specially indicated in cases requiring the exhibition of small doses of mercury frequently repeated, in cases in which the patient is also tuberculous, in which the functions of the liver and kidneys are not being carried out satisfactorily, in nervous women, in the milder forms of ocular lesions, and in those whose digestion is impaired, and who are consequently intolerant of the drug when administered by the mouth.

There are certain subjects who are not amenable to injections in any form; those suffering from Bright's disease particularly, and in a lesser degree patients with any hepatic disease; the alcoholic subject is rebellious to this, as he probably is to any other form of treatment, and in those whose mouths are in a septic condition and who are suffering from carious teeth, it should not be attempted until the mouth has been restored to a state of comparative asepsis.

It must be confessed that recurrences are just as frequent after this as after any other form of treatment, and here as in the other methods the chronic intermittent form of treatment has to be pursued over a period of at least five years. But there are few patients who would be able or willing to submit to two or possibly three courses of injections annually, and consequently it is not a treatment to be pursued throughout the course of the disease unless possibly in a few quite exceptional cases. It is of the greatest use in suppressing the disease in its most active stage, and in eliminating the syphilis toxin at the period of its greatest virulence. If resorted to at the commencement of the disease, and carried on until symptoms of mild mercurialism are present, its place may be taken later by one of the milder and simpler measures, such as ingestion by the mouth. In cases which have been inadequately treated at the outset, and in which constant recurrences of the symptoms occur, it will usually so attenuate the disease as to render it subsequently more amenable to ordinary remedies. Finally, in cases of destructive tertiary lesions, it is one of the principal mainstays of treatment, for not only does it succeed here when other remedies have failed, but it tends to alter the character of any lesions which may crop up later, and causes them to assume a more benign character.

A CASE OF SYPHILIS, PHTHISIS, AND LOCOMOTOR ATAXIA.

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THE following case is of interest, not only as a clinical history of the sequence of three diseases, but also for its bearing on the much disputed clinical problem of the influence of syphilis on phthisis, and on the relation of locomotor ataxia to syphilis.

A. H., aged 46, a native of Finland, and an officer in the mercantile marine, was seen by me on January 1st, 1908, complaining of cough, headache, loss of appetite, and pains in the legs.

Family History.

His mother died of phthisis, aged 47, when he was 11 years old, and some years later his father died of heart failure. He has one younger brother, who has always enjoyed good health.

Patient's History.

When 16 years of age A. H. went to sea, and has followed this profession ever since, having risen to hold a master's certificate. At the age of 22 he contracted syphilis, and was treated by inunction, being given fifteen frictions with mercuric ointment, under which the primary lesion disappeared, and the patient believed himself to be cured. Five years later, however, at the age of 27, his skin became covered with blotches and papules, about which he consulted an English doctor in the United States, who put him on mercury pills for three months. The skin lesions disappeared, and he has not seen any manifestations of syphilis since.

At the age of 42, twenty years after contracting syphilis, he began to feel generally weak, was easily tired, and the appetite was diminishing. He continued in this state off and on for some time, and two years later, when 44 years of age, he further noticed a difficulty of walking in the dark, which he describes "as if I was putting my foot on a step which wasn't there"; and at this time he also commenced to suffer from pains in the legs, and from slight cough in the morning. Being in Finland at this time, he consulted a physician in Helsingfors, who told him that he was suffering from a nervous disease, and advised a course of mercury. Two days later, with regard to

the loss of appetite, which had now increased to nausea and vomiting after breakfast, he saw another physician, who found tubercle bacilli in the sputum, and prescribed residence in a sanatorium. He was extremely surprised to find himself phthisical, and the same day consulted a professor of the University of Helsingfors, who confirmed both diagnoses. At this time the patient felt very weak, and entered Nummela Sanatorium, where he received ten injections of mercury, on the instructions of his physicians. He resided at Nummela for four months; on leaving, his weight had increased from 59 kilos to 75 kilos, the nausea, sickness, and cough having entirely disappeared. Five months later his weight rose to 84 kilos.

Six months ago the patient noticed that the cough, which at the commencement of his illness had attracted little attention, was now returning with increased frequency, and for this he saw a doctor in Germany, who prescribed the iodides of sodium and calcium, from which, however, no benefit was derived.

Present Condition.

The patient is a well-developed man of 48, weighing 76 kilos. He complains of cough, headache, loss of appetite, and pains in the legs. Temperature is normal.

The cough is most frequent in the morning, and his sleep is undisturbed by this. During the whole course of his illness he has never suffered from night sweats nor from fever. The chest is well developed, and there is no diminution of "tidal breathing" on either side. Percussion and vocal fremitus were normal throughout. On auscultation wheezing rhonchi were heard during expiration over both lungs, but in only one spot could any alteration in the breath sounds be detected, and this in the upper lobe of the left lung over an area corresponding to a dollar, situated in the middle of the anterior maxillary fold. Over this very limited area the breathing was bronchial, vocal resonance was increased, but no accompaniments could be heard. The sputum has been white and frothy for the past week, but prior to this was greyish-white. A small piece of solid substance when examined contained large quantities of tubercle bacilli.

The appetite is poor, he has nausea after food, and is constipated. The liver is not enlarged.

The heart is normal in size and function. The radial arteries appear thickened and fibrous. The pulse is regular, frequency 70, the wave is full and well sustained, but the arterial tension is high. The urine contains no abnormal constituents. The spleen is not enlarged, but the inguinal and posterior occipital glands show adenopathy.

The patient is an intelligent man, takes considerable interest in his case, and has the nervous temperament. He has now suffered from pains in the legs for two years intermittently, and describes the sensation as a dull pain, with now and then sharp twitches running from the hip to the knee, sometimes in the reverse direction. He has still the uncomfortable sensation when walking in the dark of being uncertain of feeling the ground, and his feet are often numb and cold. Both knee-jerks are absent, but neither paraesthesia, alchoelia, nor Romberg's sign is present. The gait is not ataxic, the legs are well developed, and hypotonia cannot be elicited. The left pupil is smaller than the right, and both eyes show the Argyll-Robertson pupil.

There is little doubt but that this patient has suffered from chronic phthisis for four years, and it appears that the pulmonary lesion, of which a small part is now apparent in the left upper lobe, has its centre at the root of the left lung, possibly in enlarged bronchial glands, which by irritation of the sympathetic chain have brought about the contraction of the left pupil. Recently the patient has had chronic bronchitis which, from the absence of fever, may have been a superadded non-tuberculous infection. In any case this cleared up in a few days. One may here touch for a moment on the purely theoretical possibility of the phthisis having supervened on a tertiary lesion in the lung. In a patient who has had syphilis, and who in after-years becomes phthisical, there is always the possibility of a dual infection, although diagnostic certitude is impossible. On this chance Sergeant¹ advises that such patients be put on mercury, and this practice seems worthy of trial. In this case, however, it is improbable that a tertiary lesion existed, as there were no pulmonary symptoms prior to the onset of phthisis, and as the presence of locomotor ataxia apparently precludes the formation of gummata. At the same time, if there still be syphilis in the system, such treatment would be beneficial.

The patient has all his life been a great milk drinker. He states that in no other country he has visited does milk enter so largely into the general diet as in Finland, which is chiefly a pastoral country and ships seven thousand casks of butter every week to Britain. He informs me that up to a few years ago tuberculosis was rife among the cattle, but that now there is an efficient inspection of milk and butter by Government chemists

and bacteriologists. As a drinker of milk he has taken it all over the world. At the same time, as it might naturally be supposed that a life at sea would have precluded all prolonged contact with phthisis, it must be stated that six years ago, two years before the onset of phthisis, he began to carry a number of consumptives for two months in the summer on a cruise round the Mediterranean, and was thus for two summers in succession in contact with tuberculosis.

EFFECT OF SYPHILIS ON PHTHISIS.

The effect of syphilis on phthisis, particularly as regards the course and prognosis of the disease, is a question on which diverse opinions have been held. On the one hand we have the grim phrase of Landouzy,² "Syphilis often makes the bed of phthisis," and on the other hand the reckless advice attributed to a certain doctor to his phthisical patients, "Tâchez donc, mon garçon, d'attraper la vérole." Such varied opinions are but proof of the fact that syphilis and phthisis may coexist under a variety of different conditions, and that each combination must be separately considered. The question raised by the present case is the influence of pre-existing syphilis on phthisis.

It is admitted by all authorities that syphilis is a predisposing cause to tuberculosis, a cause which needs no other explanation than the profound anaemia so often the concomitant of secondary syphilis, for, as Ricord⁴ has expressed it, "syphilis is a blow to the economy, a blow capable of arousing organic defects and of awaking to activity every diathesis." Not only so, but Stieffel,⁵ Jacquinet,⁶ Renon,⁷ and Sergeant⁸ have proved that when phthisis does break out during secondary syphilis it runs an extremely rapid course.

The writer recently saw a case under the care of Dr. W. A. Mackay of Huelva which bears out this view.

A lad, aged 17, contracted syphilis in 1904. He was seen early and put on Hutchinson's pills. In spite of treatment, he suffered severely from secondary symptoms, and at the end of the year in 1905, although mercury was pressed, he had ulceration and destruction of the palate, a lesion which may be considered to belong to Hutchinson's "intermediate period." At this time he was in extremely low health, and developed cough, and tubercle bacilli were found in the sputum. He now rapidly went downhill, and when seen by me in 1907 had both lungs involved in every lobe. He died two months later.

The secondary period past, syphilis does not seem to exercise this malign influence on phthisis. Thus Sergeant⁸ records two cases which became phthisical three and four years respectively after contracting syphilis and where the pulmonary lesion assumed a chronic form, and five similar cases where the phthisis appeared from thirteen to thirty-four years after syphilis. To explain such cases Sergeant⁸ has promulgated the theory of the "*terrain syphilitique*," which he describes as "a state of body resulting from old and worn-out syphilis, and which can be transmitted to descendants." He considers that this state is favourable to the development of tuberculosis, but that, "if tuberculosis is very frequent in old syphilitics, it is particularly torpid and benign in such subjects." Until it be statistically proved that the incidence of phthisis in old syphilitics is greater than among normal persons of the same age, the predisposition of old syphilitics to pulmonary tubercle will remain theoretical. On the other hand, Landouzy, Stieffel, and others have also held that tubercle in the subjects of old syphilis runs a peculiarly benign course, and the cause of this beneficial tendency to fibrosis of the pulmonary lesion is a question of extreme interest.

Handford¹¹ considered that the fibroid tendency of tubercle occurring in subjects of arterio-sclerosis was due to the high blood pressure and not to the sclerosis. Landouzy¹² holds it due to the sclerosis, and Sergeant¹³ believes it is caused by sclerosis, aided by a peculiarly active reaction to inflammation, which is one attribute of the "*terrain syphilitique*."

In the case under consideration phthisis appeared twenty years after the syphilitic infection, and is running a chronic and benign course. If we look to evidences of sclerosis outside the lung, these are to be found in the condition of the arteries, although there are no signs of aortitis or nephritis; and also in the condition of the spinal cord. It is little wonder, then, in an area of the lung where the tissues not only share the general incitement to sclerosis, but are also subject to the irritation of

the tubercle bacillus, that fibrosis should be active. Further, there is little doubt but that the active hyperaemia in the pulmonary lesion, present during "periods of high blood pressure," will also augment this process. Thus syphilis, one great cause of arterio-sclerosis, whereby life is shortened, affords a slight reprieve from a disease which might otherwise have been fatal. With regard to the course of phthisis following syphilis, it appears to be true that the more ancient the syphilis the more hopeful the prognosis.

SYPHILIS AND LOCOMOTOR ATAXIA.

It was Fournier¹⁴ who first classed locomotor ataxia and general paralysis of the insane as parasyphilitides, his view being that "although they have a syphilitic origin, they have nothing of syphilitic nature"; and recently, in his address on Syphilis and the Nervous System, Dr. F. W. Mott¹⁵ has brought together a compendium of evidence which leaves no doubt as to the essential taint of syphilis in these affections. Admitting the essential syphilitic taint in locomotor ataxia, there are three views as to its causation: (1) That it is a manifestation of quaternary syphilis. (2) Bernheim and Levi¹⁶ and others believe it to be due to an unknown toxin acting in conjunction with syphilis. (3) Mott¹⁵ holds that the syphilitic poison along with other exciting influences will "cause the nerve cells to exercise an abnormal metabolic activity in the production of side-chain molecules necessary for immunization against the toxic effects of the virus," and that there results an over-immunization against the syphilitic poison, along with exhaustion and decay of the nerve cells.

One indication that syphilis alone is not the sole cause of locomotor ataxia is the fact that in the South of Spain, where syphilis is widespread, locomotor ataxia is relatively rare, while of other exciting causes the only one absent is alcoholism.

The most important point in Mott's view is that there exists in these diseases an over-immunization against the syphilitic virus which makes the giving of antisyphilitic remedies not only useless but injurious as lowering to the general vitality. This theory of over-immunization is based on two facts—the failure of Krafft von Ebing to infect general paralytics with syphilis, and the presence of "antisyphilitic bodies" in the serum and cerebro-spinal fluid of patients with parasyphilitic lesions, which antibodies are said to increase as the disease progresses. Admitting these facts, it seems to the writer that they may bear another interpretation.

With regard to the failure to infect general paralytics, it is known that in primary syphilis, once there is general infection, it is impossible to inoculate the patient with the discharge from his own chancre, and yet from this it is not to be deduced that a patient with primary syphilis is in a state of over-immunization. When one considers the ravages of which secondary and tertiary syphilis are capable, it is probable that the failure to produce a second chancre is due, not to over-immunization, but to absolute want of resistance in the organism, due to present infection, whereby the *Spirochaeta pallida* will enter the system without the formation of a chancre, which in itself is only an evidence of tissue resistance to the virus. Further, there is the authority of Hutchinson¹⁷ that a second attack of syphilis is possible, which means that not only has the patient recovered from the first attack, but has failed to acquire a lasting immunity. On this view, when there is no local reaction to syphilitic infection, it indicates that the patient has had syphilis and is still suffering from it.

So far as antisyphilitic bodies are concerned, Bab and Fleischmann¹⁸ found them in patients still suffering from syphilis, and Citron¹⁹ states that patients who show antibodies are those who have not been sufficiently treated with mercury. Again, if these antibodies are thrown off in increasing numbers by the nerve cells when decay sets in without a greater increase in the excitation of the syphilitic virus, they then form an unusual exception to the law of Weber—that to produce effects increasing in arithmetical progression it is necessary to have stimuli increasing in geometrical progression, a law which is generally true when the phenomena of immunity are concerned. Lastly, it is certain that the *Spirochaeta pallida* can exist in the body years after the primary infection, and Ballet and Valensi²⁰ have recently

reported a case of chronic syphilitic meningitis forty-three years after infection.

Charcot, Fournier, and Hutchinson have considered that clinically mercury and iodides are of value in checking these parasymphilitic lesions, and in accordance with the practice of the last authority the patient in this case has been put on 1 grain of mercury twice daily in the form of Hutchinson's pill, and is advised to continue this treatment for twelve months, the iodides being contraindicated by the pulmonary lesion.

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ON EXTRAGENITAL SYPHILITIC INFECTION.

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THOUGH syphilis is acquired in nearly all cases in the course of sexual intercourse, or is present congenitally, one meets every now and then with patients in whom the usual mode of infection is doubtful, or is denied and cannot be proved.

This paper deals with cases of syphilis insontium, the syphilis of the blameless, where we can exclude venereal infection with great probability, or even certainty. In practice and hospital work I have met with several cases in which men and women, living with infected individuals, have developed in the course of sexual connexion primary sores on various parts of the body surface—for example, the abdomen (1 case at the Seamen's Hospital), shoulders (1 case mentioned by Mr. Turner), lips (2 cases—1 at Würzburg, 1 at the Seamen's Hospital), eyelids (2 cases mentioned to me by Dr. Wilfrid Fox, and 1 seen by myself whilst a student), tongue (1 at the Seamen's Hospital), etc. These cases I exclude from consideration in this paper.

To show the importance of small abrasions or wounds in the skin in relation to infection with a syphilitic virus, I may mention a case observed by Professor Müller at Zürich a few years ago. A blacksmith went for a walk with a factory girl in the woods. On the way he was stung on the index finger of his right hand by a wasp. Shortly afterwards he had connexion with the girl, and a primary sore appeared on his finger but none on his penis. This is, however, a case of extragenital but not of extravenereal infection. I want to call attention to the fact that people leading blameless lives may be unfortunate enough to contract a perfectly avoidable disease, which, taking into consideration its long-lasting and intense effects, is one of the most important that the medical man has to deal with.

A discussion on the subject would have been almost useless a short time ago, for we knew next to nothing of the active cause. We now know for certain that the etiological organism is a spiral body, very probably of parasitic or protozoic nature. It has been repeatedly grown in pure culture in the cornea of the rabbit, after an incubation of from five to seven weeks. I may mention the names of Tomaszewski, Bertarelli, Schuch, Neisser, Greef and Clausen, Kraus and Volk, von Benedek, Mühlens, and E. Hoffmann, as among those who have succeeded in obtaining cultures. After having passed through the cornea of several rabbits, it has still been possible to infect monkeys, to produce in them hard sores at the site of inoculation, and to find again in the resultant secondary manifestations the spirochaetes in pure culture. All the necessary postulates to prove the etiological relation of an organism to a disease have been fulfilled. Also the spirochaete, or in the newer nomenclature *Treponema pallidum*, has never been found in any but cases clinically showing themselves to be syphilis, if we make exception

of the tropical disease yaws or frambœsia, in which a similar organism has been detected by Castellani. We have now, therefore, the opportunity of making a definite diagnosis in all doubtful cases.

I shall not take into consideration the commonest instances of syphilis insontium—namely, the infection of medical men in the course of their practice. They are very frequent indeed, and, though much to be deplored, not much can be done to eliminate them from the bounds of possibility. They are among the necessary risks of the profession. In many cases the disease was not recognized, and in others the medical man endangered himself and others by neglect of the necessary precautions. Lessar published lately 5 cases of syphilis in medical men, all acquired in the course of practice. Three did not diagnose the disease in themselves, and only remembered having had whitlows on their fingers, which took a very long time in healing. Under such circumstances we must not be astonished to find no history of syphilis in many cases of general paralysis of the insane, a disease which, from its clinical, pathological, and histological appearances, I believe to be always of syphilitic origin.

CASE I.

The first case of extravenereal syphilis that came to my notice was in Genoa. An illegitimate child had been entrusted to a foster-mother in the mountains near Genoa; this child was brought to me with a sore on its left tonsil, and hard glands on the corresponding side of the neck. Doubts as to the nature of the disease were set at rest by the appearance of a typical rash by the time that the child was brought for a second examination. The foster-mother had papules on her pharynx. Her husband had been to town to deal in cattle, and during his stay there had infected himself and then had infected his wife. The woman had the habit of tasting every spoonful of food before giving it to the infant, and probably with the contaminated spoon had wounded the left tonsil of the child, which, during the process of feeding, she held on her left arm; this, however, is mere hypothesis. Mercurial inunctions soon brought the disease to a standstill in man, woman, and child.

CASE II.

The second case I met with was in Switzerland. A lady, engaged to a young man of my acquaintance, asked my advice about a sore on her lower lip. I sent her to a specialist, who diagnosed ulcus lueticum, and prescribed mercurial treatment by the mouth. It fell to my lot to tell her fiancé the nature of the complaint, and that his marriage would have to be postponed for at least two years. He had no visible signs of specific disease, and denied that he had ever had any venereal disease except gonorrhœa, but admitted that he had been with a prostitute about four weeks before, and that within half an hour he had visited his fiancée and had kissed her. At the time I considered it probable that the syphilitic germ had been carried from the prostitute to the patient without the carrier being affected. I am now rather sceptical about this mode of infection, but am persuaded that the infection took place extravenereally, and simply refer to it as a case of this kind.

CASE III.

It has fallen to my lot to help to diagnose the third case recently in London. A tailor, a foreigner, married about eight years, had a healthy wife and two healthy children. In November, 1906, he helped to eject a drunken man from a public-house, and during the struggle the man, who appears to have had a number of red spots on his forehead (corona veneris?), bit him on the little finger of the left hand. The wound rapidly swelled, and refused to heal in spite of medical treatment. In February, 1907, the patient noticed for the first time that a number of red spots had made their appearance on his chest; the spots increased rapidly in number and size. On examination he was found to be suffering from a slight angina, and to be covered with maculo-papular specific exanthem. There was no primary sore on his genitals. On the second phalanx of the little finger of the left hand there was a red, infiltrated, indolent, hard, circular sore, well-developed orbital glands on the right side, and also glands in the axilla. On the left side no glands could be detected with any certainty. All symptoms disappeared rapidly under vigorous treatment with mercurial ointment.

To these 3 cases I can add 2 doubtful cases where direct proof of extravenereal infection is wanting:

1. A Portuguese gentleman whilst dancing with a girl rubbed his forehead several times on hers. He noticed later that her forehead had a number of curious spots on it. He developed a primary sore on his temple. No primary sore could be detected elsewhere. The patient denied cohabitation, and the sore appeared three weeks after the dance. I had occasion to treat him some time after, and saw the typical scar on his forehead.

2. A butcher was sent to the out-patient department of the Seamen's Hospital for a persistent whitlow on his thumb that