characters of the two attacks suddenly occurred to me. Malaria suggested itself, and I found, on questioning, that the patient had not only resided abroad, but that four years previously she had suffered from a severe attack of malarial fever.

Acting on this discovery, a dose of quinine (10 gr.) was given, followed by 4 gr. every three hours; she had no more rigors; the temperature was normal in twenty-four hours. Here, then, probably was the explanation which in the first attack was unsuspected. Malarial puerperal fever presents, I believe, some difficulty in diagnosis from puerperal septicaemia: but the main points of distinction were well brought out in this case. First, in both attacks, the onset of fever not occurring until after the fifth day, probably always before this in septicaemia. Secondly, the particularly well-marked rigors and intermission of temperature, much more pronounced than in septicaemia. Thirdly, the short duration of the symptoms. The loaded state of the bowel possibly was a factor which contributed to the intensity of the first attack.

The severity of the first attack—the rarity, at all events, in this country of this condition—and the possibility that others like myself may overlook malaria as a cause of fever in the puerperium, are my reasons for wishing to record this case.

RESEARCHES ON HIBBERTIA VOLUBILIS.

By JOHN REID, M.A., M.D., C.M.,
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THE above plant was identified by my old and esteemed friend the late Baron Sir F. von Müller, who kindly assisted me in the bibliography, and told me that, as the order had been little investigated, my work would serve to indicate the general properties of its members. Tannin and silica are the products found.

The specimens used were obtained at Coraki, on the Richmond River and Manly Beach in N.S.W., in the months of January and February; the pistil and fruit with envelope removed were extracted after being dried.

The alkaloid dillennine may be extracted by acetic acid or spirit by the usual methods. The plant residue is then boiled in methylated spirit to yield the oil, and the residue with alkali to yield dillennic acid, from whose solution a colouring matter—stephenine, named after the late Rev. Geo. Stephen, Fordyce, Banffshire—may be skimmed off, an acid from an alkaline fluid. There is also a brown-coloured neutral resinoid obtained along with the alkaloid, when the latter is precipitated by ammonia from solution.

Dillennine is a white powder depositing acicular crystals from solution in chloroform. Its acetate forms acicular crystals, the dillennate broken plates. Solution in spirit diminishes the colouring power of tincture of guaiacum on potato surface. It is slightly volatile, decomposing partly with the odour of urea or burning feathers—charring. The usual alkaloid reactions are given, with phosphomolybdic acid, $KIHgI_2$, and iodurated potassium iodide. Given internally, the tongue becomes dry and then moist; the circulation is enfeebled; no head symptoms appear. The pupils are dilated, remaining so for a few hours. There seems to be no stimulation of the liver.

Dillennic acid precipitates with lead and lime water, from which precipitates it may be obtained. It is very insoluble in water; its solution does not precipitate iron perchloride, gum, or gelatine. It decomposes sodium bicarbonate, intensifying the sherry-red colour of its solution. Ammonia makes the colour still deeper. Alkaline solutions are very soluble. An alkaline solution gives a dark ink-like solution with iron salts to transmitted light, with a lighter colour to reflected light. Silver nitrate causes a dark grey precipitate, insoluble in dilute nitric acid but readily soluble in ammonia.

Stains of silver on the fingers are readily removed by dillennic acid and ammonia. Lead in a neutral or vegetable acid solution partially precipitates, in alkaline solution entirely. Alum partially precipitates, lime water entirely or lime salts partially, the lime precipitate being redissolved by acetic acid, etc. Potash solution is partly precipitated by acetic acid; the residue gives a precipitate with HNO_3 ; its residue a precipitate with alum. The acid burns without odour, and seems to smoulder away when heated in a glass tube.

Solution of the acid very speedily caused tetanic spasms in

a common earthworm and death, the worm *post mortem* presenting a flattened appearance. In man internally it seems to act violently on the liver, causing black motions of a watery character, with some griping and nausea. There is no irritant or astringent effect on the mouth, etc. The solution of alkaline salt or acid keeps readily, hence it has antiseptic properties worthy of investigation.

Stephenine, like carmine, dissolves readily in ammonia, and is a nuclear stain; it is soluble in glycerine, insoluble in spirit. It can be readily mounted in dammar, and will stain silk and paper of a rose colour. The oil, soluble in boiling, insoluble in cold methylated spirit, gives the sickly odour of the plant. It is solid and, like essential oils, is non-saponifiable.

BIBLIOGRAPHY.

Phyto. Aust., xl, 94: Müller also, viii, 125; xl, 94. Ersch and Gruber. *Encyc. Bentham, Aust. Flor.*, i, 19. Rosenthal's *Synopsis Plantarum Diaphoricarum*.

HUMAN AND BOVINE TUBERCULOSIS.

A PRELIMINARY NOTE.

By NATHAN RAW, M.D., M.R.C.P. LOND.,

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THE controversy amongst scientific workers as to the exact relationship between human and bovine tuberculosis is still active, and the startling statement of Koch at the International Congress in London in 1901 has, if it has as yet led to no other result, at least stimulated men to active research throughout the world. Professor Koch only this year in Berlin has reiterated his theory, and is as firmly convinced as ever he was that the two diseases—namely, human tuberculosis and bovine tuberculosis or *Perlsucht*, are quite distinct and different, and that bovine tuberculosis cannot be conveyed to the human.

The question is too large to be discussed here, and it is, of course, quite beyond my powers, in the absence of careful and prolonged experimentation, to offer a solution, but although I was taught to believe that the two diseases were really identical, previous to the paper by Koch in 1901, I have after careful observation entirely changed my view, an opinion which is based chiefly on clinical observation.

During the last five years, namely, from 1898 to 1902, I have had under my care in Mill Road Infirmary 1,750 patients suffering from various forms of phthisis pulmonalis, and 273 children suffering from *tabes mesenterica*. In addition to these cases, there have been a great number of patients affected with varying forms of tuberculosis of joints, bones, glands, and skin, as would be expected in a large Poor-law infirmary containing 800 beds.

Careful *post-mortem* examination with bacteriological and microscopical observations have been carried out in the laboratory, together with inoculation experiments conducted at the Thompson-Yates Laboratories, University College.

Up to the present time it has been customary to classify all the lesions called tuberculous in one general category of disease, and to say they were all produced by one bacillus, namely, the tubercle bacillus of Koch. The chief of these lesions are:

Phthisis pulmonalis.
Tuberculosis of pleura.
" " peritoneum.
" " lymph glands.
" " joints.
" " bone.
" " skin.
" " other organs.

If we consider for a moment the disease called *tabes mesenterica*, which is classified as tuberculosis, we must ask ourselves the questions, "How does the bacillus gain entrance to the mesenteric glands?" and "Why is the disease not decreasing with other forms of tuberculosis?"

The late Sir Richard Thorne-Thorne in his Harben lecture of 1893, says:

The matter, too, assumes a still more serious aspect if we limit ourselves to the first year of life, when raw milk is most largely used as food, for then we find that the reduction in the rate of death from the various forms of tuberculosis, which reduction has been going on at all ages for about half a century, not only disappears, but is actually transformed into a large increase, reaching no less than 27.7 per cent.

This in itself is grave enough, but its significance is still further emphasized when we remember what are the circumstances under which this increase in the rate of death from *tabes mesenterica* has gone on synchronously with a decrease in that from other forms of tuberculosis.

This statement by Sir Richard Thorne-Thorne of 1898 is still true to-day. The death-rate from phthisis pulmonalis is steadily decreasing, but that from tabes mesenterica is still steadily increasing. On the other hand, we have it stated on high authority that tuberculosis in English cattle is rapidly increasing.

The majority of deaths in infants occur between the ages of 3 and 6 months, just at a time when raw milk is consumed in greatest quantity; from that time the mortality is less and sinks rapidly as age increases.

I have for some time been inclined to the view that tabes mesenterica is not true tuberculosis—that is, that it is not caused by the same tubercle bacillus as that which produces phthisis pulmonalis.

When visiting the splendid laboratories of Professor Koch a few months ago I was much impressed with the distinctive cultural peculiarities of human and bovine tuberculosis, and was bound to admit that the cultures appeared to be distinctive. Professor Koch was kind enough to give me pure, fresh cultures of both human and bovine tuberculosis, and I made several subcultures of both. The growths on blood serum were always distinctive in each case.

From a recent case of tabes mesenterica I made cultivations of the mesenteric gland on blood serum with glycerine, and to my surprise the growth exactly corresponded to bovine tuberculosis or *Perlsucht*. Again, from a case of strumous knee-joint I made a cultivation of the lymph from the interior of the joint, with an exactly similar result. The cultivations which I have previously obtained from phthisical sputum have generally shown the usual characteristics of human tuberculosis and never bovine. Professor Ravenel affirms—

That the tubercle bacillus from bovine sources has in culture fairly constant and persistent peculiarities of growth and morphology, by which it may tentatively be differentiated from that ordinarily found in man.

From these two cases, together with a general survey of clinical facts, I feel there is some reason to suppose that whilst bovine and human tuberculosis are distinct and separate diseases, yet the human subject is susceptible to bovine tuberculosis in the early period of life especially, and that bovine tuberculosis may set up serious lesions in the human body.

I hope in a future paper to be able to substantiate this view after more precise work on tabes mesenterica, strumous glands, and tuberculous joints.

CONCLUSIONS.

In view of the foregoing, I venture to think there is some evidence to assume:

1. That there are two distinct varieties of tuberculosis affecting the human body, one produced by human tubercle, the other produced by bovine tubercle.
2. That human and bovine tuberculosis are separate and distinct.
3. That bovine tuberculosis entering the alimentary canal in milk may set up tabes mesenterica, more especially in children.
4. That bovine tuberculosis is probably the cause of enlarged lymph glands, tuberculous joints, and lupus.
5. That true human tuberculosis or phthisis pulmonalis is always conveyed from one person to another by infection, and generally from advanced cases of phthisis.
6. That every effort should be made to stamp out tuberculosis in cattle, and that milk should be boiled before use by children.

SOIL POLLUTION AND DISEASE IN CAMPS.

By MAJOR R. CALDWELL, F.R.C.S., D.P.H.

The influence of soil upon health is a matter which has long occupied the attention of the profession, and the interest attaching to this subject has of late been materially heightened by certain speculations relative to the part played by camping grounds in the incidence of enteric fever on armies in the field. These speculations naturally tend to be narrowed to the question as to the influence exerted in this connexion by camping grounds in prolonged occupation by troops.

The soil of a camp which has been occupied for any length of time may be compared to a filter or contact bed for the purification of sewage, in which, owing to lack of rest, or to what would have the same effect, excess of material to be disposed of, the nitrifying organisms are unable to meet necessary requirements, with the production of harmful and offensive

bodies as a result. In the case of the artificial filter or contact bed, not only are periods of rest most carefully regulated, but every effort is made to ensure, as far as possible, that the sewage to be treated should be of a more or less uniform character, as any sudden alteration in its composition is likely to overcome the powers of the living agencies which are utilized for its purification.

In the case of a camp it may fairly be admitted that neither of the above facts receives or, from the nature of the case, can possibly receive, serious practical consideration. Masses of human faeces, horse dung, kitchen refuse, and filth of all sorts are often of necessity thrust *en masse* into the soil, without regard to their ultimate fate once they are covered by a layer of earth of varying thickness.

I have no present intention of discussing questions relative to the variability of bacteria, except in so far as to state that when we consider how external conditions such as food and climate can so affect living protoplasm as unmistakably to alter, within a few generations, the physical and mental characteristics of the human race, we should feel no surprise if lowly organisms such as bacteria, which germinate at such a rate that the "number of individuals which might arise from a single bacterium in three or four days is almost inconceivable" (Hewlett), should develop new and sufficiently remarkable characteristics under the influence of altered surroundings, including possibly the power of producing specific disease. Whether the above theory is correct or not, the practical fact remains that as a general rule in every camp enteric fever and dysentery sooner or later make their appearance. The cause of the trouble is in most cases sought for in the water supply, which, from a sanitary point of view, is usually regarded as the root of all evil when defective, and, on the other hand, when above suspicion, as a panacea for a host of those ills incidental to service in the field.

While it would be difficult to exaggerate the importance of such a vital question, experience shows that water is by no means the sole channel by which diseases such as those under consideration are spread amongst troops. Several cases have come under my notice in which men, who for weeks had been employed in blockhouse duty on the veld, and who had only partaken of water in the form of tea or coffee, and therefore presumably safe, have been attacked by a virulent form of enteric; and officers also during the recent campaign have been victims who have assured me that for many weeks they have never partaken of unboiled water, including in the above term all forms of mineral drinks. For reasons which are too lengthy to be entered on here, the conveyance of enteric fever by milk or food amongst the troops actually in the field, as far as my own experience goes, need not be considered.

A farm, utilized as an outpost in the Harrismith district of the Orange River Colony, was to my personal knowledge a veritable hotbed of enteric fever of the worst stamp, although all drinking water was religiously boiled. The soil, however, had been much fouled by passing columns. In a camp, of which I recently had charge, also in the Harrismith district, enteric fever and dysentery occurred in spite of the fact that the water was of unimpeachable quality.

Many other instances from my personal experience could be given; let it suffice to say that, conversing with other medical officers who have recently been engaged in active service in the field, I have been deeply interested to find that their observations, like my own, point to the constant occurrence of enteric fever under circumstances which justify the absolute elimination of water as a possible cause of the disease in question, but where soil pollution was excessive. I was also much struck, during the earlier stages of the war in Natal, by the fact that men, while trekking, were as a rule singularly free from sickness, but that a return to standing camp was invariably the precursor of a lower standard of health.

The condition of a camp, under which heading blockhouses may for sanitary purposes be classed, must in any event unavoidably tend to the wholesale spread of micro-organisms of all kinds. The constant movement of men, the passage of heavy waggons with horses, cattle, or mules, the necessary trenching and digging, and apart from these, in South Africa, the heavy rainfall, are all factors in disintegration, bringing to the surface organisms which might otherwise have remained harmlessly in the soil. The influence, also, of the movements of ground air and water should not be forgotten. In particular, the effect of movements of ground air in this direction have been most ably pointed out by Sir C. A. Cameron. In his opinion, specific organisms carried into the