work in an experimental area near the city with the help of Government and the Rockefeller Foundation. The Trivellore experimental area is now holding such a detailed survey, economic and social from all the different aspects of village reconstruction. Notification should be encouraged to facilitate the collection of accurate statistics of infection, disease and mortality with the idea of applying the remedies in the proper direction.

A RATIONAL DIETARY FOR INDIA: SOME PRACTICAL SUGGESTIONS

BY

G. RAMAN PILLAI, M.B., CH. B., (EDIN.).

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THE average man in India does not live to see his twenty-fifth year, an age when the flower of manhood is nipped in the very bud. Little wonder then that the bulk of immature manhood feels unequal to the struggle for fitness when pitted against the virile nations of the earth. Among other causes that contribute to the decadence of our race, not the least important is the defective and inadequate nourishment that undermines the stamina of the people and cuts short life before it has faced and understood the serious problems of our country. A scientific study of dietetics based on the needs of the human body seems urgently called for. The modern school-boy has learnt by heart about the vitamins and other accessory foods, while, in practice, his daily meals are

devoid of the proper proportions of the very essentials of protein, fat, and carbo-hydrate that should receive our first attention. The serious defect of the Indian dietary is the lack of proper balance, especially by the conspicuous deficiency of the protein element, and the over-loading of the carbo-hydrate portion.

Let us first of all enquire what is the total requirement of the body. Estimates of the food requirements of the body are based on the amount of energy to be derived from the diet for the physiological functions at rest without intrenching on the normal weight. This is termed the "basal" requirement. When a man is at work, the additional energy is to be obtained from an enhanced dietary, because of the increased metabolism in the organs functioning under the stress of work. These amounts of energy are measured in terms of calories or units of energy that the food materials are known to evolve by their combustion. The laboratory-estimation of the rate of metabolism of each individual is the ideal proceeding when we start constructing a dietary for him on the basis of his caloric needs. But in practice all that is necessary is to follow determinations of basal metabolic rates gathered from long experience, and arrive at an average for the ordinary individual. A man weighing 100 lbs. is found to need food equivalent to 1200 calories (*i.e.*, 100×12) for his basal requirement for 24 hours, and probably 1500 ($=100 \times 15$), or 2000 ($=100 \times 20$) calories while at moderate or hard work. His weight in pounds multiplied by the factor 15 or 20 indicates the rate of metabolism or dietetic needs for grades of work. Similarly, a man whose correct weight (that depends on his body length, age, climate, *etc.*) is 150 pounds should have for practical purposes a 'basal diet' capable of developing $150 \times 12 = 1800$ calories; for moderate work he would need about $150 \times 15 = 2250$ calories; and for hard work about $150 \times 20 = 3000$ calories. Although the "basal diet" is the irreducible minimum compatible with existence without loss of weight, there is an optimum diet for each man, in sound health with normal organs of assimilation and excretion; that is a quantity of food that is represented by a caloric value between the basal figure and the figure for hard work. The nearest approach to the basal diet is the diet of the sick and that of the true sanyasin; and the field labourer is the example where a high caloric food is consumed for his enhanced energy output. The recovery from sickness is possible only when a patient can use up his basal nourishment and ascend the scales of activity diets. From the above it would be clear that our problem of diet resolves itself into one of making up our caloric requirements from the

articles of food we are in the habit of taking. We shall presently discuss how this is to be done. Meantime, another important matter, that of 'balancing' our diet, has to be considered here. This simply means, that, whatever foods and calories represent our basal diet, the ingredients of which they are composed should be so 'balanced' that the proportion between the protein, the fat, and the carbohydrates should be maintained in a manner best suited to the human organism. In other words, the chief aim of dietetics is so to balance our diet as to attain our caloric needs while selecting foods that are agreeable to the palate or our sentiments. How to arrive at the correct balancing of our food? Strictly speaking, each individual is a law unto himself as regards the quantities of protein, fat, and carbohydrate that he can tolerate; and each of these should be accurately determined by his capacity to digest and assimilate these foods and to store them in the body, and eliminate their products through the usual channels. No ready-made diet would suit everybody; but where the organs are normally functioning, an average can be prepared that would meet the ordinary man's demand. Nitrogenous food is essential for growth and tissue replacement in our organs; and protein is the only form in which the nitrogen can be utilised in the body. The protein intake should first be determined. The German school of dietists advocate 160 grammes of protein as an average for a man for 24 hours; while Chittenden in America maintains that 60 grammes are ample. For India, the American measure of 60 grammes on the average seems suitable. Roughly, for every pound of a man's weight, one-half gramme of protein should be estimated; a man weighing 120 lbs. receiving 60 grammes of protein for 24 hours, this quantity being derived from the materials of his food as listed in this article. The 60 grammes of protein has the caloric value of $60 \times 4 = 240$, (as one gramme of protein of whatever origin is equivalent to 4 calories). On a workable basis, the average healthy Indian (weighing about 120 lbs.) should take roughly 60 grammes of protein, 50 grammes of fat, and about 190 grammes of carbohydrate, totalling about 1450 calories as a basal diet:

Balanced Basal diet for an average Indian weighing 120 lbs.

	GRAMMES	CALORIES.
Protein	60	240
Fat	50	450
Carbohydrate	190	760
		1450

When additional calories are demanded by enhanced work, these are made up by means of carbohydrates that form the energy providing food. As a working diet the average South Indian labourer consumes about 600 grammes of carbohydrate in a day (=2400 calories.) The proteid and fat ratios need not be altered ordinarily for enhanced work for the same person. [Under exceptional circumstances, in intense work and in convalescence proteins are increased for their stimulating value; the British Army rations for active service provide as much as 120 grammes of protein per day, and a total caloric value of food of 4000 per day. It is a far cry from the daily food of the poor Indian ryot to that of the efficient Western army man]. The 50 grammes of fat would give us $50 \times 9 = 450$ calories of energy (one gm. of fat being equivalent to 9 calories). The carbohydrate of 190 grms. conveys $190 \times 4 = 760$ calories (as a gram of carbohydrates 4 calories). The complete balanced diet therefore brings up the caloric total to $240 + 450 + 760 = 1450$, that is roughly the basic value for the man of 120 lbs. in weight.

Having fixed the amount of food of our daily diet and the relative proportions of the essential elements, protein, fat, and carbohydrate, in other words, having balanced our diet on the basal caloric value, our next endeavour is to gather our protein, our fat, and our carbohydrate from among the provisions available in the market. Few foods are purely protein, fat, or carbohydrate in their composition; most of them, as will be seen from the tables of food appended, are mixed foods. Our ingenuity will now be directed to compose our dietetic menu or bill of fare so that all the cooked and uncooked foods put together would approximate our caloric figure while maintaining the proper balance. Let us suppose we have to construct the dietary for a man whose correct weight is 120 pounds. His basal caloric value is $120 \times 12 = 1440$. The 60 grms. of proteins may be divided between the three principal meals of the day; thus giving us some 20 grms. for each meal. The 20 grms. of protein can be gathered from: say, three eggs and two ounces of milk (see tables of food values); or from four ounces of fish; or from two ounces of bacon and two eggs. For vegetarians, four ounces of (dry) oatmeal cooked, with four ounces of milk would bring in the 20 grms. of protein; or, alternatively, "Iddlies" weighing about 12 to 16 ounces, made from $1\frac{1}{2}$ ounces of dry gram (pulses) carrying 8.5 grms. of protein, and $4\frac{1}{2}$ ounces of dry parboiled rice (carrying 8.1 grms. of protein) together with some four ounces

of milk in coffee or tea. For the mid-day meal, the 20 grms. of protein for rice-eating vegetarians has to be composed from say 8 ounces of unpolished rice (=18.4 grms. of protein) and some $\frac{1}{4}$ ounce of dry dhals curried, with vegetable curries to taste. The protein for purely vegetarian supper may likewise be secured from wheat chappaties or other preparations made from whole wheat or atta, say, four ounces of it (=15.6 grms. of protein), with accompaniments and milk to make up the deficiency. Sugar, tea and coffee, have no value as protein, and may be indulged in without transgressing the allotted limits of the balanced diet. For non-vegetarians, the menus are easier of construction from the richer animal protein foods available. For the very poor, it is worth while remembering the cheap duck's egg that has high nutritive value, a single duck's egg yielding as much as ten or twelve grams. of protein, and an anna's worth of the egg would supply the major part of a day's protein. The beans and legumes are other cheap foods with high protein content.

The fat and carbohydrate complements for the diet can also be adjusted in the same manner with the help of the food tables given below. The wheat, rice, and other cereals may, of course, be consumed in the shape of cakes and other palatable preparations.

The real difficulty in India is to prescribe a uniform bill of fare, owing to the variations of the food menus from province to province, and the different degrees of vegetarianism professed. A practical method of constructing a diet is to draw up a list of the articles a man is accustomed to, and calculate the amounts of protein, fat, and carbohydrate available therefrom; the alterations and adjustments of the components can be made with a view to balance the diet and to supply the necessary energy for work. The dietist is not likely to be the unmitigated academic nuisance that he now is, if we endeavour to base the diet on foods and dishes relished by the people, while avoiding a clash with established tastes and dislikes. An example may be here given of the mixed diet of a person in health weighing about 120 lbs. The accessory foods are not mentioned in this brief survey. Foods with vitamins can be noted from the tables of foods attached.

Diet for a Man of 120 lbs. for a Day

FOODS.	QUANTITY IN OUNCES.	TOTAL GRAMS OF			CALORIES.
		Protein.	Fat.	Carbo- hydr.	
Oatmeal	2	8	4	36	219
Egg	1	6	6	—	78
Milk (cow's)	4	4	4	16	116
Mutton	4	24	12	—	304
Butter	1	—	23	—	907
Wheat bread	8	9	—	104	459
Sugar	2	—	—	56	224
Vegetables	4	2	1	12	66
Rice (par boiled)	4	7	—	104	444
Totals	...	60	50	328	2002

The above diet is fairly well balanced and the caloric value of 2002 for the 120 lbs. gives us nearly 17 calories to a pound of body weight—suited to a moderately hard work. If mutton is not desired, it may be replaced by fish, or four eggs.

To recapitulate, it may be remembered that, starting with the correct weight of the individual, the first step is to fix the amount of protein requirement at the rate of one half gram per pound of the body weight. The next step is to select the desired proteins out of the list of foods available. Thirdly, the fat component to be calculated by taking into account the quantity present in the proteid foods selected, and supplementing it with articles such as butter, ghee, or other edible oils. Fourthly, the carbohydrate complement is arrived at in a similar manner, so that the caloric optimum is reached for the individual in normal health and performing his usual amount of work.

It is unnecessary to add that medical men and others should interest themselves in dietetics as a problem of urgent national importance. Cookery should be included in the school curriculum for every boy and girl; and scientific instruction imparted in the cultivation, the marketing, the selection and the preservation of foods without the loss of the nourishment contained in them. The population should be ensured an adequate food supply, especially the proteid foods that are at present hard for the poor to come by. Inspection and control of foods are all very well; but what is equally important is a greater production and supply of protein foods, by cattle, poultry, or dairy, farming, and cultivation or importation of others that can come within the reach of the masses.

TABLE I.
Protein Foods and their Values.

PROTEID FOODS.	GRAMMES IN ONE OUNCE.			CALORIES PER OUNCE.	VITAMINS *			
	Protein.	Fat.	Carbo- hydr.		A	B	C	D
Meat (goat's)	7.2	0.75	—	36	—	+	—	—
Mutton, lean	6	3	—	51	—	+	—	+
Beef	6	2	—	48	—	+	—	+
Bacon	3	18	—	180	—	—	—	—
Pork	6	3	—	53	—	+	—	—
Fat Fish	5.3	3.7	—	55	+++	+	—	—
Fish (non-fat)	5	—	—	22	—	+	—	—
Egg (hen's)	6	6	—	80	++	+++	—	—
Cow's Milk	1	1	1.5	19	+++	++	+	+
Cream	1	5	1.2	60	+++	+	—	+
Butter-milk	.8	.1	1.3	10	+	+	+	—
Milk-sheep's	1.5	2	1.4	30	+++	+	+	+
Milk-Buffalo's	1.8	2.1	1.2	30	+++	+	+	+
Chicken	6.7	.8	—	30	+	+	—	—

* + indicates presence of Vitamins.
 ++ " high vitamin content.
 +++ " very high "
 (—) " no vitamin.

TABLE II.
Cereal Foods and their Values

CEREALS.	GRAMMES IN ONE OUNCE			* CALORIES PER OUNCE.	VITAMINS.			
	Prot.	Fat.	Carbo.		A.	B.	C.	D.
Rice, unpolished	2.3	—	22	99	—	+	—	—
Rice, polished	1.8	.1	26	113	—	—	—	—
Rice, parboiled	1.8	.2	26	114	—	+	—	—
Wheat (whole)	3.9	.5	20	102	+	++	—	—
Wheat flour	3.1	.3	21	102	—	—	—	—
Wheat bread	1.2	—	18	65	+	++	—	—
Oatmeal	4.	2.	18	112	+	++	—	—
Ragi	2.7	.4	23	109	+	++	—	—
Cholam	3.	1.	20	101	+	++	—	—
Peas (dried)	1.8	1	4.7	28	+	++	—	—
Dhal	6.5	1.	16	100	+	++	—	—
Gram	5.7	1.3	15	96	+	++	—	—

* One gramme of Protein = 4 calories.
 " " " Fat = 9 "
 " " " Carbohydrate = 4 "

TABLE III.
Vegetable Foods and their Values

VEGETABLE FOODS.	GRAMMES IN ONE OUNCE.			CALORIES PER OUNCE.	VITAMINS.			
	Protein.	Fat.	Carbo.		A.	B.	C.	D.
Cucumber	.2	—	.5	8	—	+	++	—
Lettuce	.3	.1	.5	4	++	+++	++	—
Papaya	.1	—	.1	1	+	+	+	—
Brihjal	.3	.1	1.4	8	—	+	++	—
Tomatoes	.2	—	1.2	6	++	+++	+++	—
Pumpkin	.3	—	1.4	7	—	+	++	—
Spinach	.5	.1	.8	6	+++	+++	+++	—
Cabbage	.1	—	1.2	7	+++	+++	+++	—
Beans (fresh.)	.5	—	1.3	8	+	+	+	—
Bhendi (ladies fingers)	.5	.3	1.7	12	—	+	+	—
Onions	.3	—	.3	14	—	+	+	—
Bananas	.5	.03	2.2	11	—	+	+	—
Potatoes	.7	—	.8	36	—	+	+	—
Garlic	.2	—	.8	40	+	+	+	—
Yams	.5	—	.6	28	—	+	+	—
Apples	.1	.06	3.5	15	—	+	+	—
Oranges	.3	.03	2.7	12	+	+	+	—
Pineapples	.1	.1	2.7	12	++	+	++	—
Mango	—	.2	5.2	23	+	+	+	—
Tamarind	.4	—	8.9	37	—	+	+	—

TABLE IV
Sugars and Fat Foods and their Values

FAT FOODS	GRAMMES IN ONE OUNCE.			CALORIES AN OUNCE.	VITAMINS.			
	Protein.	Fat.	Carbo-hydr.		A.	B.	C.	D.
Butter and Ghee	—	23	—	208	+++	—	—	+
Cod-liver oil	—	28	—	252	+++	—	—	+
Cocoa-nut oil	—	28	—	252	+	—	—	+++
Gingelly oil	—	28	—	252	—	—	—	—
Olive oil	—	28	—	252	—	—	—	—
Ground nut oil	—	28	—	252	—	—	—	—
Almonds	5.2	16	4	182	—	+	—	—
Cocoa-nut	1.6	14	8	167	+	+	—	—
Ground nut	7.3	11	7	155	—	+	—	—
Other nuts	5.	16	4	183	—	+	—	—
Sugars :								
Sugar-white	—	—	28	113	—	—	—	—
„ brown	—	—	27	108	—	—	—	—
Jaggery	0.1	—	25	100	—	—	—	—
Honey	0.1	1	20	81	—	—	—	—

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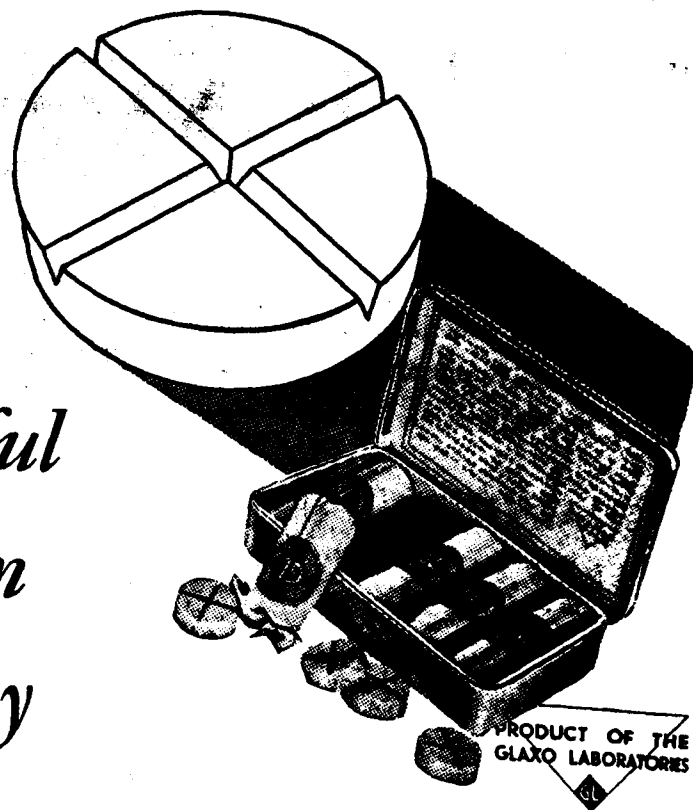
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Considerations on a Case of Dercum's Disease.

After having described a case of Dercum's disease, the Author affirms that, as regards the epilepsy of which there were notes in the family history of his patient, dysendocrine stigmata (ovarie as well as thyroidal and parathyroidal) are to be observed in epileptic subjects. The Author also states that he obtained excellent results by treating epilepsy with Endovarina, associated with other organotherapeutic product or with chemical medicaments.

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AMOEBAICIDAL REMEDIES

BY

J. CHRISTODOSS DAVID, M.B., B.S., Ph.D.,

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It is almost a truism to say that when a large variety of therapeutic agents are advocated for a particular disease its treatment is still in an unsatisfactory state. Such unhappily is the state of matters regarding the treatment of amoebic dysentery. The great variety of drugs tried in the treatment of this disease can be classified under the following heads:—

- (1) Ipecacuanha and its alkaloid, emetine.
Emetine Bismuth Iodide and Emetine Periodide.
- (2) Oxyquinolin derivatives:—
 - (a) Chiniofon or Yatren 105, which is Iodo-hydroxy-quinolin-sulphonic acid.
 - (b) Viniform or Iodo-chlor-hydroxy-quinolin.
- (3) Arsenicals:—Stovarsol and Carbarsone.
- (4) *Holarrhena antidyenterica* or *Kurchi* and its alkaloids.
- (5) Miscellaneous astringents and antiseptics, e.g., Bismuth subnitrate, Rivanol etc.

Ipecacuanha.—Ipecacuanha was used in Brazil for dysentery many centuries ago, but it was unknown in Europe till 1648 when Piso, the founder of tropical medicine introduced it. The successful use of this drug attracted the attention of one, Helvetius, who obtained a supply and sold it in Paris as a secret remedy for dysentery. He was fortunate enough to cure the Dauphin of France and eventually the French Government bought the secret from him. Its fame fluctuated through the years that followed, chiefly due to the difficulty of administering the drug. Because of the vomiting caused by the chief alkaloid emetine, Ipecacuanha sine emetine came into vogue.

But the reason this latter preparation held the field even for a short time was that owing to imperfect chemical methods a portion of the alkaloid was still left. Sir Leonard Rogers (1913) was the first person to take up Vedder's suggestion and to introduce the alkaloid for the routine treatment of amoebic dysentery.

The root of the plant, *Psychotria ipecacuanha* contains three alkaloids. In 1817 Pelletiere, the French chemist isolated the alkaloid, emetine. But it was not in a pure state, for in 1899 two

English chemists showed it to consist of two alkaloids, emetine and cephaeline. Subsequently a third alkaloid, psychotrine was isolated by them. As these alkaloids yield on chemical treatment simple iso-quinolin derivatives they may be placed in the iso-quinolin group. They are all chemically allied and interconversions can be brought about.

Pharmacological Action

External.—Emetine is a local irritant and applied to the mucous membrane causes marked irritation. Hypodermic and intra-muscular injections cause some oedema at the site of injection and extensive capillary haemorrhages among the muscle fibres round the site of injection. No necrosis occurs.

On the alimentary tract.—Half a grain of emetine develops nausea quickly, followed by vomiting. Much larger doses can be borne by injection before nausea develops and the action therefore seems to be mostly on the stomach. After injection the drug can be detected in the stomach and the intestines. The tone and mobility of the gut are stimulated, the effect being greater as one passes from the stomach distally down to the colon. There is also increased vascularity of the gut, the volume and automatic movements of the spleen also being augmented. This pooling of the blood in splanchnic vessels, the area affected by *E. histolytica*, Chopra considers a factor in its amoebicidal action.

On Respiration.—Small doses cause an increased secretion in the respiratory passages reflexly and thus act as expectorants. Toxic doses cause pulmonary congestion.

On Circulation.—On the heart of both cold-blooded and warm-blooded animals emetine has a toxic action. It depresses the excitability and conductivity of heart muscle and produces slowing and dilatation of this organ but this is not influenced by atropine or section of the Vagus. Auricular and ventricular dissociation is often produced and in most cases death is accompanied by ventricular fibrillations. Rinehard and Anderson (1931) found that lethal or sublethal doses of emetine hydrochloride in rabbits caused severe injury to the heart muscle. An interval of time was required for morphological changes to become apparent. Animals dying in less than forty-eight hours showed evidence of heart failure with an interstitial oedema of the heart muscle, indicated by the spreading apart of individual fibres. In animals surviving lethal or sublethal doses for three or more days, necrosis of some fibres and a degenerative swelling in the remaining muscle fibres became evident. This resulted in a rarefaction of

the heart muscle and in focal proliferations of the interstitial tissue in response to necrotic muscle fibres.

Intravenous injections to experimental animals cause a fall of blood pressure which is transitory. This is mainly due to the toxic action on the heart but vasomotor paralysis may also be a contributory factor. Capillaries are also affected and the endothelium is damaged and petechial haemorrhages may occur.

Epstein (1932) found that perfusion of the isolated heart with emetine cephaeline caused marked dilatation of the coronary vessels. Coronary dilatation occurred with concentrations which had practically no depressant effect on the heart. He thinks that possibly these drugs may prove of value in conditions due to constriction of the coronary vessels, *e. g.*, in certain cases of angina pectoris.

On the Central Nervous System.—Emetine is a depressant of the nervous system and causes in the frog a slowly advancing central paralysis. In mammals neuritis may be produced.

Excretion.—Emetine is eliminated by the gut and the kidneys. Excretion by the kidneys is discontinuous and prolonged. Large doses cause inflammation of the kidney.

Toxicity.—Epstein (1932) found that the minimum lethal dose of emetine to anaesthetised cats, when given intravenously was 9 mg. per kgm. and that of cephaeline, 13 mg. per kgm. When given subcutaneously death was delayed by more than a day. In these cases death was due to respiratory failure, the lungs showing congestion. The subcutaneous minimum lethal dose of emetine was 18.5 mg. per kgm. and that of cephaeline 13 mg. per kgm.

The toxic effects of prolonged emetine administration were recognised during the last war when large doses were occasionally given. Emetine diarrhoea occurred very often and was mistaken to be due to the causative parasite. Acton and Knowles (1928) quote the case of a military medical officer whose cardiac mechanism has been permanently damaged by overdosage with emetine, but who still suffers from periodic relapses of amoebic dysentery, cannot take emetine at all and has tried numerous other 'cures' without success.

Dale (1915) was the first to study the cumulative effects of emetine and found that in rabbits a profound diarrhoea set in, while in cats there occurred a lethargy deepening into coma. In man, cases of neuritis and cardiac derangement were not infrequently encountered. In his experiments Dale used cats and rabbits and used doses that in proportion to the weight of the subject would be considered as rather too high for continued

administration to man. The average weight of man being taken as 65 Kilograms, a dose of 1 mg. per kilo body weight gives the dose of about 1 gr. for such a patient. Cats weighing about 3 kilos were given doses of about 5 mgm. which work out to be $1\frac{1}{2}$ grains for an average man. Such a dose given once daily has no perceptible action of any kind on the animal and it may be repeated up to a point without any deleterious effect. These dosages range from 3 to 12. If, however, doses are continued for a fortnight, symptoms of intoxication appear sooner or later, become rapidly intensified with persistence of daily injections and terminate fatally. The results are very significant and clearly show the cumulative toxic effects of the drug. They show the serious danger of pushing on the administration beyond a certain point and ought to serve as a warning for indiscriminate and unguarded use of emetine. Young and Tudhope (1926) who recount a personal experience, noted that after 18 grains of emetine in the course of 12 days, there were weakness of the arms and legs, ankle drop and some muscular wasting; There was no pain and no tenderness in the muscles. The knee jerks were sluggish. From the summary of the toxic effects collected from human cases, it is clear that besides pronounced gastro-enteritis, acute renal insufficiency, general oedema, peripheral neuritis, delirium, coma and cardiac failure may also occur.

Amoebacidal Action.—The most important use of emetine is in dysentery caused by *Entamoeba histolytica*. Vedder showed in (1912) that the action of ipecacuanha in dysentery was due to its alkaloid emetine. Both Vedder who suggested it and Rogers (1913) who adopted the idea and introduced the alkaloidal treatment, considered that emetine had a direct parasiticidal effect on the amoeba. Dale and Dobell (1917) investigated the action of emetine on experimentally infected cats and—at that period—came to the conclusion that the action was an indirect one, perhaps, in some way rendering the tissues of the host unsuitable for the amoebae. Sellards and de Leiva (1923) on the other hand proved that infected kittens could be saved by rectal administration of emetine and concluded that it had a weak amoebacidal effect. But later observations showed that the earlier conclusions reached regarding the action of emetine on amoebae were based on results of imperfect technique. The length of survival of the organism outside the body was short and only a short exposure to emetine was possible. These results were compared with the therapeutic effects where emetine action was spread over several days and hence the disparity.

Dobell and Laidlaw (1926) devised a technique whereby the amoeba could be grown on a liquid medium, and the action of the different concentrations of the drug was observed on the cultures for prolonged periods, the cultures being kept in the incubator. Treated with this technique, emetine stands alone in its lethal action on *entamoeba histolytica*. It was found that a dilution of 1 in 5,000,000 of emetine is lethal for *entamoeba histolytica*, *in vitro* within four days, provided the reaction of the medium is not more acid than pH 6.4: with greater acidity the potency of emetine *in vitro* is reduced.

These experiments demonstrate that doses of emetine and other alkaloids requisite to kill *E. histolytica* immediately bear no relation to the minimal doses of the same alkaloids which are eventually lethal if maintained for a period of days; a very small quantity of emetine if constantly present in the intestines for days and weeks would probably suffice to make life therein impossible for *Entamoeba histolytica*, though not for the *Entamoeba coli*. The evidence which is at present available is thus in favour of the view that the therapeutic efficiency of emetine in human amoebic dysentery is probably due to a direct toxic action of the alkaloid on *E. histolytica*.

Theoretically, emetine should be an ideal drug against intestinal amoebiasis as after injection and its excretion through the intestinal wall it should destroy most of the amoebae. But it has been shown that even after the most intensive course, *i.e.*, a total of 12 injections of 1 gr. each, more than half the cases relapse or get into a chronic state showing cysts in the stools. This may be partly due to the fact that although emetine acts on the organisms lodged in the tissues of the gut wall it has no action on those in the lumen of the gut. As a rule the organisms are found in the margin of the ulcers and in abscesses deeply buried in the tissues. These deeply seated organisms are reached by emetine given by injections, until fibrosis begins and cuts off access to the organisms. This occurs in chronic cases. *Entamoeba* lying in necrotic and fibrotic tissue which is avascular are liable to escape the emetine. Encysted parasites are also not acted upon by emetine. So the best results are obtained if treatment is undertaken early enough before destruction of tissue occurs and before the parasites have time to get encysted. Another factor in delayed or imperfect cures is that emetine acts best in an alkaline medium and the pH of the intestinal contents in amoebic dysentery is 6.3. Large doses of Bismuth carbonate tend to increase the alkalinity of the portal blood stream. And so the

injection of emetine should be preferably given about 2½ hours after the administration of the bismuth salt.

ADMINISTRATION—Emetine in the form of hydrochloride may be given subcutaneously or intramuscularly. Intravenous injections may depress the heart to a dangerous extent. Some pain is felt at the site of injection but it has been suggested by Causton (1922) that this may be eliminated by dissolving the alkaloid in 1% carbolic acid immediately before the injection.

EMETINE BISMUTH IODIDE—This is a brick red powder containing not less than 26 % of emetine. It was introduced by Du Mez (1915) but was not seriously considered until Dale took up its study in 1916. It was originally thought that this salt would pass into the intestine without being dissolved in the stomach and remain a longer time in contact with the ulcerated mucosa. But Martindale (1923) pointed out that in contact with HCl in physiological concentrations, the compound is slowly decomposed with the formation of bismuth oxychloride. The drug causes intense vomiting and all attempts to prevent its ionisation in the stomach by giving it in pill form with salol or keratin coating have not been successful. Acton and Knowles (1928) prefer to give it by mouth dissolved in liquid paraffin after an injection of omnopon. Diarrhoea, and loss of weight have been noticed during the course of treatment, which consists of 10 to 12 nightly doses of 2 grs. each. Reported results are rather conflicting. Acton and Knowles (1928) are of the opinion that the majority of the carriers can be cured by this treatment.

Manson-Bahr and Sayers (1927) state that the introduction of this drug has considerably raised the percentage of cases of chronic amoebic dysentery permanently cured. Sometimes more than one course will be found necessary.

EMETINE PER IODIDE—This was prepared by Martindale (1923) and is a dark purple crystalline powder containing about 38.7 % of emetine and 61.3 % of Iodine. It is not decomposed by acids, but a 2 % solution of sodium bicarbonate liberates the emetine. Manson-Bahr (1925) believes that the periodide is more easily tolerated by the patient (in doses of 2 grs. per day) than the bismuthous iodide but is less efficacious in eradicating chronic infections.

AUREMETINE—This was introduced by Willmore and Martindale and is a dark maroon powder, insoluble in water, containing about 28 % of emetine, 16 % of auramine which is a complex aromatic compound and 56 % of Iodine. It liberates emetine and auramine in the gut. The stools are coloured orange by the latter.

It inhibits the growth of free living amoeba. It has been tried along with arsenicals like stovarsol. It is given by mouth in 2 grs. doses and is less depressing than emetine but has not been found superior in effects.

ALCRESTA IPECAC (Lilly & Co.)—This is a product in which total alkaloids of ipecacuanha bark are said to be adsorbed with Fuller's earth, each tablet containing the total alkaloids from 10 grs. of ipecacuanha. About 30 grs. a day constitute the dosage. Experience has shown that although this preparation will occasionally eradicate an infection with *E. histolytica*, yet in the majority of cases the results are unsatisfactory (Acton and Knowles 1928). The drug has no irritant effect on the stomach and is well tolerated by patients.

Gavano.—This is a preparation made by Bayer. It is apparently a derivative of emetine or cephaeline along with an organic acid. It is well tolerated by mouth. In therapeutic doses, Chopra, Sen and Sen (1934) did not find it to have any marked amoebicidal effect.

2. Oxyquinolin Derivatives

A. Yatren or Chiniofon N. N. R.—Yatren or Iodo-hydroxy-quinolin-sulphonic acid is a German preparation, containing 28 % of Iodine. It is a pale yellow powder which readily absorbs moisture. Muhleus and Menk in (1921) reported the cure by yatren of 8 resistant cases of amoebic dysentery and since then it has been more widely used. Unfortunately, published results are very discordant. The consensus of opinion is that alone it is not as efficacious in acute as in chronic cases of amoebic dysentery. Oral and rectal administration combined with emetine injections have given better results. A painless diarrhoea ensues the administration of this drug in large doses. Even less than 15 grs. per day lead to this very inconvenient result.

Its amoebicidal effect *in vitro* is not marked. Wagner (1928) found that a solution of 1 in 50 was required to kill cultures of *E. histolytica* in 24 hours, dilutions of 1 in 100 only injuring the amoeba. David, Leake et al (1933) found the amoebicidal concentration *in vitro* to be 1 in 500. York and Adams (1926) found that 5 % solution had no action on the cysts. But Vogel (1927) found that in 5000 inhibited growths of *Entamoeba* in cultures while in 100 killed them in a few hours.

B. Vioform.—N. N. R. David, Johnstone, Reed and Leake (1933) report on the use of Iodo-chlor-hydroxy-quinolin, otherwise known as Vioform, orally in amoeba infected animals and in man

This new preparation is a greyish yellow powder, almost insoluble in water and sparingly in alcohol; it contains 40 % of Iodine and is absorbed to some extent from the gut as it is partly excreted in the urine. They recommend doses of 0.75 Gm. daily in capsules of 0.25 Gm. each for 10 days, the course being repeated after a week's rest, if necessary up to a total of 15 Gm. Clinical cure was obtained in 38 out of 47 cases, as shown by 3 to 6 months follow up; there were 6 recurrences among 7 patients exposed to reinfection and no evidence of toxicity was noted in any. Usually the patient's stools hardened after 3 or 4 days treatment and some constipation was noted. The stools presented a characteristic oily green appearance.

In vitro Vioform as soluble HCl compound killed *E. histolytica* in 24 hours at a concentration of 1 in 10,000.

These authors are of opinion that vioform is the best amoebicide that has been investigated so far.

3. Arsenicals

Stovarsol (otherwise called spirocid or Acetarsonne) was first introduced by Fourneau and used as an oral specific in syphilis. Later its use was advocated in amoebic dysentery with a certain amount of success. It is given in tablet form, 4 grains twice or thrice a day. Acton and Knowles always turned to this drug in case of chronic amoebiasis and in relapses where emetine-bismuth iodide was of no use. Manson Bahr (1925) also reported two cases of relapsing amoebic dysentery which were resistant to emetine but were cured by stovarsol. The majority of workers prefer to give stovarsol along with emetine. Willmore and Martindale (1926) gave four grains of stovarsol thrice a day on alternate days to auremetine for a period of seven days, emetine in olive oil being given per rectum on the stovarsol days. Sautert (1927) found that combination of emetine injection and stovarsol gave better results than emetine bismuth iodide. Bender (1927) found that stovarsol was too toxic in doses necessary for effectiveness.

Carbarsone—A. C. Reed, N. A. David and L. Leake (1932) report very favourable results in amoebiasis from the use of a new arsenical preparation, 4-carbamino-phenyl arsonic acid or *Carbarsone*. It was first prepared by Ehrlich and is a tasteless white crystalline solid, insoluble in water but soluble in alkaline aqueous solutions. It contains 28 % of arsenic. It is much less toxic than stovarsol and its therapeutic index is 8 times as great. From its composition, possessing as it does, an amino group in the para position it may possibly be toxic to the optic nerve. It is

contraindicated in kidney or liver disease as it produces renal necrosis in animals. Extensive clinical trials in cases of amoebiasis justify the claims made for this drug as an amoebicidal remedy. The average total dose is 4.1 gram or 75 mg. per kilo of body weight in the course of ten days orally, given in 0.25 gm. doses twice daily in hard gelatin capsules. It is clinically non-toxic in effective dosage. Reed, Anderson, David and Leake (1932) suggest that the course of treatment be repeated in 10 days if the stools fail to clear. The arsenic in carbarsone is not very rapidly eliminated and care must be taken not to induce arsenic toxicity. This drug has been tried with success by Chopra in the Calcutta School of Tropical Medicine.

4. *Holarrhena antidysenterica*

This is a plant indigenous to India growing throughout the length and breadth of the peninsula. It is commonly known by its Bengali name *Kurchi*. An alkaloid *conessin* was obtained by Haines (1858) from the bark. *Holarrhennine* was isolated by Pyman (1919) and Ghosh (1928) found two other alkaloids—*Kurchins* and *Kurchicine*. A decoction made from the bark has been a household medicine in dysenteric conditions for very many years. Brown (1922) tested the action of conessine on free living amoeba and found that it had an amoebicidal action and could even in such high dilutions as 1 in 1 million inhibit the growth of amoeba in cultures. These results were confirmed by Chopra, Gupta, David and Ghosh (1927) who found that conessine has a specific effect on *Entamoeba histolytica* obtained from the stools of infected kittens, for it kills the entamoeba in mucous flakes in dilutions of 1 in 280,000 in 8 minutes in the presence of an alkali and is superior to emetine in this lethal action. Pharmacologically a fall of B. P. was noted when conessine was given intravenously and toxic doses produced heart block. Clinical trials showed that the symptoms were very greatly ameliorated by administration of tablets of Kurchi bark in doses of 20 to 30 grains a day.

Knowles *et al* (1928) found that the simple administration of Kurchi by mouth cured seven cases out of sixteen and was preferable to the hypodermic injection of both conessine hydrochloride and the hydrochlorides of the total alkaloids of Kurchi bark. Acton and Chopra (1929) concluded that the results of treatment with total alkaloids of Kurchi bark are far superior to those obtained with emetine. The Kurchi alkaloids are much less toxic than emetine and have little irritant, depressant or

emetic effects. Intra-muscular injections show much less local reaction. Injection was the method of choice in acute cases. Kurchi Bismuthous Iodide could be given orally in 10 gr. doses twice a day for 10 days without deleterious effects. In chronic amoebic colitis 4 grs. Kurchi bismuthous iodide given orally twice a day for 10 days cured 12 out of 18 cases, compared with one out of every two with emetine bismuth iodide. In nonsuppurative amoebic hepatitis intramuscular injections of the total alkaloids had a curative effect. Reed however, quoted by Leake (1932), gave 0.5 gm. of Kurchi bismuthous iodide daily for ten days to five chronic amoebiasis sufferers without relieving the symptoms or clearing their stools, even temporarily. The physicians of the Miraj Mission Hospital state in their annual report for 1934 that they have come to rely on Kurchi a great deal for the treatment of amoebic dysentery. Kurchi is very much cheaper than emetine and is less toxic and at least for these reasons deserves consideration. With the experience we have at present it is difficult to evaluate correctly the place of Kurchi in the treatment of amoebiasis. It is certainly a substitute for emetine in cases of debilitated individuals and when cheapness is a factor to be considered. In chronic cases which do not respond to the other modes of treatment Kurchi enables one to ring a change and may as in the experience of Acton and Chopra effect a marked change for the better.

5. Bismuth Subnitrate

This drug was introduced in the treatment of amoebic dysentery by Deeks in 1908. Heroic doses (180 grs.) were given in effervescent water every three hours night and day in severe cases. Later this was combined with emetine treatment. The use of this compound to increase the alkalinity of the gut has already been mentioned. Since emetine has a higher amoebicidal action in an alkaline medium, it is thought to be of great importance to render the gut as alkaline as possible.

Rivanol is an acridine dye product originally prepared by Morgenroth as an antiseptic. Urchs (1926) tried colonic lavage of a 1 in 2000 solution in the treatment of amoebic dysentery. Peters (1927) found that the symptoms quickly cleared and encysted and vegetative forms of entamoeba disappeared after colonic irrigations of a 1 in 10,000 dilutions 4 times a day for 3 or 4 days. According to Wagner (1928) dilutions of Rivanol 1 in 1000 kill all *E. Histolytica* in culture in 20 to 24 hours. Strong solutions have been found to cause spasmodic contractions

of the colon. Oral administration has been claimed to be equally efficient but further confirmation is lacking.

Conclusions

From what has been described it is obvious that none of the remedies listed can alone be relied upon to produce a cure in every case of amoebic dysentery. Hopes for the future will be concentrated on carbarsone and vioform. In this country Vioform has not been tried so far and no confirmation of the wonderful efficacy ascribed to it by American workers has yet been forthcoming. It is perhaps unfortunate, as Findlay puts it, that there is a growing tendency to introduce on somewhat inadequate grounds still more preparations in the therapy of amoebic dysentery before the true efficacy of those at present in use has been determined. As Professor Clark points out, it is even a greater pity that national prejudices are shown in the choice of methods of treatment of amoebiasis. English workers prefer emetine, the French chiefly use stovarsol and the Germans choose yatren. In India a flood of patriotic enthusiasm calls for the use of Kurchi. The latest of these remedies, viz., Vioform is of American origin and has been praised by American workers.

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CHANGING CONCEPTS IN PSYCHOLOGICAL MEDICINE

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General Remarks

A FEW words of explanation might be necessary in the beginning as to why in the following paragraphs I have not confined myself entirely to contributions to Psychiatry during the last year—as an article in an "Annual" ought to,—but have been more elastic; this is to help make my article more coherent and comprehensive. The two important publications in English which summarise progress in Medical and Allied Sciences every year, are the Medical Annual published in Bristol, and the Year Books of Medicine published from Chicago. The Medical Annual is rather conservative and insular, and its articles are in the form of a series of essays arranged in an alphabetical order; the Year Books (the volume on Neurology and Psychiatry is edited by Bassoe and Ebaugh) are more catholic and comprehensive. In addition to summaries of important articles there are running commentaries on them. For any similar venture in India, neither method is suitable for the present. The above publications can look back upon a long period of useful service; a perusal of these publications gives one a chronological history of the Medical Science in very good perspective. On the contrary, in India, until the

'Antiseptic' was enterprising enough to supply the gap, there was no similar publication. This venture however is yet in a very early stage; it has fulfilled a necessity in helping to co-ordinate and publish work done in India which was very diffuse and not easily available, but until the 'Annual' has established itself, that is at least for some years to come, for a contributor and especially in the specialities to limit himself strictly to publications in the preceding year does not seem to fulfil any useful purpose. In India those who confine themselves exclusively to the specialities are few, and very much so in psychological medicine. There are many, however, who take an interest in the subject and it would be much preferable to present a readable account of the main lines of advance in the subject while not confining oneself strictly to publications within the previous year. Last year I wrote mainly on theoretical considerations which form the framework of modern Psychiatry. In the present article, I propose to review aspects of advance which while being important additions to knowledge are of interest to Indians,—incidentally I have tried to indicate the lines along which the Indians themselves might make useful contributions to Psychiatry. Personal equation and bias are bound to play considerable part in these matters of opinion, but I have tried to minimise them as far as possible by referring to and familiarising myself with contemporary opinion on the subject.

India is very rich in Psychiatric material. Just before Kraepelin died, it was his intention to spend some time in India studying the clinical pictures of Mental disorder. The different cultures, different religions, different traditions, make possible in India a variety of clinical syndromes which in the more or less homogenous civilisation of the West would be out of question.

It is unfortunate however that in spite of this potential storehouse, very few studies are available. This is partly to be explained by the fact that until very lately the staff of a Mental Hospital was indiscriminately filled up by people who had no psychiatric training, zeal or insight. Even from the point of view of the administration, and often the general medical public, the Mental Hospitals or Lunatic Asylums as they were popularly referred to, were more detention houses for unfortunates who were thought to be incurable, who were quite different from 'sick people' in other Hospitals, and from whom society had to be protected. The fact that Officers of Prisons, Police Surgeons with the emphasis on Prison and Police, were also Medical Officers of Mental Hospitals is significant enough.

It is also very insufficiently recognised that a Mental Hospital

fulfils two purposes—the first, as a home for the incurables, making their lives pleasanter and more useful; secondly a far more important task it functions as a remarkably efficient Hospital, where patients do recover and go back into Society. In a well run Clinic, like the Phipp's Psychiatric Clinic at Baltimore, Psychopathic Hospital at Boston, or Maudsley Hospital at London, the writer had many opportunities of observing many apparently hopeless patients recover, the statistics of discharges of such patients comparing very favourably with those of any general Clinic. If we take into account, the fact that a large percentage of people, suffering from mild bodily ailments like rheumatic pains, need no hospitalisation, whereas a slight change in mental health is far more serious and the individual and the society have both to be protected; also the fact that patients suffering from incurable bodily illness have only a very short life period, and pass away out of one's attention while the majority of incurable mental patients are long lived, swelling the hospital population, one gets a partial explanation of the popular but false impression that mental disease is incurable.

It is not also very generally recognised that Medicine is a Science, just like other Sciences, and that therapeutics, though one of the most important branches of medicine, is not the whole of it. This fact that medicine has to be studied for its own sake, and not merely from a therapeutic point of view, has to be stressed most in connexion with Psychiatry—the last speciality to be recognised as an organised Science—with its emphasis on the total individual and not merely on a system as in internal medicine. It must be pointed out that Psychological medicine is a major subject in all the Medical Schools in America and Germany, and its importance is being increasingly felt in England; there is a psychopathic ward attached to every General Hospital in the West; but in India it is only an afternoon's amusement for Medical Students in their non-examination year. In teaching too, little emphasis is laid on the dynamics of normal personality, and evolution of abnormal personalities, which forms the major portion of the clientele of even general practitioners; it is confined often to a static demonstration of a few incurables, which is bound to foster in the mind of the future practitioner a sense of fatalism and therapeutic inertia with reference to Mental disease. I have had to dwell at considerable length, on the above apparently irrelevant remarks. But they are very pertinent, if in a total perspective, the important advances are considered. Because ultimately, the advances can be not in small details, but in

orientations and fresh angles of view. The most modern of these advances are primarily in the recognition of a mental patient, as a sick man, that mental disorder is curable, that money spent on a Mental Hospital and mental nursing is not a waste, but a primary necessity. Also the emphasis it lays on the individual as opposed to a system of organs, the recognition that psychiatry forms an important connecting link between the moral and social Sciences on the one hand, and biological Sciences on the other, are certainly important milestones in progress.

In the preceding paragraphs, I have tried to outline in succession, what appears to me to be significant in hereditary and anthropological data, classification, affective, Schizophrenic, organic reaction types with emphasis on syphilis, of the nervous system, and peurperal psychosis, as applicable to Indian conditions; the article concludes stressing the importance of occupational therapy, and mental nursing in psychiatry.

Heredity, Anthropology—Racial Hygiene

Some of the noteworthy publications dealing with this subject in the last few years are "Chances of Morbid inheritance" published in London, various articles in *Eugenic Review*, the British Committee Report on Eugenic Sterilization, papers from Kretschmer's Laboratory at Marburg, articles by Adolf Meyer and others in "Human Biology", Molleson's Anthropological studies from Munich, and the most important of them, Rudin's publications from Munich. The general sense of them is summarised in the following paragraphs.

Weissman's view that germinal cells can never be influenced, with its implication that acquired characters can never be inherited, exercised a tremendous influence on all work on heredity, but now it has been modified into what is termed—The law of Blastophoria or germinal injury,—namely that the descendant bears the burden of intoxications and disorders of nutrition accumulated by generations of ancestors because the germ plasm is subject to the physico-chemical and mechanical influences of the living body in which it lives, moves, multiplies, grows, and has its being. An analogy from internal medicine would be the transmission of achlorhydria, and its flowering occasionally into Pernicious Anaemia, Subacute combined degeneration, and glossitis. Mental Syndromes are very common in anaemic patients. Schizophrenic patients are very susceptible to Tuberculosis. From a consideration of all these, an interesting suggestion is put forward that Psychoses,

Tuberculosis, Anaemias etc., may be the expression of a constitutional deficiency common to that particular group of diseases.

As regards transmission of mental disease, there is a good deal of controversy in the field. This is due to the fact that mental disorders are types of reaction comparable to 'syndromes' in General Medicine like Paraplegia, and not diseases like Diphtheria or typhoid. These types of reaction are not very well defined. Psychiatrists are not in agreement as to what constitutes neuropathic taint. Mental disorders are not clear cut and there are biological difficulties, due not so much to the inadequacy of the methods and knowledge available as the failure of investigations to acquaint themselves with them and use them.

In spite of all these difficulties a good deal is known about heredity. The work of Koller, Diem, and that of Myerson, Barrett, Hoffmann, and the most scientific and intensive of them Rudin, is noteworthy in this connexion. The writer was fortunate in seeing the huge tables, and the immense care and statistical effort with which the genealogical trees of patients are studied in Rudin's Laboratory at Munich. The object is not to bother so much as regards the presence or absence of neurotic traits in remote ancestors, but to foretell with some accuracy the chances of inheritance in the future generations and how far alterations in environment affect the chances of inheritance—a far more useful study.

Some of the conclusions are as follows:—

- (1) Huntington's Chorea, a striking mental affection of middle age is inherited as a simple dominant—Myoclonic epilepsy as a recessive.
- (2) Maniac depressive psychosis is a highly transmissible disorder. The figures are 0.38 to 7 % for children of normal parents, and 31.4 % for those with maniac depressive parents—in addition about 15 % will show milder mood disorders.
- (3) In Schizophrenic there are some forms in which the causative influence of the environment is great—in others hereditary influence is greater. In general of the children of a patient, 8 to 10 % will show this directly; 40 % will show Schizoid disorders of personality, and only about half will be mentally normal.
- (4) The mortality curve for Tuberculosis rises and falls in the different generations parallel to the morbidity curve for Schizophrenics among them.

- (5) On the whole there seems a distinct tendency for transmission of functional psychosis to be "Similar". In maniac like conditions which ultimately end up in paranoid Schizophrenic states, one has to remember the difficulty of diagnosis in Schizophrenic cases simulating maniacal states.

The above conclusions, which however are not entirely free from possible sources of fallacy have been worked out for western populations.

In India, there are no reliable statistics, nor can any be expected for some time to come. The reasons are:

- (1) In the higher classes people are by no means anxious to let it be known that any of their family are in a Mental Hospital. Also, the facilities in a Mental Hospital for treatment, are so inadequate that they need not be blamed for that attitude.
- (2) In the lower classes, belief in exorcism, magic and superstition restrict admissions into Hospitals.
- (3) The Government of India classification of Mental Diseases is so old and antiquated, that no one knows what the diseases might mean.

As regards the problem of eugenic sterilisation, brought to the forefront by political events in Germany, the considered opinion of many seem to be as follows. Though sterilisation could be conceded as a matter of principle, yet the legal, and scientific difficulties in the way of its being carried out are many. Scientists are not definite about the transmission of mental diseases, and what diseases are incurable, and whether due to social and economic reasons the severe types of psychosis do not burn themselves out. Lastly, it is very doubtful whether the really serious, but noncertifiable social menaces, namely the psychopathic personalities could ever be brought under the category of sterilisable diseases.

One feels that India can make a positive contribution to Psychiatry in the field of anthropological studies. Except in America which is a melting pot of races, such studies have not been made, nor are they practicable elsewhere. In India, there is a series of racial, physical and cultural types which are unobtainable elsewhere for Psychiatric study; there are areas where the influence of different diets on mental and intellectual conditions could be studied. It is the personal impression of the writer,

which however needs confirmation, that in South India where the Dravidian admixture is considerable, maniacal states are far more in proportion to depressive conditions which are commoner in pure Aryan stock; that catatonic states, and late supervention of dementia is more common in Hindus than in Moslems, in whom hebephrenic states and early deterioration are more common; that the psychoneurotic conditions are more common amongst Parsis. How much culture, and how much racial characteristics are responsible for these conditions provided the impressions are true, is certainly worth studying—and what part ~~does~~ religion play in preventing, developing or determining the form of a psychosis would certainly be an important study.

II

Before taking up for consideration, the different reaction types, a point of some theoretical importance has to be mentioned, namely the tendency towards the gradual disappearance of the rather artificial distinction between psychotic reaction and psychoneurotic reactions, namely hysteria, anxiety and obsessional states. There are still many who believe that there is a real difference between them in etiology, development, treatment and prognosis—that a psychoneurosis is only a part reaction in which reality values are not totally altered, in which regression is not extreme thinking not completely of the dream type and the mental mechanisms not so distorted both in degree and in nature as in psychosis; that psycho analysis is always profitable in psychoneurotic states; and lastly an important criterion of differentiation that, insight, namely appreciation of illness is always good in a psychoneurotic.

Lewis in an article on "Melancholia and Depressive States" (*Journal of Mental Science*, April 1934) has reviewed the whole problem and stresses the artificiality of such a distinction on the following grounds.

Mental disorders are more syndromes than diseases, as they are understood in general Medicine i.e., they are more comparable to groups like ataxia, paraplegia, than to etiologically distinct entities like Tabes or Disseminated sclerosis. It is important to recognise that often a patient's symptoms never conform to one type, so that his proper diagnosis is not always the same. There is not a single type of so called neurosis which may not precede or alternate with any type of psychosis, and every one may contribute to the clinical picture during the major part of a psychotic attack.

Mapother remarks :—

- (1) There is practically no early case, whatever its present form, that may not develop eventually the form and course of Schizophrenic group.
- (2) There are no symptoms pathognomonic of any group which taken alone indicate that a given case will assume a form in which such reactions predominate. Symptoms must be considered in their setting and consideration—hallucinations with clear consciousness of environment, anergia, within difference that is significant.
- (3) Dissociation, including disorientation and inaccessibility and disconnexion are quite common in Hysteria, though more paroxysmal than in Schizophrenic psychosis. After all, Schizophrenic, as well as the other clinical types, are more descriptive terms, and every case must be studied as a special individual reaction and not as merely conforming to a type which it never does.
- (4) As regards the question of insight, it is incorrect to say that in psychosis or what is popularly labelled as insanity patients are not conscious of their illness.

Insight is essentially the attitude of the patient towards his illness—Yellowlus and other psychiatrists have written that when a patient knows that he is ill, it is not only of sound prognostic importance, but also is a differentiating criterion between psychosis and psychoneurosis. But it is common knowledge that in many psychoses, patient realises that he is very ill indeed. Patients with periodic melancholia regard their symptoms with complete insight. Lange says that insight can coexist even with delusions, thus emphasising the futility of artificial distinctions. One must always remember the multiplicity of etiological factors in insanity and that every individual reacts with a reaction peculiarly his own. It is not enough to type him, as suffering from a particular syndrome, but to study him from two angles (1) A cross section of his present disorder and (2) a chronological, or longitudinal study of the way in which he has reacted throughout life, and to regard the present illness as culminative of a series of such reactions.

III

Affective Reaction Types

Interesting papers on Melancholia, and Depressive States by Dr. Lewis of the Maudsley Hospital have appeared in Journals

of Mental Science, 1934. He has studied sixty five cases in detail-clinically-their mood, output of talk, thinking, psychomotor activity, stupor, maniac features, delusions, disorders of perception, feelings of unreality and depersonalisation, contact with environment, insight, physical states and psychogenesis. He emphasises the study of the individual, which must offer a dynamic diagnosis and not merely a static one, though often the dynamism, or purposiveness of the reaction pattern is obscure. Just as inflammation is a beneficial condition, it often seems that these mental states are defensive phenomena, protective in intention though often the intensity as well as the duration either fall short of or last far longer for any obvious advantage to be gained. He emphasises also the artificiality of differentiating types of depression into reactive, endogenous, psychogenic, autonomous, etc. Lewis's analysis has also failed to show anything definite in the term 'reactive'. Precipitating situations must be considered in the light of their meaning to the patient. Apparently trivial incidents may lead to widespread emotional changes, but this is very different from adequate and outstanding precipitating cases. In his analysis there were many cases in which no inkling as to why the illness had broken out could be ascertained. Comprehensible relations could be recognised in many others, but they were by no means the same as causal relations.

Jasper gave as his criteria of reactive depression

- (1) The illness must be determined by a psychogenic factor.
- (2) There must be a corresponding uniformity of the content of the psychosis with the causal factor.
- (3) The morbid phenomena must disappear with unconditional return to the normal state when the traumatic factor is got rid of.

Lewis's analysis showed that in no patient were all the conditions satisfied. He concludes that the efforts at subdivision could be only a concession to the requirements of convenient thinking in categories, and on the other hand a relic of Kraepelinian terminology. In this connexion, one should consult the excellent article on Maniac depressive states in Noyes's 'Clinical Psychiatry' wherein he criticises Kraepelin's subdivision of maniac depressive states, into mixed forms as being opposed to any dynamic conception, the conception that a mental disorder is the culmination of an individual's life reactions, which is peculiarly

his own and total, and cannot be divided into different faculties, as a division into 'mixed' forms would imply.

Lewis quotes approvingly of Schultze's statement in this connexion, that the question of reactive and endogenous depressions might be more sensibly formulated as "how far is reactive process, concerned in this case, and how far obscure hereditary or somatic determination of a fateful sort."

A discussion of the affective reaction types cannot be complete without mention of a condition termed "depersonalisation". This is a feeling of unreality, a feeling that the body has changed, the world has changed, that the patient is quite a different person, or that he is dead. This state is not peculiar to the depressive states. Deran has written about it with reference to maniacal conditions. Feeling of unreality is very common in Schizophrenic states. Especially when the onset of Schizophrenic states, has been as a preoccupation with metaphysical problems, mysticism, pseudo-religious and cults etc., the soil is very fertile for the development of such states.

There is considerable divergence, however, in the explanations offered. McDougall writing on reality, emphasises that in addition to normal visceral sensations, and intact memory, perception of reality of self is in proportion to the resistance offered to the idea of change which however does not explain very much.

McCurdy thinks that in depressive cases there is "a locking of unconscious process in infantile, antisocial motivations. These must be repressed. So thorough is the repression that it inhibits interest in the environment—the effect engendered—that of incapacity, is rationalised mainly in projection on to the idea of self—in so far as it is projected on to the environment, the latter seems to be dull and inert. That is, it feels unreal"—but it is recognised that unreality feelings may exist even apart from depressive states—when McCurdy's explanation becomes untenable. Malamud concludes that reality is a relative experience dependent on the balancing between standard subjective values and standard objective stimuli. But it is a very general conclusion not helping very much. Mayer Gross deduces unreality from a discrepancy between actual sensory sharpening of excitability on the one hand, and an incapacity to allow this improved function to become our impression through the "sensory movement", and he points out the difficulty of accounting for the frequent occurrence of unreality feelings in states of exhaustion, fever, etc., if one accepts the current views which lay the chief

emphasis on the content of the thing experienced and regard content as the directive factor in the datum of reality.

From the clinical matter of unreality, one is led to problems of perception, and its relations to consciousness and affectivity. This problem once again shows up the artificiality of separation of elements of psychic life, and of the fact that more often than not the so called causal dependence is just the statement of a temporal relation.

In this connexion one might emphasise that the system and belief in which a person is trained influences a good deal the form and content of his reality ideas. Indian philosophy emphasises that life is an illusion and this religious environment is an integral part of the life of an Indian. So one sees frequently in psychotics the feelings of unreality. For some reason or other in psychosis due to 'cannabis indica' this feeling is almost constantly present. It might be because of the fact that the addicts are more often pseudo philosophers and pseudo hermits—i.e., potential Schizophrenics and that this unreality feeling is merely a manifestation of Schizophrenia and not due to cannabis. But the writer has encountered it even in patients whose prepsychotic personality did not show evidence of any Schizophrenic disorder.

How far does the belief in Indian philosophical doctrines colour the picture of psychosis, is a very fascinating problem well worth the study.

IV

Leaving aside the depressive states, which seem to be relatively rare in India, the maniacal conditions are far more interesting. It is frequently stated in European text books, that no restraint is necessary for the maniac, and that audience always increases the maniacal symptoms. But the writer has had opportunities to observe the maniacal reactions in many of the Hospitals in Europe and America, and except in rare cases, the intensity rarely approaches the severity which is very common in India. So although the doctrines enumerated above can be accepted in principle, yet their practice in toto is impossible. Some method of restraint is absolutely essential, and where the nursing staff is inadequate, the plan followed in Wagner Jauregg's Clinic in Vienna seems to be very suitable. The patient is put in a cot, which is closed up on three sides by a net made of thick strong cotton cords of the size of the little finger. Two sides are fixed, and one side is removable, and utilised for feeding, excretions etc.

Such an arrangement though not the best available, is very serviceable and useful. As many as twenty more maniacal patients could be grouped in a ward, very few attendants are required, and if necessary, finger gloves might be used to restrain the patient. It is obvious that the patient is placed in such cases, only during those intervals when he is not in the continuous baths or undergoing other similar treatment.

As has been mentioned once before, it is my impression that in South India maniacal states are far more frequent than depressive states; the Dravidian make up lends itself more to maniacal outbursts than depressive ones. Whether it is the under-nutritive—it is notorious that the South Indian diet though very varied is the poorest from the caloric and nutritive point of view—or racial characteristics that is responsible for such a state of affairs is difficult to say. It might be interesting to mention in this connexion (though the analogy is not a real one) that some time ago Col. McCarrison demonstrated rats fed on different kinds of diet—that fed on a diet approximating to the poverty stricken South Indian was the snappiest, and most catankerous animal of the species, while that fed on North Indian specially Punjabi diet was placid, lethargic and almost somnolent. It must once again be emphasised that this view is only an impression and needs confirmation. From the point of view of biochemistry of maniacal conditions the only advance which seems to have been made in recent years is the demonstration by Zondek of the reduction of bromine in the blood. What therapeutic possibilities this observation will have is too early to say just now.

Before concluding this section, a few words might be mentioned about the involuntional conditions. It is agreed by most psychiatrists that involuntional melancholia is a distinct clinical syndrome, that psychological factors of emptiness of future existence and worldly interests, preoccupation with and fear of death, are more responsible in its causation, than the pure more or less physiological cessation of function of glands. In this connexion, the problem presented by high cast widows in India is very interesting. Most of these middle aged ladies, lead very celibate and rigid lives, live on one meal a day, busy themselves with religious ceremonials, rituals and pilgrimages which to them are of immense significance: besides all this, in the household which is fortunate enough to count one of them as a member, they are the virtual dictators. From seeing to the feeding of children, and buying of groceries, every work in the house is undertaken by them, and they are very welcome guests in any household. The

immediate psychiatric interest is, hardly any amongst them have been known to suffer from involutional syndrome, whereas the writer has seen many cases in married ladies, especially in well-to-do circles, and any number amongst the European and Anglo-Indian communities. This once again illustrates the importance of psychological factors in their causation, and value of occupation in prevention of many of these psychoses.

V

Puerperal Psychoses

It is an easy transition from the consideration of maniacal states to the psychosis associated with pregnancy and childbirth. Though they are very common in all countries, in India, puerperal psychosis accounts for more than one third of all the admissions of women of child bearing age. Here also two factors are recognised, the psychological and the physical. It is always stressed that a neurotic temperament, an unwanted or illegitimate child, marital difficulties, are important factors in the production of the psychosis. In India, in addition to the above, the domestic situation arising out of an incompatible mother-in-law, and sister-in-law has to be emphasised. The writer has seen a number of cases where a history of cruel treatment of the daughter-in-law by the mother-in-law and marital infidelity on the part of the husband is very common. When however, the home situation was adjusted, recurrences were rare.

The orthodox psychiatric view is that the puerperal psychoses are almost always confusional *i.e.*, the disorder is evinced in the field of perception essentially and associated with the motor restlessness, and in some cases actual toxic stupor. But frequently cases occur in which the type seen is very similar to the maniac phase of the affective psychosis—and in which there is hardly any clouding of consciousness and without any toxic symptoms the periodicity recurring with every child-birth.

Another point which has an important bearing on prognosis is the frequent commencement of a Schizophrenic reaction type, as acute confusional insanity—associated with child-birth. Zilboorg writing from a psycho-analytical standpoint stresses the farther fixation in such Schizophrenic pictures. Anderson (Journal of Mental Science Jan. 1933) studied fifty cases of psychoses in association with childbirth admitted to Maudsley Hospital, with special reference to the prepsychotic sexual status of the women and compared them with fifty cases of psychoses in married women of approximately the same age period, but where the

puerperium was not the precipitating factor. He studied the sexual life with reference to frigidity, chronic masturbation, homosexual tendencies, and attitude towards husband and child.

He comes to the conclusion that there is no evidence to support the view that the onset of a psychosis associated with child-birth is a product of a morbid sexual constitution, with the puerperium acting as a specific precipitating factor. The latter must be regarded in the same way as any other precipitating factor whatever.

In India economic and family situations seem to play a part in all psychosis, and much more so in puerperal cases. The family being in many cases a joint one, with a number of people resident, the daughter-in-law resenting frequently her subordinate position, hysterical reactions during the puerperium are very common; where the symptoms are more in the emotional, and physical sphere rather than in the purely perceptual.

In considering the prognosis, not merely as a statistical difference in probabilities, but as an individual forecast, one would take into account the prepsychotic personality, the possibilities of a familial adjustment, age and the clinical picture. Where the picture is more of an affective reaction type, the tendency is to recur with succeeding pregnancies. Where it is Schizophrenic, the prognosis is relatively unfavourable though acute cases certainly recover often but more often recur. In general, however, the prognosis of puerperal cases is quite favourable.

The problems of under-nutrition, with reference to psychosis in women of child-bearing age in India is one worthy of serious consideration.

One cannot conclude this section without reference to psychotic states in anæmia. Number of papers have been published by Barrett, Phillips and others, about the mental disturbances in Pernicious Anæmia, and how they have been benefited by Livertherapy. There is a tendency to lay stress on the Paranoid type of reaction as being specific to anæmia, or at any rate to the Pernicious type. But Devine reviewing the literature concludes that there is nothing causal in the Anæmia, but the Pernicious Anæmia is one or perhaps the most important of the precipitating factors in bringing out the latent psychosis. Even then there is nothing specific in the syndrome which need not necessarily be of the Paranoid type. Strictly speaking, if it is an organic reaction, the disturbances ought to be more perceptive and confusional.

In India, however, the problem of anaemia and especially

of nutritional anaemia is a very acute one. No statistics are available, but many medical men with whom I have discussed confirm my impressions that girls show frequent emotional instability, hysterical episodes, which are more common during anaemic states, and which cannot be entirely accounted for as a problem in adolescence. I think in this field there is considerable scope for even general practitioners interested in psychiatry, to publish their experiences.

VI

General Paresis of the Insane

The etiology and treatment of G. P. I. is a very controversial subject. The demonstration by Noguchi and Moore of Spirochaetes in the brain of people dying from G. P. I., and the discovery of an invariable connexion between the neuropsychiatric complex we term G. P. I., and early infection with Syphilis was of the highest significance. But it is incorrect to say that G. P. I. is "due" to Syphilis, if by this statement is meant that Syphilis in itself is sufficient to account for the symptoms observed. In only 2 % of those attacked by Syphilis is G. P. I. a sequel.

Opinions differ as to why neural syphilis should develop in some infected individuals and not others. Very few believe now that there are different strains of Spirochaetes—the neurotrophic and dementropic. Attention is being more focussed on the mental and constitutional reactions of the individuals and not on the parasite. Bolton thinks that a constitutional defective type of cortex is the important internal factor. Fildes and McIntosh believe that neuro-psychiatric manifestations are anaphylactic reactions in tissues rendered hypersensitive. The difference between the consequences of the tertiary and neuropsychiatric Syphilitic process is considered to reside in the nature of the tissues participating in the reaction. In the former, the interstitial tissue is capable of repair, and the focus is readily reached by remedial agents; in the latter, reaction of the essential elements leads to their death, and the anti-syphilitic remedies cannot easily reach the Spirochaete.—A fanciful explanation was also brought forward sometime ago, that G. P. I. was the resultant of insufficient treatment of Syphilis.

As regards the type of individual susceptible to G. P. I. opinions are varied. It was the impression of some that tabetics are always lean and paretics pyknic. One must remember that in the early stages, paretics put on a lot of fat, while later

they emaciate. There seems to be nothing definite in this suggestion.

From the point of view of prepsychotic personality, it was suggested that psychopathic and neurotic individuals are specially prone to develop this disease. But statistics from German Prisons show the incidence to be no higher than in the general population. It is understood that the Prison population is made up of a large number of psychopaths. In women, there seems to be an apparent verification. But one has to remember that libertinism in women is more common amongst the psychopaths, than in the normal married types.

As regards racial distribution, there is considerable controversy. Once the suggestion was put forward that skin pigmentation was a protective against G. P. I. but it is notorious that negroes are very susceptible to G. P. I. Again endemic malaria was thought to confer some immunity. But in Java where malaria is far more severe than in India, G. P. I. is very flourishing. It may be that malaria really confers some immunity, but the severity of the infecting process in those individuals is so intense, that the immunity is broken down. In general it must be admitted that the incidence of G. P. I. is smaller in Oriental Countries. This might be probably due to the fact that the disease attacks people in late forties or fifties, and the longevity in India is not high—and so there are fewer Syphilitics of that age in India than in the West. Often the diagnosis is not made in rural parts. Even in cities hardly one sees a classical picture with delusions, and if one has to wait for it, one has to wait for ever. It cannot sufficiently be emphasised that the mental picture developed, depends on the prepsychotic personality of the individual—the suspicious type developing paranoid traits, the jovial or the melancholic accentuating his previous personality. On the neurological side must be emphasised irregularity of pupils, loss of light reflex, twitching of muscles, facial, tongue and fine tremor of the hands. Lange's curve confirms it—superadded to these might be many more signs and symptoms—congestive attacks, paresis, aphasias, etc.

Occasionally one sees during the course of a disease process, a sudden exacerbation, which after a time seems to clear away. During this period, episodes of confusion, which however are functional, and not due to the organic process, arise. People appear to suddenly exhibit an extreme deterioration and disorientation. This flare however clears up, often without influencing the underlying organic process. This flaring up is more a

suspension of function and not an organic deterioration of function, and due only to a functional inactivity of the neurones of the highest level.

As regards Juvenile paresis, the prognosis is very grave. But in cases where deterioration started late, say during adolescence, the prognosis is more favourable than in those starting from childhood.

As regards treatment, malaria, and fever treatment has come to stay. It is however not known, that malignant tertian might be used with the same success as B. T. As fever producing agents, apart from malaria, relapsing fever sulfoxin, Tuberculin, T. A. B. Vaccine, Diathermy have all been used. The best treatment would be about 12 bouts of fever, with 12 weekly injections of Tryparsamide. It is not generally known that for some reason or other, small doses of Tryparsamide make the disease worse. It is always best to start with at least 2 grammes of the drug. In the experience of the writer, no eye troubles have followed the injection of the drug. In those cases in which retinitis follows, (18—40 hours), an Intravenous Thiosulphate is recommended.

Where nursing staff is not adequate, it is preferable to use T. A. B. Vaccine in place of malaria, and associated with Tryparsamide. Within the last two months three cases of G. P. I. have been admitted to the Mental Hospital at Bangalore, on whom this treatment seems to be producing beneficial effects.

As regards how malaria acts, no one is agreed. Some say it activates the reticulo endothelial system, some others that it kills Spirochaetes, a third group that it alters the Spirochaetes, a fourth it makes the Spirochaetes susceptible to the action of Quinine and a fifth group that malaria converts the parenchymatous lesion into an interstitial one, a highly improbable statement.

As regards the results of treatment Meagher, appointed by Board of Control, to examine treated paralytics, concludes that malaria (1) Extends life (2) improves the mental and physical state of the patient (3) allows 20 % of the patients to resume normal life.

Before concluding this section, it must be emphasised (1) Evidence of syphilitic infection in psychotic patient does not mean he is the subject of G. P. I.

(2) Mental symptoms, more in the nature of confusional or toxic reaction types, are common in cerebral syphilis which is not G. P. I.

VII

Pharmacodynamic Stimulation and Sedation in Psychoses

In the previous paragraphs it has been emphasised that mental disorders are syndromes and not diseases as we understand the term in General Medicine and that their causation is multiple. Any attempt at treatment must be a battery, and not a single unit. That undue importance has been ascribed to drugs as therapeutic agents, a fact increasingly apparent in General Medicine, is very evident in Psychological Medicine. If we recognise that specific drugs can be counted on one's fingers, Quinine and its allies, arsenic, antimony, perhaps thyroid, and that the most that could be expected from drugs is to tide over an acute crisis, that scars in viscera are permanent, that powers of regeneration are highest only in interstitial tissues, which are relatively very low in sensitivity and selectivity, and that we have to trust to the 'wisdom of the body' largely, in matters of recuperation, we can estimate in its proper place the limited usefulness of drugs. Also since thought, speech and language are the highest expressions of an evolved organism, there is nothing sensational in utilising the same mechanisms as therapeutic agents, which is what is aimed at in any form of psychological treatment, and interpretation. Bearing in mind, however, the above limitations, we can consider briefly the advances in drug therapy which have been made in the previous years.

As a result of elaborate researches by Loevenhart, Golla and others found that in schizophrenics the respiratory centre is relatively inert. So various methods of stimulation have been tried, I. V. Sodium Cyanide, Carbon dioxide inhalation etc. Especially in catatonic stupors, inhalation of CO₂ (10—30%) produces a temporary contact with reality. This could be used both as a therapeutic or diagnostic procedure—when the patient is stimulated, if the disease process is not advanced, he behaves and acts as a normal human being; but if there is dementia or acute hallucinosis or delusions, he gives expression to it; i.e., he is converted from a mass of "metabolising tissue" to a human being. But in no case have the effects been permanent.

Mlle. Pascal of Paris has used a large number of drugs singly and in combination, for stimulating Schizophrenics—Ether, Chloral, Cocaine, Strychnine, Hashish, Nitrous Oxide, music, songs, photographs etc. Her experiments were more diagnostic than therapeutic. She thinks that the chemical stimulants serve to dissociate the reversible or functional lesions from those which

are irreversible or structural. They reveal the dynamic possibilities of the Schizophrenic patient, and separate the elements which are modifiable and unstable from those which are static and immovable. In India, it is worth while trying 'hashish' for the same purpose.

Various metallic salts have been tried in Schizophrenics especially I. V. Injections of 2 to 8 c. c. of 0.02 molar Manganese chloride. The results have been disappointing. Fixation abscesses have been produced by injections of turpentine etc., and although in a few cases results have been said to be good in general it cannot be recommended.

On the other hand, however, production of fever in psychosis of rather longer duration than usual, is of great therapeutic value. Various reagents have been used to induce fever, malaria, diathermy, tuberculin, relapsing fever etc. In my experience the safest is T. A. B. Vaccine. Patients do not need the same nursing care as in induced malaria, the effects are not exhausting, and the results are quite comparable. The dosage varies with the patient—starting with 1 c. c. up to 4—5 c. c. may be given. Twelve bouts of fever are the maximum that could be induced.

Sulfosin produces terrible pains, and is best avoided. Sakel of Vienna has been producing remarkable results in catatonic Schizophrenics and in depressive stupors, by producing actual hypoglycaemic states, by injecting insulin. He was kind enough to show me round his cases on a number of occasions, and I was impressed with the really beneficial results. The technique and selection of patients are rather elaborate and his original papers have to be consulted. From 15 units to as much as 100 units of insulin have been injected. Sweat on the forehead, cold and clammy skin, are signs of impending hypo-glycaemia. The patient is left in that state anywhere from 15 minutes to 3 hours, and then a feed is given either by a nasal tube which has previously been put into the stomach or by mouth if it is possible. This seems to be a very valuable method apparently no ill effects have been recorded and it deserves a trial. In passing it might be mentioned that insulin injections have been tried with considerable benefit as a cure for alcohol, and morphia addiction.

Finally a paragraph about prolonged narcosis. Since Klasi started it some years ago, various drugs have been used to produce prolonged sleep, for as many as 12 to 14 days in agitated patients. Few people know the mechanism as to how the drug acts. The "central anaesthesia" theory of Klasi is as good as any other. But it is definitely shown that very good results are

obtained in a number of cases. Strom-olsen of Cardiff and his co-workers have shown that there is a danger of acidosis in these cases and a previous injection of insulin and glucose prevents it effectively. Somnifen, Sodium Amytal, Luminal have all been tried with varying success. But so far no mention has been made of Paraldehyde for inducing prolonged Narcosis. For the last three years, Paraldehyde (4 to 6 drachms in 2 to 4 Ozs. of olive or coconut oil twice a day per rectum) has been used with considerable success on nearly a hundred patients in the Mental Hospital, Bangalore. Not all of them however were kept in that state for 12 days—some four, some five and so on depending upon the clinical state of the patient. The beneficial results have been as good as that induced by any other hypnotic.

Various endocrine preparations have been tried, and in popular periodicals and advertisements "cures" have been boasted—specially the ovarian, testicular, pituitary and multi-glandular extracts. The administration of ovarian extracts in involutinal and similar states is scientifically sound. But due to the non-comparable conditions of oestrus in the rat and the human being, beneficial results cannot be expected. The only preparation which seems to be of some real use in many cases of psychosis is small doses of "thyroid" not as a specific, but as a stimulator of metabolism. The combination of insulin with thyroid increases the efficiency of either.

VIII

Occupational therapy and Mental Nursing

The importance of organised occupation as an important remedial agent is being increasingly appreciated in every mental institution.

- (1) Occupation decreases restlessness in the wards.
- (2) It reduces the need for restraint.
- (3) It diminishes the amount of narcotics used.
- (4) Sleep can be assured, and complete quietude at night can be established.
- (5) Most important of all, occupation tends to minimise deterioration and dementia in chronic mental patients.

The occupation to be effective must be organised and suited to the requirements of the individual patient. Being told to work indiscriminately in a tool shop or garden is occupation but not therapy. A monotonous work suitable for a melancholic is

certainly not advisable for a restless maniac. Mental defectives have to be graded in accordance with their intelligence and application for different types of work. Above all stimulation of interest in the work is essentially one demanding tact on the part of therapist. Hence we find in Boston, New York and other places, schools offering a two year course for training in occupation therapy. Such is the demand for these trained people—usually girls, that the schools are overcrowded. They are trained to enter deaf and dumb schools, orthopaedic clinics, to care for epileptics and paralytics, for re-education and attending to speech defects. In addition to the usual psychoses, encephalitis lethargica leaves as a sequel mental instability, which only organised occupation and supervision can check. Games, music, small concerts and plays all form part of an occupational group. The following scheme used as a routine in New York Hospitals gives an idea of the efficiency and necessity for occupationists; also it throws a sad comment on India.

Habit training class Schedule

6-30 A. M. Charge nurse and attendants on duty. Out of bed. Wash. Comb hair. Cleanse mouth, using tooth-brush. Lace shoes. Empty bladder and bowels.

This is to be done for patients who are unable to do it for themselves. The others are to be taught to do what they can for themselves; at first they may have to be taken care of by attendants. They should be taught to take as much pride as possible in their personal appearance.

7 A. M. Breakfast. Teach patients to make beds, sweep floors and care for ward.

9-20 A. M. Simple gymnastic exercises under direction of physical instructress; outdoors in summer, on porches in winter. If weather is too severe, open windows on section of ward, and have exercise take place therein.

9-30—11-30 A. M. Have patients go to toilet; glass of water. Class work occupational therapist and attendant on duty.

Cutting out pictures; Making scrap-book; Spool knitting; Knit wash rags and rugs; Crochet very simple fillet patterns; Crochet rugs and face cloths; Crochet shoe strings; Simple raffia work, as baskets, napkin rings, picture frames, etc. Tear and sew carpet rags; Colour pictures with coloured crayons; Braid carpet for rugs; Simple patch work; Plain sewing and mending.

Several patients may be able to perform the same work. It may be necessary to choose some particular kind of work from

the above list for certain patients. The thing to do is to get them interested in some form of useful employment, and gradually advance them to more complicated tasks.

11-30—11-45 A.M. Putting up work; each patient assisting. A box or paper bag with each patient's name on it should be provided.

11-45—12 noon. Prepare patients for dinner. Have them go to toilet, wash their hands and face, clean their nails and tidy hair.

12-0—12-30 P.M. Dinner.

12-30—1-15 P.M. Scrub teeth (those able). Rest in ward.

1-15—2-30 P.M. Tooth brush drill, consisting of the usual movements with tooth brushes in the practice of brushing teeth. Each patient should have her own tooth brush. This can be kept in box or bag.

2-30—3 P.M. Have patients go to lavatory and drink a glass of water; empty bladder. Tidy up and go out on lawn.

3—3-30 P. M. Physical Instructor on duty. Simple gymnastic exercise on lawn. In inclement weather on porch, or open ward windows and put patients through exercises in ward.

3-30—4-30 P.M. Folk dancing or games, tossing bean bag, catching ball, throwing rings, etc.

4-30—5 P.M. Nurse on duty. Take patients to toilet. Rest. Make tidy for supper.

5—5-30 P.M. Supper.

5-30—8 P.M. Music in ward, gramophone, piano, dancing, singing if possible.

8 P.M. Take patients to toilet, Brush teeth and hair. Retire.

11 P.M. and 2 A.M. Toilet for bed wetters.

For the better grade of patients

1-30 P.M. Wednesday afternoons, moving pictures: also attend other afternoons when special pictures are shown.

2 P.M. Monday afternoons. Community singing in assembly.

3 P.M. Alternate Thursday afternoons. Vaudeville show when given.

2 P.M. Tuesday afternoon. Dancing assembly hall.

Monday and Thursday mornings. Bathing.

Habit training Schedule for Juvenile Cottages

6-30—7 A.M. Rising hour. Wash, comb hair, toilet, teach patients to clean teeth, to use mouth wash occasionally and to dress properly. Pride in personal appearance must be stimulated.

Patients to drink a glass of water before breakfast. Put beds in order and tidy up room.

7—7-45 A.M. Breakfast.

7-45—9 A.M. Toilet, get ready for school, put clothes in order.

9—10-15 A.M. School, Simple academic ungraded school work.

10-15—10-30 A.M. Toilet and get ready for physical training.

10-30—11-20 A.M. Folk dancing, exercises, etc.

11-20—11-45 A.M. Outdoor games and recreation free play.

11-45—12 noon. Toilet and get ready for dinner, glass of water.

12—12-30 P.M. Dinner.

12-30—1-30 P.M. Toilet. Rest 30 minutes. Get ready for afternoon school.

1-30—3 P.M. School. Simple handwork adapted to fit individual children's needs. Variety is especially essential. Glass of water.

3—3-15 P.M. Toilet.

3-15—4-20 P.M. Exercises, outside games, etc.

4-20—4-45 P.M. Make beds, get dormitory ready.

5—5-45 P.M. Supper.

4-45—7 P.M. Singing free play. Get ready for bed. Toilet.

7 P.M. Bed.

Each child has definite duties assigned, according to individual abilities.

One cannot close this section without stressing the need for well-trained nurses in Mental Hospitals. In the first instance, it must be mentioned that male nurses are being replaced by female nurses in all progressive Institutions, as the authorities find that greater discipline, and quiet and care are assured in the agitated wards. In a well maintained institution the number of nurses works out to two for every five patients. In an institution like Maudsley Hospital where there are about two hundred patients there are over a hundred nurses (this includes probationers). Every nurse is trained for three years and has to pass a fairly stiff examination conducted by the Royal Medico Psychological Association for mental nursing, before she can get a job.

One need not say anything about conditions in mental Hospitals in India. It is fairly obvious.

IX

Prevention of Insanity

This is a very important subject, but since the present article has become too unwieldy only a few sentences can be mentioned, leaving for the future a detailed review of the subject.

Mapother considers that the following four factors are responsible for Mental disorders of any sort.

- (1) Anamolies of innate make-up—
- (2) Anamolies of changes incidental to particular ages or epochs of life.
- (3) Exceptional mental experience, whether recent or remote.
- (4) Gross physical influences.

Since mental disorder is a syndrome, motivated by multiplicity of causes, prophylaxis in the sense it is understood and practised in such diseases like tuberculosis or cholera is impossible. Again the constitutional innate tendency cannot be eradicated in the individual, but eugenic and racial measures like sterilisation of the unfit (largely theoretical) and better food and hygienic environment might minimise insanity in the offspring.

As regards collective prophylaxis, directed towards the interests of society, Mapother advises.

- (1) Education of the whole medical profession.
- (2) Provision of trained personnel.
- (3) Research.
- (4) Provision of suitable institutions.

As regards individual prophylaxis four principal factors are operative in organic mental disorder; Arteriosclerosis, epilepsy, alcohol and syphilis. Chronic alcoholism is more often the result than the cause of mental disorder. Arteriosclerosis and syphilis are problems in General Medicine. Epilepsy is an eugenic affair, about which little is known except making provision for epileptic colonies. Practically nothing is known of the biochemical factors leading psychosis in pregnancy, puerperium and menopause. Many abnormal children have potentialities to return to the normal. The psychoneurotic and hysterical disabilities could be largely prevented by wise training during childhood, and suitable occupation, suitable to the level of the individual. More often it becomes the treatment of the parent than the child. The chances of

preventing certifiable mental disorder are as limited, as the chances for preventing cancer.

Conclusion

We have come to the end of our long trail, but still many, gaps have been left. Forensic psychiatry and Child Guidance are not quite relevant to our discussion and have not been touched upon. During last year no outstanding contributions have been made to the subject of Schizophrenia, to add to what I wrote about it last year.

The object with which the above paragraphs have been written is to emphasise the dynamic quality of life, to distrust the suggestion of inevitability and fatalism—psychoses are not things made and fixed, but things which form themselves and evolve. At the heart of a psychosis, as at the heart of life, one does not find immutable tendencies, but a moving reality: where life is concerned, the notion of inertia is inapplicable.

PROGRESS TOWARDS THE TREATMENT OF TRACHOMA

BY

T. C. BASU CHOWDHARY, L.S.M.F., (C.P.),

Agra.

It is a matter of great importance to diagnose a case of Trachoma before starting for its treatment. Different authors give it different names and hence one should not get confused. Fuchs and Elliot call it as "Trachoma Granules or Granulations" and they opine that they should not be mistaken for ordinary granulation tissues as they have entirely different structure; Swanzey names it either as "Trachoma Bodies" or "Granulations" whereas Cuenod and Nataf term it as "Granular Follicles". Moreover the clinical picture presented by one case of Trachoma will always differ from another case and it is not possible that every case must show "Sago-grains" appearance. Sometimes even cases of rupture follicles have been diagnosed as those of trachoma because they presented appearance remarkably like true granulation tissue due to the combination of papillae, scar tissue and ulcerated follicles. It, therefore, sometimes becomes very difficult to diagnose a case of true trachoma. Strother Smith rightly advises us not to diagnose a case of trachoma simply because the patient has got granular lids. It

is really very true for India at least where cases of simple follicular conjunctivitis are not common due to certain irritating agents like sand, dust, smoke, glare etc. These innocent cases are generally diagnosed as those of trachoma and treated accordingly. But, thanks to the introduction of the slit lamp, which has added considerably to the facility and accuracy of its diagnosis, Trachoma may now be diagnosed in its earliest stages. MacCallen has made the somewhat complicated divisions of Trachoma into four clinical stages, to which Wilson (1932) has added one more and named it "Proto-trachomatous Stage."

MacCallen (1931) divides the stages of Trachoma into four classes *viz.* :—

- (1) Stage i or Tr. i—early stages of "Pin's head" follicles—contagious.
- (2) Stage ii or Tr. ii—contagious and is subdivided into—
 - Tr. ii (a) where follicles are large and gelatinous.
 - Tr. ii (b) (i) papillary enlargement as well as follicles.
 - Tr. ii (b) (ii) follicles with the added complications of spring catarrh.
 - Tr. ii (c) trachoma complicated by gonococcal conjunctivitis.
- (3) Stage iii or Tr. iii—where cicatrization has commenced; often non-contagious.
- (4) Stage iv or Tr. iv—where cicatrization of the conjunctiva is complete. Always non-contagious.

Due to the conflicting opinions regarding the disease it sometimes becomes very difficult to differentiate between a case of true trachoma and simple follicular conjunctivitis. Nicolle does not regard it as a specific disease of a peculiar type but one of the variety of the granular inflammations of the conjunctiva, whereas Aubaret considers it as one of the specific variety. Strother Smith, Coppinger, Wright and other eminent authors opine that 90 p. c. of cases so diagnosed and sent to them for treatment are not of Trachoma. Therefore, diagnosis is of prime importance in treating a case of "Trachoma".

EARLY TRACHOMA.	SIMPLE FOLLICULAR CONJUNCTIVITIS.
1. Follicles embedded in the conjunctiva.	1. Follicles situated on the conjunctiva.
2. Follicles always on an inflamed surface.	2. Follicles on a normal or slightly inflamed surface.
3. Small areas of the "pin-point" petechial hemorrhages around follicles.	3. No hemorrhages visible.
4. Follicles more marked on upper lid than lower.	4. Follicles more marked on lower lid than upper.
5. Follicles definitely encroaching on to the tarsal plates of lids—site of situation—upper margin of tarsal plate and angles.	5. Follicles confined to fornices, lower and upper, showing no tendency to invade the tarsal area of the conjunctiva.
6. No rapid improvement with treatment.	6. Rapid improvement with treatment.
7. Not very common in infants.	7. Very common in children.
8. Lid scarring and corneal involvement very frequent.	8. Lid scarring and corneal involvement always lacking.

Treatment—It may be divided into three kinds :

- (1) Medicinal;
- (2) Physical;
- (3) Surgical.

1. Medicinal

Of course, uptill now we are unable to find out any specific treatment for Trachoma. The oldest known remedies for this disease are silver nitrate and copper sulphate. They still hold the field but the objections against them are that these drugs are irritant and are beneficial only when used over a considerably long period and have no curative value. They only relieve the troublesome symptoms. This is the reason why these drugs are now abandoned as workers either civilian or military cannot undergo such treatment as it requires attendance at a public or a private clinic for a long period which hinders their work. Other strong irritants and caustics such as Lapis Divinus, Iodine, Iodized phenol and 10 p. c. phenol etc., have got also the same disadvantages and give no better results. For the last ten years ophthalmologists are in search of some such drugs or procedures for the treatment of trachoma which may have the following properties :—

- (a) Shortening of the period of treatment to an appreciable extent;

- (b) Causing no smarting or irritation;
- (c) Preventing the onset of complications;
- (d) Bringing under control and stopping further progress if complications have already set in.

Over here we will try to consider only a few drugs which I have tried on 2200 cases of Trachoma of which records have been kept. Though the disease is very common in this part of India and I have to treat no less than 100 cases daily, I cannot keep a proper record of all these cases as they do not stick to one form of treatment. The records of cases shown over here are those of which I had kept proper notes and they were watched for a long time, some of them still come to me for the quarterly examination of their eyes.

The following six drugs have been tried.

- (1) Silver Nitrate paint.
- (2) Lapis Divinus paint or rule.
- (3) Boric acid massage.
- (4) Acriflavine drop.
- (5) Sodium chloride massage.
- (6) Oleum chaulmoogra paint.

1. **Silver Nitrate.**—It may be used in various strengths from 2 to 60 grains to an ounce of distilled water but Strother Smith (1927) and Henry Smith (1920) have advocated the use of AgNO_3 as strong as 15 per cent solution. The drug is applied after cocainising the eye on everted lid with a swab stick very carefully so that nothing comes in contact with the cornea. Then wash the eye with saline lotion. Care should always be taken so that AgNO_3 lotion should not come in contact with the cornea. The method is repeated twice or thrice a week according to the reaction.

Though all the 600 cases tried by this method showed marked improvement and all the symptoms were relieved within a very short period, yet recurrences were noted in the majority of cases which were again subjected to the same form of treatment. During the period of treatment the eyes were frequently washed with saline lotion and one of the following eye drops was used according to the circumstances and the nature of the patients.

- | | |
|--------------------------|----------|
| (a) Argyrol lotion | 2 to 10% |
| (b) Potargol lotion | 2 to 10% |
| (c) Silvol or Neo-Silvol | 5 to 10% |
| (d) Acriflavine lotion | 1 in 500 |

Course of Treatment—2 to 6 weeks.

The main disadvantages of this method are that it can only be used by experts and not by general practitioners and that it has got no curative value. Sometimes one begins to think which Silver Salts are to be used. It is a very important question to be solved. AgNO_3 lotion 1 to 2% and Argyrol (original) are the most dependable salts.

Over a period of 30 years' observation and experimentation in eye diseases with innumerable Silver Salts, G. W. Vandergrift (1932) has found that the most dependable salts have been, and are the old 1 to 2% solutions of AgNO_3 and Argyrol in varying strength according to the necessity.

Some may ask that when we get no better results with AgNO_3 , then why should it be used at all. To answer this we must study the principles of the treatment of trachoma. Cure of trachoma is brought about in two ways viz:—

(1) Absorption of granules.

(2) Disintegration and replacement of the granules by cicatrices.

The first method is effected by a condition of hyperæmia as advocated by Bier. This hyperæmic condition is caused by caustics and irritants and that is why in chronic indurated cases these are very useful but they should never be applied with the intention of cauterizing the granules and hence they should always be used of mild strength sufficient to bring about hyperæmia. The second process is brought about naturally in due course of time.

2. *Lapis Divinus*.—It is found in stick form. It is composed of a mixture of fused copper sulphate, alum and potassii nitras. It can be applied as pure stick to the granules but I prefer to use it in the following way:—

Roll the stick with a few drops of water on a clean marble slate and then take a little of the rubbed material on the tip of the finger and apply it over the everted lid, after a minute or so wash the eyes with mercury lotion 1 in 10,000 and then drop either acriflavine lotion 1 in 500 or astringent lotion (Alum gr. 3, Boric acid gr. 4, zinc sulph. gr. 1, aqua dest or aqua rose 3i). It produces much smarting, irritation, photophobia and lachrymation and, therefore, not very suited for children and delicate patients. If it is necessary at all to use it in such cases, eyes should be cocainized first and then the L. D. used.

Course of Treatment.—One to four weeks. Out of 400 cases,

250 were relieved and 150 cured. These relieved cases showed relapses which were treated again according to the 4th and the 5th methods. Sometimes, reaction was much.

3. *Boric acid massage after Scraping*.—This is generally useful in Tr. I and Tr. II cases. Of course, for scraping various instruments are used such as Knapp's roller forceps or Rasps etc. Scraping is done after thoroughly anæsthetizing the eye and by everting the lid with one of the above instruments but I generally prefer Knapp's roller forceps. After scraping, a piece of cotton is taken with a little fine powdered Boric acid and is thoroughly rubbed over the everted lids. After 3 or 4 minutes the eyes are thoroughly washed with mercury lotion 1 in 10,000 and then the astringent lotion or acriflavine lotion is dropped into the eyes. If the lids are swollen, Boric fomentations are to be done thrice or four times a day. The eyes are frequently washed with either saline lotion or mercury lotion and the eye drop (acriflavine) is instilled four or five times a day. Yellow oxide of mercury ointment $\frac{1}{2}$ to 1 p.c. is used daily at bed time.

Of course, the reaction is much but if done carefully and with proper precaution, it may suit even very young and delicate patients too. The duration is very short only 1 to 4 weeks and the results are very satisfactory. Out of 400 cases, 200 were cured and 200 were relieved which afterwards were changed into Tr. IV. Complications are also rare.

4. *Acriflavine drop after scraping*.—It has been experimentally proved that irritants—bacterial or chemical—can bring about inflammation and infiltration of the subepithelial adenoid layer of the palpebral conjunctiva. Hence it stands to reason that caustics and irritants are not suitable for the treatment of trachoma. Only on these accounts they were regarded as useless from a long time for the treatment of follicular conjunctivitis and spring catarrh and consequently the sooner they are abandoned in the treatment of trachoma the better. Goldzieher has proved the above statement by treating many cases with CuSO_4 . Ordinary mild antiseptics or astringents have also been proved futile and, therefore, the ideal drug for the rational treatment of trachoma should possess the following properties (Ganguly 1921) (Basu Chowdhary 1932):

- (a) It should be a powerful antiseptic.
- (b) It should be non-irritating.
- (c) It should not coagulate albumin and should be able to penetrate the crevices of the granular tissues.

- (d) It should be able to neutralize the irritating toxins.

If acriflavine is judged keeping the above points in view, I am certain it will be the only drug to be found in the whole of ophthalmic Materia Medica possessing nearly all the above mentioned qualities. It has the following excellent properties:—

- (1) It is one of the most powerful antiseptic yet discovered
- (2) It is not at all irritating.
- (3) It does not coagulate albumin and acts better in the presence of serum or tears.

Where it is necessary to obtain the last point (d) a very weak potassium permanganate solution is recommended. It is for these reasons, acriflavine lotion (1 in 500 or 1 in 1000) is so frequently used in our ophthalmic practice. The strength depends on the gravity of the case.

In this method also the scraping is done as has already been described in method No. 3. Here the everted lids are not rubbed with Boric acid. Just after the scraping, the eyes are washed with a very weak potassium permanganate solution ($\frac{1}{2}$ gr. to a pint of water) and then the acriflavine lotion is dropped into the eyes. The eyes are washed in the same manner three or four times daily and the acriflavine lotion is used accordingly. But P. Ganguly, (1921) advocates the following method:—

"The patient's eyes are thoroughly washed with a very weak potassium permanganate solution ($\frac{1}{2}$ gr. to one pint of water) and then the upper and lower lids are rubbed against each other for a minute. They are irrigated again with the same lotion and the eye lids are massaged again. Lotio acriflavine 1 in 500 is then dropped into the eyes and the patients are kept in their beds with their eyes closed and not squeezed for a quarter of an hour to allow the drug to exert its full action". He further says that out of 40 cases treated in this way 38 cases were cured. The average time taken for treatment was 67 days. The most noticeable features of this treatment were:—

- (1) Uncomplicated cases never developed any complications so long as they were under this treatment.
- (2) Complications, if any, were stopped from further progress in the majority of cases. This was specially marked in cases of centripetally progressive ulcerative keratitis.

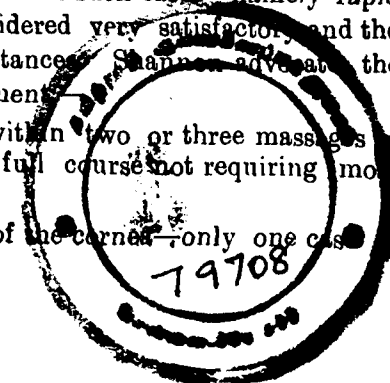
I have treated 200 cases according to my method and 180

cases according to P. Ganguly's process and 20 cases were treated simply by frequent washing with Pot. permg. lotion and instilling of acriflavine lotion. Out of these 400 cases, 350 cases were clinically cured and 50 cases turned into Tr. IV. No complications have been observed during the treatment, whereas, on the other hand, a few cases in which complications were present also showed good results as they were arrested immediately. The average time required is about 8 weeks and the highest time taken by a few cases is about 19 weeks. Massage or expression should never be done in cases complicated with ulcerative keratitis or with cheesy condition of the granules. In such cases complications are to be treated first and then curative treatment of trachoma is attended to.

5. **Sodium chloride massage.**—The patient is allowed to lie down on the table and the eyes are washed thoroughly with Saline lotion and then they are anaesthetized with either cocaine or Novocaine lotion. Martinez Saliberry (1930) who claims 80 % clinical cure recommends the following process:—

Take a little pure finely powdered sodium chloride and rub the same with a piece of sterilized cotton wool on the everted lid. If much discomfort is felt, wash the eyes again with saline lotion and drop acriflavine, otherwise, if he can bear that amount of pain do not wash the eye as in the long run it always gives good results. This method should be repeated daily in Tr. I and on alternate days in Tr. II. But all depends on reaction. Shannon (1934) gave this treatment in 20 cases. According to him, this proved the most successful of all the treatments employed so far. Saliberry shows 80 p. c. clinical cure whereas Shannon shows 100 p. c. cure in stages Tr. I and Tr. II and 14 p. c. in stage Tr. III. By clinical cure was meant the return of the eye to a completely normal appearance and entirely free from symptoms, so that on examination one could not tell that the patient had ever suffered from this disease. Since, from the nature of many old standing Tr. III cases where permanent structural damage had been done before the treatment was commenced only clinical cure was possible, the result achieved in such cases—namely rapid conversion into Tr. IV, was considered very satisfactory and the best obtainable under the circumstances. Shannon advocates the following advantages of this treatment:—

- (a) Rapid effects even within two or three massages in some cases and the full course not requiring more than three weeks.
- (b) Free from the danger of the cornea—only one case



the series (20 cases) appeared to be irritated by the treatment to the extent of getting increased photophobia and pin-point dryness of the cornea which left no permanent ill-effects.

- (c) It required only an ordinary lid hook for double eversion of the lid, a cotton wool covered probe and cocaine or some other local anaesthetics.
- (d) Treatment caused only an hour's acute discomforts, watering, irritability, photophobia, followed by relief and decrease of the weighty feeling of the lid.

Course of treatment:—One to four weeks. Out of 200 cases tried according to the above method, 170 were declared clinically cured and 30 were relieved of their annoying symptoms.

6. *Oleum Chaulmoogra.*—There are many conflicting opinions about this drug in the treatment of trachoma. It is painted over or rubbed into the conjunctiva and fornices by everting the lids energetically by means of a glass rod; the process being repeated at the interval of three or four days (Delanoë 1926, 1928) (Gubbay 1929). It may be applied on the lids by a swab stick soaked in the oil. The soapy mixture of oil and tears causes irritation for a few minutes and watering of the eyes passes off quickly without injuring the cornea or conjunctiva. The application may be made daily or every alternate day, which depends on the gravity of the case and reaction produced. About ten or fifteen applications clear up the condition. Scarring is much less. Acute cases react much causing much swelling of the lids which disappears in due course by proper care and fomentations etc. Wilson (1928) has treated an extensively controlled series of cases with it and is of opinion that its effects are determined in individual cases by personal factors of an obscure nature, in some the drug could not be tolerated, while in others a definite improvement was obtained after other drugs had previously failed. Rollet and Chams (1928) also report favourable results—in some cases, "truly marvellous" (Duke Elder—1934). J. G. Samkowski (1928) on the other hand, believes that any result obtained depends merely upon the intensity of the application, and claims that the drug is not specific for the disease and possesses no advantage over other methods. After a prolonged treatment of over a series of controlled cases, A. Gala (1912) came to a similar conclusion. Duke Elder (1934) thinks that Chaulmoogra oil cannot, therefore, be regarded as a specific remedy for the disease, and on the whole it appears to possess no advantage over

older methods. The most that can be said for it is that it is inexpensive, easily applied and usually entails a relatively small amount of discomfort. Though Shannon (1934) got a better result yet, he thinks that the beneficial results from it are much more slowly obtained than the Sod. Chloride massage and are not permanent. I agree with him and with others too so far as time is concerned; it surely takes a longer time than Sod. Chloride massage but if this oil is properly rubbed over the everted lids of selected cases, I am certain we can get excellent results. In my 200 cases, 160 were cured and 40 improved. All the types of cases were tried which gave nice results. Time taken 4 to 10 weeks. R. Gubbay of Jammu (1932) states that two years ago he commenced to use chaulmoogra oil and the results have been so encouraging that he now uses it almost to the exclusion of other applications, the lids feel lighter, the gritty sensation is less troublesome, the sticky discharge decreases and vision is clearer. K. Koman Nayar (1933) reports that massaging of the palpebral conjunctiva with chaulmoogra oil has been tried on a large scale. Extensive trials in Egyptian Hospitals have shown that this drug is not any way better than CuSO_4 or AgNO_3 ; but in his practice at Madras he has found it useful in chronic cases giving a very soothing feeling to the patients. The Hospital doctors at Pondicherry reported well about it at the session of the Indian Science Congress when it was last held at Madras.

Comparative treatment of Trachoma with Acetic acid and Chaulmoogra oil.—J. O. Tiong, M.D., Cullion—1932.

Sixty-one cases of follicular trachoma were treated. Each patient received oil chaulmoogra treatment for the right eye and acetic acid 20 p.c. solution for the left eye. A survey of the results was made six weeks, and again nine months after the last treatment.

Six weeks after the last treatment all the mild cases (20 in number) were found to have recovered; of the moderate cases 13 recovered and 9 improved; and of the severe cases 5 recovered cases were still apparently well; 8 had relapsed and 11 were no longer traceable: of the 23 cases in the first survey 2 had become free from granules and another two had become worse, the rest remained more or less in the same condition as at six weeks.

The mild cases responded very readily to both kinds of treatment. The moderate and severe cases required more treatments, the majority not less than two sittings for complete recovery.

The two methods of treatment were of practically the same efficacy, but the acetic acid produced more untoward effects.

Subconjunctival injections—many workers have tried subconjunctival injections of various drugs as Gold salts, Sod. Chloride and Oxy-cyanide of mercury etc., in the treatment of trachoma. I have also tried S. C. injections of saline and of Oxy-cyanide of mercury but with not very bright results. Wilson (1928) obtained good results by injecting subconjunctivally at 4 or 5 days interval gold salts, but he recommends a compound called "Triphal". He is of opinion that it is more efficient than any of the old methods and produces a clear cornea as an end result. The only disadvantages are that the gold salts are very costly and produce very severe reaction which sometimes patients cannot bear. Many scholars have tried injections either of cyanide or of oxy-cyanide of mercury solution 1 in 3,000 or 1 in 4,000 subconjunctivally but they do not report very favourably. H. Smith recommends the employment of S. C. injections of cyanide of mercury in cases of trachoma but he speaks nothing about the end results. Some authors go so far as to advocate intravenous injections of Copper salts.

Sometimes due to excess use of Silver Nitrate the lids become a little harder and the palpebral conjunctiva becomes blackish. This is known as "argyrosis". To remove this Weymann recommends the S. C. injection of the freshly prepared mixture of the following drugs:—

2 parts of Pot. Ferrocyanide 2 p. c.

1 part of Sod. Thiosulphate 12 p. c.

Several other drugs and methods have been experimented with, but on the whole one can conclude this review by saying that no specific medicine has up till now been invented, only some improvement has been brought in the methods of their applications, whereby satisfactory results have been obtained by certain workers.

2. Physical Methods

These methods have also been tried by various workers but did not prove very efficacious. Wilson (1928) who has tried carbon-dioxide snow on a large number of cases does not consider it a better agent than copper sulphate. Kirkpatrick is also of the same opinion and says that the application of carbon-dioxide snow and exposure to X-rays have been recommended in the treatment of trachoma but these measures have

not proved entirely satisfactory in his practice. On the other hand, Stephenson, Walsh and Mayon have reported favourably on the treatment of Trachoma by X-rays tube exposure. A. Monbern (1929) who tried Diathermy claims very satisfactory results. He destroys the infected areas of conjunctiva by coagulation necrosis, making use of three methods according to the depth of the coagulation desired. The first is the classical method of diathermy by two electrodes modified only by the fact that the indifferent electrode does not rest directly on the skin but is separated from it by the clothes which form the dielectric of a condenser. This method permits an extensive coagulation of tissues and can be utilized for destroying the more exuberant granulations of the palpebral conjunctiva. The second method involves a single electrode only, which is kept in contact with the tissues and has merely a superficial action. This is indicated for use in peritomics and for destroying discrete conjunctival granulations, pannus and hair follicles. The third method is similar to the second except that the electrode is held 1 or 2 mm. away from the surface to be coagulated, so that a spark is allowed to jump across, producing a minimal coagulation. This gives the maximum degree of security in treating a case of pannus, and is convenient also for destroying very fine granulations. The author claims that this is a rapid and bloodless method, and allows the patient to return to his work immediately without requiring further dressings. The end results are also said to be satisfactory because of the extreme flexibility and suppleness of the resultant scars, which do not appear to be followed by the secondary contractures, which are so frequently met with after prolonged treatment by caustics (Duke Elder, 1934). Ragain (1929) also thinks it a satisfactory method and says that the method of choice in the treatment of the lids is monopolar filgration. More reports on the subject may establish its utility in cases of Trachoma but diathermy should only be used by experts.

Ultra-Violet rays.—Hurst (1928—31) reports very favourably about U. V. Rays but Shannon (1934) says that he did not achieve the results anticipated; though it resulted in a temporary relief in symptoms during treatment. The improvement seemed to be due to the general tonic effect of the treatment in chronic cases, and the improvement in the superadded infection rather than any true influence on the trachoma. The course of treatment—2 to 3 weeks. Hurst's technique—For all ophthalmic work—Tungston arc is superior to mercury vapour type of lamp because the latter is so variable in its output of U. V. Rays. The

rays should be of long wave length. The U. V. Rays unlike X-rays have their path impeded by blood and, therefore, two drops of adrenaline solution 1 in 10,000 are put into the eyes prior to light treatment. The patient is told to close his eyes gently as if asleep, but not to squeeze up the lids. A nickle copper adjustable mirror is employed to focus the light on to the closed lids 2—4—8 maximum minutes twice a week. He has treated 50 cases of trachoma by this method and complete cure has resulted in all of them. The cases were nearly of all the stages.

Radium.—It is used in the treatment of trachoma, spring catarrh and rodent ulcers. A tube containing six milligramme of radium bromide may be kept over the lids for a few minutes once a week.

3. Surgical Treatment

It includes expression, grattage, curetting, cauterization, excision etc. Only the last named operation requires a little description; the rest have got the same old stereotyped methods.

Excision is done by removing the fold of the conjunctiva about 10 m.m. broad containing granules from over the everted lids. It is generally done in Tr. II and sometimes in Tr. III when the corneal complications are present and no irritating drug is easily to be applied on the lids.

Tarsotomy.—(Kuhuts' method) is useful in cases of Tr. III showing chronic Tarsitis with hypertrophy especially when accompanied by active corneal complications. In such cases no chemical or other local therapeutic agents are capable of giving permanent relief from symptoms or arresting the disease for good. Tarsotomy is a very useful operation in such cases and gives good results. In 4 out of 6 cases of Shannon (1934), excellent results were obtained. It arrests the lid diseases and the advancing pannus, corneal ulcerations or keratitis liable to lead to blindness and it cures the ptosis. I am inclined to think that this operation always gives good results provided that the selection of cases for operation is done a bit carefully. I have tried this operation on many cases but 80 cases were operated with the idea of watching the end results. I had known no recurrence in these cases nor were there any other defects except that in 5 cases there was a bit of deformity of the lids. It takes not more than 3 weeks time for both eyes, because, I generally operate one eye at a time: if however both the eyes are operated at one sitting it will not take more than 10 days or utmost two weeks.

D. D. McHenry (1929) believes that many cases of trachoma respond readily to treatment and that 99 percent are curable. The

basis for the treatment of this affection should be surgical in all but very acute cases; proper surgical procedures will shorten the treatment by many months and in many instances years, as compared with the treatment by drugs alone. In the great majority of cases of well advanced trachoma the caruncle is involved, and must be included in surgical procedures if successful results are to be obtained. Any surgical method that will entirely eradicate the trachoma follicles and their contents with a minimum destruction of normal mucosa is adequate. Usually treatment is commenced by a radical operation. In acute cases under good anaesthesia, he rubs off the follicles with a finger covered with gauze saturated with either Boric acid powder or 2 to 5 p. c. CuSO_4 in glycerine. This is followed by the application of CuSO_4 (2 to 5 %), glycerine or AgNO_3 1 p. c. daily or two or three times a week.

The patient subsequently applies at home mercuric Oxycyanide (1 in 5,000 to 1 in 3,000) solution two or three times daily. Most chronic cases show a decided hypertrophy of the orbicularis muscle with, often, a blepharophimosis due to years of squinting, in these the operative treatment is preceded by a radical canthoplasty, according to Ziegler's method, care being taken to cut the canthal ligament. He has got his own technique of performing this operation. Tarsotomy has no place in the treatment, but is of value in cured or nearly cured cases with thickened and distorted lids. The operative procedure should always be followed by drug treatment and observation for one or two years must be done before the cure can be regarded as established; any follicle appearing during that time must be destroyed.

General treatment

Though it is certain that together with the above treatment patients are always advised to obey the general rules of hygiene, yet we must be precise in our statements. The patients should always be asked to save their eyes from sun or glare, dust, smoke and dirt etc., and should try to live as far as possible a sane life free from drink etc. Now the Madras School under Wright has begun to think that Trachoma is also a deficiency disease and therefore the patients should always be advised to take more of vitamins, in the form of cod liver oil, fresh fruits, eggs and

tomatoes etc., than anything else. All irritating materials of diet should be avoided. Constipation and pyorrhoea should be treated accordingly.

Result analysis of 2,200 cases treated for Trachoma by various drugs and the results of 80 cases of trachoma in which Tarsectomy (Kuhuts' method) has been done. These cases were treated within the last four years from Oct. 16th 1930—to Oct. 15th 1934.

TREATMENT USED.	TOTAL CASES TREATED.	DURATION OF TREATMENT.	RESULTS.			REMARKS.
			Cured.	Re-lieved.	Other-wise.	
1. Silver Nitrate ...	600	2 to 6 weeks	200	400	—	A
2. Lapis Divinus ...	400	1 to 4 weeks	150	250	—	B
3. Boric acid massage ...	400	1 to 4 weeks	200	200	—	C
4. Acriflavine drop ...	400	4 to 8 weeks	350	50	—	D
5. Sod. chloride massage.	200	1 to 4 weeks	170	30	—	E
6. Oil Chaulmoogra ...	200	4 to 10 weeks	160	40	—	F
7. Tarsectomy ...	80	2 to 3 weeks	80	—	—	G

A=600 cases were tried by this medicine but no very hopeful results were obtained as the relapses were common and each case had to undergo two or three courses and even then we had only 50 p. c. result. Rest changed into Tr. IV.

B=400 cases were treated by L. D. only 150 cases we declared clinically cured out of which 90 cases got relapses and they were again treated by the same method when in total 150 were declared clinically cured. Rest changed into Tr. IV.

C=400 cases had this treatment, out of which 200 were clinically cured, and the rest 200 were relieved of their annoying symptoms when about 70 had relapses which were again treated by this method and became quite O. K. in due course of time. Rest changed into Tr. IV.

D=The results are very brilliant, out of 400, 350 were declared cured and rest 50 were changed into Tr. IV.

E=200 cases were treated according to this method. 170 were clinically cured and 30 improved.

F=This treatment was given in 200 cases out of which 160 were declared clinically cured and 40 improved. A few of these improved cases changed into Tr. IV.

G=The Kuhuts' method was tried in 80 cases together with acriflavine drop (1 in 500) for about two months. The results were simply wonderful. All of them were declared clinically cured.

Treatment used.	Total Cases	Clinical Cure				Rapid conversion to Tr. IV				Disease arrested				Gradual improvement to Tr. IV				Doubtful result				No effect			
		No.		%		No.		%		No.		%		No.		%		No.		%		No.		%	
Silver Nitrate 15 per cent ...	(a) 5	—	—	—	—	60	3	—	—	—	—	—	—	1	20	—	—	—	—	—	—	1	20	—	—
Berberine or Sod. morph ...	(b) 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	100	—	—
Scraping ...	(a) 10 (b) 3	6	1	60	33	—	—	—	—	—	—	—	—	1	33	—	—	—	—	—	—	4	40	1	33
Ultra Violet Rays ...	(a) 8 (b) 4	2	—	25	—	—	—	—	—	—	—	—	—	2	25	—	—	—	—	—	—	3	37	2	50
Sod. Chloride ...	(a) 8 (b) 14	8	2	100	14	—	11	—	78	—	—	—	—	—	—	—	—	—	—	—	—	1	8	—	—
Ol. Chaulmoogra ...	(a) 1 (b) 3	—	—	—	—	—	1	—	25	—	—	—	—	1	100	—	—	—	—	—	—	—	—	—	—
Tarsectomy ...	(b) 6	—	—	—	—	—	—	—	—	4	67	—	—	1	16	—	—	—	—	—	—	1	6	—	—
Total ...	(a) 32 (b) 39	16	3	57½	6	—	15	—	34	—	8	—	3	11	—	—	—	—	—	—	—	7	25	—	—
																						15	34		

(a)=Tr. I and Tr. II cases.

(b)=Tr. III and Tr. IV cases.

MORE ABOUT INSULIN

BY

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OF all the drugs known as specific for one or other disease Insulin has proved to be the most successful one for the treatment of diabetes and its numerous complications. It has more than fulfilled the anticipation and expectations of the scientists as Sharpey Schafer (1916) who was responsible for the name (till then a hypothetical hormone) or Banting and Best (1922) who in Macleod's laboratory, successfully extracted it in a concentrated form from the islets of Langerhans of normal pancreas and were later on awarded the Nobel prize in Medicine for this epoch-making discovery. Since then the mortality from diabetes and its complications has gone down to an irreducible minimum in the civilized countries of the world. 'Fresh fields and pastures new' are being explored every day by the investigators to expand more and more the scope of the application of the drug with the best possible result in not only conditions associated with disease or exhaustion of the islets of Langerhans but also for many other conditions. The drug when used in right dose in a suitable case will always perform a miracle but slight indiscretion regarding the dose and its proper application may precipitate a disaster. For this reason, Insulin has lately been regarded as a double-edged weapon capable of doing good as well as harm. Hence, I make no apology for selecting this extremely important subject for the special annual number of the Antiseptic and I propose to discuss in brief the action of Insulin and its value as a therapeutic agent in the light of modern researches.

Properties.—Ordinarily it is a white amorphous powder soluble in water, the aqueous solution being stable in acid and neutral medium even up to a fairly high temperature as 100°C, but in alkaline solution it deteriorates even at the body temperature. The credit of first preparing a crystalline form goes to Abel (1926), which has been confirmed by a different method by Harrington and Scott (1929). According to the former it is chemically related to the sulphur containing amino-acid cystine and probably to histidine too. He has given the chemical formula as $C_{45}H_{69}O_{14}N_{11}S$, 1 mgm. being equivalent to 40 units (1 international unit is the quantity one-third of which if injected into a rabbit of 2 k. gm. in weight would produce symptoms of hypoglycæmia ending in death within three hours).

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It is, however, usually employed clinically as insulin hydrochloride which is soluble in water, with a potency of 20 units per c. c.

Method of Administration.—As insulin is destroyed by trypsin and by pepsin even in acid solutions, it is quite ineffective if given by the mouth. So it is usually administered by hypodermic injection. Estimation of the correct dosage must be made according to individual requirements, which depends upon two factors (1) state of disease and (ii) diet. The dose as a rule should not exceed 30 units twice daily. Several small repeated doses provide much better results than a big dose all at once. Whenever a big dose is decided on, the patient must be carefully watched for some time and some sugars such as glucose, maltose, lactose, fruit sugar or even cane sugar must be available close at hand.

Mode of Action.—Dale and his associates (1926) enumerated the effects of a suitable dose of insulin in a diabetic patient as follows:—

- (1) It enables the sugar to be utilised normally and glycogen to be deposited in the liver and muscles.
- (2) Tissues can utilise more sugar so that the metabolism is increased. There is a rise in oxygen consumption and also the carbon-dioxide output as a result of which the respiratory quotient rises.
- (3) It inhibits sugar formation in an extra quantity from the proteins in the liver (as is usual in diabetes).
- (4) With the increased sugar metabolism, the metabolism of fats is more complete so that ketosis and ketonuria either do not develop at all or disappear altogether.
- (5) More hexose-phosphate is formed and deposited in the muscular tissues so that the inorganic phosphorus content of the blood fall along with the lowering of the blood sugar. The excretion of Phosphorus in the urine too is diminished.

Boldyreff and Stewart (1932) while working at the Pavlov Institute noted the following effects after injection of insulin. (a) constriction of pupils (ii) slowing of the heart and (c) lowering of the body temperature. The former (1932) has also shown that it has a powerful secretagogue action on the gastric glands. All these effects are evidently due to the stimulation of the parasympathetic fibres distributed to various situations of the body. The writer in collaboration with Dr. Prasad have been able to

corroborate these findings so far as the action of insulin on heart and blood pressure (1934) is concerned. Experiments in our hands showed the following effects: (a) Insulin in small doses produces slowing of the rate of the heart and sometimes diminution in the amplitude. (b) This is due to the stimulation of the nerve ending of the vagus peripheral to the ganglia. (c) In this respect it acts as a true physiological antagonist to atropine, which was also previously noticed by the estimation of bloodsugar by Chahvitch (1929) and Barone (1931).

In a subsequent paper (1935), we have also shown that (a) different sugars, as glucose, fructose, lactose, maltose, and even cane sugar increase the efficiency of heart contractions when added in suitable doses to the perfusion fluid, (Locke and Rosenheim 1904, also found similar results with galactose, rhamnose, 1—arabinose and glucoheptose and Clark (1913) with glycogen) and that insulin in small doses further enhances the action of the sugars on the heart. (b) The effects of insulin stimulating the vagus are absent or rarely present when a suitable dose of insulin is combined with suitable doses of different sugars. According to Sharpey Schafer (1926) "under the influence of insulin, glucose undergoes a change which renders it more oxydisable and therefore better able to be metabolised by the tissues". We obtained also another very interesting result in this connection, that intravenous injection of glucose in saline preceded by a subcutaneous injection of insulin (10 units) about half an hour before the starting of perfusion improved the force of contraction of the heart considerably for a long time. From this it is evident that different sugars and preferably glucose intravenously preceded by a small dose of insulin hypodermically might be used as cardiac tonics as digitalis and adrenaline.

Effects of an over-dose.—(1) Hypoglycaemia which may develop from less than half an hour to several hours according to the blood sugar level and the dose employed. The following symptoms manifest themselves one after another, (a) extreme hunger and a sense of fatigue, (b) tremulousness (c) flushing and profuse sweating (d) and last of all, all sorts of mental disturbance, as delirium and coma may occur. This may be relieved by oral administration of sugars, preferably glucose and also by injection of adrenaline or sometimes pituitrin.

Experiments in our hands (Pal and Prasad 1934) have clearly shown that there is always a fall in blood-pressure after a big dose of insulin. If the dose is a very big one there may be complete stoppage of the heart, to be followed by a gradual

reappearance of the beats of equal or higher amplitude. This "vagus escape" like phenomenon is indeed, very peculiar.

Indications for insulin treatment.—Insulin is always called for in cases of diabetes mellitus which do not respond to dietetic treatment and glycosuria persists before diet reaches a standard necessary for life. It is also an absolute necessity in the important complications of the disease like coma and ketosis, peripheral neuritis, gangrene, carbuncle and boils and ocular manifestations like, cataract, retinitis, amblyopia amaurosis etc.

Contra-indications.—It should never be given in a case of renal diabetes. For eliminating this condition blood must be examined for its sugar content more than once before commencing the insulin treatment. It should be used with utmost caution on a patient with weak heart, if the blood sugar level is not sufficiently high. If insulin must needs be given, and any deleterious effect comes after the injection, an intravenous injection of glucose in saline should be given forthwith. Adrenaline also may counteract the further slowing action of insulin on the heart.

Summary.—The chemical properties, method of administration, mode of action, effects of an over-dose, indications and contra-indications of insulin have been briefly described in the light of modern researches. The possibility of its use in combination with intravenous glucose as a cardiac tonic has also been mentioned. Many of the effects of insulin in the body have been explained by its stimulating action on the parasympathetic nerve endings, insulin acting as a true physiological antagonist to Atropine.

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NEUROSES AS MET WITH IN GENERAL PRACTICE AND THEIR TREATMENT

BY

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DURING recent years the words "neurosis" and "psychoneurosis" are being very largely talked about in our medical circles and in some cases even without understanding their proper significance. There was a time when any talk in relation to this group of diseases was considered to be a useless gossip but at least so much progress has been made in the modern days that we are beginning to realise their importance to a certain extent and although we still look upon the whole affair with suspicion which is entirely bred on our ignorance, we have at least begun to participate in discussion regarding these matters. But so much ignorance still prevails about the correct significance of this group of diseases that, I hope, that a brief discussion on this subject will not be out of place.

The term neuroses applies to disorders of mental origin and must be distinguished clearly from psychoses which are mental diseases proper. It should be looked upon as essentially a disorder of temperament, the manifestations of which are always multifarious and spread over the whole range of patients' temperament. Some hold that they are generally the outcome of certain circumstances and situations operating in the adult life when an individual fails to adopt himself to them and thus their etiological factors must be searched for in the current life of the individual, while others are of the opinion that these cases start in childhood as a result of milder form of disturbance in the psychological development in that period. These disputed theories, however, need not prejudice us at this stage from understanding their correct significance.

The word "neuroses" has an association of some kind of nuisance in the minds of an average medical man and a subject of this malady instead of expecting treatment and sympathy at the hands of medical men is more often the object of fun and is generally dispensed with a hall-mark of a "neurotic" which is thought to be almost synonymous with something absurd or ridiculous with the result that the poor wretch drifts from one doctor to another with no apparent benefit and is turned down from everywhere with almost the same rebuff, till finally he

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either puts an end to his life as his troubles become unbearable or there may be a temporary amelioration in the symptoms as the immediate situation which precipitated the attack, has probably ceased operating but only to recur back no sooner the patient is confronted with a similar situation and thus remaining a subject of a never ending misery.

Neurotics when sympathetically interrogated pour out their train of symptoms in a stream and they have a tendency to describe their troubles in superlative terms such as awful, terrible, excruciating or the like. As a class these people are characterised by a hypersensitive, selfcentered, emotional, worrying type of temperament. They resent interference of any kind and resemble children in many respects. In fact it has been claimed by some that a neurotic retains in his adult temperament some traits and tendencies which should have been left behind with childhood and it is this very childishness which makes it impossible for him to meet the demands of adult life.

Three conditions are usually described under the group of Neuroses.

- (1) Neurasthenia.
- (2) Anxiety Neurosis.
- (3) Hypochondriasis.

Neurasthenia.—Is the word which is most commonly used and has met the usual unfortunate fate of having entered in the common parlance. It has been used without understanding for almost every variety of mental disorder, but it must be realised that in the strictest sense it means only that condition which is characterised by nervous exhaustion and undue mental fatigability. In the Freudian sense it has been described as a fatigue neurosis which has as its basis a fixation at an infantile stage in the sexual development.

Prolonged severe effort with insufficient rest, excessive physical and mental exertion, excessive masturbation sexual excesses, acute infectious fevers, and the so called severe attack of "flu" and long continued illnesses are some of the factors which predispose to this condition. It should be clearly distinguished from an anxiety state and if proper treatment is employed, recovery is usually speedy. This mental state if continued for long may predispose to other serious mental disorders.

Treatment consists in physical and mental rest, improvement of general nutrition, change of climate and environments and symptomatic treatment for important symptoms like sleeplessness

and dyspepsia etc., use of a general tonic like "Incretone" is sometimes very helpful. In refractory cases Weir-Mitchell treatment should be resorted to.

Anxiety Neurosis.—Is one of the commonest neurotic condition. It is the condition which has been largely confused with neurasthenia in the past—although psychologically speaking it is the direct opposite of neurasthenia.

As opposed to neurasthenics where the excessive fatigability is due to lack of energy, the neurotic has generally an excess of pent up energy which for want of proper outlet of expression has taken up this perversion. All of us are anxious and worried sometimes, for one reason or the other and even normally there is a good deal of variation in this capacity. Some are very easily upset and worry about trifles while others are of unusually calm and placid temperament—but when this worrying capacity transgresses the normal limits and a person worries about nothing, for no reason or rhyme it is said to be pathological and it is this state which is termed anxiety neurosis. One frequently meets cases of this mental state among the student community in the examination days, among business men when they have entered in some big contract and are anticipating failures, among lawyers when they are on the point of losing some good case, among approved candidates when they become conscious of losing their jobs, among service men when they are aware either of a retrenchment or when their chances of promotion are jeopardised, i.e., in almost every sphere of life when the means for desired end seem inadequate and anticipation of the pains of failure are dominant. Earnest Jones defines this mental state as a result of the perversion of fear instinct and that all the manifestations are due to either the distortion or exaggeration of the normal physiological accompaniments of fear.

The cardinal features of this state are marked anxiety, irritability and insomnia. This may at times be so acute that it may cause great prostration and temporary complete disability. This mental state may also determine the onset of certain symptoms attributable to the functional disorder of various symptoms, viz. Dyspepsia, Vomiting, Polyuria, palpitation of Heart etc., etc.

Difficulties in diagnosis of such a condition may sometimes be very great owing to the outward resemblance of this condition with the early stages of certain physical as well as mental diseases. Early cases of exophthalmic goitre, early phthisis, epidemic encephalitis, G. P. I. etc., may be mistaken for an anxiety Neurosis on a cursory examination.

Sometimes depressed stage of maniac-Depressive Psychosis or early cases of dementia præcox where depression is a dominant feature, may also be confused with an anxiety neurosis. But the depression in an anxiety state is based on certain reasons and is thus a secondary depression as opposed to the depression in maniac-depressive Psychosis where it is primary in the sense that it sets in without any cause. A patient with pronounced primary depression will often tell you that he does not know why he is depressed and all such cases spontaneously recover after a certain period. From the point of view of prognosis and as well as treatment it is necessary to recognise between these two conditions.

These neurotics when they present themselves for examination and treatment, should be listened to very carefully and sympathetically, and should be allowed to say their story in full. After a thorough examination and when nothing organic is found they ought to be re-assured about the soundness of their different organs but they should never be told that because nothing organic has been detected, there is nothing the matter with them. They should be told that they have nothing to be ashamed of, and that they are not responsible for their troubles but that if they would follow the doctors' advice and instructions they would get rid of them in a very short time.

The cardinal feature in the treatment of a neurotic consists not in the injudicious advice for physical and mental rest but in a thorough study of the patient's existing situation and his environments and then accordingly advise him as to how to adopt himself to it. Very often one hears a neurotic saying that it is not the work but the worry that kills him and when one inquires into the cause of the worry, in the majority of the cases one finds that it is either a result of lack of work or unsuitable work. Never allow a neurotic to go off his work. What he requires is either some extra work or a congenial situation to carry on his present work in order that he may be able to utilise his store of suppressed energy. I have seen several mild cases among the student community taking a serious turn after they were asked to put off their examination and take rest. What such cases require is a dash of extra courage, which may pull them through the ordeal, along with a good deal of encouragement and sympathy on the part of their teachers and fellow-comrades? In short what the neurotic needs is a bit of "push and go" to face bravely the confronting situation and not run away from it. Besides this, symptomatic treatment may also prove of great value. Cautious use of sedative drugs such as chloral and Bromide or Paraldehyde

or medicinal etc., for insomnia has been found to be extremely useful in breaking the vicious circle. General health should also be properly looked after and in selected and refractory cases psychotherapy judiciously applied will be of great help.

Cases of hypochondriasis are also included in this group of diseases. Here again, anxiety is the predominant feature, but as opposed to the anxiety which is related to environments in cases of anxiety neurosis, in these cases it is regarding the functioning of the patient's internal organs and consequently such patients are always complaining of some kind of bodily ailment. Sometimes such hypochondriacal symptoms are also present in some forms of psychoses and psychoneuroses but they can always be differentiated from pure case of Hypochondriasis, by the presence of other mental symptoms such as hallucination, delusions etc., and physical symptoms characteristic of the mental diseases and the absence of insight in many of them will often clinch the diagnosis.

Treatment in these cases consists in diverting the attention of the patient from the so called diseased organ which may be done by asking the patient to take up some kind of interesting work if possible and indulging in games and congenial societies for recreation. Improvement of general health should also be thoroughly ensured and factors of suggestion and persuasion may prove of some value in some cases.

Finally one would like to add a few words about the frequency of these cases. It has been roughly estimated that in Great Britain one man in every 13 persons is a victim of this malady and although no such figures can be quoted in relation to our country, one feels that it must be equally frequent here as well, and in view of the enormous degree of incapacity which it imposes on its victims, it is worth while that the medical profession in our country should also take up this cause.

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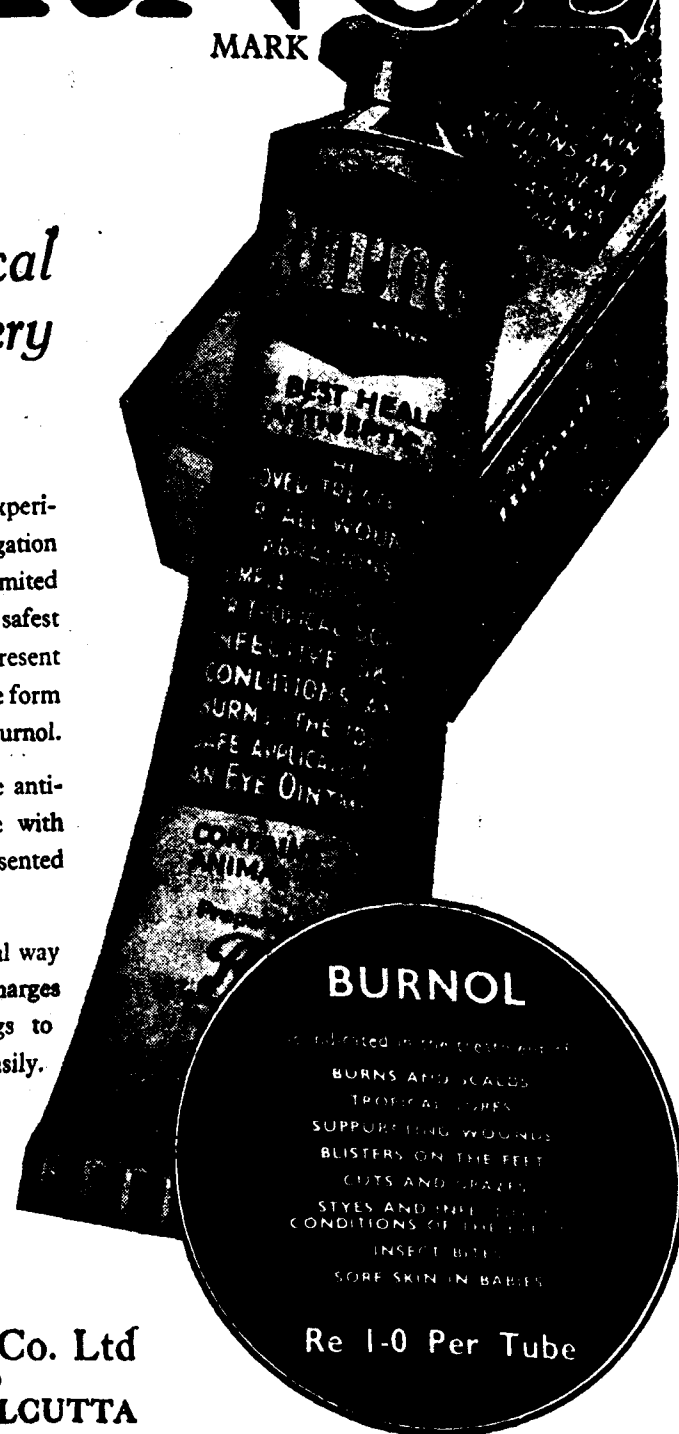
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THE OCULAR SYMPTOMS IN GENERAL DISEASES

BY

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An ophthalmologist is supposed to be merely a specialist in Eye Diseases. This idea is completely erroneous. If he desires to be of real service to the suffering humanity, an ophthalmologist should not possess only a "tubular Vision", i.e., only see two eyes as if through two tubes and leave alone the rest of the body. He should remember that the eyes are parts of the body and are most differentiated of all the organs. Hence he must be a general physician, to interpret which of the pathological changes in the eyes and their nerves and muscles are due to pathological changes elsewhere. He has one great advantage over other specialists that he can more closely examine and detect at an early stage, any pathological change in the visual organs.

Some of the very common symptoms for which a person consults an ophthalmologist are (1) Dim Vision (2) Headache (3) Glasses do not fit (4) Diplopia—apart from ocular diseases.

I do not propose to go into all the general conditions in which ocular symptoms occur. Only a few conditions will be dealt with by means of illustrative cases which have come under my observation.

Firstly, Dim Vision.—Apart from refractive errors and opacities in the media, Dim Vision means defect in the perceptive organs in the Retina or in the conduction of the visual impulse from the Retina to the termination of the Visual fibres on the inner aspect of the posterior poles of the occipital lobes. Hence, pathological changes in any part of the brain through which the visual fibres of pupil reaction to light and accommodation are passing will be reflected on to the visual organs.

Case, I. S. N. C., Hindu, male, 32 years of age, of good physique and health, stenographer by profession. History of Dimness of Vision, left eye—Duration 2 weeks. This is the 3rd attack in last 3 years. In the first two attacks, his right eye was affected and complete recovery took place after injections and medicines. His vision was R. E. = 6/6 part. L. E. = 6/36. There was no refractive error. Fundus oculi = Normal in each eye and the media were clear. A central Scotoma for red and green was elicited in the left eye. A case of Retrobulbar Neuritis. On examination, the Knee-jerk was exaggerated, Babinski's sign and ankle clonus

were present, and abdominal reflex was reduced. The case was diagnosed as one of Disseminated Sclerosis and was referred to a physician. In this case, he had no other symptoms *e.g.*, tremor, nystagmus, scanning speech, fleeting palsies etc.

It may be the privilege of an ophthalmologist to diagnose many early cases of this disease and since occasional dimness of vision lasting for a variable period, or passing double vision of Nystagmus may be one of the earliest signs.

Case II. J. R. Hindu male, 48 years of age, was a clerk by profession, at present retired due to defective eye-sight. His general health was good. His father and mother had Cataract. He was under the impression that he was developing Cataract. Vision, R. E. = 6/36. L. E. = 6/24 (pt) cannot be improved. Pupils were pinpoint, reacting to accommodation but not to light (Argyll Robertson pupil); examination of the Fundus: Optic Atrophy B. E. His Knee jerk was absent, Romberg's sign was indefinite. Blood was examined for W. R.; it was found positive 6/10. The case was referred to a physician as a case of the Tabes Dorsalis. Syphilitic poison in the system may affect the eyes in many varied ways, the common amongst them being—in Cong. Syphilis—Interstitial Keratitis, in acquired Syphilis—Iridocyclitis Choroiditis, Retinitis, Neuritis of Optic Nerve, Paresis or paralysis of Ocular muscles and in Neuro-Syphilis—Spinal miosis, A. R. pupil, Optic atrophy.

Case III. M. R. R. Hindu male—a healthy young man aged 28 years brought a batch of 12 ladies to Calcutta during the last Solar eclipse (Ardhodaya Joga) to bathe in the Ganges. He took them out in 3 batches, no eclipse was seen in Calcutta and the day was warm. In the afternoon he was feeling unwell and giddy, in the evening he had a very high rise in temperature and became unconscious. A doctor saw him and gave him an injection. The next morning he was conscious, had no fever, had bad headache and was very nearly blind—Vision being hand movement in each eye. The pupils were dilated, and reacted very slightly to strong light of an electric torch. The Fundus and Discs were very pale and the retinal arteries were very thin. The injection given on previous evening was found on enquiry from the attending Doctor to be one of 10 grs. quinine intra-muscularly. It was a case of Quinine Amblyopia. In a month's time the Vision improved to 6/12 each eye, but the peripheral Field remained contracted and had the shape of a horizontal oval. At this stage he left for his village home. This case is of special interest because of its rarity, in spite of the fact that Quinine is so extensively

used. This is most probably the first case I have seen in Calcutta.

Case IV. W. D'c. A. I., male aged 56 years, complained of rapid fall of vision for both near and distance—duration 1 month. He was an anæmic, unhealthy looking person smelling strongly of tobacco. The gums were very unhealthy. History of Gastro-intestinal trouble off and on. Appetite was not good. His vision was R. E. = 6/60. L. E. = 6/36. Fundus Oculi were normal. There was pallor of the temporal side of the Discs which might or might not have any significance. There were bilateral Centro-Caecal Scoloma for red. A case of Bilateral retro-bulbar neuritis. He gave history of smoking 20-25 Burmah (cheap) cheroots daily, and drinking fair amount of alcohol, mostly beer and brandy daily. So, the diagnosis was Tobacco Amblyopia.

Case V. L. B. H. P. Ch. 12 years of age had an attack of Diphtheria and was in medical college hospital for over one month. On returning home, she wanted to read her story books and she could not. On examination, she was found to be suffering from Paralysis of Accommodation. When this paralysis started could not be elicited. She completely recovered in about a month's time. After Diphtheria, paralysis of any of the external ocular muscle may take place, the external rectus being the most vulnerable causing Squint and Diplopia.

Case VI. R. M. A. Hindu male, 44 years of age, clerk by profession, of anæmic and labby appearance. He changed his reading glasses 3 months ago. For about one month he was quite all right. Since then his distant vision was slowly getting worse, but he can do his nearwork better than before without glasses. He was using bifocal glasses—glasses for distance being plane glasses and for near was plus 1.50 Dsph. each eye.

On examination, his eyes were found to be normal, Fundus Oculi = Normal. On refraction R. E. with minus 1.00 Dsph. = 6/6. Left eye with minus 0.75 Dsph. = 6/6. His general history was most indefinite. He was advised to have his urine examined first. Urine contained sugar—3%. He was referred to a physician with the assurance that with treatment for sugar in the urine his Vision will be the same as it was before. He reported 1½ months afterwards that his vision had become all right.

In diabetes, quite a number of eye symptoms may occur *e.g.* Iritis, Retinitis, Retrobulbar Neuritis and Cataract.

Second Symptom is Headache.—A sensory reflex in the innervation area of 5th nerve may be interpreted as headache. Headache of refractive errors, imbalance of the Ocular muscles, Iridocyclitis

and Glaucoma are of the same type. This innervation area includes the Duramater, chiefly of the base of the skull and tentorium Cerebelli, and nasal Sinuses. Deviated nasal septum is also a cause for headache. Metabolic disorders specially in affection of the gastro-intestinal tract, liver and kidney may cause headache. This type is most probably toxic.

Case I.—Mrs. C. A. I. Female aged 48 years complained of right sided headache off and on for about 2 weeks. She never had this kind of trouble before. The day she reported, she had tremendous headache and eyeache. The eye was troubling her most. On examination, nothing was found wrong as regards her eye. Nothing abnormal was found except a tender upper molar-tooth. She was advised examination of urine and X-ray of the root of the tooth. An apical abscess was discovered and she got complete relief on removing the tooth.

Case II. A. F. T. A. I. male, aged 42 suffered off and on from headache mainly frontal temporal, sometimes occipital, for the last 3 years. Recently, it was coming on very frequently. He changed his glasses 2 months previously. His glasses were found to be correct and no cause could be found in the eyes. He gave history of Dysentery 4 years ago. He suffered from 'weak stomach' since then. His right iliac region was slightly tender and so was his liver, though there was no appreciable enlargement. He was referred to his physician. He later reported that his physician agreed with me and he got rid of his headache after a course of Injections of Emetine.

Case III. Miss. S. I. C. H. Female, 18 years of age, used to have severe headache on one side or the other for several years formerly about 2 to 4 times during the year and at the time (May, 1932) almost every 2 months. She had changed her glasses 4 times. While describing a typical attack she mentioned of a "Coloured haze" in front of the eyes, which on enquiry she described as Coloured wavyline; on further enquiry and examination, it was found to be a case of "Ophthalmic migraine" and as such she was referred to her physician (This case has already been reported in Journ. I. M. Association Nov. 1933.)

Case IV. K. M. H.m. ch. 13 years of age complained of severe headache, frontal and temporal and also eyeache and Dim Vision. The ache originated in the eye and then spread to his head-duration 4 months. His vision in each eye 1/60. On ophthalmoscopic examination he was found to be suffering from Neuro-Retinitis both eyes. His radial arteries were sclerosed and Blood pressure was high. His condition was provisionally

diagnosed as Toxic Neuro-retinitis (albuminuric) and was admitted into a medical ward, where the diagnosis was confirmed. His blood pressure was 200 m. m. of Hg. Systolic and 145 m. m. Diastolic (this case was reported jointly with the physician in Indian Journal of Pediatrics, July, 1934).

In cases of headache in the frontal region, especially if accompanied by any of the following symptoms—Vomiting, Polyuria, Olfactory hallucination, amenorrhœa or impotence of early onset, examination of the eye ground and Field of Vision are very strongly indicated, since an ophthalmologist is a great help to the Physician and Surgeon in cases of Pituitary tumour. I saw a case in a boy of about 13 years of age and the diagnosis was confirmed by X-ray examination. Unfortunately, his case card has been misplaced.

Third Symptom.—The glasses do not fit. These cases are usually elderly people who get their glasses from opticians. They become concerned with their eyes as soon as they find that the optician cannot improve his eyesight with glasses. Diseases of Retina choroid or optic Nerve are the causes. Almost all diseases of these structures are due to some general Disease *e.g.*, Nephritis, Diabetes, Syphilis, Pernicious anæmia etc.

Case I. C. P. S. European male, 55 years of age, bookmaker by profession. He took his last pair of glasses from an optician last year. For about 3 months he had been noticing a sort of haze in front of his eyes and it was getting worse. His optician could not improve his vision. His Vision was R. E. = 6/24 Corrected. L. E. = 6/24 (pt). Corrected. The media of his eyes were clear. He was found to be suffering from Neuro-retinitis—most probably of the albuminuric type, as the fundus picture was not very typical. His Blood pressure was 240 Systolic and 150 diastolic. He was referred to his physician who later informed me that the patient was suffering from chronic interstitial Nephritis with secondary heart.

Fourth Symptom—Diplopia.—This symptom has got to be very carefully investigated since transient pareses of the eye muscles, commonly of the external rectus occur in Tabes Dorsalis, Cerebral Syphilis, Disseminated Sclerosis and meningitis and encephalitis.

Many of the eye diseases are not diseases *sui generis*, for example Xerosis and Keratomalacia, and many cases of night-blindness are caused by avitaminosis of Vitamin A; Phlyctenular Conjunctivitis and Keratitis are the ocular signs of Scrofulosis, Iritis and Iridocyclitis are caused by some toxin circulation in the blood—of Syphilis, Tubercle, Pyogenic, Gonococcal etc.

NON-SPECIFIC PROTEIN THERAPY

BY

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THE failure and sometimes over-use of specific therapy has led to the introduction of what is called Non-specific protein therapy. It was suggested to Joseph Miller by a surgeon that if mixed vaccines were used instead of the specific, a great therapeutic benefit may result and to demonstrate this, he took pus from surgical patients and transferred it to a bottle containing beef-tea which he incubated. Cultures were mixed, sterilized by heat and filtered and made use of in a case of Arthritis with the result that the pain and the swelling disappeared in 24 hours by a single injection. Miller was greatly impressed and became one of the greatest exponents of Non-specific protein therapy. This led to the introduction of the vaccines, later marketed under the name of Phylacogens.

Although this therapy is of recent date, yet it was employed by certain observers long ago. Rumpf (1893) treated typhoid by pyocyaneous vaccine; Bokenham (1895) found diphtheria anti-toxin useful in typhoid and streptococcal infection. Matthews (1895) showed that proteose was as effective as tuberculin. Ichikawa (1912), the first to use the intravenous route, observed that typhoid could be modified or terminated by intravenous injection of paratyphoid vaccine. Krans and Mazza (1914) reported good results with B-coli vaccine in puerperal infection. Ludke (1915) showed the utility of an albumose intravenously. Schmidt and Saxl (1916) used milk intramuscularly.

Non-specific protein therapy is a aptly described as "the ordeal by chill and fire". This is also sometimes called as "pyrogenic therapy". These indicate the chief reactions which follow its use.

- (1) *The chill or rigor*—This may occur 15 to 30 minutes after intravenous and 2 to 3 hours after intramuscular injection. The rigor may be definite or it may be just muscular twitching, without sensory disturbances.
- (2) *Fever, 'fire' or rise of temperature*—Temperature may even rise to 104°F within 3 to 4 hours with a rapid defervescence following an intravenous injection while with intra-muscular injection the rise of temperature is less and defervescence is delayed.

- (3) There is an increase in the pulse rate and a slight rise in blood pressure.
- (4) *Leucocytic count*—At first there is leucopenia which may be due either to the accumulation of leucocytes in the internal organs or to functional paralysis or depression of the bone-marrow. This temporary leucopenia is followed by leucocytosis in which polymorphs preponderate. This leucocytosis is due to the release of leucocytes from the splanchnic area to the peripheral circulation and to some stimulation of bone-marrow.
- (5) *Focal reaction*—Any existing inflammatory lesion becomes more acute, with increase of pain, tenderness and hyperæmia. This negative phase, is succeeded by retrogression of the inflammatory lesion and even sometimes restitution to normal. This is the desired focal reaction but in some cases there is a great exacerbation and even an operation may become necessary. The desired focal reaction is biphasic, there being a negative and a positive phase. Various attempts have been made to eliminate or at least shorten the negative phase but it has been observed that without the negative phase, adequate therapeutic positive phase is not possible.

The following table illustrates the biphasic phase.

	NEGATIVE PHASE	POSITIVE PHASE
Blood reaction	Acidosis	Long-continued alkalosis
Calcium and Potassium ratio	Reduction	Increase
Nitrogen	Increased elimination	Retention
Enzymes	Decrease	Increase
Compliment	Decrease	Increase
Capillary flow	Stasis	Rapid flow
Permeability	Increase	Decrease
Kidney	Anuria	Diuresis
Reticulo-endothelial system	Active phagocytosis	Lessened activity
<i>Nervous Tone :</i>		
Splanchnic	Para-sympathetic	Sympathetic
Peripheral	Sympathetic	Parasympathetic

Technique of injection.—For intra-dermal injection, a tuberculin syringe divided into 20th of a c.c. is employed. Suitable sites are extensor surface of the arms and thighs. The needle is introduced parallel to the skin surface and injection is given in papillary layer. When the injection has been carefully placed, there appears a non-translucent wheel, alabaster white, sharply circumscribed with a rose pink border, the needle showing through the epidermis. To obtain general and not local tissue immunity, it is advisable to put intra-dermal injection at least 6" apart. With repeated injection of an antigen in the same place in the skin, local tissue immunity occurs. The skin round the injection becomes so solid as not to allow the foreign protein to be absorbed and eventually necrosis results. This anaphylactic inflammation occurs, according to Opie, because antigen and antibody have met in the tissues. This is known as 'the Arthus phenomenon'.

Injection by other routes are given in the usual way.

Mechanism of reaction and its theories.—Various theories have been put forth by various observers. Gay and Claypole (1914) considers the therapeutic effect to be due to leucocytosis; Paltanuf (1915) attributes it to thermo-genetic substances in the proteins used. Rohonyi (1916) attributes the good effect to the production of some neutralizing substance against the invading bacteria. Heinemann (1918) showed that foreign protein stimulated the liberation of specific antibodies in animals where the previously injected antigen had failed. Weichardt (1919) attributed the good effect to the general stimulation of the blood and tissue cells, resulting in the increased production of specific substances. Dollken (1919) thought there was selective stimulation of certain organs. Larson (1919) suggested the liberation of so-called 'sessile' antibodies. Starkenstein (1919) thought that alteration in the permeability of the blood vessels checked the inflammatory processes. Pemberton (1920) attributed the good effect to increased catabolism of glycogen. Ling (1925) showed that injection of foreign protein in normal person, caused the shedding of proteolytic, peptolytic and lipolytic enzymes, into the circulation within 24 hours. Mackenzie and Fruhbauer (1937) observed that this therapy induced re-awakening of an old immunity and to this they applied the term "anamnesic reaction".

There is a clinical and experimental evidence to suggest that when the antibody-forming tissues (probably the reticulo-endothelial system) are stimulated against particular antigen, the response is frequently general, as well as particular. This means that antibodies produced at previous occasions, in response to

different antigens are produced again. Non-specific protein-therapy stimulates the antibody-forming tissues i.e., the cells of reticulo-endothelial system.

Peterson (1928) believes that true mechanism combines many of these theories and following non-specific protein injection, observes that

- (1) There is an increased tolerance to intoxication, due to decreased permeability of the cell membrane.
- (2) The toxic material is more rapidly destroyed due to cellular stimulation and mobilization of proteolytic enzymes.
- (3) The lymphagogue effect floods the lymph spaces with plasma rich in antibodies.
- (4) Increase of the anti-enzymes in the lymph spaces makes further proliferation of the bacteria difficult.

Non-specific protein agents.—These may be classified into 4 main classes:—

- (1) Blood and Sera—either human or animal
- (2) Proteins of animal or vegetable origin or their split products.
- (3) Bacterial vaccines or extracts.
- (4) Tissue extracts

1. BLOOD AND SERA:

- (a) *Normal blood*, after clotting, due to some colloidal arrangements, behaves as a foreign protein. Blood may be given sub-cutaneously or intramuscularly in doses of 10 to 50 c.c. and Serum in doses of 1 to 3 c.c. intravenously, subcutaneously or intramuscularly. Patient's own blood is useful since, as in many cases, a toxin or its resultant antibody is circulating in blood. Gilbert (1894) used auto-serotherapy in cases of pleurisy with encouraging result. Normal sera of animals have been used e.g. chicken serum, in pneumonia; beef serum in anthrax and horse serum in diphtheria and hæmorrhagic diseases. In such cases, however, the patient must be tested with the foreign serum previously to avoid any sudden allergic reaction. Smith (1916) and Cecil (1917) used normal horse serum in gonorrhoeal and other forms of arthritis. I have used auto-hæmotherapy in cases of arthritis, especially

of the peri-articular type and sciatica with very good results.

- (b) *Immune Sera* Anti-meningo, strepto and diphtheritic sera have been used sub-cutaneously, intramuscularly and intravenously without very marked results.
- (c) *Anti-toxic Sera*.—McCallum (1897) used diphtheria anti-toxin in tuberculosis and tubal infections. Lilienthal (1897) used it in acute surgical infections. Talamon (1901) used it in pneumonia; Paton (1906), in tuberculosis, arthritis and cerebro-spinal meningitis. However, one has to be careful in making use of this method because there have been cases of fatal accidents due either to the patient being a horse-sensitive individual or there being a gap of 10 to 14 days between the two injections.

2. PROTEIN SOLUTIONS:

- (a) *Proteins of animal origin*—Egg-albumin has been used to produce shock and gelatine intravenously in hæmorrhagic conditions. Milk is the chief agent employed. Cow's milk is boiled and then cooled; 2 to 5 c.c. are given intramuscularly, increasing the dose every 2 to 4 days till the maximum of 10 c.c. is reached. One has to be careful that the needle does not enter the vein as there is a fear of fat embolism. Boiling the milk lessens the danger of an allergic reaction in a sensitized individual. Milk was first employed intramuscularly by Schmidt and Saxl in the treatment of typhoid in 1916. Muller and Thannar, in the same year, used it in the case of iritis. It has been suggested in asthma (Schiff 1923), in erysipelas and gynaecological condition (Gellharn, 1926). I have used it in a good number of cases of arthritis and inflammatory condition of the tubes in the form of Lactolan, Lactumin and Aolan, with encouraging results. A female patient who was complaining of high fever, dating from labour, was examined and found to have inflammatory condition of the tube. She was given intradermal injections of Aolan together with glycerine douches when she made a very quick recovery.

- (b) *Proteins of plant origin*—Nucleic acid and nucleins were used to stimulate antibody formation (Horbaczewski, 1891), but now sodium nucleate is used, which has no protein. Half a gram is given subcutaneously or intramuscularly as a 5% solution. More recently nucleo-hexyl has been used intravenously.
- (c) *Protein split products*—These are the proteoses, the peptones and histamine.
 - (i) *Proteoses* are prepared from fibrin, gelatin, milk or wheat and 2 to 10%, solution of these, is given daily in $\frac{1}{2}$ to 2 c.c. doses, care being taken that only a mild reaction is produced. These were first used by Ludke (1916), in infectious diseases. Miller and Lusk (1916) found it useful in typhoid when given intravenously. Ramirez (1921) found the proteose prepared from milk useful in arthritis.
 - (ii) *Peptone*—Intravenous injection of 8 to 10 c.c. of a 10% solution is used for the production of shock. Many peptones are prepared from the digestion of beef, such as, Armour's but Witte's peptone is prepared from the digestion of fibrin. Peptone, in the treatment of diseases has long been in use. Nolf since 1908 has been treating paroxysmal hæmoglobinuria and other hæmorrhagic diathesis. Gow (1921) used it in cases of septicæmia. Crowe and Veitch (1923—24) have advocated its use, preliminary to vaccine therapy in arthritis.
 - (iii) *Histamine*—Bray has been using it in allergic conditions. He gives $\frac{1}{10}$ th of a milligram subcutaneously and gradually increases it by $\frac{1}{10}$ th of a milligram, till a milligram dose is reached.

3. BACTERIAL PRODUCTS:

- (a) *Vaccine*—These have been employed in producing non-specific reactions. Schafer (1911) employed mixed bacterial vaccine in all infectious diseases. Coley's fluid is a mixed culture of streptococcus erysepalatus and B. Prodigiosus, employed in non-operable cases of Sarcoma and Carcinoma. B. coli vaccine in doses of 20 to 25 millions, was used in

arthritis by Perkins and White (1923) and Middleton (1923). V. Jauregg (1913) used streptococcus vaccine in General paralysis of insane. Typhoid and paratyphoid vaccines are very commonly employed. The reaction with these is often severe and good results with the same have been obtained by Miller and Lusk (1916), Cecil (1917), Scully (1917), Thomas (1917), Synder (1918), Cowie and Calhoun (1919), Cowie (1921), Betz (1921) Campbell (1925) and Yeoman (1926). Since 1926, this vaccine has been extensively employed. In syphilitic paresis, it is preferred to malarial infection, as frequency of chills can be regulated and there is no anaemia which follows the malarial infection.

- (b) *Tuberculin*.—This is relatively inert in non-tubercular cases. V. Jauregg (1909) used it in the treatment of paresis and Van Leeuwen and Varekamp (1921), introduced the tuberculin treatment in asthma.
- (c) *Tissue extracts*.—Various tissue extracts have been used in different diseases. Tumour extract in neoplastic diseases; cartilage extracts in chronic gout and arthritis; vascular extracts in arterio-sclerosis, although these have been attended with little success. Marrow and splenic extracts have been used in diseases of haematopoietic system and poly-glandular extracts in metabolic diseases. Paul (1929) used splenic extracts in tuberculosis and allergic skin conditions by sub-cutaneous method. Good results are claimed from oral administration also. Healing is said to be quickened and allergic skin conditions disappear within a few days.

Indications for non-specific protein therapy.—If is useful in infectious diseases when the following conditions are present.

- (1) The infection is localised rather than generalised.
- (2) When the focus of infection cannot be reached for culture or when the organism is unknown and undetermined.
- (3) Where the organism is known but the specific therapy has failed.
- (4) Where circulation has become retarded owing to struc-

tural changes, the lighting up of the infection, through non-specific reaction, reactivates the healing mechanism e.g., tuberculosis, appendix and gall-bladder.

Diseases in which this therapy is useful.—

1. **ARTHRITIS.**—In acute cases 70% of the patients get comfort after 2 or 3 injections, although in half of them only, the relief is permanent. Peri-articular cases are much more benefited than hypertropic and traumatic. Typhoid vaccine intravenously is the most employed agent. The colon bacillus, the albumose and milk, have all been used. Some people think that the benefit is not due so much to non-specific reaction as due to muscular contraction in which occurs during the chill and which may break up small adhesions. Non-bacterial substances e.g., bee-stings have been used. Auto-haemotherapy has also been used with success. This sort of therapy is sometimes attended with risk and hence the more drastic of these methods are falling into disuse. The employment of stock vaccine, as a method of non-specific protein-therapy, is less open to objection and also has the advantage that, if the specific microbe is present, it may assist by more direct action.

2. **GONORRHOEA AND ITS COMPLICATIONS.**—such as, arthritis, prostatitis, epididymitis and tubal infection, have all been benefited by this therapy. Miller and Lusk (1916) used typhoid vaccine intravenously Miller and Weiss (1916) used milk intramuscularly.

3. **BRONCHIAL ASTHMA**—and other allergic conditions e.g., urticaria, angio-neurotic oedema and migraine etc.

Auld (1917) advised the use of peptone in bronchial asthma and though the brands have varied between Witte's and Armour's, Witte No. 30, is considered the best. This peptone has been used orally as tablets and rectally as an enema but the intra-muscular and intra-venous routes are generally used. Van Leeuwen and Varekamp (1921) introduced tuberculin treatment in asthma. Ling (1928), Simpson and Stone (1929) and Maxwell (1930) obtained good results from tuberculin therapy. Schiff (1923) suggested the injection of whole milk. Other substances e.g., broth, sulphur etc., have been used. Van Leeuwen used 0.5 to 1% sulphur in olive oil, giving 1 c.c. intramuscularly. Auto-haemo and auto-sero therapy have been used with advantage in asthma and also in urticaria and angio-neurotic oedema, especially of the recurring type. Blood is withdrawn from the vein at the bend of the elbow and injected

subcutaneously and intra-muscularly. Injection of the mother's serum has found beneficial in popular urticaria of children.

4. SKIN CONDITIONS—Eczema, dermatitis venerata, generalised and localised pruritus, pemphigus, psoriasis, leukoplakia, kraurosis vulvae and chronic X-ray dermatitis and ulceration—Engman and McGany (1916) and Scully (1917) used typhoid vaccine in psoriasis. Non-specific therapy has been found useful in large spored ringworm, chronic inflammatory patches, sluggish ulcers, carbuncles and boils. In most of the dermatological conditions, non-specific protein therapy increases the susceptibility of the lesions to local treatment and so hastens the cure.

5. DISEASES OF THE EYE—Muller and Thanner (1916) used milk injection in iritis and gonorrhoeal ophthalmia when it is said to have acted as specific remedy. Allen (1925) prefers to use typhoid vaccine. Milk injections have been found useful in keratitis, choroiditis, retinitis, conjunctivitis, corneal ulcers, trachoma etc. Horse serum has been used in cases of iritis and retinal haemorrhage, and typhoid vaccine in leucic conditions and iritis (Boyd 1919). Peptone has been used in ocular conditions, following acute infectious diseases.

6. NERVOUS DISEASES—Non-specific therapy has been useful in puerperal mania (Barkin, 1929). In general paralysis of the insane, tuberculin, staphylococcal and typhoid vaccines were used prior to V. Janregg's (1917) malarial treatment. Peptone, milk and brain extracts have been employed in epilepsy, though without apparent benefit. Vaccines of staphylococci and B. prodigiosus have been advised in neuritis.

7. HAEMORRHAGIC DIATHESIS.—Milk has been employed largely in purpura, haemophilia, malaena neonatorum and haemorrhages after operation but it has been superseded by various haemoplastic sera, prepared from horse, rabbit or human. As allergic deaths have occurred from the use of sera from horses, preference should be given to human sera.

8. VASCULAR DISEASES.—Non-specific protein therapy has been employed to produce vaso-dilatation in Raynaud's disease, thrombo-angiitis, obliterans and arterio-sclerotic gangrene with gratifying results. Schindler (1928) used this therapy to inhibit peristalsis in peptic ulcer.

9. KIDNEY DISEASES.—Kolischer (1929) used whole blood intra-muscularly in cases of nephritis with benefit.

Contra-indications.—These are :—

- (1) Pulmonary tuberculosis (acute or quiescent), because

severe focal reactions or acute pleurisy generally occurs.

- (2) Pregnancy—because severe uterine contractions may be stimulated.
- (3) Marked arterio-sclerosis or uncompensated cardiac, renal or vaso-motor diseases, for deaths from arterial thrombosis and anuria have occurred.
- (4) Generalised or chronic multiple infections or state of exhaustion because the fatigued cells cannot be stimulated.
- (5) Haemorrhagic conditions—haemophilia, epistaxis, ulcerating stage of typhoid and dysentery or within a fortnight of operation.
- (6) Chronic alcoholism, as patients develop delirium tremens.
- (7) Allergic conditions, unless it has been determined whether the patient is hypersensitive to it.

THE CONTROL OF MALARIA ON A GROUP OF TEA GARDENS IN THE SIBSAGAR DIVISION OF ASSAM: SOME OBSERVATIONS AND RESULTS

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Introductory

IN a series of Papers which have already been published, the reasons which led up to the inauguration of anti-malarial control measures on the Tea Gardens of the Jorehaut Tea Company, Ltd., which are situated in the triangle enclosed between the lines joining Jorhat, Mariani and Titabar, in the Jorhat Sub-division of Sibsagar, Assam, have been fully detailed and the control methods adopted have been carefully outlined. In the last Paper of this series, *Further Observations on a Malaria Survey in the Jorhat District, Assam, with some notes on the Anti-Malaria Measures Employed*—(Manson and Ramsay)—Records of the Malaria Survey of India Vol. III, No. 3, June, 1933,—these control measures have been reviewed from the aspect of cost, and clear indications have been given for the guidance of Companies who require concrete evidence of the expenditure which is

necessary to secure the freedom of their Labour Forces from malaria in Assam.

No attempt was made in the former Papers to indicate the advantage of Malaria Control from the commercial standpoint. In the present Paper, an attempt is made to shew what results may be attained after two and a half years of anti-malarial control. It must be clearly understood that results in a campaign against Malaria are progressive, and that even better results will certainly follow the pursuance of the policy already initiated.

Control has been directed mainly against the larval period of Anopheline life, but has been supplemented by the judicious use of drug therapy and also a continuous campaign against the adult Anopheline population. In assessing the relative values of these three lines of operation, it will be clear from the context that anti-larval control has been the principal mode of attack.

The scope of the present Paper covers the period from August 1st, 1932, till November 30th, 1933.

The work was started by and has been carried out since its inception under the auspices of the Rose Institute, Putney Heath, London.

Laboratory

The research work which is a necessary corollary to any scheme of Malaria Field Control, is conducted at the Central Laboratory, Cinnamara, which constitutes the working centre of the Jorhat-Mariani-Titabar triangle.

FIELD TRAINING.—The Laboratory has been used as a training centre since the beginning of the anti-larval control in this area and has already trained 61 Malaria Field Surveyors. These have been despatched to many Gardens in the Sibsagar Division of Assam, to the Dooars in Bengal, and to South India. During the period under review 29 Surveyors have been trained and despatched for service on the Tea Estates of Assam. These men are fully equipped to conduct the preliminary survey of Tea Gardens prior to control and to apply and direct control measures. They are also trained to carry out infectivity surveys and to diagnose malarial infections in blood slides.

Geography and Climatology

The Geography and Climatology of the district have been fully elaborated in the preceding series of Papers.

The following brief notes indicate the main features of the area controlled, and are given here for ready reference.

The area consists of 7,000 acres under tea plantation and some 2,000 acres used for rice cultivation. The remainder of the area is about 7,000 acres which comprise virgin forest and jungle.

Water courses run from east to west. Swamps and dead river beds are found throughout the district, and are completely filled during the rainy season. Small rivers are called Jans.

The total population of the area is about 20,000 in all: most of whom are engaged in tea plantation or in agricultural pursuits.

The permanent rivers are the Dessoie, Dhoolie River and the Syoota Jan. Swamps, natural water channels (hulas) and drains form the secondary breeding resorts of the Anopheline population during the Monsoon Season.

From November till February the climate is cool. From May till October it is hot and very humid. The South-West Monsoon or rainy season begins about the middle of June and extends until the middle of October. During March, April and May the North-East Monsoon supplies a moderate rainfall.

During the year under review, rainfall has been considerably less than usual. The average yearly rainfall over a period of eleven years (1919-1930) was 81.79 inches.

Rainfall normally shows its maximum incidence in July, August and September, and generally falls rapidly in October. The minimum incidence occurs during the November to February period.

During the year under review—August 1st, 1932, to July 31st, 1933, the total rainfall was 72.98 inches only.

Table 1 shews the monthly and yearly rainfalls and degrees of wetness for a period of ten years from January, 1924, till December, 1933.

From this Table it will be seen at a glance that the rainfall during March, May, June, July and September, 1933, was very low.

There is undoubtedly a distinct correlation between the character of the rainfall, as expressed by the degree of wetness, and the amount of Epidemic Malaria.

The degree of wetness is estimated by multiplying the number of wet days in each month by the total rainfall for that month and dividing the result by the number of days in the month. This gives a better index of the distribution of the rainfall than the bare monthly total, as that might represent one or two heavy falls and a long spell of drought.

The degree of wetness, as can be readily seen in the accompanying Table, was abnormally low during March, May, June, July and September, 1933.

From the 13th of July, 1933, until the 12th of August, 1933, the total rainfall was only 4.93 inches and the degree of wetness was 2.14. The average maximum temperature during that period was 92.5°F. There is no similar period of drought and high temperature in the records for the last twenty years.

The importance of these factors will be evident in the remarks under Larval Findings.

Epidemic Malaria was prevalent in the Sibsagar District in uncontrolled areas during the present year and statistics from various Gardens which are not controlled shewed this clearly.

In one local uncontrolled Garden, malarial admissions numbered 1857 from April 1st, 1933, to November 30th, 1933, out of a total admission, from all causes, of 3034.

During September there was again a long hot spell without rain. Between the 8th and 20th September, 1933, the rainfall was only 0.97 inches and the mean average maximum temperature for the same period was 93°F. Such a long dry spell with high temperature and humidity is most unusual in this month, when the Monsoon is generally very active.

Table II shews Maximum and Minimum Temperatures, and Relative and Absolute Humidities for the year August 1st, 1932, to July 31st, 1933.

Table III shews the relation of Temperature and Humidity to the incidence of Malaria.

Mosquito Findings

There have been no addition to the species of Anopheline mosquitoes identified during the year and the list remains as before.

The species identified either in the larval or adult stage in this district are:—

- | | |
|-----------------------------|----------------------------|
| 1. <i>A. minimus</i> | 10. <i>A. maculatus</i> |
| 2. <i>A. vagus</i> | 11. <i>A. karwari</i> |
| 3. <i>A. hyrcanus</i> | 12. <i>A. aitkenii</i> |
| 4. <i>A. philippinensis</i> | 13. <i>A. tessellatus</i> |
| 5. <i>A. aconitus</i> | 14. <i>A. gigas</i> |
| 6. <i>A. kochi</i> | 15. <i>A. jeyporiensis</i> |
| 7. <i>A. fuliginosus</i> | 16. <i>A. leucosphyrus</i> |
| 8. <i>A. barbirostris</i> | 17. <i>A. ramsayi</i> |
| 9. <i>A. culicifacies</i> | 18. <i>A. umbrosus</i> |

Notes on Adults

A. maculatus.—Only one adult of this species was found on 27th April 1933, and this was found in a cowshed.

A. leucosphyrus.—Adults of this species were found from August 9th 1932, till October 7th, 1932, and again from May till July, 1933. No infections were found in this species.

A. culicifacies.—Two adults were hatched in a cowshed.

A. umbrosus.—A few adults of this species were found. Dissection of these revealed no infections, but the stomach juice shewed a green vegetable fluid containing chlorophyll. Blood was not found in any of the dissections made.

Variations in Mosquito types

A. karwari.—Larvae of this type were found with posterior clypeal hairs branched.

A. minimus.—Adults of this species were found with upper half of the proboscis pale; the wing-field paler than usual, and 2 or more dark areas on the 6th vein. These were found in a jungle area during October, November and December, 1932.

The differences in type are enumerated as follows:—

- | | |
|---------------------------------|---|
| <i>A. minimus</i> —(Typical). | <i>A. minimus</i> —(Atypical). |
| Proboscis—Black. | Proboscis—Half pale. |
| Palps—Distinct white bands. | Palps—Pale bands. |
| 6th Vein—Always two dark areas. | 6th Vein—Sometimes more than two. |
| Wing-field—Pale. | Wing-field—Slightly paler in fresh specimens. |

In relation to the above species it has repeatedly been observed that *A. minimus* larvae are found in jungle remote from human habitation, often several miles away. It has already been noted that *A. minimus* will breed even in rice-land if adjacent to a densely populated area and the inference seems to be that there are in Assam two distinct types of *A. minimus*, one—Androphilic and the other—Zoophilic. Further investigation of this interesting theory is being made.

Larval Notes

A. ramsayi.—This species was not found during the year and is evidently only a casual visitor in this district.

A. culicifacies.—This species which is one of the most dangerous carriers in India, was found in the larval form in sandy beds in the permanent streams, which are the Dessoie and Dhoolie Rivers. Larvae were found in these rivers from 20th April until the end of July, 1933, and none were found subsequently. They disappear as soon as the rivers attain a moderate velocity and become laden with alluvial deposit.

A. karwari.—This species occurred in a swamp area and was found from 23rd February until September 10th, 1932. Its importance has not been defined.

A. maculatus.—Like *A. culicifacies*, *A. maculatus* appears to be only a casual visitor and was found in the larval form in a local water-way during May, 1933. Curiously enough, the water-way contains the effluent from two septic tanks although the water is clear and gently flowing.

A. tessellatus.—This species occurred from 8th October, 1933, till 1st December, 1933. It is usually a late comer, and seems to prefer small shady puddles where the water is slightly contaminated with dead vegetation or even cow-dung.

A. leucosphyrus.—The larval form was found from 4th May until 7th August, 1933, always in jungle areas under partial shade.

A. umbrosus.—This species, the bionomics of which were fully discussed in a previous Paper, was first found on 26th August, 1933, under shade in a Rubber Plantation. Since then it has been found fairly plentifully. It was not found from January 3rd, 1933, till August 26th, 1933, in spite of diligent search.

In connection with the larval breeding grounds of *A. umbrosus*, an interesting fact was elicited during the year. A drain which runs through broken bamboo shade in one of the Tea Gardens in this district has been repeatedly searched for three years for Anophelines, and particularly for *A. umbrosus*. The drain had a gentle flow and under the unshaded portion, *A. minimus* was found. During this year, the drain became blocked under the main garden road and there was no flow as before. Careful search revealed the presence of many larvae of *A. umbrosus*. The block was removed and normal conditions were established, when *A. umbrosus* larvae again disappeared. This area is of interest in that, in addition to stagnant, peaty water, the water was contaminated by buffaloes along the road-side and distinctly urinous. It seems evident that *A. umbrosus* can survive in contaminated water under shade, so long as there is no flow and that rate of flow necessary to eliminate this species, is very slight.

The instance quoted is important as it shews the ease with which *A. umbrosus* can be eliminated.

A. minimus.—In the appendix, dissection records for the year are given and also a Table of total dissection carried out. These shew *A. minimus* as the only species of which particular account must be taken in eliminating Malaria in this district.

A. minimus.—In the section under Geography and Climatology, the abnormal character of the rainfall and the low degree of wetness have been noted. The importance of these factors is principally in relation to this species of Anophelines. In normal

years, the permanent streams and rivers are repeatedly flushed during the Monsoon period and the rate of flow is fairly high. In the present year, owing to the deficient rainfall and its peculiar distribution, the normal flush and flow of permanent waters did not occur. The result was that *A. minimus* which is normally not found in permanent water from the middle of June until late in September, was present during the whole period of the Monsoon.

Permanent waters which are normally free from this species during Monsoon, became potent sources of *A. minimus* activity and constituted reservoirs of Anopheline supply additional to the usual epidemic Summer breeding resorts. *It is very necessary to point out this factor in years of short rainfall in Assam, as so far the importance of permanent waters has not been definitely emphasised. In elaborating any scheme for anti-larval control in Assam, permanent waters must therefore be taken into serious account, as auxiliary breeding grounds in years of short rainfall.*

Velocity and Silt

The importance of Velocity and Silt as factors in the control of larval breeding grounds has been clearly pointed out by Ramsay in his paper entitled "The Factors Which Determine the Varying Degrees of Malarial Incidence in Assam Tea Estates, and the Fundamental Principles Governing Mosquito Control of Malaria in Assam."—Trans. Royal Socy. Trop. Med. and Hyg. 23, 5, pp. 511-518.

The term 'Silt' is a very definite one scientifically and it is proposed to refer to suspended matter carried down by permanent rivers as "alluvial deposit" as this term includes sand, silt and clay which are carried along in direct proportion to the rate of flow of the water.

It has been found that the larvae of *A. minimus* will not breed in streams where the velocity is high and alluvial deposit is present in considerable quantity, but that *A. minimus* larvae will survive in pockets in the banks where the velocity of flow is reduced although alluvial deposit is still present.

It was considered advisable to examine the relative effect of these two factors in laboratory experiments.

For this purpose, it was first determined that *A. minimus* larvae will breed out in water containing alluvial deposit in suspension. These experiments were carried out in dishes each containing the water in which *A. minimus* larvae were found in nature.

One jar contained the natural water only; the second jar, natural water plus alluvial deposit stirred up two hourly.

Twenty larvae were placed in each jar and some natural vegetation was added to provide necessary larval resting places and possibly food supplies.

The results of the experiments showed the following:—

In jar No. 1—Natural Jan water, *not stirred*, all larvae died or emerged in 11 days.

In Jar No. 2—Natural water plus alluvial deposit (stirred two hourly), all larvae died or emerged in 15 days.

Pupation occurred in both jars and adults emerged. There was therefore no evidence that alluvial deposit, if stirred up two hourly, had any appreciable effect on larval development.

Experiment 2.—A very large basin was filled with ordinary Jan water without alluvial deposit. The type of basin employed had sides sloping to the centre and allowed alluvial deposit to collect readily at the bottom. In the basin a circular tin container with a fine wire-mesh bottom was suspended. This container was provided with vegetation and 10 larvae were placed in it. The outer basin was furnished with a screw propeller on the end of a long shaft which was driven by a fan motor, capable of speed regulation. The object of the inside container was to keep the larvae clear of the propeller whilst allowing free circulation of water and alluvial deposit through the wire-mesh.

In a parallel experiment, under the same conditions specified, alluvial deposit was added to the water in the outer basin.

In the experiment with natural Jan water only with the motor on full speed, all the larvae died in 47½ hours. In the parallel experiment, with the natural Jan water plus alluvial deposit in the outer basin and the same motor speed, all larvae died in 47 hours.

The experiment was repeated several times and at different motor speeds. In no case was the effect of alluvial deposit noticeable as larval death occurred in natural water as speedily as in water containing alluvial deposit.

The rate of death varied only with the speed of the motor: the faster the water circulated, the sooner the larvae died, and the inference made was that *velocity was the principal factor in larval death* and that alluvial deposit is only present under unnatural conditions as a direct result of the rate of velocity of the current.

In the water which contained alluvial deposit, larvae on dissection shewed, in some cases, the presence of the alluvial

deposit in the stomach. It is possible that this has some indirect action as a larvicide, although many larvae died without shewing stomach deposit. This point is being investigated.

The main fact that emerged from the experiments was that alluvial deposit is of secondary importance as a larvicide and that velocity of flow is the principal factor in larval destruction.

This finding is corroborated in a Paper by De Jesus (P. I.) in the American Journal of Hygiene, 1933, Mar. Vol. 17 No. 2.

In that Paper it is noted that *A. minimus* larvae are swept away and breeding becomes impossible when the current exceeds 1 foot per second. This rate of flow is approximately 2/3rd of a mile per hour.

In Assam, in normal Monsoon conditions, the rate of flow in permanent waters attains 3 miles per hour. The absence of flow and flush in permanent rivers has been commented on and the presence of *A. minimus* larvae during the present season is thus readily accounted for. The presence of *A. minimus* larvae in pockets of river banks where velocity of flow is reduced but alluvial deposit is still present, is also clearly explained.

Larval Death by Drowning.—

The fact that mosquitoes are less troublesome after heavy rain, during the Monsoon, has long been commented on by the Planting community. The general opinion is that larvae are drowned during heavy rainfalls. This was tried experimentally in basins containing larvae exposed to heavy rainfall, but was not corroborated. Larvae survived the heaviest rainfall in these experiments. (Larval death by drowning is not easy, as they can live under water in laboratory experiments for one hour, and still emerge alive).

The absence of adults after heavy rainfall is chiefly due to larval breeding grounds being cleared out by the increased velocity of flow of permanent waters.

Types of shade Vegetation

In addition to the types enumerated in the previous Paper, Jengoo Pat or (Jeng-pat) has been found an excellent shade plant. It grows naturally in Assam both along the banks and in natural water-ways. In addition to being a perennial, it is cattle-proof on accounts of its spiny formation. The botanical name of this plant is "*Calamus Erectus*", family—Palma.

Polygonum Flaccidum.—

Whilst this is not a shade factor strongly recommended, it was investigated during the year. The juice of this plant is

greenish and mucilaginous and kills all Anopheline larvae in 15 minutes in pure solution. It is used by the Assamese for killing earthworms, and has probably a direct anti-larval action.

Duranta.—

The berries of this plant when macerated, exude a juice which is very lethal to Anophelines and the use of this plant as a shade factor is enhanced by this action as the berries readily fall into drains covered by it and their poisonous action on larvae occurs. The alkaloid in this plant is analogous to Narcotine, and has been investigated by Dr. C. Harler, late Chemist to the Indian Tea Association, Tocklai Experimental Station, Cinnamara.

Anti-Larval Measures

Paris Green.—

A further investigation of this larvicide was made during the year and particularly in reference to the types of diluent used with it for anti-larval control.

EXPERIMENT—I.

Absorption of Paris Green on Charcoal.—

Paris Green was absorbed on wood charcoal in the following manner:—

"By evaporating to dryness a 99:1 mixture of Charcoal and Paris Green suspended in 12 times its weight of H₂O and powdering the residue, a product is obtained which is much more toxic to Anopheles larvae than a simple mixture of Charcoal and Paris Green. Addition of CaO raises the toxicity".—*Journal of the Society of Chemical Industry*, Vol. 51, No. 45, Brit. Chemical Abstracts, B. page 955. Novm. 4th, 1932.

The results were disappointing and did not merit the trouble of preparations. No increased lethal action on larvae was observed.

EXPERIMENT—II

Paris Green and Lime.

Paris Green was then tried with Soapstone as the diluent but with the addition of Lime in the different proportions of 2 p.c., 5 p.c. and 10 p.c.

The average results of a considerable number of experiments are given in the following Tables.

TABLE A.

Average times of death of Larvae in experiments with Paris Green floatable 4 p.c. dilution with Soapstone Powder and Lime.

Lime Nil. (Control).	Lime 2 p.c.	Lime 5 p.c.	Lime 10 p.c.
2-33 hours.	5-40 hours.	8-15 hours.	2-5 hours.

TABLE B.

Average times of death of Larvae in experiments with Paris Green (ordinary) 4 p.c. dilution with Soapstone Powder and Lime.

Lime Nil. (Control).	Lime 2 p.c.	Lime 5 p.c.	Lime 10 p.c.
2-17 hours.	3-10 hours.	2-10 hours.	2-10 hours.

TABLE C.

Average times of death of Larvae in experiments
with Paris Green (ordinary) 1 p.c. dilution
with Soapstone Powder and Lime.

Lime Nil. (Control).	Lime 2 p.c.	Lime 5 p.c.	Lime 10 p.c.
5-38 hours.	2-52 hours.	3-10 hours.	3-15 hours.
6-53 hours.	3-45 hours.	4-53 hours.	3-53 hours.
Paris Green (floatable). 6-15 hours.	—	—	—

From the above Tables it will be seen that the addition of Lime to 1 % dilution of Paris Green considerably shortened the lethal period for Anopheline larvae.

The results in the experiments made with Paris Green dilution of 4% with Soapstone seem to indicate that the addition of Lime, 2%, 5% and 10 %, does not materially affect the lethal period. The best results were obtained with 4% dilutions of either floatable or ordinary Paris Green, and this strength has been adhered to for anti-larval control during the year.

It must be clearly pointed out that the addition of Lime to Paris Green sometimes sets free Arsenic in solution, and the practice cannot be recommended as a routine measure in Assam, where cattle are abundant and poisoning might readily ensue.

The decrease in the lethal period of 4% as against 1% dilutions is so considerable that 4% dilutions without Lime are indicated as the best method of application for Assam; but, where cattle or other domestic animals are absent and economy is essential, the use of 1% dilution of Paris Green with the addition of 10% Lime may be used. The addition of Lime to Paris Green in any proportion is also contra-indicated if the powder is to be applied on rice-fields, as rice crops are apt to be adversely affected by the application.

The experiments were carefully carried out in Petri Capsules with the same species of larvae, of approximately equal growth. The amount of the mixtures of Paris Green which would form a thin, even film, of the same density as was employed in the field, was carefully determined by experiment and the same quantity of mixture was used in each Petri Capsule under the same conditions of light, temperature and humidity.

The amount of mixtures which formed an even film on Petri Capsules of 3.6 inches diameter was found to be four grains.

Ten larvae were placed in each dish. The times, given in hours and minutes, represent the time taken to kill off all the ten larvae and are the averages over a number of similar experiments.

Solubility of Arsenic.—

The effects of the addition of Lime to Paris Green are given in the following experiments. The samples of Paris Green were in each experiment derived from a different source. These experiments were carried out by Mr. P. Carpenter, F.I.C., F.C.S., Chief Scientific Officer, Tocklai Experimental Station, Indian Tea Association, at my request.

1 gram of Paris Green was shaken up with

(i) water 250 c.c.

(ii) 1 gram of Lime and 250 c.c. water.

Paris Green.		gms. Arsenious acid in 250 c.c. = (1 gm. Paris Green).	per cent dissolved.
Sample marked—			
1.	(a). No Lime	.0087	.87
	(b). Lime	.0062	.62
2.	(a). No Lime	.0099	.99
	(b). Lime	.0081	.81
3.	(a). No Lime	.0087	.87
	(b). Lime	.0081	.81
4.	(a). No Lime	.0044	.44
	(b). Lime	.0093	.93
5.	(a). No Lime	.00495	.495
	(b). Lime	.00688	.688
6.	(a). No Lime	.00743	.743
	(b). Lime	.00743	.743

It will be observed that the addition of Lime to Paris Green in three samples very considerably increased the solubility of the Arsenic, and in two cases decreased the solubility. It is evident that extreme care is necessary in using Lime, unless proper facilities are available for chemical analysis of the Paris Green used and for testing its reaction to Lime. The addition of Lime to Paris Green can only be made safely in these circumstances, and is not recommended for Assam.

Summary

Lime 10% in 4% solution with soapstone is indicated. It may be dangerous to cattle by liberating arsenic.

Drug Therapy

In conjunction with anti-larval control, Drug Therapy was used as an adjuvant and particularly, with the object of reducing the number of gametocyte carriers on each Garden. With this aim in view, all children (between two and ten years) on each Garden, were treated during the pre-malarial period. Treatment was limited to a course of Quinine and Plasmoquine for four weeks prior to March 23rd each year, as control measures usually begin about that date and infected A. minimus are generally found in uncontrolled areas during the early weeks of April.

The dosage given was 1/6 grain Plasmoquine twice weekly, and on the other days of the week when Plasmoquine was not given, Quinine was administered in the usual routine doses.

The object of this short course was to reduce the gametocyte population, so as to prevent the early infection of *A. minimus* and the consequent spread of malaria. This is not recommended as a routine measure as it would be infinitely better to continue treatment on similar lines throughout the entire malarial epidemic season—June till November.

Children only were selected for the preliminary treatment as they constitute the principal source of supply of gametocytes.

Bungalow servants were also treated with Quinine—Plasmoquine, the dosage being Quinine 10 grains twice weekly and 1/3 grain of Plasmoquine once weekly.

New coolies who arrived from malarious areas were also treated with 1/3 grain Plasmoquine twice weekly, so as to prevent infection of the resident population.

Actual cases of malaria were treated with Atebrin and Plasmoquine in the five days course recommended by the Manufacturers. In addition to the treatment, these cases received 1/3 grain of Plasmoquine after discharge from Hospital for 3 or 4 weeks.

Plasmoquine Prophylaxis on a tea estate

On one Tea Estate, the entire Labour Force were given Plasmoquine only once weekly. This was administered purely for its gametocidal action and during the period, July—October, 1933, when the gametocyte rate has been found highest and the infection rate in *A. minimus* is also at its apex.

The results of this experiment are given in the following series of tables which are self-explanatory.

The dosage used was as follows:—

For all adults over 10 years of age ... 1/3 grain Plasmoquine once a week.

For all children between 2 and 10 years of age ... 1/6 grain Plasmoquine once a week.

For infants up to 2 years of age ... 1/12 grain Plasmoquine once a week.

The Plasmoquine was given on the same day of each week, and the entire Labour Force which is self-contained and not migratory, was treated. Very careful records were kept of the treatment. Spleen and Parasite Rates were determined before the treatment began and again after the treatment was completed.

PARASITE AND GAMETOCYTE RATES OF TOTAL POPULATION OF A TEA ESTATE BEFORE PLASMOQUINE PROPHYLAXIS.

Date of Examination of Slides	Began on 6th May, 1933.	Ended on 25th June, 1933.
No. of Slides Examined	...	1005
No. of Slides Positive	...	157
No. of Slides Negative	...	848
Percentage Positive	...	15.6
Percentage Negative	...	84.4
Type of Infection	...	...
Mixed (M. T. & B. T.)	...	...
Total	157	...

NO QUARTAN FOUND No. of Gametocyte-Positive Examinations.

Crescents	9
B. T. Gametocyte	4
Total	13

Parasite Rate	...	15.6
Percentage of Gametocyte Carriers to total Positive Slides	...	8.1
Percentage of Gametocyte Carriers to total number of Population examined	...	1.2

Plasmoquine was given to all population from 8th July, 1933.
Spleen rate of total population was 20.3 p.c.

Treatment with Plasmoquine was completed on 7-10-33.

PARASITE AND GAMETOCYTE RATES OF TOTAL POPULATION OF A TEA ESTATE AFTER PLASMOQUINE PROPHYLAXIS.

Date of Examination of Slides	Began on 28th October, 1933.	Ended on 23rd November, 1933.
No. of Slides examined	...	949
No. of Slides Positive	...	108
No. of Slides Negative	...	841
Percentage Positive	...	11.4
Percentage Negative	...	88.6
Type of Infection	...	...
Mixed (M. T. & B. T.)	...	...
Total	108	...

NO. QUARTAN TYPES No. of Gametocytes—Positive Examination.

Crescents	5
B. T.	1
Total	6

Positive Rate	...	11.4
Percentage of Gametocyte Carriers to total Positive Slides	...	5.6
Percentage of Gametocyte Carriers to total number of population examined	...	0.6

Spleen rate of total population was 17.2 p.c.

TABLE SHOWING COMPARISON OF BLOOD FINDING BEFORE AND AFTER PLASMOQUINE PROPHYLAXIS (GAMETOCIDAL ONLY.)

Total population of a Tea Estate.	Before Plasmoquine Therapy.	After Plasmoquine Therapy.
No. of slides examined	1005	949
No. of slides positive	157	108
No. of slides negative	848	841
Percentage positive	15.61	11.40
Percentage negative	84.4	88.60
Parasite Rate	15.61	11.40
Gametocyte Rate of positive slides	8.31	5.60
Gametocyte Rate of total population	1.81	0.60

TYPE OF INFECTION

Type of Infection.	Before Plasmoquine.	After Plasmoquine.
Total slides positive of which, there were	157	108
M. T.	115	64
B. T.	38	37
Mixed (B. T. & M. T.)	4	7
Quartan	Nil	Nil

TYPE OF GAMETOCYTES

Type of Gametocyte.	Before Plasmoquine.	After Plasmoquine.
Crescents ...	9	5
B. T. Gametocytes ...	4	1
Total	13	6

ANALYSIS OF AGE GROUPS

No. Examined and Age Group.	Before Plasmoquine	After Plasmoquine
Total examined of whom there were ...	1005	949
1. Adults ...	669	698
2. Children (2-10) ...	277	216
3. Infants (Below 2 Years) ...	59	35

DISTRIBUTION OF MALARIA IN GROUPS

No. of Positive Results.	Before Plasmoquine.	After Plasmoquine.
1. Adults		
Percentage Positive ...	11.60	8.20
2. Children (2-10 Years.)		
Percentage Positive ...	32.40	19.90
3. Infants (Below 2 Years)		
Percentage Positive ...	16.90	22.90

DISTRIBUTION OF GAMETOCYTES

Number.	Number of Gametocyte carriers Before Plasmoquine.	Number of Gametocyte carriers After Plasmoquine.
1. Adults ...	4	1
2. Children (2-10) ...	10	4
3. Infants (Below 2 Years) ...	Nil	1

VITAL STATISTICS.

Malarial admission to Hospital during months of	1931	1932	1933
June ...	74	19	4
July ...	98	68	12
August ...	91	60	24
September ...	75	38	21
October ...	62	21	12
November ...	62	37	20
Total (June—November) ...	462	283	93

PERCENTAGE OF MALARIAL ADMISSION TO TOTAL POPULATION

Month of	Total Population.	1931	1932	1933
June ...	1126	6.6	1.7	.4
July ...	1127	8.7	6.0	1.1
August ...	1134	8.0	5.3	2.1
September ...	1136	6.6	3.3	1.8
October ...	1128	5.5	1.9	1.1
November ...	1102	5.6	2.4	1.8

TOTAL ADMISSION (ALL CAUSES).

Total Admission (all causes) during months of	1931	1932	1933
June ...	442	117	122
July ...	597	275	163
August ...	458	343	220
September ...	410	303	246
October ...	458	275	237
November ...	813	183	149
Total (June—November) ...	2668	1556	1187

RATES PER 1,000 OF TOTAL ADMISSIONS TO TOTAL POPULATION

Month of	Total Population.	1931	1932	1933
June ...	1126	392.5	157.1	100.8
July ...	1127	529.7	244.0	144.6
August ...	1134	399.4	302.4	194.0
September ...	1136	360.9	266.7	216.5
October ...	1128	400.1	243.7	210.1
November ...	1102	284.0	166.1	135.2
Average Rate per 1,000 per annum (June-Nov.)	1126	394.4	230.0	166.9

DEATHS FROM MALARIA

Month of	1931	1932	1933
June ...	1	Nil	1
July ...	2	Nil	Nil
August ...	1	1	Nil
September ...	Nil	1	Nil
October ...	Nil	Nil	1
November ...	1	1	Nil
Total ...	5	3	2

DEATHS FROM ALL CAUSES

Month of	1931	1932	1933
June ...	6	4	4
July ...	8	2	1
August ...	3	4	2
September ...	3	4	2
October ...	8	5	4
November ...	1	4	3
Total ...	29	23	16

COMPARATIVE TABLE OF DEATH RATES

Death Rate.	1931	1932	1933
Malarial Death Rate per 1,000 per annum (June—November.) ...	8.9	5.3	3.6
Total Death Rate per 1,000 per annum (June—November.) ...	51.5	40.9	28.4

The following table shews the effect of the administration of Plasmoquine on Test-cases which exhibited Gametocytes in the peripheral blood. Similar experiments were conducted on a series of cases and the results were always approximately the same.

It is evident from these cases that Plasmoquine in doses of 1/3 grain weekly for adults was sufficient to prevent the appearance of Gametocytes in the peripheral blood for approximately 2 weeks, but that Plasmoquine in doses of 1/12 grain weekly for young children was insufficient to produce the same effect.

Finally, I have to thank my Indian Staff, who are working under my supervision at the Central Laboratory, Cinnamara, particularly, Dr. L. R. Dey, Laboratory Assistant, for their loyal co-operation both in the Laboratory and in the Field.

Summary and Conclusions

1. Infectivity Tables shew that *A. minimus* is the only vector of human malaria in the Sibsagar District of Assam, which should be taken into serious account.

2. It has been shewn that in years of short rainfall, especially when the distribution is irregular, the permanent rivers of the Sibsagar District remain active breeding grounds for *A. minimus* throughout the Monsoon. They thus form an additional source of malarial spread under such climatic conditions, and must be taken into account in any scheme of anti-larval control.

3. The factors of velocity and alluvial deposit have been investigated and the primary importance of the velocity factor has been exhibited. The investigation of the effect of alluvial deposit on larvae requires further research.

4. The effect of the addition of Lime to Paris Green has been shewn and the superiority of 4% dilution of Paris Green has been established.

5. The danger of adding Lime to Paris Green has been proved, and this practice is not recommended for Assam.

6. The effects of Plasmoquine, as a gametocide, have been investigated and the results tabulated for a resident population. It has been elicited that the dosage of 1/12 grain Plasmoquine weekly for children under 2 years of age is ineffective, but that doses of 1/3 grain weekly are sufficient for gametocidal prophylaxis in adults.

7. The early results of anti-malarial control have been tabulated and the effect of malaria control on drug expenditure has been pictured graphically.

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GAMETOCYTE EXPERIMENTS

Type of Gametocyte found.	Dosage of Plasmoquine.	Age of Patient.	Result.
B. T. and M. T.	1/3 grain	12 Years	Gametocytes absent after administration of 1/3 grain Plasmoquine for 14 days.
M. T.	1/12 grain	1 Year	Gametocytes present two days after the administration.

The comparative Tables reveal some interesting facts. Whilst there was a marked reduction in M. T. cases, there was no reduction in the B. T. group, but actually a small increase in mixed B. T. and M. T. infections. This seems to indicate that Plasmoquine, in the doses used, was more effective in reducing the incidence of M. T. infections than in combating the B. T. group. Further evidence on this point is essential before any definite conclusion can be made.

The gametocyte population was reduced from 13 cases to 6 cases after Plasmoquine in spite of the fact that, normally, at the end of the epidemic malarial season, an increase should have been recorded. It is evident that Plasmoquine, in the doses exhibited, has a beneficial effect in reducing the number of gametocyte-carriers.

As regards the distribution of infections, it is clear that Plasmoquine in dose of 1/3 grain weekly is sufficient to produce a definite drop in the malarial rate in adults. It is also clear that the dosage of 1/6 grain weekly has a beneficial action in reducing the amount of malaria in the age group (2-10 years). On the converse, the dosage of 1/12 grain for children under 2 years old is manifestly inadequate as there was an increase in this group of 6 per cent.

This finding agrees with the test-cases in which it has been clearly demonstrated that Plasmoquine in doses of 1/12 grain weekly is insufficient to sterilise the peripheral blood from gametocytes.

It had been hoped to shew the influence of Plasmoquine, in the doses adopted, on the infectivity of *A. minimus* by feeding them daily on test-cases to whom a single dose of Plasmoquine had been given. This would determine the viability of gametocytes after their re-appearance in the peripheral blood, and thus would establish the longest interval between doses of Plasmoquine which could be safely allowed in Prophylaxis.

These trials have not been numerous enough to permit of inclusion in this Paper.

It is hoped to continue this research during 1934.

The object of this entire research was to determine the minimum dosage of Plasmoquine and the maximum periods between such doses, which could be used on Tea Gardens in Assam as a prophylactic measure for the elimination of gametocytes.

Some Results of Anti-Malarial Control

In estimating the results, it is generally considered that quinquennial periods should be used for comparisons, and the figures here given indicate the trend of control rather than the final results which, it is hoped, will be attained at the conclusion of the quinquennial period, 1931-1936.

It is considered advisable to publish the results so far as they are attained, in the hope that they will prove a help to others who may contemplate the inauguration of control measures on their own Estates.

In any case, the results attained are sufficiently good to shew what can be done in the space of two and a half years time in such a malarious country as Assam.

Anti-malarial control was started on 23rd March, 1931, after a preliminary survey in 1930.

In Table IV the Spleen Rates, Parasite Rates, Birth Rates, Death Rates and Sick Rates in the Cinnamara Medical Practice are given for the quinquennial period, 1926-1930.

Table V is used for comparison of the period, 1931-1933, during which anti-malarial control was in progress.

Tables VI and VII shew the average monthly incidence of malaria and all other causes of sickness during the pre-control period and after control was established.

The reduction in both malarial and total sickness is very striking.

Tables VIII and IX shew the causes of mortality and percentage of mortality in the same two periods.

Tables X and XI shew the number of cases treated during the three years before control and the three years following control.

Any commentary on the above results is unnecessary as the Tables shew clearly the results which have been attained and indicate the possibilities which can be confidently hoped for in the future of control work in Assam.

Acknowledgments

In conclusion, I have much pleasure in thanking the Chief Scientific Officer, Tocklai Experimental Station, and his Staff, for their very valuable help in my work, in supplying the Tables of Rainfall, Humidity, etc., and for many other useful suggestions.

I have also to thank the Managers of the various Tea Gardens in the Jorehaut Tea Company, for their help and for the facilities accorded to me throughout the period of my research.

I acknowledge with gratitude the assistance given by the Haverro Trading Co. Ltd., 15 Clive Street, Calcutta, who, as agents for Bayer-Meister-Lucius, the Manufacturers of Plasmoquine, kindly supplied the Plasmoquine for the experiment detailed; and my sincerest thanks are particularly due to Dr. O. Urchs, and Dr. A. G. Brocke of Bayer-Meister-Lucius.

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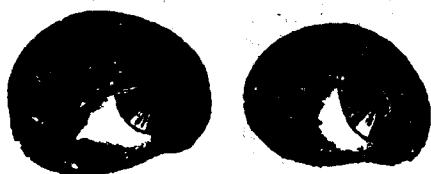


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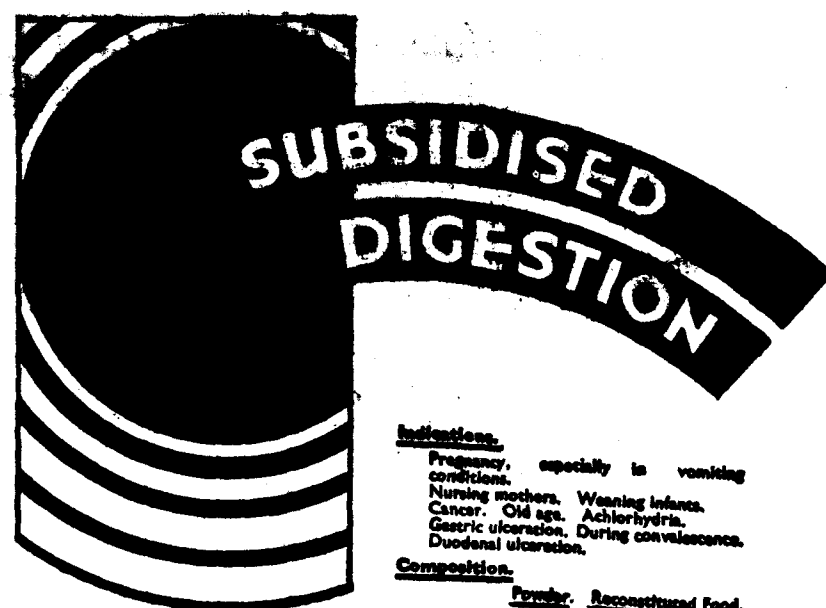
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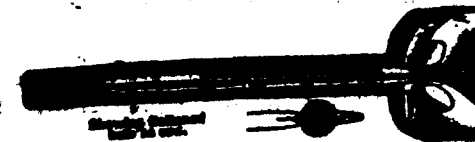
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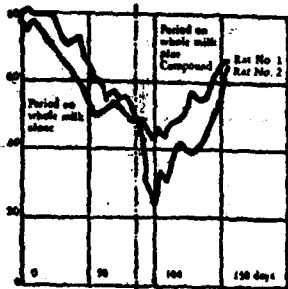
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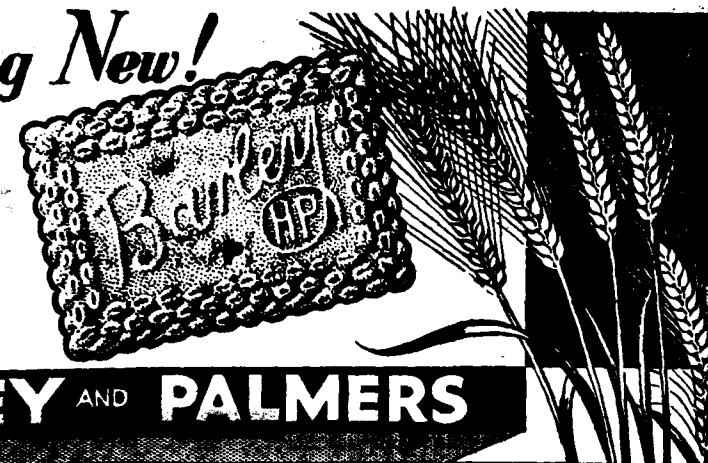
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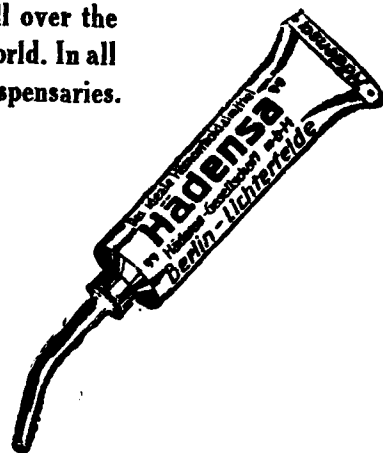
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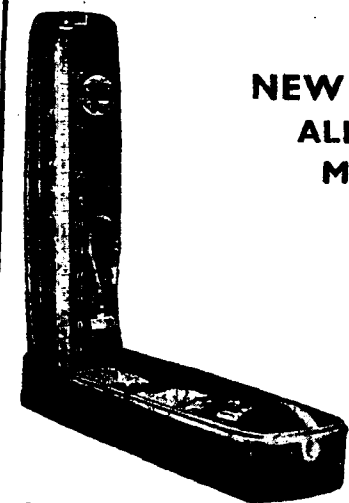
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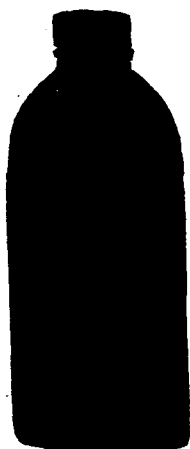


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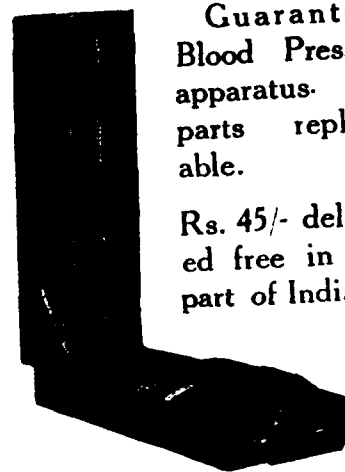
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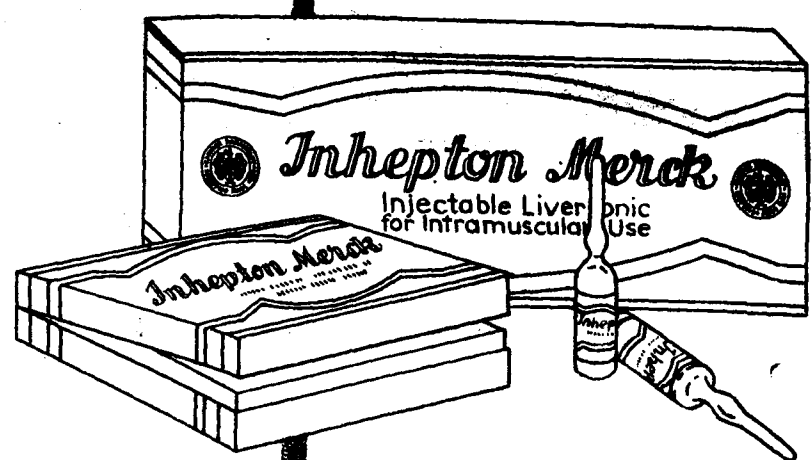
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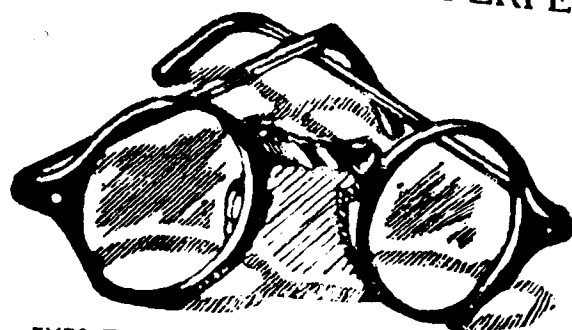
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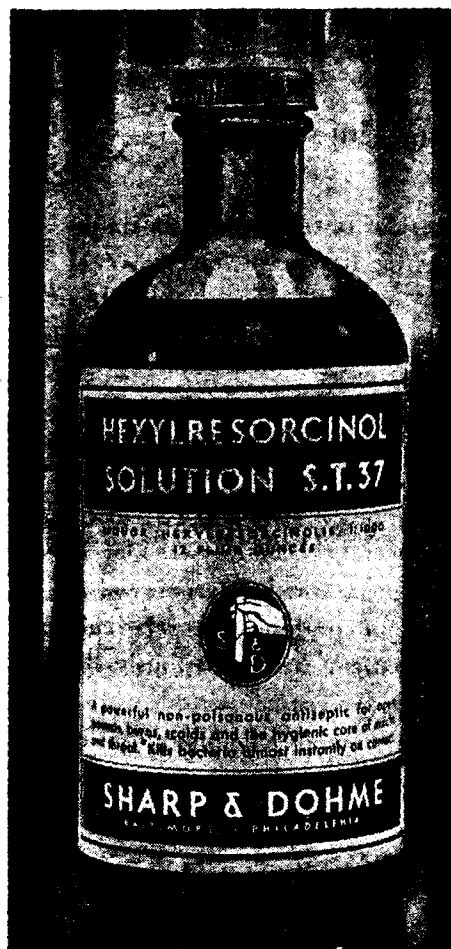
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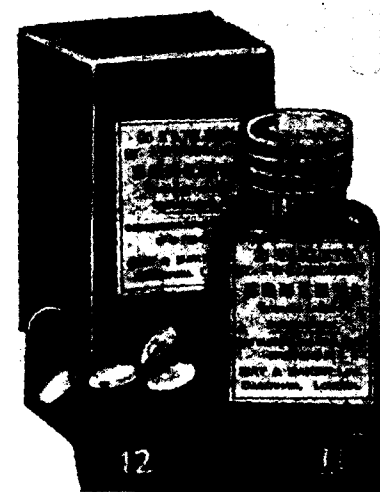
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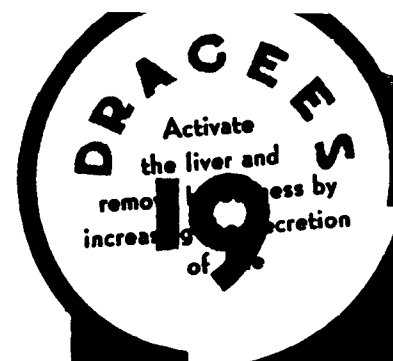
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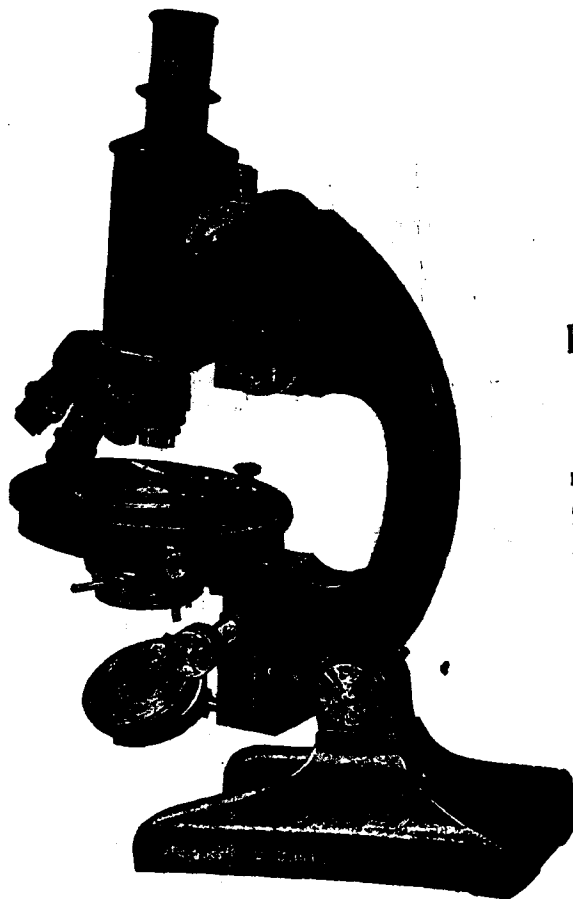


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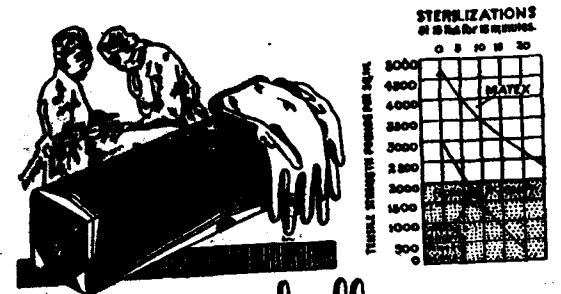
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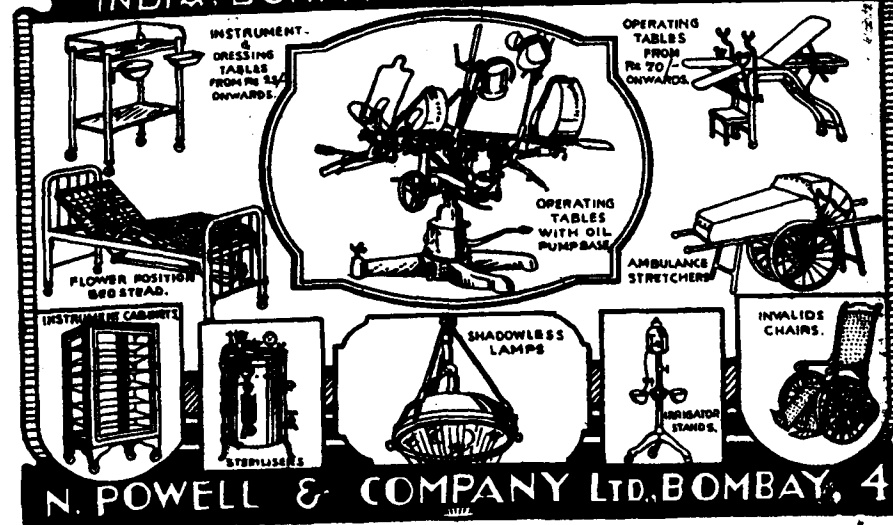


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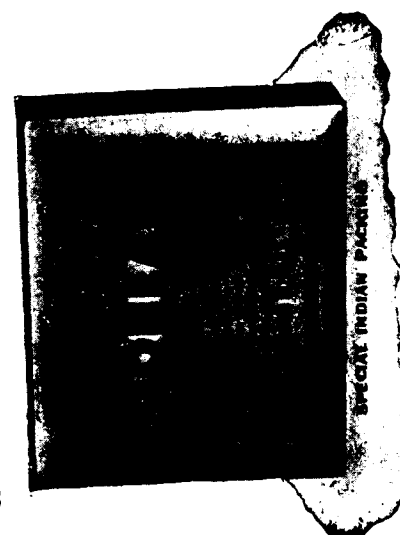
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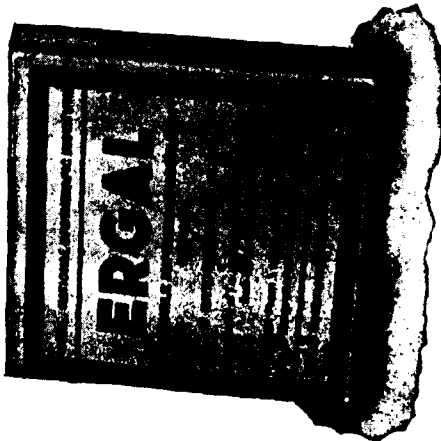
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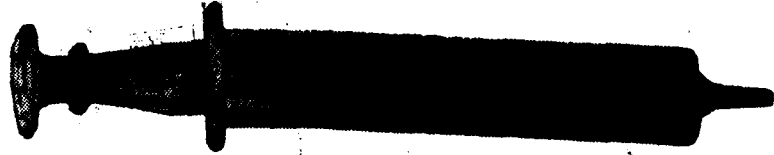
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Original Articles

SOME NOTES ON THE DIAGNOSIS OF GLAUCOMA*

BY

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THE purpose of this paper is not to give you a complete survey of the Glaucomas but to discuss a few questions mainly regarding the diagnosis of this disease. Its importance can never be over-estimated and my impression is this that many more eyes can be saved if the average general practitioner can suspect the presence of this disease much earlier than what is usual in this part of the country. We all have the painful experience of attending to cases of absolute glaucoma who had consulted medical opinion in the smaller dispensaries, and were asked to wait for a cataract extraction on the maturity of the lens opacity.

Raised intra-ocular tension produces a chain of signs and symptoms, all of which can be traced to the primary cause—the increase of tension. In as much as there must, in every case, be a factor causing this increase of tension, all glaucomas must be considered secondary. It must, however, be admitted that the pathogenesis of a very large number of cases is still obscure, although we are moving very fast towards the unravelling of their mysteries.

Clinically we have a group of cases which are called secondary glaucomas; the causative lesion in them is clear, and some of the important ones may be mentioned as under:—

* Contributed to the Special Annual Number of the Antiseptic.

- (a) Adherent leucomata. The iris is drawn and incarcerated into the corneal scar as a result of which a large part of the iridial angle is obscured and a gradual rise of tension takes place. When a large part of the iris is affected then it is better to operate rather than to allow the case to proceed to an established secondary glaucoma.
- (b) Iritis. Secondary glaucoma may be due to acute or chronic iritis. In the acute cases the iritis should be treated first, but in chronic cases the glaucomatous element should pre-eminently receive attention. These cases are very difficult to tackle, and certainly form a very large and important group fit to receive separate attention.
- (c) Traumatic cataract. Trauma may be due to operative interference or to accident. When the anterior chamber is full of cortex and the tension shows signs of increasing it is always better to clear the chamber by a suitable incision preferably corneal.

There are other causes also of secondary glaucoma but compared to the above they are rare. The above represent cases that can be diagnosed more or less easily. Their easier diagnosis and more obvious cause lend them to more proper treatment so that in the large majority of cases a reasonable amount of satisfactory result is usually achieved.

There is, however, the group of Primary Glaucomas to which I would draw your especial attention. We have to remember that:—

- (a) It is a disease of late adult life. In western countries it is rare under 50 and certainly not very common under 60: but in India the average minimum age would perhaps be 40—45 years. The youngest case of acute primary glaucoma on whom I have operated was a man aged 31 years and though the unoperated eye was under eserine it developed acute glaucoma on the day of operation of the first eye.
- (b) It is more common in women, particularly in highly strung nervous women of an excitable disposition; I have seen it quite frequently in women who are full-faced, heavily built and of the robust outsize type. The age incidence in them is usually about 35—40.

- (c) It is commoner in hyperopic eyes which are small eyes with large ciliary muscle and small circumlental space. The size of the cornea gives a very good idea about the size of the eye ball.
- (d) It is seen in subjects who cannot adapt themselves easily to sudden vascular pressure changes, whose capillary system has more or less lost its elasticity and adaptability.

On this predisposing natural condition may come forth an exciting cause, the matchstick that lights the gunpowder—and this leads to an attack of acute primary glaucoma. The exciting cause may be anything that leads to a sudden dilatation of the capillaries; the psychological factor indeed plays a very important part in the onset of acute glaucoma which clinically is easy to diagnose.

The greater majority of glaucoma cases that we see and that we ought to be careful about are the chronic cases. We usually meet them under two different conditions: in patients who come with an undoubted glaucoma in at least one eye when the systematic examination of the other reveals the presence of the disease in that also, or in a case which has primarily come for refraction but whose optic disc looks very suspicious of a glaucomatous cupping and a further detailed systematic examination confirms the presence of a glaucoma simplex. This latter condition shows the importance of a routine examination of the eye even in ordinary cases of refraction. Even at the risk of going into details and mentioning points which may seem too elementary it would be advisable to discuss some points in the early diagnosis of glaucoma at length.

It has been repeated often that unless you think of the disease you will never be able to diagnose it. The subject of chronic, particularly congestive glaucoma will give more or less a characteristic history. There have been occasional attacks of transient misty vision, to which perhaps much importance is not attached by the patient himself. Quite often such attacks might have been thought of as due to accommodative asthenopia, and various combinations of spheres and cylinders might have been prescribed. Increasing presbyopic correction might have been given of late. He might tell you that of late there has been an increase of what may be called the light minimum.⁽¹⁾ As he comes from a bright light to a comparatively dark room he might be taking a much longer time to get his eye adapted to the

darkness; a dulling of sensitivity to dim light is an important point in the early diagnosis of the disease. It is very difficult to distinguish as to when the physiological limit has been crossed and the condition becomes pathological, but quite often this defect in the light sense, though occasionally transient, is so much, that the patients themselves are very insistent in telling it to you. Laboratory tests have been devised for measuring the light minimum, but a clinician is not expected to work its details. Suffice it to say that a history of increase in the light minimum given by a sensible patient is one of the earliest evidences of glaucoma.⁽²⁾ It is usual to gather up cumulative evidence in such cases for or against glaucoma, because cases come during the interval of such attacks, and almost always for a change of glasses.

One must always ask the patient about the presence of halos. Physiologically they are present in a variety of conditions which for practical purposes are more or less obvious. Pathologically they are almost invariably due to some droplets of fluid collected in the corneal epithelium. Pathological halos caused by increased intraocular tension may be present only during certain occasions; the patient may complain that in the far end of the day or after work he begins to see the halos, and rest for some time or a gentle massage of the eyes removes them. The vision may be perfectly normal; the field may be equally so, but an eye which shows this condition is certainly a glaucomatous eye. A woman patient of mine had this the only complaint that when she had worries, or when she had to do a large amount of work, she always saw the halos, and she took it as an indication to stop work. She was really a case of chronic glaucoma, as a subsequent detailed examination proved it. In another case reported by Adams,⁽³⁾ a patient, at first neglected as having borrowed her friend's symptoms was later on carefully examined. Half an hour's work with the needle in the consulting room caused the halos to appear and the tension which was at first normal to go up to pathological limits. It is therefore essential that any history of halos, particularly in an elderly patient should always be most thoroughly investigated before glaucoma as its cause may be negated.

The headache of which the patient complains is not really very characteristic; it is usually referred to the temples and pressure on the eyeballs does not ordinarily affect it. It is usually increased along with the attacks of congestion or of transient misty vision. It may occur with excitement or shock, or occur in the evenings after the day's work. Unless the attack is one of

acute glaucoma it never deprives one of sleep. One must be very careful in using a mydriatic in such cases. The use of a miotic usually relieves such headaches. I do not believe in the use of homatropine as a method of diagnosis of glaucoma and I can remember at least five cases where the use of cocaine induced an attack of acute glaucoma which had to be controlled by operation.

I have looked upon congested ciliary veins as a sign of stasis in the eye. I admit that in Indian conjunctivæ which are proverbially dirty quite often such congestion of veins may be masked by the superficial circulation, but when present they do certainly show that all is not well with the eye. They should be looked for about 4-5 m.m. away from the limbus. Unless the disease is very far advanced the cornea may be transparent; otherwise in well-established cases there is a general steamininess of the cornea, a loss of lustre having been noted fairly early. The anterior chamber may not be shallow in the earlier stages; it is also not noticed as patients come in the intervals of the prodromal attacks.

There is nothing pathognomonic in the pupil reaction of glaucoma, and its value lies only when it is considered with other evidences of the disease. A pupil which fails to react or to maintain sustained contraction is practically seen in many fundus conditions. One must know that in old subjects the pupil is a little more contracted than the normal; consequently a slightly dilated or not properly reacting pupil should at once arouse suspicion and lead to further investigation.

Tension in most cases is far and away the deciding factor. One must however always remember that a glaucoma can occur without any obvious elevation of tension⁽⁴⁾. Congestive glaucoma cases usually come at quiet intervals; even then the tension of them is usually slightly raised. One measurement of tension may not be enough, but if subsequent measurements are done they should always be done with the same tonometer in order to arrive at the proper relative values. Marked inequality of tension in the two eyes should also arouse our suspicion.

The above may serve to diagnose a more or less typical case of chronic glaucoma but there is a large number in which none of the above factors may be present. Glaucoma is a very elusive disease. There are two factors by which one may hope to establish a diagnosis of such cases. They are (1) Cupping of the optic disc and (2) Changes in the field of vision. These two are really inter-related and it is not possible for a change in the

field of vision unless there is some change in the optic disc, however slight it may be.

The cupping in the optic disc is really not easy to diagnose. An obvious case, what may be called a text-book case, where tension is high, shows a cupping which is easy of diagnosis, but the difficulty arises when you are faced with a disc in a case where no other sign of glaucoma is present. The early cases are confused with what are known as physiological cupping and the later stages with those of optic atrophy. Primary optic atrophy is not a pressure atrophy, it is due to a death of nerve fibres, an ascending or descending degeneration resulting in a shrinkage of the area which really forms the head. The cup is therefore shallow, envelopes therefore the whole disc, and has a pallor which is quite characteristic. If the atrophy proceeds to greater length, the depth of the cup also increases, but is practically never so great as in a glaucomatous pressure atrophy. A shallow-cupped markedly pale disc with fair loss of vision is one of optic atrophy whereas a deeply cupped one is primarily of pressure atrophy. The disc of the optic atrophy in its entirety is pale from the outset on account of the death of the vasa nervosum.

Greater difficulty is experienced in the differentiation of physiological and glaucomatous cupping. It is only by careful examination of all types of discs that one comes to know of this difference. It may be well to remember that a physiological cupping is caused by the fact that the scleral hole is too big to be filled up completely by the nerve fibres. A large physiological cupping means a comparatively larger scleral hole. The lamina cribrosa is not displaced in this; the cup is central, never envelopes the whole disc and should never be too deep; the colour of the rest of the disc is absolutely healthy. In the glaucomatous cupping the main cause of the depth is the pushing backwards of the lamina cribrosa; consequently this type can be very deep. The cup fills a large part of the disc because the pressure so exerted acts on the entire base. The longer the glaucoma has lasted usually the deeper will be the cup. In a shallow glaucomatous cup the colour may be still good, whereas in an atrophic cup the colour is usually pale. It is however very difficult to say where the limit of deep physiological cupping ends and that of a real glaucomatous cupping begins. One must look also to the overhanging margins of the cup, to the bending of the blood-vessels at the margins and also usually to some contractions of the arteries. One may indeed compare glaucomatous cupping to a condition which would resemble the depression created by the

pushing in of a piston whereas a physiological cupping is more or less funnel-shaped.

My personal impression is that what we call a deep physiological cupping is really potentially glaucomatous; not that it has to do anything with the ætiology of the disease but that unnoticed increase of tension makes itself very obvious by a deep physiological cup. Probably such an eye more frequently turns out to be of glaucoma. Great care should therefore be taken before a physiological cup is passed on as normal in an eye.

The field considerations I shall take under the head of Perimetry.^(*) The peripheral field is observed with the aid of a perimeter and the central field by means of a tangent plane like the Bjerrum Screen. Both these are subjective tests and are naturally dependant upon the intelligence and co-operation of the patient. What is the object of perimetry in a case of glaucoma? Field observation is of value:—

- (a) In prognosis of individual cases;
- (b) In finding out the effect of treatment and indicating the methods of treatment in individual cases;
- (c) In the investigation regarding the method of production of these field defects;
- (d) Lastly and to a less extent in diagnosis.

Gross peripheral field defects can be easily found out by the use of fingers. The earliest changes in the peripheral field can be only observed if relative perimetry is done *i.e.*, objects of different sizes used on the perimeter. An area which is sound to a 5 mm. objective may be found extensively damaged if a 1 mm. object is used. I usually take the field of vision with a 5 mm. objective and then with a 1 mm. objective. The normal 1 mm. field is about ten degrees lesser than the normal 5 mm. field on the temporal side but in the inferior nasal quadrant they overlap fully, because the field on that side is cut off to a certain extent by the prominence of the nose and can be easily extended by tilting the head a little. The objective should first be moved from the blind to the seeing area, and then again from the seeing to the blind area, and the mean of the two readings should be taken. Any noise during the movement, or for that matter any thing else that may excite the attention of the patient must be avoided. The lighting should be uniform. Without this attention to details a perimetric chart may be very misleading.

What do we expect in the peripheral field? First a general contraction, then gradually the contraction becomes more marked

on the nasal side. Three explanations have been given of this condition :—

- (a) The temporal retinal vessels are longer, hence the vascular supply of the retina in this part is deficient as compared with the nasal side. All our knowledge of physiology however go against this argument.
- (b) The other possible reason is that the line of pressure falls naturally on the temporal side of the disc; but it is observed that the central area is not affected early, and that the area immediately upper or lower to the raphe is first affected. As to why this should happen one does not know, but the blood-vessels have probably something to do with this.
- (c) The third possible explanation is that due to increased tension the nerve-fibres are pressed against the scleral ring, mostly on the temporal side; but if this alone were the factor then the field should be lost primarily by an enlargement of the blind spot. This as we know is not the usual case.

A portion of the peripheral field on the temporal side is really the last area to be lost, mostly by peripheral shrinkage rather than any extension of a centro-coecal scotoma.

The testing of the peripheral field gives the surgeon an idea as to how the treatment of a case is having effect. Field changes and tension do not go together, so that in a glaucomatous eye, the tension may be showing normal readings whereas the field may be regressing. Control of glaucoma cases by field charting is indeed the only real control.

The central field is best palpated with the help of a tangent plane such as the Bjerrum Screen. The original inventor of the method, Bjerrum of Copenhagen used at first the back of his consulting room door for the screen. A 1 mm. test-object is passed round the area of the blind spot always bringing the object from the seeing to the non-seeing area, and the blind-spot is carefully charted first. Then the rest of the field for about 25 degrees is carefully palpated and any scotomata are noted. Clinically the condition of the coecal area is important in the earlier cases, as it is said that the Siedel's sign is one of the earliest to develop, and this sign can be best noted on the tangent plane. I must admit, however, that in the fields that I have charted, wherever a definite Siedel's Sign has been found, the periphery has also shown a defect.

The presence of field changes show that the disease has been definitely established; indeed, the absence of field changes do not show that glaucoma is not advanced enough to cause a field defect. I have yet to see a case in which a defective field has not been accompanied by at least a strongly suspicious cupping of the optic disc.

The measurement of tension forms one of the most important methods of the diagnosis of glaucoma. Our first suspicions are aroused by the use of our fingers, but if we were to depend only on this we would be missing many early cases of glaucoma. I may at once say that the usual tonometers do not measure the intraocular tension: that can only be measured by putting a tube into the eye and connecting it with a manometer. This really has no place in clinical work. What we really do in indirect tonometry is measuring the impressibility of the cornea to the instrument that we are using. The intraocular contents keep the coats of the eye-ball in a state of tension, and the impressibility of the eye-ball depends not only on the contents but also on the strength of the coats. The tonometer is therefore not an accurate instrument so far as the intraocular tension is concerned. This, however, does not detract from the practical usefulness of the instrument, because even small relative differences of tension can be very easily recognised by its means.⁽⁶⁾

Any tonometer may be used but it is always better to keep to one and stick to the same in all measurements; being a delicate instrument one gets used to the same. The first essential of good tonometry is a perfect anaesthesia. It would be better to avoid cocaine as it dilates the pupil; we were using holocain before but we have now replaced it entirely by pantocain $\frac{1}{2}\%$. Without this if the patient is struggling the result will naturally vary; attention to other details is also required if dependable results are expected :—

- (a) The instrumental error, if any, should always be noted by placing the instrument on the artificial cornea.
- (b) The instrument when placed on the cornea should be in perfect apposition to it; a correct corneal tonometry cannot be done if the instrument is indifferently placed.
- (c) No pressure should be applied while placing the instrument on the eye; it is only the weight of the instrument that should be allowed to act on the eye.

- (d) I always prefer to do tonometry while the patient is in the recumbent posture, though the Baillart tonometer which I commonly use is also designed for tonometry on the sitting patient.

When the tonometer is applied to the eye a careful observer will note that there may be two types of movements in the needle (7):—

- (a) The oscillatory movement. The needle of the tonometer may show a pulsatile movement round about a particular point. This is due to the fact that the application of the tonometer causes the appearance or rather the exaggeration of the arterial pulse in the retinal vessels and it is this pulse that is reflected on needle of the sensitive instrument. One would expect this under physiological conditions where the arteries are not sclerosed, in which latter case they would have lost their elasticity and consequently their power to adapt themselves to different pressure conditions. One would not expect such pulsatile movements in cases of high blood-pressure or in long standing cases of chronic glaucoma.
- (b) The other type of movement has no connexion with the arterial pulse, but is directly due to the reactions of the intraocular pressure to the weight of the instrument. A careful observer may come across three varieties:—
- (i) The needle may fall a few points after an initial rise. This is the most common occurrence. It shows that the Vascular choroidal coat adjusts itself to the new pressure conditions. We know that the choroidal system acts as an elastic pad of capillaries which regulate the intraocular pressure, and the presence of this reaction shows that the choroidal blood-vessels have not lost their elasticity.
- (ii) The tension may remain stationary after the application of the tonometer. Quite often it occurs in normal eyes but it is quite possible that these eyes are not physiologically normal, and that either the choroidal pad has lost its

elasticity and power of adjustment to new pressure conditions or that there is some venous obstruction. I think that these are potentially dangerous eyes so far as vascular crises are concerned.

- (iii) The tension may go slightly higher and higher after the application of the instrument. This is only seen in some established cases of glaucoma and may be considered as a late stage of the condition described just above. The prognosis in these cases is markedly grave.

Tonometry in the diagnosis of glaucoma is not a thing that should be indifferently done, and as shown above, much valuable information and clinical understanding can be obtained with the help of this instrument used correctly. We have discussed among other things what may be called the diagnostic triad of glaucoma—particularly of chronic simple glaucoma: Ophthalmoscopy, Tonometry, and Perimetry. I shall conclude this note after mentioning some points in connexion with an important type of glaucoma that has come into prominence very recently, I mean, the Glaucoma of Epidemic Dropsy.

The glaucoma of epidemic dropsy is considered to be the ocular manifestation of the oedema that occurs elsewhere in the body. It is said that a toxin of the nature of Histamine⁽⁸⁾ is liberated as the result of using diseased rice and this affects the capillary system of the body by rendering them more permeable. An increased permeability of the ciliary epithelium combined with a dilatation of the blood-vessels and capillaries occurs in the eye, and what may be called an oedema of the eye results. This type of glaucoma differs in certain important characteristics from the ordinary primary glaucoma.

It occurs in all ages and may occur in any stage of the original disease. The cornea is not commonly affected except in the later stages. The anterior chamber is most commonly normal, it may even be deeper in the earlier stages. The pupil reactions are affected only very late in the course of the disease. There is practically little or no ciliary injection, indeed, signs of congestion in the eye are most often absent. The tension after some fluctuation usually goes up very high, much higher than what the external appearance of the eye would suggest, and miotics usually fail to reduce the tension excepting in the very early stages. The cupping of the optic disc develops rather late in the disease, but

a pallor is occasionally noted. Due to the marked increase of tension the field changes occur fairly early, they are more or less of the same character as described above, but it has been noted that after relief of tension return of the field is much more common than in the ordinary cases. This is thought to be due to the fact that in the glaucoma of epidemic dropsy a physiological block occurs for a very much longer time than in other instances. This has been compared to the physiological block that occurs in the pituitary lesions. Even in those cases where signs of epidemic dropsy have disappeared, the patient continues to suffer from hypertension in the eyes. (9)

It must therefore be borne in mind that all cases of epidemic dropsy should occasionally be subjected to tonometry, as in this condition it is far and away the only sign to be relied upon. Headaches are not at all marked, though the patient frequently complains of halos early in the disease.

As we are all aware, the cause of primary glaucoma is unknown. Very probably the organic changes that occur in the eye are the result of the disease and not the cause of it. Most of these organic changes are absent in the glaucoma of epidemic dropsy. Our conception about the physiology of intraocular pressure is rapidly undergoing change, and it is quite possible that with investigations into the cause of oedema in epidemic dropsy we may be able to unravel some of the mysteries of glaucoma. It may also be that what we are grouping to-day under a common heading of glaucoma is really a group of different diseases caused by different agencies or factors. Whatever it is, from the treatment point of view to-day all our aims are directed towards the relief of tension. As the disease is so damaging in its effects, and so varied in its character and onset, it is exceedingly essential that we do take more interest in its early diagnosis, and try to refer cases to the specialists much sooner than what we do now.

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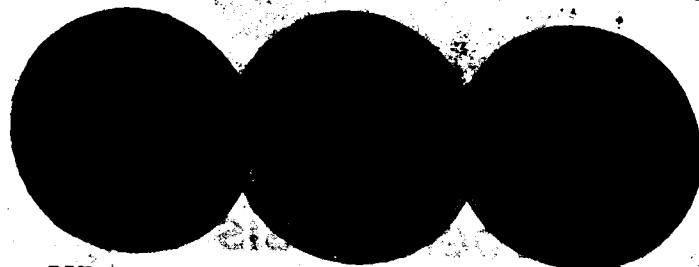
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ARTERIO-SCLEROSIS, ANGINA PECTORIS AND CORONARY THROMBOSIS*

BY

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Bombay.

ONCE the sclerosing changes begin to occur in the vascular system, it is not one part that suffers, but the whole system begins to participate in the banal effects, but the brunt of the disease falls at one place more than the other.

If the brunt of the sclerosing changes falls on the kidneys, the kidneys suffer and there is failure of the kidneys to excrete toxic products of proteid metabolism with death from uraemia.

If the brunt falls on the coronary vessels, there is angiospasm, ischaemia and angina pectoris; if there is thrombosis of the coronary branches there is ischaemia and fall of blood pressure.

But the sclerosing changes do not occur only in the parts affected; in a case of an old lady aged 60, there were at first anginal pains for about three years with raised blood pressure, subsequently she developed coronary thrombosis from which she recovered, and later on suffered from hemiplegia due to thrombosis of cerebral vessels.

This shows widespread changes in the vessels of the whole body to a greater or lesser extent.

With arterio-sclerosis there is generally raised blood pressure but it is not always so.

Whether the kidneys suffer or the coronary arteries bear the brunt, the heart is the organ secondarily to suffer from loss of nutrition in the end, causing myocarditis and secondary dilatation. Due to arteriosclerosis, the heart hypertrophies at first with a thumping first sound; much later on, a feeble first sound is heard due to myocardial changes and dilatation with subsequent cardiac failure.

The prognosis in arteriosclerotic cardiac changes is very difficult, and cardiologists of front rank have given their opinions in various medical journals to that effect. Sudden deaths, when the patient seems to be enjoying good health, with no symptoms or physical signs pointing to immediate danger, have occurred in the practise of many; some of these deaths are due to thrombosis of a larger branch of the coronary artery. With this, there are symptoms of shock, the blood pressure falls and the pain is severe, not localised like anginal pain but occurring, in the

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whole of the upper and front part of the chest. It is often unbearable.

This condition is not very difficult to be recognised; but the stumbling block is with patients having been treated some time or other for anginal pains, relieved by ordinary treatment, and doing their normal work without any indication of oncoming catastrophe, neglecting medical advice.

In those cases of sudden deaths not due to coronary thrombosis, slowly but imperceptibly myocardial degeneration occurs: on listening to the heart the first sound is slightly weak or appears normal to the ear; there is no distress whatsoever, the systolic blood pressure is normal or very slightly less than normal, the patient is anxious, the doctor assures him of there being no danger, but after the physician has left the patient, the patient dies suddenly or before the physician could be sent for, the patient after showing some signs of distress, is dead.

As the patients feel well they do not consult physicians, or if they do the medical man finding the heart sounds nearly normal, the symptoms complained of by patients are passed off as minor anginal troubles; he is advised rest or prescribed drugs of digitalis group or if the pressure is slightly high drugs are prescribed for lowering the tension.

These are the cases in which daily and individual attention to the patient is required. Here daily blood pressure readings in the flat, supine and standing positions should be taken. In these cases the diastolic pressure is raised and the systolic blood pressure remains at the lower limit, the pulse pressure being low; or the diastolic and systolic are both low, which indicate exhaustion of myocardium. It may be compared to the India rubber bulb of a motor horn which goes on hooting even after wear, the sound getting weaker yet giving service, till one day the hoot stops suddenly.

In like manner, in the beginning there is hypertension, the heart is able to withstand the peripheral resistance and it hypertrophies; this condition goes on for a period of two to four years when the heart is able to stand the strain. Symptoms of angina pectoris occur, which yield to treatment by rest and vasodilator drugs.

With the sclerosis of blood vessels increasing, the anginal symptoms become more frequent and of greater duration, the strain on the heart is greater, and its contraction power gets weaker. The blood pressure still remains higher as the heart has to supply blood to the distant organs efficiently, but the heart

begins to feel the strain. Three things may happen now to the heart. Due to (1) slightly weakened circulation and sclerosis of coronary arteries, coronary thrombosis may occur, (2) cardiac dilatation may occur with symptoms of back pressure, (3) sudden failure after increasing myocardial degeneration which may be hastened if the patient suffered about this time from Influenza, Pneumonia etc., and just recovered. The heart becomes unable to bear the myocardial degeneration due to arteriosclerosis and the toxins of infectious fevers.

Blood Pressure.—Those people who have a family history of longevity have never high blood pressure and their arteries feel soft. Their metabolism and blood pressure regulating mechanisms are in good order. Claude Wilson quotes the instance of the most successful Everest climber who has a normal blood pressure 100/70. I have seen active persons of 60 years with a good family history of long lives, who have blood pressure 120/70.

Upto a few years ago, the rule for normal blood pressure was laid down to be age 100, that is, for a person of 60 the systolic blood pressure would be 160. This is incorrect: for a healthy life it ought to be half the age—100, that is, for a man of 60 it ought to be about 130 m.m. Hg.

Dr. Sutton gives the following average readings from his examination of 600 cases (150 in each decade), as follows:—

20—30		30—40		40—50		50—60	
M	F	M	F	M	F	M	F
126	118	128	122	130	128	135	124
78	70	80	78	82	80	83	80

“Hurst has suggested that for convenience, we should consider hyperpiesia to be present when blood pressure is more than 25 m.m. above the average for the individual's age and sex. This would give a limit of 150 in men and 140 in women upto the age of 40 and 150 for both sexes between 40 and 50 and 160 for both sexes after 60. For hypopiesia 105 will be the lower limit for men and 100 for women”. Dr. Sutton suggests that the diastolic pressure should not exceed 90 at any age. I agree with that statement, because though a high diastolic of 100 m.m. Hg. may not indicate immediate danger, a high diastolic and high systolic pressure may threaten apoplexy. A high diastolic and

comparatively low systolic, and low pulse pressure indicate on-coming cardiac failure. A low systolic and low diastolic also indicate cardiac failure, or if the kidneys are sclerosed, on-coming oliguria and renal failure.

Blood pressure regulation is a wonderful mechanism. For efficient circulation even in patients suffering from arteriosclerosis a certain adequate amount of pressure is requisite; hence in cases suffering from myocardial degeneration and commencing cardiac failure ending in sudden death, there is not much indication from blood pressure readings taken occasionally, but regular daily readings will give some indication of falling blood pressure from the previous levels. The heart has to carry on the circulation and for that in spite of its weakness it has to keep up a certain amount of pressure which apparently is not low but considered from the individual's standpoint is low; the danger signals of on-coming cardiac failure are giddiness and faintness, a sunken feeling at the heart, dyspnoea, a gradually getting feeble first sound of the heart and a falling blood pressure.

"Janeway gives the average duration of life in 100 fatal cases of high pressure as being four years and Fisher gives insurance figures giving a mortality of 35% above the average, with a systolic blood pressure over 150, and with a systolic pressure of 170 or more, the mortality is four times as high.

Treatment—There is a difference of opinion whether high blood pressure should be lowered or not. This question has arisen because, some physicians have treated cases in the early stages with benefit, while others having treated these cases in later stages, have seen the ill effects of the lowering of blood pressure.

Both views are relatively correct having noted one aspect of the case. In the beginning, when the blood pressure is high and there are symptoms of headache, palpitation, anginal symptoms and when apoplexy is threatened, high blood pressure kept down is beneficial.

More than drugs, moderation in diet is beneficial. One meal out of the three may be missed. The quantity of proteid and starchy food lessened, and the fluids imbibed should be lessened in quantity, because the volume of blood is increased, and with increase of peripheral resistance, the heart has to exert proportionately more, with liability to cerebral haemorrhage.

Exercise in moderation and lessened business worries quieten the circulation.

As to drugs for lowering blood pressure, in the beginning, Diuretin and Pacyl, I have found to be of benefit. For anginal pains,

trinitrine and erythrol tetranitrate are of use, also heart muscle extract and camphor by mouth, which failing, relief is obtained by judicious use of Eukodal and Eupaverine, by mouth.

But dieting or drugging, once the sclerotic changes have commenced, nothing can stop them.

Salines are of benefit, taken every fortnight. Venesection is of benefit in early plethoric cases. Iodides are useful in syphilitic cases, as patients with renal symptoms become worse instead of deriving any benefit. All other drugs have very little effect in lowering the blood pressure. The action of even drugs like Lacarnol, Pacyl and Diuretin must be controlled by blood pressure readings.

After sometime a stage is reached when our efforts at lowering the blood pressure are harmful. This stage is reached when heart shows signs of myocardial degeneration, and a time comes when it has to be supported by more generous diet and finally by cardiac tonics. Camphor per os is useful when this stage is reached. Patients should be accustomed to blood pressure measurements as much as to the use of the stethoscope, by assuring them that it is a routine examination and nothing to be afraid of, because I am convinced a regular use of the Sphygmomanometer as much as a Stethoscope is necessary for the guidance of treatment of these cases to avert sudden danger. Sphygmomanometry should now be in a line with listening by means of the stethoscope, taking temperature readings, or pulse and respiration counting.

The control of arterio-sclerosis is from the young age, by moderation in diet, and healthy exercise in moderation. When the symptoms are apparent they may be lessened, but the disease goes on its downward course, whatever we may do.

Dr. Wilson quotes authors who state 'One fails to find a basis for thinking that there is a relation between arterio-sclerosis and diet, and one can only conclude that rational treatment at present is non-existent'. "Neither diet nor drugs have been shown to have any effect whatsoever on the course of the disease." Vegetarian people suffer as much as those living on a mixed diet."

Summary:—

- (1) Arteriosclerosis is premature, rapidly advancing senility.
- (2) Bad heredity and rapid wear and tear by excesses in food and sedentary habits, with undue mental stress, bring on these sclerotic changes in the heart and blood vessels and other organs.

- (3) No one cause can be assigned for these premature senile changes. Intestinal toxæmia, with subsequent damage to the liver, damaged excretory powers of kidneys, deficiency or changes in the endocrine secretions, all acting in a vicious circle lead to arteriosclerosis.
- (4) Stemming of arteriosclerotic changes and its treatment once it has developed is hopeless; yet moderation in diet, and drink and judicious use of different drugs, in the first and last stages, will postpone the fatal termination.
- (5) The treatment of arteriosclerosis should be not when the first symptoms are noted, but be from the young age by preventing or delaying its onset by diet, exercise etc.
- (6) Optimism must be the keynote in the treatment once degenerative sclerotic changes have been diagnosed. Treat as occasion arises. Leave off when the patient is well, and give proper attention to diet, rest and exercises in the interval.
Camphor by mouth is a drug useful at all stages. Vasodilators and drugs that lower the blood pressure are useful in the early stages; they are harmful when cardiac degeneration has occurred, when it may be required to strengthen the heart and maintain the blood pressure.
- (7) In acute and oft repeated anginal pains and in acute pain of coronary thrombosis, Eukodal and Eupaverine by mouth, I have found of benefit in allaying the symptoms, sometimes like magic.
- (8) In late stages and threatening cardiac failure Coramine, and Caffeine as cardiac stimulants are highly beneficial.
- (9) Sphygmomanometer should be in routine use, as a stethoscope or thermometer is used by medical practitioners because it guides us in all cases whether to give a lowering or stimulating line of treatment.
- (10) A good instance in point is that of Coronary thrombosis, where there are anginal pains and fall of blood pressure, where vaso-dilators and other drugs are not only useless but harmful, and a stimulating line of treatment by Caffeine and Coramine is more successful.

TOXAEMIAS OF PREGNANCY*

BY

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TOXAEMIAS of pregnancy can be grouped according to the period of incidence into: (1) Toxæmias of early months, and (2) Toxæmias of later months pregnancy.

In early months toxæmia manifests itself in different forms. A feeling of nausea which is present in 50% per cent of a pregnant woman is a manifestation of some form of toxæmia. In some women it develops into persistent and sometimes uncontrollable vomiting. Other common toxæmic manifestations are herpes, pruritis, excessive salivation.

In a few cases peripheral neuritis develops. At times it is so severe as to cause sleeplessness and exhaustion. At times chorea and asthma are manifestations of toxæmias. I had a case of severe asthma. She could not sleep and was on the verge of nerves. I treated her as a toxæmic case. She responded to the treatment, recovered, and delivered a normal healthy child at full term. I have treated cases of chorea too on the same lines with perfect satisfaction.

The cause of toxæmia of early months is probably the imperfectly controlled action of the ferments produced by the foetus on the maternal tissue. The placenta is either not formed or imperfectly formed in early months, and hence the failure of local reaction in the uterus. This reaction protects the mother against the activities of the ovum.

Another reason probably is the faulty action of the kidney which leads to auto-intoxication. Disturbance of ductless glands may also play a part. I had observed a few cases of Albuminuria clearing up on thyroid treatment and of persistent vomiting responding only to adrenalin treatment.

The gravest manifestation of toxæmia of early months is Hyperemesis gravidarum. There are three types of this condition: 1. Reflex, 2 Neurotic, and 3 Toxæmic.

Reflex type is due to some local lesion, such as retroflexion or exaggerated antelexion. Correction of local lesion, regulated diet and regular action of bowels is the only treatment.

The neurotic type requires judicious treatment. The patient should be given hot milk or tea with (Khakhara) in bed. She should be told that this was only a temporary discomfort. Gastric

* Specially contributed to the Antiseptic.

sedatives such as cerium oxalate grs. v. t. d. s. after meals or pepsin, bismuth or bromides are given merely as a suggestion to restore the patient's confidence. At times slightly greater mental pressure such as a threat of major operation, discomfort of a nutrient enema, is used to bring her round. Electric current on quite irrelevant part of the body, general anaesthesia without operation or the application of medication to cervix are also methods used with the view to treat the patient suggestively.

The toxic type is most difficult to control. Its pathology is mainly centered round the liver. There is a central necrosis of the lobule surrounded by fatty degeneration and then a layer of healthy liver tissue. There may be thrombosis of branches of portal vein. The ammonia coefficient is increased. In normal metabolism it does not exceed 5 per cent. In toxæmia it rises from 10 to 15 per cent. and if it is 20 percent it means acute toxæmia. The symptoms of this state are:—

- (1) Retching progressively increasing, causing insomnia. Vomit is first composed of bile and mucus; it later becomes of coffee ground appearance.
- (2) Anorexia.
- (3) Urine is scanty, contains albumin, casts, bile, acetone, diacetic acid and sometimes glucose.
- (4) Ammonia coefficient is increased.
- (5) Exhaustion.

This condition must be diagnosed from vomiting of acute intestinal obstruction, gastric ulcer, cerebral tumour, onset of acute specific fever, hydatidiform mole and acute hydramnios.

The treatment is to put the patient to bed undisturbed, if possible, in a dark room. No relatives should be allowed with her; instead a capable nurse should be kept in attendance. Food should be given in small amounts at frequent intervals. If vomiting persists food should be stopped by mouth and nutrient enemata given. This consists of peptonised milk followed by copious saline or 2 per cent glucose. Careful watch must be kept for the onset of exhaustion or for any marked change in patient's condition. Gastric sedatives such as cerium oxalate, inguinine in ice cold water, thyroid or adrenalin are sometimes useful in checking vomiting. If these palliative measures fail, the uterus must be emptied. I usually do it by dilating the cervix by insertion of a stomach tube into uterus. If cervix is resistant, Caesarean section is the only treatment. Rectal saline with glucose

and sodii bicarbonate is given after the operation with a view to check the acidosis.

Toxæmias of later months are of two types:—

- (1) Pre-eclamptic, and (2) Eclampsia.

Symptoms of pre-eclamptic toxæmia: (1) Frontal headache. (2) Dimness of vision; flashes before the eyes; very seldom blindness due to oedema with partial separation of the retina. (3) Oedema about the eyelids, hands, ankles, lower abdomen and vulva. (4) Morning sickness may return. (5) Epigastric pain. (6) Lassitude. (7) Blood pressure rises. (8) Urinary changes.—(a) Amount is decreased; (b) Albumin varies; (c) Ammonia coefficient is slightly increased.

It should be differentiated from old standing nephritis. The differentiating points are:—

In nephritis:—

- (1) History.
- (2) Cardiovascular changes: (a) thickened arteries, (b) raised blood pressure, (c) Cardiac hypertrophy.
- (3) Chemical investigations of blood and urine:— In nephritis, diastatic contents of the urine is reduced. It is increased in toxæmia. Urea content in blood is increased in nephritis, while it remains unaltered in toxæmia.

Prognosis of pre-eclamptic toxæmia is good if treated in time. I have not lost a single case so far. Prognosis is rather bad for the foetus.

Treatment consists in examining urine of every pregnant woman every month and if albumin is found it should be examined daily. Patient should be kept in bed. Diet should be restricted in proportion to albumin in urine. Large quantity of barley water and imperial drinks should be given. Magnesium sulphate enema is given to clear up the bowels and hot baths are given to stimulate the skin. I have found very good results from the above treatment.

Eclampsia is one of the most severe forms of the toxæmias. There are two types 1. Fulminant; 2. Slow. Its pathology is as follows:—

- (1) Liver is of pale yellow colour with red areas underneath the capsule.

- (2) *Lungs*-congestion, oedema and sub-pleural hæmorrhages.
- (3) *Heart, brain, spleen and kidney* show areas of necrosis and hæmorrhages.
- (4) *Fœtus*-tissues and organs of the fœtus show the same lesions as that of mother's.

Symptoms: (1) Urine is very much decreased in amount. (2) Blood pressure is very high. (3) Eye symptoms. (4) Severe and constant headaches. (5) Epigastric pain. (6) Fits. Premortory stage lasts 20 seconds and goes into tonic stage. Patient becomes rigid due to contraction of all muscles. This lasts for 30 seconds and is followed by clonic stage which lasts from one to two minutes and passes into coma. Temperature may rise during the attack to 104 degrees or to 105 degrees. It is due to muscular activities as well as interference with heart centre in the medulla. Fits may recur while patient is still comatose or there may be interval of half an hour or so. If patient is nearing labour there is sometimes only one Fit.

It should be differentiated from epilepsy which can be done from history.

Treatment is of two natures:—(1) Prophylactic, that is, antenatal cure, and (2) Curative.

Curative treatment consists of elimination and sedatives. Patient is put in a dark room as quiet as possible. She is placed on her side, with a gag in her mouth to prevent biting of the tongue. Once she is made comfortable, she should be given a stomach wash. At the end of the wash put two ounces of magnesium sulphate in solution with a drachm of sodii bicarbonate. Next a high bowel wash with saline or magnesium sulphate is given. After the intestinal canal is washed out put in 40 grs. of chloral hydrate. If the patient is conscious large quantities of barley water and imperial drinks should be given; if unconscious saline injections should be given. Skin can be stimulated by hot bottles or by specially heated beds or by electric cradle. These are the various ways of eliminating toxins.

If there is a high tension pulse, veretone $\frac{1}{2}$ to 1 c.c., intramuscular injection has a very good effect. Pulse rate lowered and blood pressure falls. If pulse rate is below 100, chloral hydrate is a good drug. If patient is conscious, chloral hydrate grs. xx with pot Bromide grs. xx may be given per mouth. If results are not got, pot. Bromide grs. 25 is repeated after an hour. If patient is unconscious chloral hydras gr. xl. should be given per rectum.

Many obstetricians give morphia from $\frac{1}{2}$ to 1½ grs. I do not like it as it is contra-indicated in cases of anuria and it has a depressing effect on the heart. Cyanosed patients should be carefully watched as they may require oxygen.

Some obstetricians claim good results from serum treatment. 15 to 25 c.c. of serum from a non-syphilitic pregnant woman is injected at the interval of 24 hours. Equally good results are obtained from the serum of a non-pregnant woman or horse.

In very few cases radical treatment is indicated. If a patient is in labour and the os fully dilated, it is better to terminate the labour by forceps. It is seldom necessary to induce labour. I have done so only in one case.

Eclamptic cases are more prone to septic infection; so, rigid asepsis should be observed. Fulminating type of eclampsia has a very bad prognosis, while the slow type has a comparatively good prognosis.

PECULIARITIES OF CALCUTTA CEREBRO-SPINAL FEVER OF 1934*

BY

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in Collaboration with

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EVERY now and then, an epidemic of Meningitis broke out during the year 1934. Altogether 135 samples of Cerebro-spinal fluid from Meningitis cases during the Calcutta epidemic of 1934 were studied. Out of these, 10 samples were found to be grossly contaminated and 8 samples without any growth; possibly there was complete autolysis in these samples during the time, they were brought to my Laboratory. Out of a total of 117 samples from which causative organisms were isolated, 8 samples were found to contain *Streptococcus* some of which were gram-positive *Diplococcus*, forming chains in broth and 26 samples were found to contain *Pneumococcus*. These 26 samples were all found to contain *Diplococcus* of doubtful gram-negative character, negative to *Serum-Inulin*, to start with, but they showed a distinct halo of greenish discolouration in blood-agar, showing resemblance to *Pneumococcus*. On repeated sub-cultures for more than 30 generations, they were found to be distinctly gram—

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positive, and positive to serum—Insulin and this could be definitely classed as Pneumococcus.

2 samples were found to contain Influenza Bacillus. 4 samples demonstrated both Streptococcus as well as Meningococcus. The rest (77 samples) showed gram-negative Diplococcus, out of which 29 samples contained Meningococcus pure, as they corresponded with it both in cultural and fermentative characters and 48 samples were found to contain Gram-negative Diplococcus of a peculiar type (6-A Group). The percentages in which different organisms were found to occur may be summarised in the following way:—

- 6.8 % Streptococcus.
- 22.9 % Pneumococcus.
- 1.8 % Influenza Bacillus.
- 3.4 % Streptococcus and Meningococcus combined.
- 24.5 % Meningococcus pure and
- 40.6 % Gram-Negative Diplococcus of a peculiar type.

The last named peculiar group of organisms consists of easy growers-growing from the very beginning in ordinary nutrient agar (primary cultures, succeeding two and three generations and later on as well). They require no enrichment fluid in the medium for their growth, and does not ferment any of the sugars, Dextrose, Maltose, Lactose and Saccharose.

"It is noteworthy that the greatest irregularity in fermentation reactions are noticeable in the strains freshly isolated from C. S. F., which naturally were accustomed to an environment, rich in protein, while strains from the Nasopharynx tended to be more regular in fermentation" (1). But these strains of "6-A Group" continued to give negative sugar reactions even after 90 generations. We used liquid sugar media, similar to that used by Murray without the agar i.e., 1% Peptone, 1% standard salt solution (containing 25% NaCl, 1% CaCl₂, 2% KCl). 10% solution of Sugar was first titrated and reaction adjusted to pH 7.0 to 7.2, as many samples of Sugar give decidedly acid solutions, and if sterilised in this condition, they may be hydrolysed. Sufficient sugar solution was then added to the Peptone filtrate, to make the concentration of Sugar 2%; reaction was again checked and 1% of Andrade's indicator added. Then the medium was complete, which was sterilized and immediately before use, one drop of sterile fresh Serum was added to ensure growth of the organism.

These "no-sugar-fermenters" of "6-A" group of strains were negative to standard Meningococcus typed Serum (Oxford)

by agglutination. But they are not auto-agglutinable and they refused to grow in gelatin at 20°C. They failed to grow at a temperature between 15 to 18°C., in ordinary and enrichment media though they kept alive for more than seven days even in ordinary agar, as, after keeping them for 7 days at this temperature when they were put in an incubator, they were found growing after 24 hours even in ordinary agar. The growth is moist and picks up easily, when touched with platinum needle, emulsifies easily and smoothly in Saline, giving an even suspension.

Perhaps, we are not justified in calling this group, Meningococcus. Gram-negative Diplococcus isolated from C. S. F. is not sufficient criterion of Meningococcus. But, "Gram-Negative Diplococcus", with certain cultural and fermentative properties isolated in pure culture, from the C. S. F. of a patient suffering from Meningitis are agreed by all to be true Meningococcus" (2) This peculiar type of organisms has been found from C. S. F. of patients suffering from Meningitis, in pure cultures but both the cultural and fermentative characteristics are different from Meningococcus.

Neither can they be classed as Micrococcus Catarrhalis. The virulence of this organism to Laboratory animals, as distinct from Micro-Catarrhalis is very high. Rabbits are highly susceptible to infection by this group. They are not auto-agglutinable and they refuse to grow in Gelatin at 20°C. The prevalence of this group of strains is so high that more than 40% of all strains causing Meningitis during this epidemic belong to this group. Mortality of patients affected with this group of strains is also very high; we did not find many cases, affected with this type, to be cured. This group of strains, therefore, deserves and rightly claims to be considered as a separate entity altogether.

Classification of fatal cases has led us to conclude that the cases with Mixed-infection of the Meninges (Meningo and Strepto) are the most dangerous ones. Cases of Pneumococcal origin generally die within 24 to 72 hours before any focus in lungs can be spotted and proper diagnosis is arrived at. They are first taken to be of Meningococcal origin and are generally though very wrongly considered amongst failures of treatment of Meningococcus Meningitis by Anti-Meningococcus Serum. "6 A" group of organisms is also responsible for creating havoc in this epidemic.

Treatment of Meningococcus Meningitis by Anti-Meningococcus Serum was found generally to have given satisfactory results when adequate quantities of Serum have been administered.

By adequate quantities, we mean, 100 c. c. to 150 c. c. of Serum to be injected straight off, into a patient intrathecally as much as possible, a part intravenously and the rest intramuscularly. We have seen cures even in cases given up as hopeless in some Hospitals in Calcutta, by adopting similar procedure. Addition of fresh Normal Serum has also helped in some cases, possibly by reason of Alexin introduced.

Though we had to sacrifice many rabbits, we have now been able to prepare high-titre Serum, against one particular strain of this ("6A") group and we are carrying on with absorption test and further work on this peculiar group which resembles Meningococcus in some respects but differs from it in important peculiarities.

Our sole aim from the very beginning, was not diagnosis only, as is the case with Clinical Pathologists and as such, we would not be satisfied only when a name to this type of organism is given. What we want to impress is that there are many causes of failure in the treatment of Meningitis cases, amongst which the preponderance of this new type of organism is one.

My special thanks are due to my seniors, Dr. Charu Chandra Basu of Carmichael Medical College and Dr. M. N. De of Calcutta Medical College for giving me innumerable suggestions and constant help in this line of work.

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GONOCOCCAL ARTHRITIS *

BY

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Incidence

IN a series of 900 cases of gonorrhoea at the Anti-Venereal Clinic of the Bombay Municipality there have been 297 cases of Arthritis. This gives a percentage of 3.3 which is higher than the usual figures quoted in European countries.

Aetiology

The association of articular inflammation with gonorrhoea was known as early as the 15th Century, long before the discovery of the Gonococcus. But even after the discovery of the germ by Neisser in 1879, the controversy continued whether the same organism which produced urethritis was the cause of arthritis. This controversy came to an end by the discovery of Gonococcus in the joint fluid by Petrone in 1883 and by Hewes in 1894 who isolated Gonococcus from the blood of patients from Gonorrhoea and Arthritis.

While it is possible that in some mild cases, gonococcal arthritis is due to a *toxæmia from the primary focus* and that in some advanced cases the condition is *aggravated or kept up* by an added infection from *secondary organisms* in the urethra or from some *septic focus* such as the teeth or the tonsils, it is now certain that most cases are *gonococcal septicaemias* and that the infection of the joint is definitely metastatic. There is ample evidence from the research of reliable workers that the gonococcus is carried by the blood stream to the joint as the organism has been isolated from the blood and cultivated from the affected joints. I have isolated it twice from a joint. It is not always possible to find gonococci in the effusion aspirated from the joints and this is probably due to the fact that the organism localises itself in the synovial membrane or the cartilage and thus the resulting exudate is sterile.

Primary Focus

In every case of gonococcal arthritis there is a primary focus of infection. In the male it is generally the prostate and seminal vesicles, in the female, the cervix. Arthritis is rare in cases of only anterior urethritis in the male and in urethritis only

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in the females. The time of onset of arthritis is therefore usually at the later stages of the primary infection.

Children

We have not come across cases of arthritis among children. It is some consolation to find that in the case of these innocent victims nature has made some provision not to allow the organism easy access into the blood stream or given the tissue of their joints less vulnerability. At the Royal Infirmary, Edinburgh, Lees has recorded only two cases, but both of them as complications of Ophthalmia Neonatorum. At the Great Ormond Street Children's Clinic, London, in 250 cases of vulvovaginitis during the last 12 years, Nabarro never had a single case of arthritis.

Joints

Contrary to the common conception which one generally has, the involvement of joints is polyarticular in 75% of cases and monoarticular in 25% when the time of onset is within the first five weeks. However, the later the course of the disease, the more monoarticular the arthritis tends to become. With regard to the joints most frequently involved my series of cases reveals a very curious order of frequency: knee, ankle, metatarso-phalangeal, shoulder, elbow, wrist, metacarpo-phalangeal. It will be seen that the lower extremities are oftener involved in a definite order of frequency from the knee, which is evidently the most affected joint of the body, to the small joints of the foot and that the upper extremities follow in the same order from shoulder to hand. An interesting fact which I have never been able to explain satisfactorily is that, in women, the wrist joint is attacked more frequently than in men.

Clinically and pathologically all cases of arthritis may be divided into two main groups:

- (1) the acute and (2) the sub-acute and chronic.

There are four types of acute infections which I will describe in their order of gravity. Each of these will retain its type features, if taken in hand early, but will gradually pass into the next one of graver issue if seen late or left unattended. There are also mixed types depending on the virulence of infection and the resistance of the patient:

- (1) A painful arthralgia flying from joint to joint without showing any appreciable physical signs.
- (2) An infection in which the inflammatory process is confined to the synovial membrane with abundant

effusion of fluid in the joint. Involvement of one joint may be followed by another. The larger joints are mainly affected. Pain and the presence of fluid are the main features.

- (3) An infection which starts with an inflammation of the synovial membrane producing a small amount of serofibrinous exudate unlike No. 2 where the effusion is abundant. Erosion of cartilaginous surfaces sets in early followed by the involvement of periarticular tissues—capsule, tendon sheaths and muscles—which become œdematous and painful. In this type there is an accompanying temperature. The smaller joints are involved more frequently.
- (4) An acute type in which the intra-articular exudate becomes purulent and there is marked ulceration and erosion of cartilaginous surfaces. It generally occurs in the large joints. It is rare. The temperature rises high and the condition is very painful.

The sub-acute and chronic cases may be divided into two types:

- (1) A synovial type, involving a single joint and especially the knee-joint. Moderate effusion, and thickening of the synovial membrane. Swelling and pain are not very marked. This type may evolve from the untreated acute synovitis type or it may be sub-acute from the commencement due to a mild infection.
- (2) A type in which there is scant effusion of fluid, and the synovial membrane, articular surfaces and periarticular tissues are all thickened and œdematous showing fibroplastic changes with the consequent limitation of movement by adhesions and the wasting of neighbouring muscles.

Diagnosis

If the detection of the Gonococcus in the fluid aspirated from an affected joint had been constant, such as is the case with pneumococcal joints, this method of diagnosis would have been the best. But the gonococcus is only rarely found in the joints, and therefore the important point in the diagnosis of gonococcal arthritis, both acute and chronic, is the finding of the focus of infection. This is a simple matter in acute cases of gonorrhoea, but in the chronic ones it becomes an extremely difficult task.

It needs a specialised investigation to obtain the pathogenic material from the suspected sources and a very elaborate bacteriological technique to interpret the findings. Few seem to realise that this is a step which has to be carried out by an expert.

Coming to the Clinical condition, while a joint which has any of the aspects described above should make us suspicious of its origin, a *painful, persistent joint associated with periarticular changes* should strongly suggest an immediate examination of the genito-urinary tract.

Clinically an acute gonococcal joint is often mistaken for acute rheumatism. There should not be much confusion if one bears in mind that in acute gonococcal arthritis, constitutional upset is slight, as against marked temperature and prostration in acute rheumatism; that subsidence of fever is not accompanied by subsidence of the inflammation of the joints; that response to salicylates is a point in favour of rheumatism; and that involvement of periarticular tissue and especially of the tendon sheaths is a marked feature of a gonococcal joint. Acute tuberculous arthritis is slower in its onset, generally monoarticular, not very painful and X-Rays will reveal a definite lesion of the bone which is not common in gonorrhoea. In other pyogenic arthritis of an acute type such as are originated by typhoid, pneumonia, dysentery, acute tonsillitis etc., the signs of the active diseases are there to help in diagnosis. An X-ray is of little assistance in such cases as both the gonococcal joints as well as the pyogenic affections may give similar pictures.

The sub-acute and chronic cases of gonococcal arthritis are difficult to diagnose clinically from the other various forms of chronic infective arthritis. In a chronic tubercular joint, X-ray appearances may help by pointing out definite osseous changes, but in other cases the radiographic pictures of chronic gonococcal arthritis simulate those of any chronic infective arthritis and do not help very much. Therefore in a persistent condition in which there are periarticular changes, the detection of a gonococcal focus and the reaction to treatment are of considerable assistance in diagnosis.

In chronic cases, while in some instances the joint may be non-gonococcal, although a gonococcal urethritis is found in the patient, in others, a gonococcal joint may persist due to a superimposed infection by some other latent foci in the teeth or tonsils or by tuberculosis. How far also a post-gonococcal urethritis due to secondary organisms is responsible for the persistence of a joint affection is a factor which should not be lost sight of.

Prognosis

Destruction of articular surfaces bringing about marked deformities, intra and periarticular adhesions with consequent ankylosis and wasting of neighbouring muscles are the common results of an untreated joint.

Arthralgias which are probably toxæmias in most cases quickly respond to treatment. Prognosis in acute and sub-acute cases of Synovitis is invariably good. In the acute and sub-acute cases in which there is periarticular involvement *without articular damage* one can hope for a normal joint if treatment is given on proper lines; but if the radiographic picture shows destruction of articular surfaces, loss of function is bound to occur and one must strive to obtain a useful joint by orthopaedic and electro-therapeutic methods. In suppurative joints there is usually considerable loss of function. In chronic joints, prognosis is dependent on the amount of damage to tissues and the deformities which have already set in. Complete recovery of function is seldom possible.

Treatment—If one understands the pathological factors underlying this disease, it will be easy to grasp the rationale of the methods of treatment which may be dealt with under the following four heads:

- (1) Treatment of the general condition.
- (2) Treatment of the focus of infection.
- (3) Local treatment of the infected joint.
- (4) Treatment through the blood.

1. Attention to the general condition of the patient must include rest, mild diaphoretics, diuretics, aperients, tepid spongings, etc., to eliminate toxins. Light diet is imperative. In acute cases, Novalgin or Eucadol will help to relieve pain. In chronic cases, iron is necessary to increase resistance and iodides in any form are useful to bring about absorption of inflammatory bye-products.

2. Treatment of the *original focus* of infection on proper lines is the most important step without which there is hardly any chance of a joint recovering. I need hardly emphasise this point. Suffice it to say that one may even have to resort to Belfield's vasotomy or to vesiculotomy for the eradication of the focus of infection if the infection is traced to the vesicles and if a joint persists more than the time one should expect it to last, and is producing grave constitutional symptoms.

3. Local treatment of the affected joint aims at relieving

pain and bringing about resolution of the swelling. Pain is relieved by resting a joint on the bed in a sling or in half open splints, whatever is suitable or convenient. This is helped by any of the sedative applications of which I prefer a coating of glycerine Belladonna covered up with hot antiphlogistine plaster. In sub-acute cases, rest may not be so necessary and so long as there is pain, the same soothing application may be used. As soon as the pain subsides the joint has to be vascularised in order to obtain absorption of inflammatory products and for this purpose Lees' favourite stimulating ointment has given good results in my cases: 40 grs. of Salicylic Acid in an ounce of Ung. Capsicum. I have also tried Iodex with success. In the declining stage of an acute joint or in chronic cases, the time-honoured Scott's dressing is the most effective application to vascularise and bring about absorption. Bier's passive hyperaemia can be applied in all cases, acute and chronic, and gives excellent results. If properly carried out it will sometimes relieve pain in an acute joint where other means have failed. In chronic cases it is a very rapid method of carrying out the engorgement treatment where heat and drugs would take a long time to succeed. Diathermy is valuable in sub-acute and chronic cases to relieve pain, reduce swelling and to assist in vascularising the part. The advantage of diathermy over other methods of applying heat may be conceded so far only as it produces deep seated heat up to 112° F and that it is as such a more rapid and efficient method of obtaining the effect which can be obtained with antiphlogistine at a slower pace. Beyond that, I do not think any enthusiast's contention that diathermy benefits by killing gonococci directly has been accepted by anyone who has done enough work to give an opinion.

Above all, in all cases, with the exception possibly of pyarthrosis, the initial immobilisation of the joint should only be continued till the acute pain is subsided. As soon as possible, passive and voluntary movements and massage must be instituted. This is the only way of avoiding adhesions and the consequent disabilities.

A case of purulent joint generally needs operation. So also chronic cases need correction of deformities. Beyond these we have no experience of operative measures undertaken of acute, sub-acute or chronic joints. Good results have been obtained by different workers by puncture or incision and lavage, but we are of the opinion that such measures should be reserved for intractable cases or when the general condition of the patient demands such interference and cannot wait for conservative therapy.

Vaccine therapy is the sheet anchor in the complications of gonorrhoea and in arthritis it has the double advantage of acting both on the affected joint as well as on the infected focus. As far as we can gather, no worker has as yet denied the beneficial results of vaccine treatment in this condition. Any reliable vaccine commencing with an initial dose of 5 millions Gonococci and working up cautiously will give satisfactory results; but as a larger dose of antigen produces a better effect provided it does not give undesirable reactions, sensitised and detoxicated vaccines are preferred and have given better results, the former beginning with 100 millions and the latter with 5,000 millions organisms. The intramuscular route is the best but recently Harrison suggests that the intradermal one is worthy of a more extended trial.

During my attendance at St. Thomas Hospital in London a few cases of arthritis were treated along with other manifestations and complications of gonorrhoea by a vaccine which was termed *Ecto-antigen* prepared by Dr. Oliver on the principle elaborated by Dimond at the Royal Herbert Hospital, Woolwich and which gave remarkable results. The vaccine consists of a solution of certain protein metabolic products of a particular strain of gonococcus which in a particular medium extrudes polar bodies. It is injected intradermally as near as possible to the site of infection. This vaccine is not yet in the market but when perfected holds out great hopes for gonorrhoea and its complications. Whatever vaccine is used and whatever way it is given it is important to bear in mind that the role played by secondary organisms at the focus of infection is of considerable importance and better results can be secured by incorporating an auto-vaccine in the selected vaccine or by using a mixed vaccine.

Vaccine therapy is greatly enhanced by giving the patient, in between successive doses of vaccines, a protein shock. A mild shock may be given by the intramuscular injection of 5 c.c., of sterile milk, a stronger one by the intravenous injection of 10 millions of T. A. B. vaccine. They are more useful in chronic cases. "Arthigon" a polyvalent gonococcal vaccine containing urotropine, and "Gono Yatren" a suspension of polyvalent gonococci in 3% Yatren solution are a combination of specific and Non-specific therapy and give good results in acute and sub-acute cases. In cases in which the combination of vaccines with protein shocks is not entirely satisfactory one may switch on to a combination of vaccines with chemo-therapy. Intramuscular injections of sulpharsenol or contramine between successive doses of vaccines help sometimes to clear a resistant

joint while intravenous Iodides given in the same way prove of value in joints with adhesions and changes in the bones.

Review of Treatment

The line of treatment advised in this article is the fruit of many years experience. The same methods were adopted at the Royal Infirmary, Edinburgh by the late Dr. David Lees and are adopted by Col. Harrison at the St. Thomas Hospital, London, with both of whom I worked and at whose Clinic I was able to confirm my notes.

Coyen and Gagey (Bullet Soc. de Therap) claims immediate relief from pain by the application of *radium* to the joint. We have had no experience of this method. No one has yet definitely reported whether radium does anything beyond relieving pain. If the dosage used is just enough to relieve pain, this therapy will only hold the field as a palliative and therefore as an adjuvant to other treatment.

The frequency of infection of the seminal vesicles in cases of arthritis in men has led to the practice of applying antiseptic treatment direct to the infected vesicle through the Vas Deferens in both acute and chronic cases. Belfield suggests vasotomy and subsequent lavage of the vesicles with 20 c.c. of 5 per cent collargol and more recently with a solution of aristol in cod-liver oil (10 c.c. of the former to 30 c.c. of the latter). Kidd advocated vasostomy by temporary fixation of the vas to the skin for about seven days to enable at least three instillations of 10 c.c. of 5% Collosol Silver to be introduced in a period of one week. We do not think that in acute cases of joints any operative interference with the vesicles is needed as has been advocated by American enthusiasts. In sub-acute or chronic cases resistant to all local and focal treatment vasostomy may be tried if the Vas is patent and the vesicles are infected. The success of this operation is bound to be variable if one realises the anatomical difficulties of reaching all the pouches of a vesicle, this being the reason why some workers have reported brilliant results while others have condemned the method as a failure.

The claims of Diathermy to destroy gonococcus in a joint have been dismissed by most authorities. The heat produced by the current at 112°F. does not directly destroy gonococcus in vivo. It is conceded that diathermy applied to the joint will relieve pain, reduce swelling and assist in vascularising the part—an effect which ultimately tends to stimulate cell-metabolism and lower the vitality of the infecting organism. As such, it is a

powerful adjuvant in the treatment of gonococcal arthritis and its value is enhanced if the current is applied both to the joint and to the focus of infection when such focus is in the prostate, vesicle, or cervix. We have adopted this procedure as a routine as advised by Cumberbatch and find that the results are very satisfactory. The application of Diathermy is most effective in sub-acute and chronic cases and is to be advised only in such cases.

In the field of operative treatment of gonococcal joints, aspiration of the affected joint, aspiration followed by irrigation with antiseptics and arthrotomy followed by joint irrigation and drainage have all been advocated and practised. Ballenger (Surg. Gyn. Obst.) reports favourably on 27 cases by aspirating 15 to 20 c.c. of synovial fluid and re-injecting it into the gluteal muscles at two-day intervals. Churchmann (J.A.M.A.) aspirates the joints and washes it out in turn with Saline Solution, Hydrogen Peroxide and Saline Solution again. He then instils a solution of 1 in 1000 gentian Violet into the joint cavity and allows it to act for 5 minutes. This is re-aspirated from the joint and a fresh supply of 1 in 10,000 gentian violet is injected and left in the joint cavity. Klapp advocates periarticular or intra-articular injection of Rivanol 1 in 1000. Surgical intervention in a joint cavity always leaves the possibility of the introduction of sepsis and we think that such an intervention should only be resorted to in cases of definite purulent arthritis if there is indication of constitutional symptoms. In any case it does preclude the necessity of treating the focus of infection.

Anti-gonococcal Serum has been used in the treatment of gonococcal arthritis by various workers many of them considering it of definite therapeutic value. Thomson has extensively reviewed all the contributions on the subject in his book "Gonorrhoea". We have no experience of this therapy.

GRANULOMA GENITO-INGUINALE*

BY

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Definition

Granuloma, Genito-Inguinale is a mildly contagious, chronic and progressive disease characterised by granulomatous ulceration of the inguinal and ano-genital regions, showing no tendency to spontaneous healing.

Synonyms

Refer appendix attached.

Aetiology

It is commonly met with in South India and the disease is endemic in many parts of the world. Affects all races. Common in both sexes though females are largely affected. Males—20 to 40 years. Females—15 to 40 years. Rare in childhood and old age. No seasonal variations, cases being met with throughout the year. Pregnancy aggravates this condition and its termination tends to ameliorate this. Fœtus in utero is unaffected.

Mode of onset

Usually the Granuloma genito-inguinale makes its first appearance as a post operative development after operations for piles, anal fissures, inguinal bubo and after circumcision. It may set in with intolerable itching and leading on to the formation of innumerable ulcers which take on a granulomatous character. It may appear as a nodule (about the size of a pea) which, breaking down, leaves a granulomatous ulcer; or an ulcer on the penis in the male or on the external surfaces of the labia in the female. This last is common and usually met with.

Pathology

Though it is a disease with a predilection for the skin and mucocutaneous junctions, yet, it is not uncommon for the disease to affect the mucous membranes of the fauces, palate, cheeks and the lips of mouth. Though the buccal mucous membrane is affected, the vaginal mucous membrane is unaffected. From its usual site on the penis or labia, being autoinoculable, the disease spreads, and in the perineo-ano-genito inguinal and thigh regions the ulcers are commonly seen. Less frequently, perhaps as a result of sexual malpractices, the ulcers are met with on the buttock, lower abdominal wall and lips of the mouth.

* Specially contributed to the 'Antiseptic'.

The earliest lesion is usually an ulcer on the penis (or on the external surfaces of the labia in the female) or a nodule, which, on breaking down, leaves an ulcer, the surface of which is only superficial, the subcutaneous tissue being seldom involved. The surface of the ulcer is slightly raised and filled with red granulation tissue which being studded with papules and nodules, the surface looks uneven. Though fresh and soft in early cases, in longstanding ones the granulations are hard and indurated. Neither the edges of the ulcer are well cut nor are they undermined or indurated. The ulcer looks dry. Frequently there is a thin discharge. The ulcer spreads in one direction only, the other parts of ulcer presenting the appearance of healing. Slowly the ulcer spreads into an extensive ulcer. The healthy tissue just beyond the spreading edge of the ulcer is thickened and swollen. Most probably this is due to extension of the disease processes within these tissues and consequent infiltration and exudation. Very commonly the adjacent lymph glands are not enlarged. If glands are enlarged, their enlargement may be due to co-existing venereal infection or filariasis.

A Bacillus Donovanii has been discovered in connection with this ulcer. The definite relationship between this organism and the ulcer is yet to be finally established.

The primary ulcer is said to be more infectious than the later enlarged granulomatous ulcer.

From its early situation on the penis or labia the ulcer spreads up to the inguinal regions and then down the thighs.

Transmission

The disease is transmitted from one person to another through the barber's common razor, infected clothes, and through social contact with infected persons. Pediculis pubes is mentioned as a factor. Whether actual sexual intercourse is necessary to get infected with this disease is yet to be proved beyond doubt.

Signs and Symptoms

With the ulcer on the penis, in the early stages, the patient suffers little or no signs or symptoms. In most cases the earliest lesion is unnoticed. When the disease sets in with pruritis of the private parts, the patient feels ill at ease and spends many a sleepless night. Due to scratching the parts with the finger nails, the hairs in these areas fall off, the skin peeling off in thin scales. Thus formed abrasions, by contiguity, continuity and by auto-inoculation give rise to well formed extensive ulcers which take a long time to spread or heal. As regards the cleanliness of the area, the discharge from the ulcer varies in quantity and characteristics: if the parts are clean and dry, there may be a thin discharge without any smell; if the parts are unclean (probably due to secondary infections with pusforming organisms) the discharge is

appreciable (may be abundant) in amount and offensive in its smell. Since it has made its first appearance, the ulcer takes one, two or more years (depending upon the vitality of the patient and cleanliness of the parts) to spread. At this stage, the patient becomes dispirited, anæmic and weak.

Sequelæ

Under proper treatment the ulcer heals leaving a superficial but extensive, depigmented scar, which at first soft and yielding, becomes sclerosed, hard and unyielding. Such extensive scar, contracting, gives rise to deformity which, however superficial the scar may be, is great. In women, deformed, distorted and obstructed genitalia disabling normal sexual intercourse or making it painful, are frequent sequelæ. Menstrual troubles or troubles resulting from retained menses, as a result of the above sequelæ are common. Non-conception as an indirect result thereof is frequent. Absolute sterility is rarely reported. In men, the ulcer developing at the penoscrotal junction, the stem of the penis becomes involved and it cannot be mobilised: the glans only is visible. In both the sexes, the ulcer developing at, about, or around the anus or urinary meatus, as a result of the cicatrization of the ulcer, stricture of the respective parts is common.

Prognosis

Due respect to personal hygiene and cleanliness of the parts, combined with an early diagnosis of the condition, its efficient and proper treatment, gives a speedy relief from the disease. The isolation of the patient will avoid spread of infection.

Treatment

Local.—The ulcers are dressed with half to one per cent tartar emetic solution. The parts must be kept clean. Scars are liable to break down (when soft) and ulcers may reappear. So, cicatricial scars require special plastic methods after complete healing has taken place.

General.—If the patient is weak and anæmic tonics containing iron or arsenic, may be given.

Special.—As against the old fashioned treatment with one per cent, freshly prepared, tartar emetic solution given intravenously, the modern treatment with the standardised, ready made, Bayer's Fouadin given I. M. compares favourably, with good results.

Rajam recommends the following dosages:—

Day of Treatment.	1	2	3	4	5	6	8	10	12	14	16	Eleven Injections.
C. Ca. of Bayer's Fouadin.	1.5	2.0	2.5	3.0	3.5	4.0	4.0	4.5	4.5	5.0	5.0	39.5 C. Ca.

In chronic cases Liq. Hydrarg. Perchlor, M 45 in Mistura Potasi Iodidi Oz. III, may be given depending upon the tolerability of the patient for iodine.

Any co-existing filarial, venereal infection or other disease must be promptly attended to.

Differential Diagnosis must be made from the other ulcerative and granulomatous affections of the genito-inguinal regions.

Appendix

No.	Synonyms.	What they signify.	Objections to their uses.
1	Granuloma Inguinale	That the periano-genito-inguinal regions are the only sites where the ulcer develops	It is not so. The ulcer also affects (though to a small extent) the lips of the mouth, cheek, fauces and palate.
2	Ulcerating granuloma of the pudenda		
3	Groin ulceration		
4	Perianal granulomata		
5	Serpiginous ulcer of the genitals	That the ulcer is met with only in the tropics.	I. The ulcer is endemic in many parts of the world. II. These terms do not distinguish this particular ulcer from the other granulomata met with in the tropics.
6	Granuloma Tropicum		
7	Granuloma Pudendi Tropicum		
8	Tropical Granuloma	These are vague terms	These do not distinguish this particular disease from the other granulomata.
9	Infective granuloma		
10	Ulcerating granuloma	That the ulcer is of venereal origin	More proof is necessary to show the venereal origin of the disease.
11	Granuloma contagiosa		
12	Chronic venereal ulcers	That the ulcer is accompanied by changes in the lymphatics and lymphatic glands	That the ulcer is in most cases unaccompanied by any changes in the lymphatics or lymphatic glands. The slightly enlarged glands present in cases of this disease met with in South India are attributed to the coexisting filarial infection which is very common in the areas where these ulcers are common.
13	Granuloma venereum		
14	Lymphopathis venerea		
15	Lymphogranulomatosis Contagiosa		

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THE MODERN TREATMENT OF BURNS AND SCALDS BY TANNIC ACID*

By

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FOR the treatment of burns and scalds, Tannic Acid is superior to any other substance, known at present, for the following reasons:—

- (1) Dressing of Tannic Acid is painless, so it does not increase the initial shock.
 - (2) It avoids frequent dressings.
 - (3) It prevents toxic absorptions and sepsis.
- The collapse in cases of burns is due partly to the fright and upset of the accident, but much more largely to the absorption of protein bodies from the damaged tissues and the great loss of fluids which occurs from the burnt area; and the Tannic Acid, by completely coagulating all these damaged tissues, prevents these latter causes of collapse: it is obvious, therefore, that the earlier the Tannic Acid is applied, the less the collapse from the burn.
- (4) It restricts granulations and promotes regrowth of the Epidermis
 - (5) The scar left is pliant with comparatively little tendency to contract.
 - (6) It can be conveniently used in private practice or at the patient's home.
 - (7) Mortality with Tannic Acid treatment is lowest being about 4% only.

The first step consists in treating the initial shock and this should be done before any attempt is made to remove the charred clothes or even to examine the burn. For the shock due to fright no drug is better than Opium or its derivative Morphia, and this should be administered early and freely. A valuable method for combating shock is by immersing the patient immediately in a warm bath, kept at an even temperature of about 98° F by the addition of hot water from time to time. When he becomes sufficiently quiet, he should be put in a warm bed. If the pulse

* Specially contributed to the Antiseptic.

is feeble, the foot of the bed is raised by blocks. Should symptoms of shock still persist, these may be counteracted by infusions of normal saline per Rectum, subcutaneously or intravenously according to the condition of the patient. When recovery occurs small quantities of hot water and later hot milk may be given.

Routine Local Treatment

It is essential that the first aid dressing, (which is usually applied by gauze soaked in 2½% aqueous solution of Tannic Acid) should be removed, and the area carefully and thoroughly cleaned before the final Tannic acid spray is employed. This careful cleaning is of utmost importance, because by this alone can subsequent sepsis be avoided. This precaution is more often neglected than observed. The local cleansing is usually done half heartedly and in hurry because the patient complains of severe pain. This half hearted cleansing is useless, because if Tannic Acid solution is sprayed over such an area, a crust will no doubt form, but on the 2nd or 3rd day, it will become soft, margins of the burn will become red and inflamed and sero-pus will be found oozing from the margins, patient will complain of pain and there will be symptoms of Toxæmia as shown by rapid pulse and dried and furred tongue. All this results from a failure in the thoroughness of the preliminary cleaning. This crust will have to be removed, area recleaned thoroughly and Tannic Acid sprayed again in order to get a good result. It is evident, therefore, that the burnt area should be cleaned thoroughly. The cleansing must start with the removal of dead and charred tissues, the excision of all loose skin raised over the blisters and the removal of grease, special attention being given to the edges of the burnt area. The margins and the surroundings should be cleaned thoroughly with Methylated Spirit, then the whole burnt area including the surroundings should be swabbed with Ether. Ether will remove any grease, natural or applied, the removal of which is essential for the formation of a good coagulum. The whole burnt area should be very carefully but gently cleaned. Vigorous cleaning and scrubbing are to be avoided as these do more harm than good. It is obvious that this cleaning cannot be carried out unless the patient is rendered insensible to the pain, which such a cleaning of the damaged area must entail. If the burn is over a large area, general anæsthetic may have to be given, but as this is liable to be followed by Pulmonary complications, safer and less drastic procedure is to give Opium or Morphia. Thus, for an infant of one or 2 months, 3 to 4 minims of Tincture

Camphor Co: may be given, for an infant of 6 to 12 months ½ to 2 minims, for a child of 10 years, 10 minims of Tincture Opil, and in adults a hypodermic injection of ½ grain Morphia may be given prior to this local cleansing.

The part to be treated is so protected as to keep the clothes away from having any contact with it. This can be done by a protective wire cage or a cradle. In infants and very young children if the burn is over a joint of an extremity, the part proximal and distal to the burn should be tied to the side of the cage, cradle or cot with gauze bands so that the newly formed coagulum may not be disturbed by the movement of the infant. Where electricity is available one or two electric bulbs should be suspended from the top of the cradle. These will keep the bed warm and assist in drying up the sprayed solution. When the patient is in position, the burnt area is sprayed from an Atomizer with a solution of Tannic Acid (2½% in warm sterile water). It is an advantage to add Acriflavine, 1 in 1000 solution, to the Tannic Acid in order to control sepsis. This solution should be freshly prepared for each application; for if allowed to stand for any length of time, it becomes converted into Gallic Acid. The spraying is repeated at intervals of ½ to 1 hour, until the burnt area is covered by a layer of brownish coagulated tissue which is leathery in consistence and insensitive and completely seals the burnt area. To produce this coagulum may necessitate 15 to 20 sprayings. The Tannic Acid solution has no effect on healthy skin and can be sprayed on freely; but as it is harmful and irritating to mucous membranes when the face is burnt, the eyes, nose and mouth must be protected by pads of moist cotton wool during the spraying, or in burns in this region an ointment of Tannic Acid may be used instead of the watery solution. It is very essential to give plenty of fluids orally, per rectum, subcutaneously or even intravenously to prevent concentration of blood. Once the coagulum has formed, it should be left alone until it separates naturally and it should on no account be covered by any form of dressing as it tends to soften, becomes septic and detached. If, however, sepsis does supervene during the course of treatment, as indicated by rapid pulse, dried and furred tongue, pain, inflamed and red margins, escape of pus from the edges of coagulum, it is an indication that the coagulum should be removed, area recleaned thoroughly and spraying again repeated. If a serous or seropurulent discharge is found at the edges of the coagulum or beneath it, with no signs of inflammation at the margins, the discharge should be very gently wiped away with dry sterile gauze, or, if

beneath the coagulum, evacuated by snipping the latter with scissors and the part dusted with sterile powder. The pus should on no account be wiped away with lotions, nor should wet dressings be applied, as they promote toxic absorption. It may be found that a clean ulcerated surface with moist granulations remains on the separation of the coagulum which usually separates from 14th to 20th day. If the ulcer is small it is treated with ointment of Tannic Acid daily or on alternate days. It will no doubt heal by this method but as repeated applications of ointment are necessary it is better to dust the ulcer repeatedly with a sterile powder such as Stearate of Zinc. This forms an adherent cake and is allowed to remain until healing takes place when it crumbles away. As an alternative the ulcer may be dressed with the following lotion, purified Alum, gr. 20, Zinc Sulph, gr. 10, Glycerine, 7 floz, water, to 1 pint. If, however, the ulcer is extensive, it should be treated by subsequent autogenous skin grafting.

When both the back and front of the body are burnt, the part most extensively involved is treated by Tannic Acid spray while the part on which the patient lies may have to be dealt with Tannic Acid compress of three layers of lint thoroughly soaked in warm Tannic Acid Solution 2½%. The dressing should not be wrung out. Light bandage is applied directly to the outer side of this compress. These compresses are removed in from 12 to 24 hours after moistening them with warm Tannic Acid solution, and are only reapplied should a satisfactory coagulum not had formed. The above method should be the method of choice in all kinds of burns, as it invariably gives satisfactory results.

Instead of the standardized 2½% solution of Tannic Acid which is usually used as a routine treatment, 5 to 10% solution has been recommended and closed methods have been advocated. I have found that 10% solution certainly does irritate the skin and in one of my cases it did further damage; and 5% solution has no distinct advantages over the usual 2½% solution. 5% solution, however, is better for first aid use.

J. H. Hunt, and P. G. Scott, believe that 5% Tannic Acid solution is the best. A soft camel hair brush is preferred to a spray. If blood or serous exudation is free and a spray is used, it is the surface of the blood or serum which is coagulated and fluid collects beneath. Such exudates are wiped away with a brush, allowing the Tannic Acid direct access to the surface of the burn. The method of these writers is to paint the burned area with a 5% solution of Tannic Acid in water, and apply a dressing soaked

in the same solution. No anaesthesia is required. Next day when the dressing is removed, the burn will be found covered with a thin brown crust; and the dressing is repeated. On the 3rd and 4th day, this crust is reinforced with Collodion. This strengthening with Collodion is most essential at the edges of the crust where it is in contact with the skin and its organisms; because here it is that separation first occurs from the friction of the dressings and organisms first gain a hold. After strengthening with Collodion, the surface of the crust remains hard and dry and the crust separates towards the end of the 2nd week exposing the new epithelium which has grown beneath it. For the first aid treatment of all burns and scalds, these writers advocate the use of dressings soaked in a 5% solution of Tannic Acid in water.

P. H. Mitchiner recommends a 2% solution of Tannic Acid in 1 in 2000 Perchloride of mercury. The Perchloride solution is used because it is a precipitant of proteins. His technique is as follows:—A compress consisting of either 6 layers of sterile gauze or 3 layers of lint should be thoroughly soaked in the solution of 2% Tannic Acid and 1 in 2000 Perchloride of mercury and applied closely and evenly over the entire burnt area without wringing the dressing out. It is then bandaged in position, the bandage being applied directly to the outside of the compress. The whole of the outside of the bandage is sprayed over with the solution to ensure that the dressing is thoroughly wet. Such a dressing can be left in position untouched for a fortnight in the case of small burns and three weeks where large areas are involved. When the dressing is removed the scab will usually separate completely from the burnt area.

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BETEL CHEWING IN RELATION TO ORAL SEPSIS AND CARCINOMA*

BY

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THIS article gives briefly some observations made on patients who were treated for diseases of the mouth at the Dental Institute, Colombo, during 1925—1934. The total number of patients observed for this period is approximately 100,000. Diseases of the mouth, from dental caries to cancer of the cheek were admitted for treatment. Records are being kept on the incidence of betel chewing and its relation to diseases of the mouth.

Betel chewing is a habit prevailing at least among 90% of the population of India and Ceylon. The essential ingredients are PIPER BETEL (Sanskrit—Tambulam, Tamil—Vettilai), ARECA CATECHU (Sanskrit—Guvaka, Puga, Tamil—Paaku), and LIME (Sanskrit—Sankka Bhashma, Tamil—Sunnambu). The dried leaf of the TOBACCO plant is used in addition by a majority of the betel chewers. Varying quantities of spices and flavouring agents are added and their nature and quantity depend on the locality and the tastes of the people. A Sanskrit 'sloka' attributes the following qualities to *Piper Betel*:

"Is pungent, bitter, spicy, sweet, alkaline, astringent, a carminative, a destroyer of phlegm, a vermifuge, a sweetener of breath, an ornament of the mouth, and a kindler of the flame of love."

The chief consumption of *Areca Catechu* is as a masticatory either in itself or in combination with betel. It is both astringent and diuretic. The unripe fruits when not dry in their interior have intoxicating properties, and produce a mild headache and giddiness in some. The *Lime* is added in small quantities to stimulate salivary secretions, and stain the mouth red. This red stain is considered to give, especially in females, a sense of beauty. The leaf of the *Tobacco* is added to produce an exhilarating effect owing to its nicotine; and spices as cardamoms are added to produce a pleasant odour.

The habit of chewing betel can be compared to the chewing of gum by a section of the population of the United States of America. The investigations conducted at the Dental Institute revealed the following statistics. 90 % of the patients chew betel and do not object to chewing it. About 50 % chew on an

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average of four times a day. About 25 % on an average of seven times a day: about 10 % chew betel continuously and they are unable to concentrate on their work unless betel, arecanut, and lime are present in the mouth. About 3 % are unable to sleep at night unless a quantity of betel, arecanut, lime and tobacco are chewed well and the mixture is retained in the mouth during sleep. More than 25 % of the patients have developed a craving for the leaf, and unless they chew betel, they are unable to attend to their ordinary work. About 5 % would forego their food rather than betel and I have observed several cases where the individuals lived for 3 days without any food except betel, arecanut, lime and tobacco, with water to drink at intervals. Two patients, who were admitted to the ward for treatment of carcinoma of the cheek, became restless and threatening to the ward attendants because betel was withheld from them during their stay.

The literature available on the diseases produced by betel chewing is scanty. It is not treated in books written by European writers and the Indian Medical profession have not given sufficient study to this subject. It might be said that excessive betel chewing produces diseases in man, as excessive use of alcohol or opium; whilst the problem of alcoholism or opium is extensively studied and recorded, the incidence of diseases as a direct result of betel chewing is not given a serious study.

I propose to divide the effect of betel chewing into 2 stages:—

- (1) *Betel chewing* is indulged by individuals occasionally; In these cases apart from a transitory staining of the lips and tongue, no marked beneficial or evil results are observed.
- (2) When betel-chewing becomes a regular habit—The habit is acquired owing to the following effects:—
 - (a) As an invigorating effect on the general system, especially when the tobacco-content is increased.
 - (b) As an aid to digestion—mainly due to excessive salivary secretion produced by the lime—especially when the lime-content is increased.
 - (c) As an aphrodisiac mainly in females between 30—50. The proportion of areca-catechu is greater to produce this effect and half dried nuts are preferred to the fully dried ones.

The effects of betel chewing on:—

- (1) *Teeth*—The teeth are stained deep red, and the deposits are found to contain lime, nicotine and

organic matter from the Piper Betel and Areca Catechu. This deposit can be scraped off with difficulty and histologically there is no evidence that the enamel spindles and dentinal tubules are stained. The stain is mainly superficial but if the Nasmyth's membrane is present, it is usually found to be stained especially over the mandible molars. Attrition of the enamel and the exposure of the dentine are usually noticed in inveterate betel chewers. This attrition produces a sharp edge in the teeth especially in the Maxillary and Mandibular regions. This in turn irritates the mucous membrane of the tongue and cheek.

- (2) *Gingival Margin*.—It is definitely inflamed in excessive betel chewing. The term excessive chewing is applied to those cases where more than five chews are indulged in or when an excessive quantity of lime and tobacco are necessary to produce the required effect in the individual. The gingival trough contains a sediment of lime and nicotine and in mouths which have a tendency to collect tartar, excessive betel chewing accelerates tartar deposition.
- (3) *Oral Mucous Membrane*.—It is definitely thickened in excessive betel chewing. The mucous glands are hypertrophied in the early stages and sclerosed in the later stages. Leukoplakia of the cheek is not a common condition associated with betel chewing.
- (4) *Tongue* is fissured and inflamed with excessive betel chewing. The circumvallate papillae are prominent in patients who chew betel moderately. There is a tendency for these papillae to atrophy in the later stages when a chronic hypertrophic condition of the oral mucous membrane and tongue is produced. The effect on the oral tissues and the general system by excessive betel chewing is noticed after several years of continued habit. A period of fifteen to twenty years is required to produce marked pathological changes in the tissues. The effect on the general system is secondary to the chronic infection of the tissues produced by persistent irritation by the constituents of the betel chew. Dyspepsia and arthritis of the joints of the hands and knees are the commonest

symptoms. *The incidence of carcinoma amongst the betel chewing population is well marked.* In 94 % of the cases of carcinoma of the cheek, tongue and lip, a history of *excessive* betel chewing was obtained. In 90 % the site was the lower mandible region and the adjoining cheek. 8 % in the tongue and 1 % in the lip.

Racial Incidence.—Carcinoma is greater amongst the races inhabiting the west coast of India—the Malayalees. Sinhalese come second, and Tamils third. *Sex.*—Greater incidence in males—more than 70 % in males and less than 30 % in females. *Age Group.*—Commonest age between 35—55. Only one case was observed during this period, under observation of a malignant growth in an edentulous mouth: The presence of ragged teeth which are caused by continual chewing of betel is a favourable factor for the production of carcinoma of the mouth. The ragged teeth maintain a continual irritation of the adjacent cheek. The teeth of patients suffering from carcinoma of the mouth are brittle and tend to fracture easily during extraction. The bone is more dense than normal in a cancerous patient.

General Lines of Treatment :—

1. Health talks and persistent newspaper articles, in the different languages in India and Ceylon should draw the attention of the public to the evils of *excessive betel chewing*. Excessive betel chewing should be condemned in a similar manner as excessive drinking of alcohol.

2. Dental surgeons should search for ragged teeth and watch early stages of chronic inflammation of the oral mucous membrane especially in the molar region. The ragged teeth should be extracted and the patients warned against excessive chewing.

3. The sign of pain in the ear should be carefully watched and in the earliest stages radium and operative treatment is the only cure.—Later stages—with enlargements of the glands—operative treatment, radium and diathermy may or may not cure the disease. The average duration of the disease is 2 years. Septic pneumonia usually precipitates death.

THE TECHNIC AND THE CLINICAL SIGNIFICANCE OF THE RABBIT TEST*

BY

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Hansraj Praggi Thackersey Prince of Wales Fellow, of the University of Bombay for 1934.

SINCE the important discovery by Zondek and Aschheim of the presence in the urine of pregnant women of an "anterior pituitary like hormone" producing changes akin to maturity in the ovaries of immature mice, a large number of workers have tried this original test and its many modifications for the detection of chorionic tissue in the body and but for a few exceptions have had very encouraging results in the use of most of these tests for diagnostic purposes.

These tests may be divided into two main groups:—

- (1) Those which depend on the induction of maturity in the gonads of female or male animals or on the indirect changes produced in the tubular genital tract through the circulation of the hormones of the stimulated gonads and
- (2) Those which utilize the peculiar nature of the female sex cycle in an animal which ovulates only after coitus. The most suitable among these animals (Rabbit, Cat and Ferret) being the rabbit.

It is not the purpose of this paper to discuss the rationale of the biological tests and the nature of the substance producing these biological reactions. Suffice it to mention, here, that whether the substance causing the changes is produced in the chorionic tissue or not, it has some close relation to the presence in the body of active chorionic tissue in contact with the blood stream and its amount varies directly with the proliferative activity of the same.

With this brief introduction I may now directly proceed to describe the technic of the Rabbit Test as practiced by me.

The sample of urine

The first specimen passed by the patient on waking up in the morning is best for all purposes and is particularly asked for by me in quantitative estimations. It should be collected (catheter specimen is not necessary) in a clean dry vessel and stored as soon as possible in an ice chest. As I have only worked with

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local specimens I have not asked for any preservative to be added but tricresol one drop for every 25 to 30 c.c., is advised. Formalin destroys the hormone, strong solutions of alcohol precipitate it. Perfume bottles and bottles of hair oil are not suitable for collecting the specimen and it is best that the patient avoids taking drugs like quinine for at least 24 hours before collecting the specimen of urine.

It is best to ask for a fresh sample of urine in case a particular specimen proves toxic. Part of this second fresh specimen may be shaken up with an equal quantity of aether and separated by the centrifuge and evaporation. All workers are not agreed as to the 100% security from toxicity by this treatment as claimed by Zondek.

The specimen is warmed up just before injection. In this country gently rolling the test tube between the palms of the hands is sufficient but if the urine is warmed up in a water bath it should be remembered that the hormone is destroyed on heating at 60°C or by prolonged heating at 45°C.

If there is a precipitate it usually disappears whilst warming the urine. If the urine does not become clear it is usually easy to take up the supernatant fluid from the test tube into the syringe.

Choice of the Animals

In this country I find animals 3 months or older and 1100 grams or more in weight are mature enough to respond to the injection of the urine of a definitely pregnant woman. If the animals are being used repeatedly, they may be conveniently used at intervals of 3 to 4 weeks. It is always a wiser plan specially for a beginner when in hurry, not to use an animal which has been used before, more so, if there was a good amount of hæmorrhage in the follicles at the last laparotomy or there were adhesions near the ovary.

The Injections

The urine specimen is gently warmed and injected into the marginal ear vein of the rabbit. Application of rectified spirit to the ear is enough to make the veins prominent in most cases. If this is not successful, Xylol may make the veins very prominent. A thin bore needle not only enables an easier puncture without transfixing the vein but also averts the danger of a rapid injection of the urine.

4 injections of 6 c.c., or 6 injections of 4 c.c., with not less than two hours interval between the two injections is a convenient general routine procedure.

Time of Reading the Result

48 hours after the 1st injection (not before), the animal is opened up under aether anaesthesia by a median abdominal incision of about 2 inches with its lowest point about 2 inches above the symphysis. The details of the technic will be found in a previous contribution.⁽¹⁾

In case of haste two animals may be used and one opened up within 18 to 30 hours as necessary and if this be negative the final result confirmed by opening the other animal at 48 hours.

The Criterion of a Positive Reaction

The occurrence of fresh hæmorrhage or ovulation is taken as a criterion of a positive test. The ovaries of the mature rabbit show on their yellowish surface many transparent graafian follicles of various sizes. In the isolated animal these do not show any hæmorrhage, nor do they rupture spontaneously. During the process of follicular atresia, however, a small amount of hæmorrhage may occur at times and this may misguide a person not well acquainted with the appearance of the rabbit ovaries.

If the animal is being used repeatedly, hæmorrhage which has occurred at a previous ovarian stimulation may sometimes produce a misleading picture at the next laparotomy. I have known hæmorrhage occur on some occasions even after 48 hours after the 1st injection (when I usually examine the ovaries); thus hæmorrhage may be seen at a subsequent laparotomy in a situation where there was none at the time when the ovaries were examined previously.

The hæmorrhage of follicular atresia shows a peculiar pinkish colour in a small follicle not protruding over the surface.

The hæmorrhage of a previous stimulation shows as a small dark black spot.

Fresh hæmorrhage shows as a rule a characteristic large, prominently projecting, purplish, glistening follicle.

However on some rare occasions on seeing a medium sized follicle with some hæmorrhage into it one has to rely only on its appearance to decide whether the hæmorrhage is fresh or old and if there be no other evidence of fresh stimulation it becomes very difficult to decide the time when the hæmorrhage has occurred. Such an appearance by itself, however, is only likely to be produced so far as my experience goes with a very small quantity of hormone and in the usual qualitative test there is bound to be seen other evidence distinctly pointing to a fresh stimulation.

A freshly ruptured follicle shows as an umbilication on the top of a conical follicle from which at a laparotomy a certain

amount of blood is always seen exuding. Fresh rupture may be seen over a hæmorrhagic follicle or a follicle which does not show hæmorrhage. It is the most reliable evidence of a fresh ovarian stimulation.

I have often seen marked enlargement and protrusion of the follicles without hæmorrhage when a small amount of hormone is injected and specially when such a follicle shows a leash of blood vessels running over it or when there is a central vesicular elevation as seen with a hand lens the possibility of a small quantity of the hormone in the sample injected is very high.

It is important to bear in mind that a yellow, vascular corpus luteum as observed by the naked eye is never seen within 48 hours when the animals are usually operated. If seen they only indicate a possibility of the animal not being isolated well. In any case it does not indicate a fresh stimulation, far from suggesting the presence of a large amount of hormone, as may be mistaken, if the fact that luteinisation (as seen by the naked eye) cannot occur so soon, is not borne in mind.

The Significance of the Biological Tests of Pregnancy

These tests are utilized for the differential diagnosis of:—

- (1) A normal uterine gestation.
- (2) An extrauterine gestation; and
- (3) For the detection of the presence in the body of abnormally proliferative chorionic tissue as in a vesicular mole or chorionepithelioma.

1. In normal pregnancy the biological tests become positive usually in the 1st week after the missing of the period. They may be positive earlier but on the other hand they are not positive in some cases at such an early stage and become positive later. They become negative within a week after delivery. If by some abnormal process the chorionic tissue is destroyed to a sufficient extent the biological tests become negative.

In the diagnosis of a uterine gestation therefore the biological tests could be utilized in 3 types of cases.

A. The diagnosis of an early pregnancy for the purposes of a therapeutic abortion or for social purposes when a young maiden wants to hasten her marriage to avoid society gossip or when a young woman for other social reasons such as an intended voyage or so wants to know whether she is pregnant at a stage when a physical examination cannot decide the point.

I must here point out the importance of a physical examination to avoid the possibility of missing an ectopic gestation

which though comparatively rare is so very dangerous. It is also important to bear in mind the possibility of our skill being ill utilized for the purposes of a criminal abortion.

B. *The diagnosis of a pregnancy from other uterine or non-uterine tumours* clinically not distinguishable from a pregnant uterus, the best examples being a degenerating fibroid causing a cystic and uniform enlargement of the uterus. In these cases it is an unfortunate fact that on account of the comparative opacity of the liquor amnii the radiologist may fail to help us just when it becomes difficult to feel the foetal parts or hear the foetal heart.

C. *The Diagnosis of destruction of chorionic tissue and necessarily foetal death.*

In about 2% of cases of normal pregnancy the biological tests are negative in spite of a continuing gestation. Personally I have only had two specimens which during my quantitative estimations showed absence of the hormone in the smaller amounts and proved toxic in somewhat larger amounts (5—10 c.c.).

In all cases one has to remember when dealing with a possibly pregnant uterus, that the biological test may be negative if the chorionic tissue is considerably destroyed. Even when part of the chorionic tissue is destroyed the test does not become negative at once, specially when we inject a large quantity of urine. It takes a pretty long time specially in advanced gestation for the test to become negative after foetal death.

Thus one has to be careful in pronouncing on the one hand that the foetus is alive because the test is positive or on the other that the foetus is dead because the test is negative. A drop in the quantity of hormone excreted or a positive reaction later becoming negative may help us here more.

2. In the diagnosis of an *ectopic gestation* it is important to bear in mind that a negative test does not exclude an ectopic gestation as destruction of the chorionic tissue may produce a negative test. However the patient's life is not out of danger necessarily.

It is very important that the clinician should send the specimen of urine as soon as he suspects an extrauterine gestation in a case under him. In case of haste two animals may be used as suggested above.

I have seen two cases of infected abortion clinically resembling ectopic gestation in many respects in which the rabbit test was positive and would therefore request the clinician to bear this in mind. The Rabbit test has proved very useful to us in the

differential diagnosis of ovarian enlargements with amenorrhoea and of inflammatory swellings in the pelvis from an extrauterine gestation.

3. The rabbit test has been utilized in many cases by me to distinguish the degree of proliferative activity of the chorionic tissue.

This question arises clinically when the diagnosis of a vesicular mole from a normal gestation or of an incomplete abortion from a chorionepithelioma arises. I have found, however, that at about 1½ to 2½ months the hormone excretion with a normal uterine gestation is also high and thus it is only possible to be sure between a normal gestation and a vesicular mole after 2½ months. (See Author's cases 1 and 2 in the Antiseptic of January 1935. Case 2 delivered a healthy child on 25th December 1935).

The biological tests are also useful for the follow up of a patient from whom abnormally proliferative chorionic tissue is removed or expelled as in a case of vesicular mole or chorionepithelioma (after expulsion or removal).

Here again, I must emphasize the importance of a quantitative estimation, which alone allows us to be sure of the prospects of the case in a short time, for the test may remain positive with larger quantities for months without any metastasis. A single quantitative estimation by showing a low hormone content may guide us as to the improbability of a metastatic growth left behind.

In this brief account I have only tried to arouse the practitioner's interest in what is now becoming a most important laboratory test leaving out details for more critical and technical papers.⁽²⁾

I might only mention in conclusion that this is a reaction which requires not only a good knowledge of technic but a sufficient knowledge of general Obstetrics and Gynaecology with special reference to the female sex hormones to successfully interpret it for then alone could be avoided a good amount of unnecessary blame on this valuable method which deserves to be treated as a servant of humanity to be used only in need and to improve clinical acumen and not to replace it.

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1. S. B. Anklesaria *Rabbit Ovulation Test*: *Journal of the University of Bombay*, March, 1933.
2. A book on this subject by the author will be published in a few months.

Cases and Comments

LOCKED TWINS IN AN ESTATE LABOURER

BY

H. C. P. GUNewardENE, L.M. & S., (Cey), L.R.C.P. (Lond.), M.R.C.S., (Eng.),
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TWIN pregnancy though not an uncommon condition, locking of the twins during delivery is admittedly very rare⁽¹⁾. Comyns Berkeley⁽²⁾. (1931) points out that this condition receives more than its due attention in the text books, while the condition has never occurred in the practice of Queen Charlotte's Hospital. It is also known that many eminent obstetricians have gone through their whole career without coming across a case. The rarity of the condition is ascribed to the fact that twin foetuses are usually under-developed.

Leonhardt's analysis of 1849 cases of Twin pregnancy recorded by Williams⁽⁴⁾ (1931) shows that in nearly 40 % of twin pregnancies both foetuses present by the Vertex and in only 15 % is the first delivered by the Breech and the second by the Vertex. Therefore it is more likely that when locking does occur the impact is of two presenting heads. The locking of the after-coming head of the second foetus is thus a greater rarity.

A call to attend a difficult labour in a woman labourer was received on the 30th March last at 7.30 a.m. at the Watawala Hospital. The estate lines in which the woman lived were 8 miles away from the Hospital. I reached her at 8 a.m., and was given the following history. This was her first pregnancy and had apparently been in the best of health throughout. Labour pains had started the previous evening and during the night a foetus was partially delivered by the breech—the limbs and the body were out of the vulva. She had strong pains every few minutes for the last six hours but no progress was made. The Estate Midwife had attempted to deliver the aftercoming head without success. The woman looked healthy but worried and excited. The pulse rate was 80 with good volume and tension. The pains used to come on every three or four minutes, last for about a minute and leave the patient tired. The woman lay on a single dirty cloth spread on a dirtier cowdung covered floor.

The uterus was rather large and doughy. On internal examination, a hard mass was felt posterior to the neck of the half delivered foetus. This mass was felt through a soft covering.

Further examination revealed that it was another head with the cervix stretched over it. More detailed abdominal examination showed a suspicion of foetal parts. No foetal heart sounds were heard. A diagnosis of impacted twins was made. The problem that presented itself then was her treatment.

Jellett's⁽⁵⁾ (1929) advice to attempt to extract the second foetus past the body of the first—when the foetuses are small—could not be used as the foetuses were fully developed weighing 6½ lbs. each. The course to follow was to decapitate the first foetus and push back the head, to allow extraction of the second foetus followed by the head of the decapitated foetus. To attempt the operation on the floor of this room with a small electric torch as the only source of light might have meant disaster to the woman in one of many obvious ways. The delay entailed in removing the patient to the hospital with the attendant jolting in a tea estate lorry would certainly tax the woman's remaining vitality a great deal. Had the uterus become atonic as a consequence there was grave risk of post-partum haemorrhage. The latter course, however, was decided on. She was given a quarter of a grain of Morphine Hydrochloride hypodermically, the foetus was bandaged to the thigh and she was put into the lorry at 10 a.m.

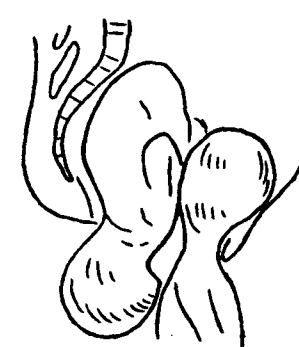


Diagram showing the body of the first foetus and the head of the second out of the vulva.

On arrival at the Hospital she was taken on a wheeled stretcher to the ante-room of the operating theatre, cleaned and taken on to the table. It was now found that the head of the second foetus had descended through the cervix and was out of the vulva. In fact the problem had solved itself. Examination of the head of the second foetus showed that it was dead. Apparently the easier course was to decapitate the head of the second foetus after tying one of its arms, which lay near, and push the body in to allow the delivery of the first foetus. The decapitated body

was then easily delivered by pulling on the arm. During this procedure no more than half a drachm of Chloroform was used by the open method. Five minutes later the placenta and membranes were cast entire. There was no P. P. H.

Examination of the placenta and membranes showed that the cords arose close to one another from the middle of a large placenta. Both foetuses lay in the same amniotic sac, not even the vestiges of a partition showing. Both foetuses were females.

Her convalescence was uneventful. The uterus was tender and on the fourth and fifth days she had an evening temperature of 101° F. In ten days she was able to leave the Hospital. 20 c.c. of anti-streptococcal serum was given subcutaneously on the first day after the operation. Warm vaginal lysol douches were given twice daily for six days.

A doubt still remains in my mind whether the second foetus could have been saved had the first child been decapitated and the delivery completed in the Lines.

Points of Interest

1. A case of Uniovular Twin pregnancy in which the progress of the birth of two well developed foetuses became obstructed by the locking of the aftercoming head of the first foetus with the forecoming head of the second is recorded.

2. The foetuses were in one amniotic sac.

3. The enormous distension of a primi-parus birth canal without injury and the absence of any immediate after-effects in the mother are worthy of note.

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AN INTERESTING CASE OF HAEMATOCOLPOS

BY

C. M. CHANDWANI, M.B., B.S.,

Assistant Surgeon, N. W. R. Bhatinda.

I was called in to see a girl aged 14 years having retention of urine and a bulging behind the labia. The girl was in distress, hence the consultation.

History.—She was married about 4 years back, but had come to reside with her husband only 5 months back. She did not know what menstrual periods were. She noticed a small swelling about 4 months back but did not pay attention as it neither caused pain nor discomfort. It went on increasing in size after some time, till 3 days ago, she found it of sufficient

size to cause sudden stoppage of urine and constipation. Her general condition was good. She had neither fever nor any constitutional disturbance excepting fast pulse and tension due to distended bladder with its concomitant uneasiness.

Signs.—Although the bladder was evacuated by female catheter, the swelling though smaller still persisted. It was soft and fluctuating, but without any signs of inflammation. There was neither any vaginal opening nor even dimpling. The interlabial space was covered with tough tissue. The vulva had a peculiar appearance.

Operation.—After preliminary preparation and enema, she was put on the table and general anaesthesia administered. A slit was made at the posterior commissure and the opening deepened slowly and cautiously, guiding the index finger of the left hand along with it. This finger was introduced to feel catheter point left in the bladder and to discover Vesico-Vaginal Fistula if any. Hardly had the opening been deepened to 1½ inches when suddenly a gush of dark-brown thick fluid burst like a spring. It kept on flowing as long as the finger was there, but as soon as it was released flow stopped due to intervention of lax areolar tissue.

As the slit was further widened and deepened, more and more fluid rushed out and the quantity, though not measured, would roughly be about 40 ounces. All this time the left index finger was feeling the catheter which was being moved inside the bladder, but no tear was discovered. The fluid did not coagulate either on the table or in the receptacle.

All of a sudden, I noticed that the girl stopped breathing and the pulse grew feeble. Anaesthesia was at once withheld and the operation stopped. Artificial respiration was started and heart region vigorously massaged. The wound was hurriedly packed with gauze, leaving a rubber tube in, and a T-shaped bandage applied.

After about ten minutes of artificial respiration and massage of Cardiac region, slight respiratory movement was noticed. It grew more distinct and the pulse also gained in strength. She was immediately transferred to a bed kept ready and she regained consciousness after one hour and a half. The oozing of fluid continued for 4 days more after which there was no staining of the bandage or dressings. She did not allow the tube to be kept longer as she thought she was completely cured. Next day both husband and wife left for their home quite pleased and satisfied.

Conclusions:—

1. Obviously this is a case of Haematocolpos.
2. First menstruation started 4 months back when she noticed a small swelling.

3. At each succeeding period, the swelling increased till the last one which was so big as to obstruct the neck of the bladder and thus cause retention of urine, constipation and the allied ill-effects.

4. The fluid did not coagulate—chief characteristic of the menstrual fluid.

5. There were no constitutional disturbances of grave nature.

6. This condition might recur as there was nothing to maintain the patency of the vaginal valley produced artificially.

My thanks are due to Dr. C. Cairns, O.B.E. Chief Medical and Health Officer N. W. R. Lahore and Dr. B. L. Chopra, L.R.C.P., M.R.C.S., Divisional Medical Officer, N. W. R. Delhi who have very kindly permitted me to get this article published in the columns of "The Antiseptic".

A CASE OF ATEBRIN TOLERANCE

BY

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Darjeeling Himalayan Ry. Hospital, Siliguri, Darjeeling.

IN July 1934, Mr. X., a gentleman *æt.* 38 sought my advice regarding his treatment of chronic malaria, from which he had been long suffering. I learnt he had taken quinine on many occasions prescribed by different doctors without any lasting cure (which is practically impossible at Siliguri,—a hyper-endemic sub-Himalayan malarious region, where re-infection is a daily occurrence) and was getting fever off and on. However, I advised him to try a bottle of Atebrin, one tablet thrice daily after meals.

19 days after I first saw him, I met him again in the street. I enquired if he was getting fever till then. He was very cheerful and told me that he did not get fever even for a single day after I advised him the excellent tablets and he was still continuing the same without break. I was much surprised to hear this and explained to him that I had advised him to take only one bottle, which is sufficient for a cure and he ought to have stopped it long ago. However, I took him to my dispensary, thoroughly examined him but could not find anything abnormal. I told him to stop the medicine and not to take it again without consulting me.

The points to note:—Continuation of Atebrin for 19 days without any toxic effect: even his conjunctivæ were not coloured yellow, which is not even claimed by its manufacturers.

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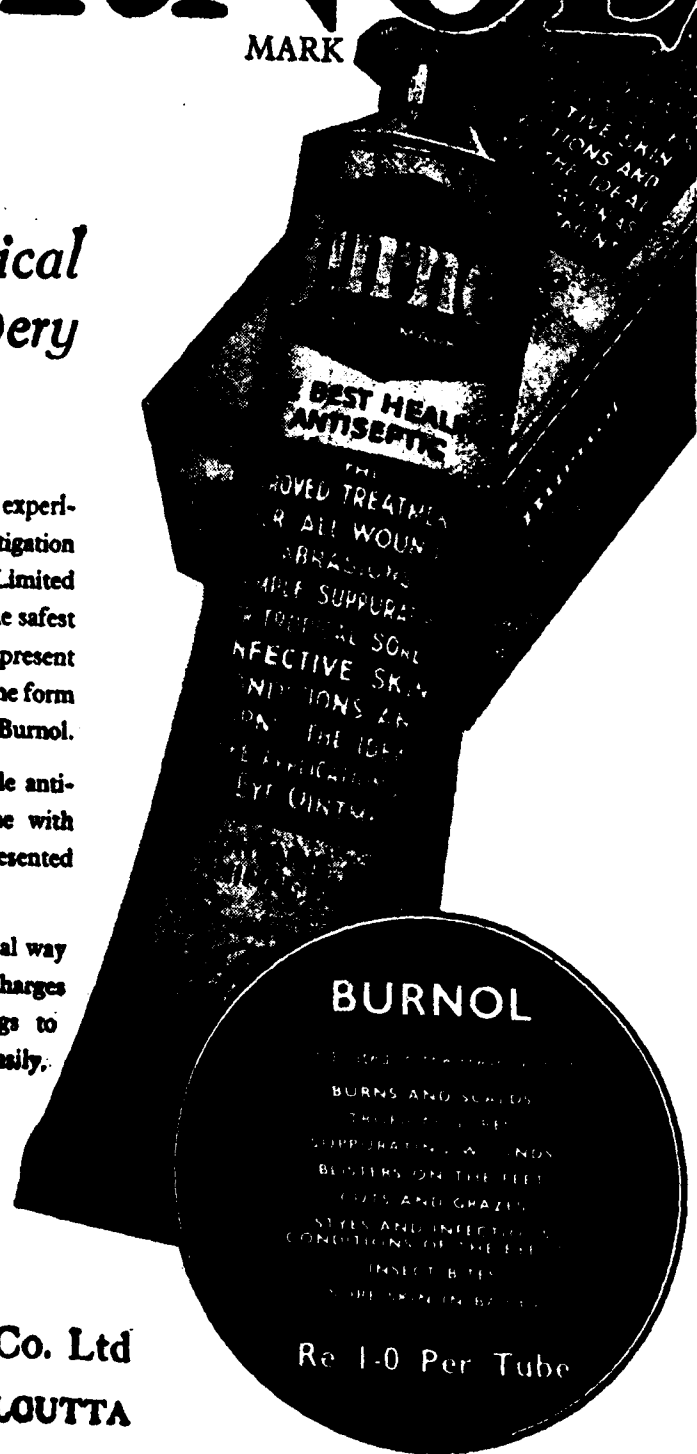
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Editorial

THE MADRAS MEDICAL COLLEGE CENTENARY

THE Madras Medical College, which is the second oldest institution in the British Empire, Calcutta being the first, will be completing 100 years in a few months and it is proposed to celebrate its Centenary then, on a grand scale. Calcutta had celebrated the Centenary of its Medical College last year in a fitting manner and Madras must not lag behind in men, money or material to make the Centenary of its Medical College, a signal success. From a humble beginning as a medical School, training only Hospital Assistants or Dressers as they were originally styled, and Civil Apothecaries, it rose to the position of a College, now imparting instruction even to those candidates aspiring for the highest medical degree of the Madras University. Its Alumni who can be counted by thousands, have served and are still serving suffering humanity, not only in India but also in Burma, Ceylon, Malaya, East Africa, South Africa, Palestine and other places. Not a few have distinguished themselves in public service and in the field of medical research. The Madras Medical College is also noted as being the first institution in India to admit lady students within its portals. It, therefore, behoves the products of the Medical College, men and women, now practising and the general public whom they are serving, to join hands and commemorate this unique event in a manner worthy of its tradition. The invitation by the Committee appointed to concert measures for the celebration of the Centenary, to the public to participate in the celebration was conceived in the right spirit and we trust the medical profession and the general public will contribute

liberally to the funds that are being raised for the purpose. Any donations or contributions from our readers may be remitted to us and we will gladly undertake to acknowledge the same individually in our 'Antiseptic' and transmit the amount collected to the proper quarters. This arrangement, we are sure, will save their time and trouble.

In this connection, our readers may be anxious to know what form the Centenary memorial will take. Many have been the suggestions made but only four appear to have crystallized, viz., (1) a Memorial Hall, (2) A Hostel for medical students, (3) Post-graduate course and (4) Scholarship for Study and Research.

It is too early to predict which proposal would find favour with the majority, but we need hardly stress that everything depends on finance.

Medical Notes and News

Ovarian Hormone Therapy.—Review on an address delivered by Prof. Aschheim at the meeting on 17-12-34 of the Medical Union of Luisenstadt, Berlin.

As an introduction, the lecturer gave a survey of the physiological and anatomical research work of the last 40 years, which has led to the present day knowledge of the function of the female genital organism.

Almost simultaneously with the spreading of the established facts about the cyclic changes of the uterine endometrium (Hitschmann & Adler) the first research work concerning the female sexual hormones also commenced (Fraenkels Fellner, Steinach etc.) after the internal secretory function of the ovaries was previously ascertained by means of castration and transplantation of animal ovaries (Knauer, Halban). The biological effect of the female sexual hormone and the method of standardising were ascertained by experimental tests on rodents (Stockard and Papanicolaou, Long and Evans, Allen etc.). Corner and Allen were the first to discover the existence of the second female sex hormone, the corpus luteum hormone and realising it served the purpose of preparing for and maintaining pregnancy (gestation), they called it "Progestin". Later on when purified hormone preparations were manufactured, these research workers succeeded in producing a true menstruation in castrated female monkeys. The climax of experimental research, however, was reached when

Kaufmann succeeded in proving that the effect of the two ovarian hormones, "Progynon" and "Proluton" (Progynon: follicular hormone, Proluton: corpus luteum hormone) alone were sufficient to cause menstruation, as with the help of these two hormones he was successful in producing true menstruation in women, either castrated or suffering for years from amenorrhoea.

Only a few years ago ovarian deficiency was treated with extracts prepared from animal ovaries, without considering the fact, whether the animals were in a period of oestrus or not. The hormone contents of these organic ovary preparations, therefore, used to vary and were often practically nil. Nevertheless, many cases of climacteric disturbances treated with such preparations often led to remarkable therapeutic success. This is not very surprising as, since pure and standardised hormone preparations are produced, it is a well known fact that particularly during the climacteric age very small quantities of follicular hormone may suffice to do away with any disturbances. In severe cases, especially for nervous patients, a higher dosage from 5000 up to about 50,000 international units daily (5 international units are equal to one mouse unit "Schering") should be administered either by mouth or by means of injections. The effects of high dosages of Progynon B in oil are very remarkable. Serious menopausal troubles like vasomotoric disturbances, unbearable headache as well as climacteric neuralgia of the pelvis and arthropathia can very often be obviated for a longer period by giving one or two injections of 50,000 international units of Progynon B in oil. Skin diseases, particularly those found to be irresponsive to every other therapy like kraurosis vulvæ, pruritus vulvæ, vaginal ulcer of unspecific origin (observed by Kaufmann), acne rosacea, psoriasis and certain eczema often respond excellently to Progynon B in oil.

In cases of menstrual disturbances (amenorrhoea, oligomenorrhoea and dysmenorrhoea), Aschheim also advises to commence treatment with peroral administration of small doses (Progynon dragees). Only if this treatment proves unsuccessful Progynon B in oil should be given. According to the lecturer's experience in cases of amenorrhoea it is possible to produce menstruation in every instance by way of a combined treatment of Progynon B in oil (follicular hormone) and Proluton (Corpus luteum hormone), provided the uterus is not entirely undeveloped. Even in such cases of primary amenorrhoea, in which the uterus was considerably under-developed, the treatment was successfully applied. Occasionally Aschheim could produce menstruation lasting for

several days in uteri, which only had the size of a finger joint. So far the spontaneous menstrual cycle could not be achieved, but Aschheim considers it very important if, even for mere psychic reasons, artificial menstruation is produced in women suffering from primary amenorrhœa, as they very often acquire an inferiority complex which can be banished by the fact of a menstruation taking place.

Secondary amenorrhœa responds easier to this therapy and frequently spontaneous menstruations were observed following treatment with Progynon dragees or Progynon B in oil without Proluton. As an explanation for the occurrence of spontaneous menstruations after Progynon therapy, Aschheim points out that Progynon also influences the Anterior Pituitary Lobe.

According to Aschheim, Progynon has a decidedly favourable effect on the whole organism and increased intellectual efficiency as well as an improvement of the bodily and psychical condition of patients are repeatedly noticed after treatment with Progynon. A full explanation for these facts has not been found as yet and it would be interesting, if systematic research on the part of neuro-pathologists could set in here.

The therapeutical application of Proluton is rather limited compared with Progynon. Aschheim mentioned that it is successfully used as a prophylactic against habitual abortion and in the treatment of glandular-cystic hyperplasia (metropathia hæmorrhagica). It was expressly pointed out that due to the fact that Butenandt succeeded in producing synthetic corpus luteum hormone, it is hoped that production on a large scale and at lower cost will be possible in the near future.

In regards to the therapy with gonadotropic hormones, Aschheim, who is one of the discoverers of these hormones, expressed rather sceptic views. He said it could not be denied that these hormones may do harm to the follicular system of the ovaries, unless it becomes possible to separate for practical application the two synergetically acting hormone-parts of the anterior pituitary lobe, *i.e.*, the hormone 'A' responsible for the ripening of the follicle and the hormone 'B' influencing the development of the corpus luteum. Since many years Aschheim is, therefore, using always for treatment of ovarian dysfunction only the chemically pure and exactly standardised ovarian hormone preparations "Progynon", "Progynon B in oil" and "Proluton".

Vaginal Ulcer—A consequence of Ovarian Hormone Disturbance, cured by Hormone Therapy.—By Dr. C. Kaufmann. Report on an address read before the Society for Gynaecology in Berlin on the 20th July 1934.

The patient is 33 years of age. It is noteworthy that the first menstruation took place only when she was 33. This belated menstruation indicates ovarian deficiency. Once the menstrual cycle set in, it was regular for 4 years, when the woman became pregnant and gave birth to a healthy child. After delivery, menstruation soon set in again and was regular for 2 years. Afterwards the woman fell ill. Large ulcers appeared, at first in the left-hand, later also on the upper thigh and the breast. These ulcers healed only very slowly leaving big scars. Simultaneously considerable brownish discharge occurred from the vagina. Large ulcers in the vagina were ascertained. For several months it was attempted to heal the ulceration by means of washing and cauterisation. This treatment was not successful. When the patient was brought to our clinic the posterior part of the vagina showed an ulcer about an inch in diameter with hard edges. The base of the ulcer was red and elevated. Spirochætes were not found in the abrasion. The sero reaction in the liquor was negative. The histological examination of a specimen cut from the ulcer only revealed that the ulcer tissue was entirely non-specific. We were unaware of the cause of this ulcer.

It was remarkable, however, that the ulceration occurred simultaneously with Amenorrhœa as the gynaecological examination of the uterus and vagina proved these to be normal, the Amenorrhœa could only be explained as being due to ovarian dysfunction. When discussing the therapeutic treatment to be adopted we started from the supposition that possibly the ulceration in the vagina may be caused by ovarian hormone disturbances and consequently the patient was treated only with high doses of the benzoic ester of the *dihydro-follicular hormone, local treatment being completely abandoned.

In October 1933, the patient was given during 23 days in all 600,000 m.u. of the above form of follicular hormone *i.e.* 3 million international units. 5 days after suspending treatment bleeding occurred for 3 days. During the course of treatment it was, practically speaking, possible to observe how the ulcer in the vagina faded day by day whilst prior to treatment it was an inch in diameter; after treatment, that is to say after 23 days, the size was reduced to a small speck. Three months later the

* Kaufmann used Progynon B Oleosum for this purpose.

patient returned for a final examination. Ulceration had taken place meanwhile twice at regular intervals, the appearance of the vagina was quite normal. After further 6 months the patient returned to the clinic stating the following remarkable facts:—

"After our treatment, menstruation had been regular for 5 months, the next expected menstruation, however, failed to occur and shortly afterwards strong, brownish coloured discharge came from the vagina. Two ulcers were ascertained this time in the vagina, one very nearly in the same position as the former ulcer, a second one in the vaginal cavity".

Also this time an attempt of local treatment outside the clinic proved unsuccessful. We have treated the patient also for the new ulceration only with this hormone and not locally. 600,000 mouse units (3 million international units) were administered in 24 days. After completing treatment, the ulcer situated at the posterior part of the vagina had healed up completely whilst the 2nd ulcer in the cavity of the vagina had turned into epithelial tissue. Final examination carried out after some time showed the vagina in a perfectly normal state.

The gist of this case in my opinion is:

We are acquainted with a new kind of ulceration in the vagina so far unknown to us which, we consider, is due to ovarian hormone dysfunction. After unsuccessful attempts to heal the ulcers by applying local treatment, we have been able to cause the ulcers to disappear within a very short time by administering a sufficiently high dosage of follicular hormone, viz., *Prodynon-B in Oil*. Our observations are not only interesting because they concern a rare case, but it seems that this particular case opens a so far unknown field of new indications for ovarian hormone therapy in the treatment of vaginal diseases.

Natural Vitamin D in infant feeding.—By Dr. John Campbell, Scientific Adviser to the New Health Society.

The discovery of the vitamins and a study of their action has thrown a flood of light on the problems of nutrition which has greatly lessened the incidence of the many diseases due to dietetic deficiencies and no better example can be quoted than the importance of Vitamin D in Infant Feeding.

Natural Vitamin D.—We are now able to trace the vital processes whereby Vitamin D is produced in milk and nature and to follow its transitions through many channels to the foods in which it ultimately finds a home for the nutrition of the human race.

The ultra violet rays of sunshine are chiefly responsible for the origin of Vitamin D. The radiant energy of these rays actuates the fat particles of plant tissue and from the sterol radicles produces Vitamin D. This elaboration takes place during the sunlight hours in grass and in the southern seas, a similar action occurs in the teeming millions of minute plant organisms which inhabit the upper sunlit zone. In the former case, part of the Vitamin D in the grass is stored, after consumption, in the fatty tissues of the animal to form the vitamin content of butcher's meat, or in milch cows to reappear in the fat of milk. In the latter case, the Vitamin D content of the marine plant organism is the source of the vitamin fat of fish and fish liver oil.

This natural vitamin D initials the normal fixation of calcium, and phosphorus salts in the skeletal and dental systems and its presence in optimum proportions in the diet is necessary for the prevention of rickets.

Irradiated Ergosterol.—Steenbock was one of the first workers to demonstrate the fact, that when certain constituents of fats e.g. ergosterol, were exposed to the ultra violet rays of a quartz mercury lamp a product was developed which appeared to be identical with natural vitamin D in properties and was prophylactic and curative in rickets.

This view was held for a long time but it has now been established that the vital principle of irradiated ergosterol is not identical with the vitamin D of cod liver oil.

Space does not permit of even a brief review of the evidence but the authoritative conclusions of Steenbock, the discoverer and patentee of the process which controls the world's production of irradiated ergosterol for commercial purposes is so important that they may be quoted.

A full account of the tests, carried out on chickens, appears in the Journal of Biological Chemistry, July 1932, and may be summarised as follows:—

- (1) The vitamin D produced by ordinary irradiation of ergosterol with a quartz mercury vapour lamp is a different substance from that found in cod liver oil.
- (2) Whereas 1 % of cod liver oil of average potency resulted in normal bone production it required from 40 to 120 per cent cod liver oil equivalent as irradiated ergosterol to produce the same result.
- (3) Irradiated ergosterol in excessive doses was found to be toxic, manifested by anorexia, loss of body weight,

with a great increase of fixation of calcium of the cardiac and kidney structures.

It would thus appear that synthetic vitamin D (irradiated ergosterol) is not identical with the natural vitamin and is much less potent in action and in excess—a contingency which might easily arise when the administration is controlled by lay persons—it is toxic in effects supplementing the normal fixation of lime in the bones and teeth by a calcification of soft tissues like the arteries, breast, kidney and liver.

In infant dietary especially, the preference should surely be for natural foods as against synthetic or artificial products and the mass experience of medical officers attached to Infant Welfare Centres and the Infant Departments of our hospitals support the view that milk from pasture fed cows, especially on the luscious grass of English pastures, or its equivalent in powder, powdered by an effective Roller Process as exemplified in the improved *Cow and Gate* method has sufficient actual potency in vitamin D to give complete protection against rickets without the introduction of an additional supplement.

If it is considered necessary in special conditions to reinforce milk in vitamin D it is difficult to find any reason to support the use of an artificial product like irradiated ergosterol, admittedly less potent and not so safe as the natural vitamin contained in a tasteless and odourless cod liver oil concentrate. For such a climate as India, sterility to the disease germ of typhoid and gastric enteritis (diarrhoea) is an essential and modern installation for powdering milks, by the Roller Process, achieves this without measurable loss of natural vitamin potency. In some recent bacteriological examinations of milk powders the writer found the export brand of Cow and Gate gave the extraordinary low average count of 89 colonies per m. l. with absence of *B. coli* and all pathogenic flora.

The Natural Vitamin content was at the same time found to be as high as 250—300 International Vitamin D units, per pint of reconstituted milk. In other words, each pint of reconstituted milk contains the equivalent of a teaspoonful of high grade Cod liver Oil.

'Wellcome' Brand Insulin.—Burroughs Wellcome & Co. announce that all 'Wellcome' Brand Insulin is now made with pure crystalline Insulin, the Insulin of 100 % purity. "Wellcome" Brand Insulin is the first commercial product to be prepared with pure crystalline Insulin.

Messrs. Cow and Gate, Ltd., wish to state emphatically that that they have *not* followed the example of other manufacturers and are not shipping their Food to India in bulk to be repacked and dated. Cow & Gate Milk Food is *made, packed and dated* at the Somersetshire Factories of the Company and immediately shipped to India for sale in its *original containers*.

Help for Quetta Sufferers.—Victims of the Quetta earthquake are having Rs. 1400 worth of biscuits distributed among them by the India Office, as a gift from Messrs. Huntley & Palmers Ltd., the well-known biscuit manufacturers of Reading, England.

Proceedings of Conferences, Associations, etc.,

THE FIFTH ANDHRA MEDICAL CONFERENCE.

Vizagapatam.

The fifth session of the Andhra Medical Conference was held at Vizagapatam on the 7th, 8th and 9th of June 1935.

The Conference was opened by Mr. B. Venkatapathi Raju, B.A., B.L., C.I.E., who took the opportunity to refer to the step-motherly treatment given by the Madras Government to the Vizag Medical College and hoped that the Government would soon afford better facilities to medical students at Vizag and effect the improvements urgently required by the Medical College and Hospital.

He urged the conference to extend its sympathy to all systems of medicine. Long before there was any scientific knowledge in Europe, India had perfected a system of medicine called Ayurveda. In conclusion, he opined that the day would soon dawn when allopathic men would devote part of their time to investigate and bring to light the many hidden truths that now lie buried in Ayurveda.

In the unavoidable absence of Dr. Moonjee, Dr. B. T. Rau was requested to take the presidential chair. He then delivered a stimulating and learned address touching practically on every one of the major issues that confront the Medical profession in the Andhradesa.

Dr. A. Lakshmipathi of Madras opened the Pharmaceutical exhibition. He referred to the great mineral and vegetable wealth of India. Drugs abundantly found here are being exported to Europe for refinement. These finished products return to India in a new garb and are sold at very heavy cost. Incidentally, he would also mention that the drug was the least important thing in treatment

and that the medical profession would soon realise the value of drugless treatment.

The delegates and the visitors after going round the exhibition adjourned to the King George Hospital, where Dr. B. Tirumalrau entertained them to tea.

The Scientific section then opened its proceedings under the presidentship of Dr. Tirumalrau and a number of medical lectures were delivered for the benefit of the doctors that gathered.

Dr. Trasi, (Professor of Obstetrics, Vizag Medical College), read a paper on 'post-partum haemorrhage'. He referred to the percentage of incidence in various countries, emphasized the importance of ante-natal prophylaxis and discussed the comparative merits and demerits of the various methods advocated by different authorities. He gave in detail the technic of a method, which in his experience was the most satisfactory one to arrest post-partum haemorrhage.

Dr. Dinker Rao (Professor of Medicine, Medical College, Vizag) next lectured on 'Hypertension'. He gave a comprehensive list of the current theories of causation and emphasised the clinical and bio-chemical investigations which would help the doctor in diagnosing this disease from apparently similar conditions and drew attention to clinical features which were important in prognosis.

The next day, the delegates after visiting the Andhra University and the Mental Hospital, Waltair, again assembled in the Pathology Block to hear and observe the lecture demonstrations.

In the absence of Dr. B. T. Rao, Dr. T. S. Tirumurti took the chair during the morning session.

Dr. P. Ramachandrarao (Asst. Professor of Pathology, V. M. C.) showed a large collection of post-mortem specimens and slides collected from atypical fatal cases of malaria and discussed in detail the microscopic changes noted in these cases.

Dr. Kini (Surgeon K. G. Hospital) gave a lecture-demonstration on 'some surgical aspects of hip-joint disease' showing cases, photos and X-ray films, illustrating the condition and functional capacity before and after certain operations.

Dr. R. Viswanadhan (Lecturer in Tuberculosis) next dealt with 'bronchiectasis' illustrating his lecture with case records and Radiograms.

Dr. Ch. S. John (of Nidadhavole) who followed next read an interesting paper on 'sterilisation in men'.

The Conference assembled in the Town Hall in the afternoon with Dr. B. T. Rao in the chair when Dr. P. Kutumbiah (Physician K. G. Hospital, Vizag.) gave a clinical lecture on 'neurosyphilis'. He referred to the incidence, classification and clinical diagnosis of the disease and read out case reports illustrating different types of Neurosyphilis.

Dr. Abbu Mudaliar, Professor of Ophthalmology, Medical

College, Vizag, next read a learned paper on 'The Recent Advances in the Diagnosis and Treatment of Trachoma'.

Dr. A. Lakshmipathi (Madras) next read an interesting paper on the 'Therapeutics of Indian Medicine'. He prefaced by giving a brief statement on the Tridhatu theory, which formed the foundation of Ayurveda. Disturbed conditions of three-dhatus, known as Tridoshas were reduced in normal by giving drugs having opposite qualities. As an instance of the valuable, though somewhat out-of-date methods, he discussed the therapeutics of the eight urines (Ashta-mutras) viz., those of the buffalo, goat, sheep, cow, horse, camel, elephant and ass. He dealt with the various uses to which these urines could be put and instanced number of cases, where one or other of the eight urines had been used with considerable success.

Dr. N. T. S. Yazulu (Vizianagaram) who followed, read a paper on 'Indigenous Drugs' and made some suggestions for the improvement of indigenous pharmaceuticals.

After the visit to the harbour and King George Hospital, the Scientific Section resumed its proceedings yesterday with a lecture demonstration by Dr. Kesavaswami on 'Interpretation of X-ray films'. This was followed up by a cinema film taken in the King George Hospital showing the characteristic gait in different nervous diseases. Another interesting series of films on 'Hormones' were shown by Bayer & Co. The first paper for the day was by Dr. G. V. Subba Rao of Tenali on 'The Village Call' narrating his experiences when summoned to see emergent cases. The next paper related to physiological problem concerning the human parotid saliva. Mr. T. S. Ramachandran read out the results of a bio-chemical assay of different kinds of saliva, while Dr. Baseer described the results of injecting animals with saliva. He seemed to suggest a relation between some as yet unidentified hormone or substance in the saliva and the gonads. Dr. Trasi made a few comments from the point of view of a gynaecologist, while Dr. Krishna Rao offered some criticism as a morphologist.

The next paper by Dr. Seshacharyulu, which dealt with 'The human heart in action' suggested a few lines of investigation to study what he called the "dynamic physiology" and pleaded for greater attention to human machinery than to rats and rabbits.

The scientific section closed with a paper by Dr. Govinda Nair on 'the new treatment for small-pox' wherein he gave his experiences with the liver extract "campoulan," which injections, if given sufficiently early, appeared to reduce the amount of pustulation and scarring in the latter stages.

About ten papers from various parts of India by specialists in their line, had to be taken for read for want of time. Among them were three papers from the Indian Institute of Medical Research, Calcutta, one from Dr. Naidu of Haffkine Institute, one from Dr.

Sundara Rao of Calcutta School of Tropical Medicine, who kindly responded to the invitation of the Scientific Section.

The Medical Conference passed the following resolutions:—

"The Andhra Medical Conference has heard with deep sorrow the great calamity that has befallen the people of Quetta and North-west Frontier Province and conveys its heart-felt sympathy to the members of the bereaved families and exhorts all the members of the medical profession in the Andhradesa to contribute liberally towards one or other of the relief funds that are started in the country for the help of the distressed people.

The Andhra Medical Conference urges on the Government of Madras and the Andhra University authorities the necessity and the urgency of getting the Andhra University M.B.B.S. degree recognised by the Indian Medical Council by effecting immediately the necessary improvements required by the Inspection Commission in the King George Hospital and the Medical College, Vizagapatam."

The President in his concluding remarks, expressed the hope that the varied activities of this conference would give impetus to the profession to organize themselves for better professional and scientific work and that a spirit of co-operation and emulation would pervade all ranks of the profession.

A number of delegates spoke thanking the reception committee for the arrangements and demonstrations organised for the benefit of the conference.

After a vote of thanks to the numerous individuals and public institutions, that co-operated in making the Conference a success, the Conference was brought to a close.

The same night, there was a farewell dinner at the delegates' camp, where the gathering was entertained to delightful music by South Indian artists. The doctors from various parts established new contacts, and renewed old friendships. The gathering broke up with a feeling that they had spent three days usefully and happily.

THE TRICHINOPOLY DISTRICT MEDICAL ASSOCIATION (Regd.) Trichinopoly.

A monthly meeting of the above Association was held on Saturday the 18th May '35 at 5 P. M., in the E. R. High School, Trichinopoly when about 30 members were present. Dr. C. Somasundaram of Puvaloor, was 'At Home' and Dr. R. Kalamegham, M.B., B.S., presided.

Dr. T. S. S. Rajan showed a small boy aged 10 on whom he had operated upon for Hydronephrosis. The removed matter resembled a big bag with the kidney substance embedded in its wall. He demonstrated the old case of stricture of Oesophagus shown at the previous meeting and which showed some improvement. He also

demonstrated a case of multiple arthritis in a girl of 10 sent over for X-Ray and demonstration by Dr. V. Iravatham of Thirukkattupally.

A case of Electric Burns treated with cod-liver-oil-ointment in the Government Head Quarter's Hospital, Trichy was also demonstrated.

After demonstration, there was discussion in which many members took part.

Dr. K. S. Narayanan of Madura then delivered an interesting lecture on 'Peroral Endoscopy' explaining the technical indications, and its usefulness for diagnosis and treatment. He also demonstrated a number of latest instruments and explained their use.

With a vote of thanks proposed by the Secretary to the Lecturer, Chairman of the evening, the Host, and the Manager of the premises, the meeting terminated.

THE EAST GODAVARI DISTRICT MEDICAL ASSOCIATION, Cocanada.

Minutes of the monthly meeting held at Pithapuram on
22nd June, 1935.

The monthly meeting of the Association took place this time at Pithapuram. A large number of doctors from all over the District attended. The Pithapuram group of members were at home to the Association. After Tea, the members were taken round the wards of the Mission Hospitals in batches by Dr. Allyn and Dr. Eaton, and interesting cases shown. Noteworthy of mention is a silver pessary improvised by Dr. Allyn, of great value in cases of Antiflexion of the Uterus.

The proceedings commenced at 6 P. M. with Captain J. S. McMillan, I.M.S., in the chair. Some interesting cases from Pithapuram were exhibited by Dr. Eaton. One was a case of typical Pseudo-Hypertrophic muscular paralysis and two cases of skin grafting where gauze soaked in melted bees wax was used in the place of guttapercha tissue as a dressing and one case of a fibroma of the lobe of the ear wherein a silver wire was inserted under the skin to keep up the contour of the ear. Dr. Eaton discussed the operation for the removal of tonsils and expressed that in his experience the method of their removal with a blunt guillotine without preliminary dissection is very good. Dr. Murty of the Headquarter Hospital, Cocanada, gave a discourse on "Pre and Post Operative Treatment in Surgery".

A resolution was passed congratulating Dr. Allyn on the award of the Silver Jubilee Medal to her which she so richly deserved.

After an enjoyable dinner on the lovely terrace of the Mission Hospital, the guests dispersed.

THE TRICHINOPOLY DISTRICT MEDICAL ASSOCIATION Trichinopoly.

A monthly meeting of the above Association was held at 5 P. M. on Saturday the 22nd June '35, at the E. R. High School, Teppakulam, Trichinopoly when about 35 members were present. Dr. L. R. Fernandez was 'At Home' to the members and Dr. M. Balammal, M.B.B.S., presided.

A large tumour removed from the abdominal wall of a young woman aged 23 by Capt. Sangham Lal, I.M.S., District Medical Officer, that morning in the Government Head Quarter's Hospital, Trichy was demonstrated. The point of interest in the case was, the rapid growth of the tumour (5 months) and the difficulty to locate its origin, whether intra or extra peritoneal before operation.

Dr. R. Sambasivan, M.B.B.S., demonstrated a case of presystolic murmur and explained that many other conditions of the heart were labelled as pre-systolic murmur, and hence this demonstration of a clear case of pre-systolic-murmur.

Dr. N. C. Subramanyam, B.A., M.B., B.S., read an interesting paper on 'Haemorrhage during pregnancy' and explained the various conditions when bleeding could occur, and the necessary treatment to be adopted for each condition. This was followed by a discussion led by Dr. (Mrs.) M. Monsingh in which many members took part.

In her concluding remarks Dr. M. Balammal, gave her views on the various points discussed. She also read case notes of a case on concealed intra-uterine-menstruation (Haemato-metra) due to obliteration of the Os on account of previous ulceration and the treatment adopted by her.

With a vote of thanks to the Chair, to the Host, the Lecturer and the Manager of the premises, the meeting terminated.

ALL - INDIA MEDICAL LICENTIATES ASSOCIATION Madras.

"Dental Profession as it is practised in India" was the subject of keen discussion that arose among the Medical men of Madras, that gathered at a Clinical Meeting held under the auspices of the above Association on Wednesday the 10th July '35, at No. 10, Thambu Chetty Street, Madras.

Dr. S. R. Bhat, M.B., B.S., L.D.Sc., was the Lecturer, Major G. R. McRobert, I.M.S., presided.

The Lecturer in the course of his speech pointed out that out of 5,000 men practising dentistry in India, 90% are unqualified and the consequent sufferings of the public due to improper handling of dental cases are untold and unimaginable. The so-called dentists from China

and Japan and others without any preliminary qualification whatsoever are treating dental cases in Madras in places open to all sorts of infection unmindful of the principle of aseptic surgery. While tracing the history, the progress and the high standard of efficiency of dental surgery in America and the Continent, the learned Lecturer stressed on the necessity of Legislation to prevent unqualified hands practising dentistry in India. He also pointed out the comments in a British Medical Journal which brought to the notice of the Government of India the need for well-organised dental institutions to train qualified medical dentists in order to eradicate the evils of quack surgery in India.

The President, while concurring with the views expressed by several of the speakers, such as only qualified medical men should practise dentistry with special qualification and that they should do propaganda among the ignorant masses against the dangers of quack surgery, laid stress on the necessity of substituting well qualified dentists to meet the demand. He opined from his experience in Burma where also there are very few qualified dental surgeons, that medical organisations in India would do the needful to combat this great problem of dentistry in India.

The meeting terminated with a vote of thanks to the Chair, the Lecturer and those present on the occasion.

THE TRICHINOPOLY DISTRICT MEDICAL ASSOCIATION. (Regd.). Trichinopoly.

A monthly meeting of the above Association was held at 5 P.M., on Saturday the 20th July '35, at the E. R. High School, Teppakulam, Trichinopoly when about 45 members were present. Dr. C. E. R. Norman, F.R.F.P. & S., D.P.H., L.A.H., C.H. Chief Medical Officer, S. I. Ry. and President of the Association presided and Dr. N. C. Subramanyam, B.A., M.B., B.S., was 'At Home' to the members.

The Secretary moved the following resolution which was carried unanimously :—

'This Association requests the District Medical Officer Trichinopoly and President, District Board, Trichy, to issue a general circular to their medical subordinates permitting them to attend meetings of the District Medical Association which will be held on Sundays, Penultimate Saturdays or on Holidays, so as to obviate the necessity of applying for permission each month'.

Dr. B. S. Viswanathan, L.M. & S., of Coimbatore delivered an interesting lecture on 'Modern Treatment of Tuberculosis' and discussed the different methods of treating the disease at various stages. He also demonstrated an 'Artificial-Pneumothorax' apparatus

and explained its technique. He showed a number of skiagrams of 'Tubercular lung' and at various stages of treatment.

Dr. Rajan demonstrated a case of acute Pulmonary Tubercular lung which showed remarkable improvement under 'Pneumo-thorax treatment'. Then an interesting discussion followed in which many members took part.

Dr. Raghavan demonstrated a 'Collosal Transfusion Ampoule' and explained it was ready and simple to use.

With the chairman's concluding remarks and a vote of thanks to the Host, the Lecturer and the Manager of the premises, the meeting terminated at a late hour.

THE CHETTINAD MEDICAL ASSOCIATION

Kanadukathan.

The usual monthly meeting of the above Association was held on 28-7-35, at S. M. Hospital Tirupattur, under the Presidency of Dr. Mangalam Pillay, in the absence of the President. About 20 members were present. After tea, arranged by the hosts, Dr. T. S. Shetty, the Secretary read the minutes of the Association.

Dr. T. S. Shetty gave out three interesting case reports, two of Diphtheria cases, one in a child of 3 years, another in an adult of 35 years both Indians, curiously enough at the same time, one coming from Madura, another from Ramnad District. He wanted to know if any doctors had any case in their practice. Dr. F. Y. Sander, cited two cases from his experience. There was a discussion on the advisability of doing Tracheotomy in advanced cases with breathing trouble, but Dr. Sander, suggested that incubation is a better method and more easily done but hospitalisation is essential lest the tube be coughed out.

Dr. Shetty spoke about an interesting case of cerebellar abscess operation he had done in his hospital, in a case of neglected mastoid infection. Dr. Victor reported of two orbital tumours he had operated in S. M. Hospital.

Dr. F. Y. Sander, M.D., demonstrated some interesting X-ray films of the Gastro-Intestinal tract. After this an interesting lecture on 'Record keeping' was delivered by Dr. D. O. Sendel, M.B., M.R.C.S. He suggested some novel and very easily manageable record keeping for all out-patients both in private and public institutions.

After the President's concluding remarks and the usual vote of thanks, the meeting terminated at 7-30 P.M.

THE TINNEVELLY DISTRICT MEDICAL ASSOCIATION

Tinnevelly.

The Tinnevelly District Medical Association held its monthly meeting on Sunday the 28th July 1935 at Courtallam (Jamal Palace) one of the most healthy spas of Southern India, noted for fine waterfalls and excellent mountainous scenery. Members numbering 57

including some lady doctors gathered from all parts of the District. Some of the officials and non-officials graced the occasion. All the members had an early bath in the excellent waterfalls which were in full swing. There were fine drizzlings and the members enjoyed the season well. M. R. Ry. I.C. Iswaran Pillai Avl., M.L.C., the President, District Board, Tinnevelly, was present for the best part of the function.

After fine dinner, the meeting began at 2-30 p. m. under the presidentship of Lieut. Col. T. S. Shastry, I.M.S., the President of the Association. The minutes of the last meeting were read and passed. Dr. K. Kalyanaraman, L.M.P., read very interesting case notes on Pyloric Stenosis and Tuberculous Empyema of the kidney. This kidney patient who is now in very good health was shown at the meeting. Rare and interesting specimens of (1) Epithelioma of Eyeball, (2) Cancer Breast, (3) Tumour Testis and (4) Tuberculous kidney, successfully operated by Lieut. Col. T. S. Shastry, I.M.S., were demonstrated.

Then the discussion on 'Dyspepsia' was resumed from Papanasam meeting by Dr. A. L. Anantanarayana Iyer, M.B., B.S., of the Government Hospital, Tenkasi. There was a lively discussion on all the operated cases referred to above.

After the discussion, Lieut. Col. T. S. Shastry, I.M.S., summed up the salient and important features in the correct and proper diagnosis of Dyspepsia, reviewing the most successful methods adopted in the treatment. After a hearty vote of thanks to the President, the meeting dispersed.

After tea, the party reached Tenkasi where a Health Exhibition was arranged at the Elementary Weaver's School. School boys and girls of Tenkasi and its neighbourhood assembled. The girls of the school gave an entertainment on "Kolattam" singing health songs (songs about the mischief of flies and some other health songs.) Lieut. Col. T. S. Shastry, I.M.S., welcomed the guests and requested M. R. Ry. Iswaran Pillai, Avl., M.L.C., the President, District Board, Tinnevelly, to open the Exhibition. The exhibition was opened by him at 6-30 p. m. He expressed in a short speech that such exhibitions are very useful and beneficial to the masses and promised hearty co-operation by equipping the schools and dispensaries with posters on infectious diseases and directing all the teachers under his control to learn from the Local Medical Officers the significance of these posters and then to teach their pupils once a week these lessons of health. Dr. G. Parthasarathi, M.B., B.S., of Tenkasi gave an interesting lecture in Tamil on the prevention and causation of Tuberculosis, Leprosy and Cholera explaining the posters on the subjects which were exhibited on the walls in easy Tamil for the benefit of little children. The Exhibition was thrown open to the public till late in the evening. The exhibits consisted of posters relating to Cholera, Tuberculosis, Malaria, Small-pox,

Leprosy, Fly danger, etc., This was very much appreciated by the public.

Lieut. Col. T. S. Shastri, I.M.S., offered cordial thanks to Dr. S. Kanthimathinathan, L.M. & S., and his co-workers for their kind and generous hospitality and for organising the meeting, to Dr. S. Kolappa Pillai, L.M. & S. the District Health Officer, Tinnevely, for arranging the Exhibition so well and to M. R. Ry. I. C. Iswaran Pillai Avl., M. L. C., the President, District Board, for the great encouragement he has given.

Book Reviews

Midwifery—By *Ten Teachers*, under the direction of *Clifford White*, M.D., B.S. (Lond.), F.R.C.P., (Lond.), F.R.C.S. (Eng), F.C.O.G. Edited by Sir Comyns Berkeley, J. S. Fairbairn and Clifford White, 1935, 5th Edition, 740 pages. Illustrated. [Edward Arnold & Co., London]. Price 18/-net.

This well known text book of midwifery is by Ten Teachers of the subject in London Medical Schools and in charge of eight general and three large lying-in-hospitals. It embodies the collective wisdom and experience of some, if not all, of the medical schools it represents. Originally intended for students preparing for their final examination, it is now intended even for medical men for use in their general practice. It is a sister Volume to "Diseases of Women." The present edition appears under the direction of Clifford White, who now succeeds to the position of director held by Sir Comyns Berkeley. It has been thoroughly revised and rearranged. The book is divided into five sections. The first deals with pregnancy; the second with labour; the third with the puerperium; the fourth with the new born child and the last with the relief of pain and suffering in obstetric practice. The text has been brought up to date by the addition of recent work and new methods of treatment, more particularly regarding the physiology of menstruation, the ovarian cycle, the toxæmia of pregnancy, pyelitis and puerperal infection. The printing and general get up of the book is very satisfactory. We strongly recommend its use as a text-book of midwifery for students and as a reference book for practitioners.

The Diseases of the Endocrine Glands.—By *Hermann Zondek*, M.D., (Berlin), 1935, 3rd edition. Revised and enlarged; translated by *Carl Prausnitz*, M.D., M.R.C.S., L.R.C.P., 492 pages. Illustrated. [Edward Arnold & Co., London]. Price 40 sh. net.

The science of Endocrinology though only a few decades old, has made enormous strides. During this time it has profoundly influenced physiology and pathology. Professor Zondek, whose work on endocrinology is known all over the world, is very well fitted to write a treatise on this subject. In writing this book his aim was to make it useful to the clinician and in this he has succeeded. This book does not follow the usual course in which the individual hormonal glands are discussed as the basis of the diseases that may be referred to them. Instead, the author has arranged the material according to diseases, independent of their glandular origin. In the first part of the book, the author gives a general description of the problems of endocrinology with summaries of the Physiology and Chemistry of the endocrine-organs, glands, hormones and vitamins, the relation between the hormonal glands and the central nervous system. In the second part which occupies the greater portion of the book, the various endocrine diseases such as Graves' disease, Myxœdema, Cretinism, Acromegaly and Addison's disease are described. This book is copiously illustrated and is provided with an excellent bibliography. The general get up of the book is very good and the publishers have to be congratulated on that. We have no hesitation in saying that this is one of the best books on the subject in the English language.

Alcohol and Anæsthesia—By *D. Burridge*, D.M., M.A., (Oxon.) 1934, Pages 65. London: Williams and Norgate Ltd. Price 2/6 net.

An attempt has been made in this book to give an explanation of some of the neural and psychic effects associated with the drinking of alcoholic beverages. The writer has employed the new principle that central neuroses are rhythmically active structures which possess two sources of potential for their energy manifestations, and that the physiological basis of an idea is a group of nerve cells rhythmically active in unison. The author has explained the action of alcohol in the light of modern knowledge of colloidal systems. Thus the energy manifestation can be attributed to two sources, namely, aggregation changes and adsorption changes. The adsorption phenomenon has been called kinesiphore A. and the energy available in the aggregation state has been called Kinesiphore B. With this observation the writer explains that alcohol decreases the nervous excitation energy which is derived from

Kinesiphore A. and increases that which is derived from Kinesiphore B. producing states of depression and stimulation.

On this basis of a nerve cell endowed with two Kinesiphores, the organ of mind has been deduced to consist of two different structures, neural and the psychic, and the thought or an idea is only the outcome of interaction between these two Kinesiphores A and B.

The influence of alcohol on the organ of mind in the various aspects of human activities has been discussed, and the author sums up by saying that the dangers of alcohol lie in the possession in an individual of the following five factors:—

- (i) Susceptible nerve cells
- (ii) A small powered mind
- (iii) Extreme Views.
- (iv) The beast idea
- (v) The cracking care.

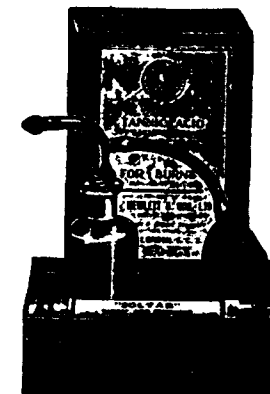
and concludes the chapter by saying that 'the alcohol problem' is not so much provided by the drug as by the mental make up of a limited number of its users". This new doctrine has been applied to the problem of intoxication and chronic alcoholism and anaesthesia and the facts have been explained adequately within its scope. We recommend this book to all our fair minded readers for their impartial judgment.

Medical case Taking and Diagnosis.—By A. J. Kohiyar, B.A., M.D., (LOND.) M.R.C.P., (LOND). Hony. Physician, J. J. Hospital, Bombay, 1935, pp. 133. [Publishers: Medical Bulletin, Empire Automobile Buildings, Queen's Road, Bombay.] Price Rs. 3/-

Dr. Kohiyar, the well known Bombay Physician, wrote for our contemporary the 'Medical Bulletin', a series of articles on 'Medical case Taking'. He has now published them in a book form. It is a very ideal book for the student giving him in detail the various systems and the methods of investigating them. The last chapter is devoted to the investigation of Pyrexial conditions with special reference to doubtful cases. The printing is done well and the book is nicely got up.

Preparations and Inventions

Improved Tannic Acid Outfit for Burns (Hewlett's).—The Tannic Acid treatment of burns by means of a spray has been recommended for several years, but the importance of using a freshly made solution of Tannic Acid has prevented its universal adoption.



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Ergometrine.—The isolation of the new ergot alkaloid, Ergometrine, recently described by Dudley and Moir was followed by the commercial issue of the drug by *Burroughs Wellcome & Co., London, (Eng.)* within the short space of three weeks from the first announcement of the discovery. (*British Medical Journal*, April 6, 1935).

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'Hypoloid' Ergometrine 0.25 mgm. in 1 c.c. for intramuscular injection.

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The alkaloid used in these preparations is of the high degree of purity associated with the firm's products and crystallises readily from a number of solvents as described in Dr. Dudley's later communication (*British Medical Journal* April 13.) Ergometrine is characterised by the rapidity with which it causes contraction of the uterus and is used clinically for this effect during the puerperium.

Given orally, in a dose of 0.5 mgm. to 1 mgm., Ergometrine produces contraction after an interval of $6\frac{1}{2}$ to 8 minutes, the contractions being identical in mode of onset and general character with those produced by active liquid extracts of ergot. It may also be given by intramuscular injection, in a dose of 0.25 mgm. to 0.5 mgm., which produces strong uterine action in $3\frac{1}{2}$ to $4\frac{1}{2}$ minutes. Intravenously, in a dose of 0.05 mgm. a strong response follows in 110 seconds and in a dose of 0.1 mgm. in 65 seconds.

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A. O. Tuberculin Vaccine.—Tuberculosis vaccine is a preparation of tubercle bacilli originated by Arima, Aoyama and Ohnawa in Osaka, Japan and licensed by the Japanese Government in 1927. According to the originators, AO is made from Tubercle bacilli of the human type. It is sterile, consists of the native protoplasm of the bacilli, is easily absorbed, is completely innocuous, is derived from strongly immunizing strains of bacilli, and has a uniform potency. It is sterile and there is no danger of infection. As it consists of the native protoplasm of the bacilli, it is able to immunize the inoculated organism in the same way as the organism is immunized by infection with live tubercle bacilli. As it is easily absorbed, it acts quickly as an antigen by causing the production of

antibodies in the inoculated organism. The easy absorbability is brought about by the autolytic changes which, during the long cultivation, take place in the bacilli, which are devoid of waxy substances. AO is innocuous as its use in 400,000 patients in different parts of the world upto the end of 1932 shows. No ill effects have resulted from its administration upto the time of writing. Because this vaccine consists of specially selected, strongly immunizing, strains of bacilli, it is remarkably effective. Its potency is constant, as its efficacy is measured by a special immunobiologic method and is expressed in antigen units (A.E.) The application of AO is threefold: it may be used for prophylaxis, diagnosis and therapy.

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Notice

The following communication R. No. 1680-H. d/d. 9th August '35 has been received from Major-General Sir F. P. Connor, Kt., D.S.O., K.H.S., I.M.S., Surgeon General with the Government of Madras, which we publish for the information of our readers:—

"I have the honour to forward for your information and for the information of the registered medical practitioners a copy of the Vaccination certificate form to be used by District Medical Officers, Civil Surgeons and Registered Medical Practitioners for the issue of vaccination certificates to intending passengers to foreign countries from India."

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on date.....with vaccine lymph issued from the
.....Institute.
Date of issue of lymph.....
Calf No.....
Date of receipt of lymph.....
Date of Vaccination.....

Signature
(Registered Medical Practitioner).

Corrigenda

The Antiseptic Vol. xxxii—No. 1—January 35 issue p. 40—Line 13, for 'and thus forms a biological contact,' read, 'and thus from a biological contact.'

The Antiseptic, Vol. xxxii. No. 1—January 35, issue, p. 40, line 26, for 'Dr. P. P. Gharpure,' read, 'Dr. P. V. Gharpure'.

The Antiseptic Vol. xxxii. No. 6, page 333, second line after the word 'Jaw' insert the words "in front" and the sentence will read thus "behind the jaw in front and below the ears".

The Antiseptic, Vol. xxxii. No. 6, page 334, 8th line, Before the word 'duct' insert the words "Infection of " and after the word 'as' insert "of" and then the sentence will read thus, "Infection of the duct as well as of the superficial portion of the gland".

The Antiseptic, Vol. xxxii, No. 6, page 336. First line, for '12.8, per cent' read '42.8 per cent', and the sentence will thus be "the mortality rate was 42.8, per cent.

The General Education of the Doctor

The following communication appearing in the B. M. J. (July 13, 1935) will be of some interest to our readers:—

"Sir,—As a member of one of the former committees of Council of the B. M. A. on general and/or medical education, the following examples of defective instruction or confused thinking which came to my notice recently have shown me again that some improvement in the curriculum is overdue. They go some way, also, towards confirming the report of the Medical Curriculum Conference recently published.

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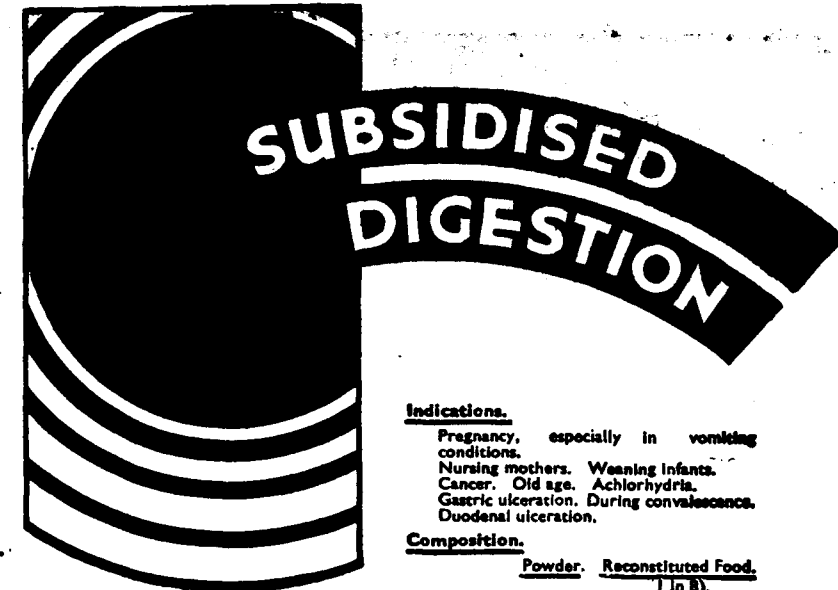
2. This second instance occurred in the notification of tuberculosis, which was described as "T. B. Thysis".

3. This same patient above was also notified by another doctor as suffering from "P. T." whatever that may be.

By themselves these examples may not appear to be of much importance, but incorrect spelling of technical terms may be indicative of incorrect knowledge. The instances I have cited came from three separate men."

Harrogate, July 7th

I am, etc.
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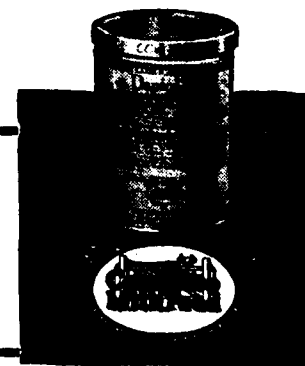
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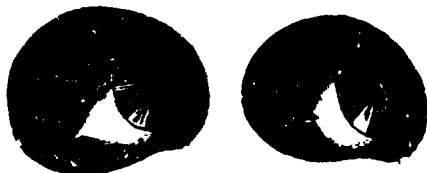


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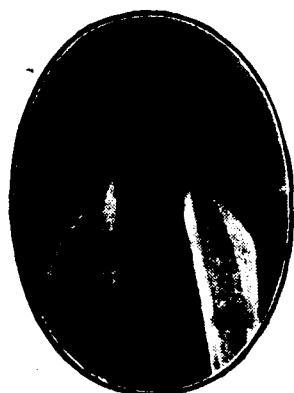
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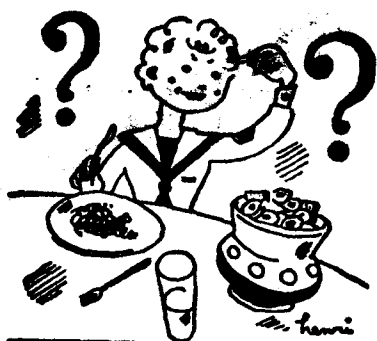
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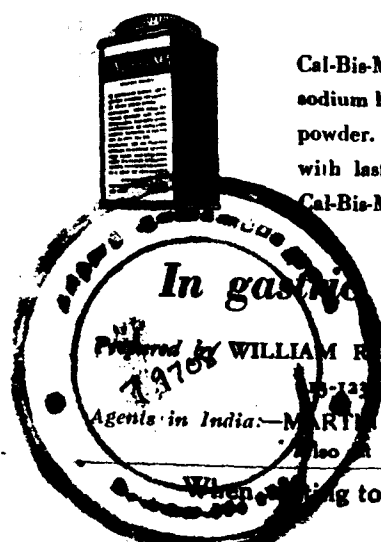


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