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THE DIAGNOSTIC FEATURES AND TREATMENT OF LEPROSY.

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The clinical picture of leprosy drawn by many of our text-book writers is that of a disease as readily recognizable by its typical features as it is repulsive by its hideous deformity. This common conception is derived from examples or representations of the disease in its fully developed or final stage. With its initial manifestations and the varied

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phenomena exhibited in the earlier stage of its evolution, few medical men in this country are familiar. While it is undoubtedly true that the clinical features of a case of leprosy typical in its development and advanced in its evolution are so striking and characteristic as to be absolutely pathognomonic, it is equally true that in its earlier stages, and even in fully developed cases with atypical manifestations, there is no disease in the entire domain of pathology more difficult of recognition. It is precisely this latter class of cases which have a most important relation to the general subject now under discussion. Leprosy in this country is essentially of exotic origin, and Dr. Hyde has told you that the vast majority of lepers in North America are imported cases. Dr. White will doubtless urge the establishment of a rigid quarantine against the immigration of lepers as the most effective prophylactic measure. In the writer's opinion, however, no system of quarantine can be instituted sufficiently searching and rigid to exclude a disease so little manifest on ordinary examination as leprosy.

Mr. Jonathan Hutchinson states that on the occasion of a visit to the Leper Hospital in Norway, he examined a number of the inmates who appeared to him perfectly well. Asking to be shown the means by which identification was arrived at, little brown patches, sometimes a single patch on the limbs, were pointed out, which were anæsthetic in their centres. Referring to the efforts then being made by the United States authorities to prevent the ingress of lepers, by the inspection of all Norwegian immigrants before they were allowed to land, the Bergen physician said: "They only recognize bad forms, and these but seldom go over; they don't know such cases as these."

It will be my object in this paper to consider more especially the diagnostic signs of the disease at an early stage, when they are so little manifest on ordinary examination as to escape identification.

The difficulties which attend the diagnosis of leprosy depend upon its prolonged period of incubation, the absence of any initial lesion that might connect it with a known exposure, the indeterminate character of its prodromal symptoms, and, finally, the multiplicity and variety of its manifestations. The fact that leprosy is essentially a proteiform malady is not sufficiently appreciated. While syphilis may surpass it in the number and variety of its eruptive elements, the cutaneous manifestations of leprosy most accurately imitate many of the ordinary dermatoses. This imitation is carried into the realm of neuro-pathology; nerve leprosy simulating most deceptively the manifold forms of neuritis of toxic, traumatic, and constitutional origin. The earlier manifestations of leprosy, unlike those of syphilis, are in no sense "specific" or peculiar to the leprous process; there is nothing regular in their mode of evolution, nothing constant in their appearance, nothing distinctive in their morphological characters; they are so variable, uncharacteristic, and

absolutely indefinite, that they would never be ascribed to leprosy in any country where the disease was not endemic, or there were not decided reasons for suspecting its presence.

As is well known, the lesions of leprosy chiefly affect the skin and nerves, and according to the determination of the morbid process toward the cutaneous or nervous system, two principal forms are recognized.

The prodromal symptoms of the *tubercular form* possess but little diagnostic value; they may be so slight as to escape recognition. The malaise, general debility, vertigo, digestive disorders, fever, etc., are commou to other diseases. The febrile movements, formerly ascribed to cold, damp, or malaria, we now recognize as due to the invasion of new parts of the body by the bacilli, and the toxic effects produced by their emanations.

The prodromal symptoms of the *anæsthetic* form are much more variable, and quite as uncharacteristic. They consist chiefly of disorders of sensation, hyperæsthesia, formication, pruritus, and sensations of burning, tingling, and numbuess. The pain and motor weakness often present are ascribed to rheumatism or neuralgia. In both forms symptoms referable to changes in the mucous membranes of the upper air-passages, slight hoarseness, rhinitis, epistaxis, etc., not infrequently precede the outbreak of any eruptive accident.

The first objective signs of leprosy are usually manifest in the form of erythematous spots or patches of variable size, shape, and color. These spots almost invariably make their first appearance upon exposed parts, the face, hands, and feet; later they become more generalized. The exanthem sometimes resembles that of the eruptive fevers. I have recently seen a case in which the initial rash had been diagnosticated as measles, from which it was differentiated by its persistence. For three years it faded and reappeared a number of times in the form of erythematopapular lesions, before the charcteristic tuberculation took place. Still another, in which the right side of the forehead and cheek was occupied by slightly raised erythematous patches of a sombre-red color, simulating perfectly lupus erythematosus. In the tubercular form the spots may come and go a number of times before remaining permanent or becoming the seat of tubercles. They are to be differentiated from the lesions of exudative erythema and the macular syphilide by their localization and their slower involutive changes.

The erythematous spots of the anæsthetic form are characterized by their permanence, their tendency to clear in the centre while spreading peripherally, their achromic changes, and later, by their anæsthetic centres. They are to be distinguished from the patches of chromophytosis, morphœa, and vitiligo.

Months or years may intervene between the first appearance of leprous erythema and the development of tubercles. The tubercles, which constitute the most specific sign of this form, may develop upon the erythem-

atous patches, or upon previously clear surfaces. They vary in form, color, consistence, and in size from a pin-head to that of a small nut. The tubercles may remain stationary or progressively enlarge. After their full maturity they may undergo spontaneous resorption and reappear a number of times. They may soften and break down, forming shallow or deeper ulcers, or they may undergo a fibrous induration into small hard masses, which persist indefinitely. They may be discrete or aggregated in patches. Their seats of predilection are the facial mask and the extremities, but they are not confined to these regions. Situated along the external malleolar region and in front of the leg, they bear a most deceptive resemblance to the nodules of erythema nodosum. When small they have been mistaken for the papules of lichen planus, acne indurata, rosacea and sycosis. When larger the tubercles may resemble the tumors of molluscum fibrosum, sarcoma, carcinoma, mycosis fungoïdes, syphilis, and lupus vulgaris.

The diseases with which leprosy is most apt to be confounded are syphilis and cutaneous tuberculosis, with which it shares the pathological peculiarities of cell infiltration of the connective tissues, followed by disintegration of the morbid products and ulceration.

The lenticular tubercles of leprosy resemble absolutely the small papular syphiloderm. The tubercular syphilide, which bears the most deceptive resemblance to leprosy, is distinguished by the more rounded contour of the lesions, their development in circular or crescentic forms, their absence from the lobes of the ears, and their more general distribution. The ulcers of syphilis are more rounded, more superficial, and more circumscribed in extent. The ulcerations of leprosy do not present a serpiginous mode of extension. Lupus is distinguished by its occurrence in the form of isolated patches, and its more limited localization. In all doubtful cases of tubercular leprosy, the demonstrable presence of the bacilli in the tissues or liquid exudates establishes the diagnosis.

An early manifestation of the anæsthetic form is a bullous eruption, which may even precede the erythema. It is to be distinguished from pemphigus vulgaris. Frequently the first indication of the disease, especially in children, is the existence of burns, scalds, or other traumatisms which the patient has received unconsciously. In tropical countries where patients go barefoot, the so-called plantar ulcer is often an early sign.

The phenomena of nerve leprosy are essentially those of multiple neuritis; they consist of hypertrophy and nodular infiltrations of the nerve cords, readily recognizable in the ulnar and peroneal nerves, paralyses of special nerves, with atrophic and degenerative changes of the muscles, giving rise to contractures, and the peculiar "bird-claw" deformation of the hands. Anæsthetic leprosy has been mistaken for progressive muscular atrophy, arthritis deformans, hysterical paralysis, mutilating

scleroderma, Raynaud's disease, syringomyelia, etc. The lesions of the bones and joints, with the mutilations and deformities which commonly occur in the advanced stage, can scarcely be confounded with the clinical picture of any other disease. As the bacillus cannot be demonstrated in the lesions of nerve leprosy, anæsthesia constitues the most important diagnostic feature of this form. Since leprosy is exclusively human in its origin, the history of known contact with a leper, or of residence in a leprous country, is of great diagnostic worth.

In this necessarily brief sketch, I have been compelled to pass over the leprous manifestations of the mouth, nose, and throat, the ocular lesions, the changes in the cutaneous glands, the alopecia, the visceral complications, and other pathological coincidences which furnish important diagnostic indications. Want of time also forbids more than a passing allusion to those *atypical* forms of the disease in which a deviation from the normal plan of evolution introduces an element of confusion. While as a rule the lesions of leprosy are more or less symmetrical, cases are met with in which the manifestations are strictly unilateral. I have had under observation a case in which twelve years after infection the only symptoms were dystrophia and anæsthesia of the right hand, forearm, and ankle; another of ten years' duration, in which the manifestations were limited to three or four erythematous patches with anæsthetic centres on the left side; still another, in which the sole signs of the disease were a single tubercle on the right cheek, and anæsthetic changes in the right hand.

TREATMENT.—It would be presumptuous in a medical man living in a country where leprosy is not endemic, to formulate conclusions as to its treatment based upon his own necessarily limited experience. For results possessing definite value, we must rely upon the clinical experience of competent medical men living in leprous countries, who have had opportunities of testing remedies on a large scale and during a long period. Unfortunately, this clinical testimony, instead of being conclusive, is of the most conflicting and contradictory character.

In estimating the value of treatment certain possible sources of error should be considered. The study of the natural history of leprosy, abandoned to its own evolution and uninfluenced by treatment, shows that it does not pursue a progressive, uninterrupted course: the morbid process alternates between activity and repose; it often presents remissions sufficiently prolonged and complete to give deceptive indications of a cure. It may be formulated as a general law that recessions are the rule in leprosy, especially in the earlier stages. If a remedy happens to be given when such a remission is about to occur, the observer is apt to attribute the spontaneous subsidence of symptoms to the treatment employed. On the other hand, if the treatment is instituted coincidently

with an exacerbation or new outbreak, it is condemned as a failure. In the writer's opinion, the claims of most of the remedies which have been vaunted as "specifics" in leprosy, are largely based upon *post hoc* conclusions as to results, which, rightfully interpreted, are mere coincidences.

Without passing in review the vast number of drugs and methods of treatment which have been employed, we will glance at the clinical testimony in regard to a few which at the present day are most in repute.

Chaulmoogra oil perhaps ranks highest in professional esteem. It is claimed by Beaven Rake and most European observers, that under its prolonged use discolorations clear up, leprous nodules undergo involution, ulcers heal, and there is a notable amelioration of all symptoms, while Bidenkap, Daniellsen, and other experimenters have been disappointed with its results. Of gurjun oil, which enjoys such a high repute in India, Hillis states that it is a most valuable agent in all forms of leprosy, exercising a specific action upon the sweat glands, evidenced by increased perspiration and return of sensation in the anæsthetic areas. This opinion is concurred in by many of the civil surgeons in India. On the other hand, Drs. Beaven Rake, Vandyke Carter, and others, depreciate its value, declaring that the results are disappointing. Salol, so highly extolled by Lutz in arresting the leprous fever, causing the eruption to disappear and the ulcers to heal, is as strongly condemned by Dr. Cook, Superintendent of the Leper Hospital in Madras, who, after an extensive experience, declares: "Salol is, in my opinion, of no therapeutic value in leprosy; in fact, a decided failure." So with the entire list, salicylic acid, carbolic acid, creosote, crude petroleum, the sulpho-ichthyolate of ammonium, arsenic, etc.: highly praised by some observers, they are by others, equally competent, condemned as useless or barmful.

We thus perceive that among men who have had the largest opportunities for experiment, there is a most woful lack of unanimity as to the value of any of these various remedies.

In this country and Europe the therapeutic problem is complicated by the modifying influence of climate upon the course of the disease. It is a matter of observation that most lepers who come to this country get better, for a time at least, with or without medication, and when treatment is employed it is difficult to differentiate between its effect and that of climate and improved modes of living. Thus in a case of pronounced tubercular leprosy referred to me some two years ago by a colleague in New York, the cutaneous manifestations entirely disappeared within a few months under the influence of large doses of chaulmoogra oil internally, with daily baths and inunctions of gurjun oil. In another patient referred to me five years ago by Dr. Besnier, of Paris, there has been an apparent cure from the use of phosphide of zinc and strychnine. It is difficult to determine what precise measure of curative influence should be ascribed to the drugs in these cases, since in another case, under

observation for two years, there was an arrest of the symptoms under the influence of hot baths, massage, and general hygienic measures—no drugs whatever having been administered.

CONCLUSIONS.—For purposes of conciseness, the writer's views may be summarized in the following conclusions:

1. From the standpoint of scientific therapeusis, a clear conception of the pathogenesis and pathological anatomy of leprosy is an essential condition in formulating the principles of rational treatment.

2. It is now generally conceded that Hansen's bacillus is the active, efficient cause of leprosy, and that the presence of the bacilli in the tissues sets up either directly, or indirectly through their toxines, the vast array of organic changes and functional disorders peculiar to the disease.

3. There is no substance known to science which, introduced into the body, is capable of destroying the bacilli without destroying the living cells which contain them.

4. Furthermore, from the nature of the pathological changes and the position of the bacilli in the deeper tissues, it is evident that no germicidal agent can be brought into direct contact with the pathogenetic organisms, and hence all treatment which has for its object the destruction of the bacilli is impossible of application.

5. The treatment of leprosy by injections of tuberculin has been disappointing in its results. Experiment has shown that the action of tuberculin is positively pernicious in setting free the bacilli in the tissues and determining the development of new foci of the disease.

6. The treatment of leprosy is essentially empirical; whether, as has been claimed, certain remedies act by virtue of their sterilizing properties upon the living tissues, rendering them unsuitable to the growth and multiplication of the bacilli, cannot be determined.

7. The more or less rapid development of leprosy depends upon the resistance of the tissues to the inroads of the bacilli. In exceptional but well-authenticated cases, this capacity of resistance is sufficient to dominate and destroy the pathogenetic microbes, as shown by the observation of abortive cases in which indubitable signs of the disease definitely disappear and never recur.

8. This capacity of resistance may be strengthened by change of climate, improved habits of living, and measures calculated to build up and maintain the general health at the highest standard.

9. Observation shows that the removal of a leper from an infected district to a more favored climate exerts a marked modification upon the course of the disease; there is, for a time at least, an arrest or retrogression of the symptoms. This lull in the manifestations is, as a rule, disappointing in its duration. Of the one hundred and sixty Norwegian lepers who have emigrated to this country, there is no record of a single definite cure.

10. A dry, moderately cool, mountain atmosphere is most favorable in its influence upon the disease. A hot moist climate, or a damp cold climate are both unfavorable.

11. A nutritous diet of fresh meat and vegetables, warm clothing, exercise in the open air, freedom from exposure to damp and cold, are important elements in the hygienic course of treatment.

12. The care of the skin by frequent hot baths, massage, with inunctions of oils, etc., should receive as much attention as the constitutional treatment.

13. The special remedies which clinical experience would indicate to be of the most value, are chaulmoogra oil, gurjun oil, arsenic, and certain agents of the strychnos family; all are, however, more or less disappointing in their results.

14. All observers agree that in advanced cases, where general dissemination of the bacilli has taken place, curative treatment is absolutely futile. The most favorable conditions are that treatment be instituted early, and that it be prosecuted actively and energetically during a prolonged period.

15. The surgical treatment of leprous sores, necrosed bones, perforating ulcers, the excision of tubercles, amputation of the members, tracheotomy, various delicate operations about the eye, nerve-stretching for the relief of pain, the removal of threatening complications, are of the most signal benefit.

16. Finally, we may conclude that while medical science holds out no definite promise of cure to the leper, its resources are sufficient to arrest or retard the progress of his disease, to promote his comfort, and to prolong his life.

A CLINICAL AND EXPERIMENTAL STUDY OF URÆMIA.

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and

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(Continued from p. 193.)

Pathogenesis.—At the outset we are confronted by the possibility that uræmia may be due to purely mechanical causes, a theory brought to its highest perfection by Traube, who holds that it is the result of œdema of the brain and consequent anæmia, brought about by the watery condition of the blood, coupled with the increased arterial tension.