in whisky before going to sleep, are efficacious. Mild counter-irritation, or the application of a hot poultice, will sometimes promptly relieve the cough. In the later stages of the disease, when cavities have formed, the accumulated secretion must be expectorated and the paroxysms of coughing are now most exhausting. The sedatives, such as morphia and hydrocyanic acid, should be given cautiously. The aromatic spirits of ammonia in full doses help to allay the paroxysm. When the expectoration is profuse, creasote internally, or inhalations of turpentine and iodine, are useful.

(*d*) For the *diarrhœa* large doses of bismuth, combined with Dover powder, and small starch enemata, with or without opium, may be given. The acetate of lead and opium pill often acts promptly, and the acid diarrhœa mixture, dilute acetic acid (♏ x–xv), morphia (gr. $\frac{1}{8}$), and acetate of lead (gr. j–ij), may be tried.

(*e*) The treatment of the hæmoptysis will be considered in the section on hæmorrhage from the lungs. Dyspnœa is rarely a prominent symptom except in the advanced stages, when it may be very troublesome and distressing. Ammonia and morphia, cautiously administered, may be used.

If the pleuritic pains are severe, the side may be strapped or painted with tincture of iodine. The dyspeptic symptoms require careful treatment, as the outlook in individual cases depends much upon the condition of the stomach. Small doses of calomel and soda often allay the distressing nausea of the early stage.

XXVII. LEPROSY.

Definition.—A chronic infectious disease caused by the *bacillus leprœ*, characterized by the presence of tubercular nodules in the skin and mucous membranes (tubercular leprosy) or by changes in the nerves (anæsthetic leprosy). At first these forms may be separate, but ultimately both are combined, and in the characteristic tubercular form there are disturbances of sensation.

Etiology.—The disease is very widely spread, and within the past few years renewed attention has been directed to it, owing to a belief that it is greatly on the increase. It is one of the oldest of known diseases. At present it prevails widely, particularly in hot countries. In India it is estimated that there are over 250,000 lepers. In Europe, where it prevailed in the middle ages, it has become almost unknown except in Norway and in the Orient. On this continent leprosy exists in the Gulf States and extensively in Mexico. At Key West Berger states that there are one hundred cases, and Blanc found forty lepers in New Orleans. A few isolated cases arrive from time to time in the cities of the Atlantic coast. In the Northwestern States a few cases exist among the Norwegian and Icelandic settlers. On the Pacific coast cases are seen not infrequently among the Chinese. An endemic focus is at Tracadie,

New Brunswick. A few cases are also met with in Cape Breton, N. S. At Tracadie, which is on a bay of the Gulf of St. Lawrence, the disease is limited to two or three counties which are settled by French Canadians. The disease was imported from Normandy about the end of the last century. The cases are confined in a lazaretto, to which they are sent so soon as the disease is manifest. I made a visit to the settlement two years ago with the medical officer, A. A. Smith, of Chatham, at which time there were only eighteen patients in the hospital. It is interesting to note that the disease has gradually diminished by segregation; formerly there were over forty under surveillance.

In the Sandwich Islands leprosy has developed to an enormous extent. Morrow states that in 1889 there were 1,100 lepers in the settlement at Molokai.

In the West Indies the disease has been long endemic, and Beavan Rake, of Trinidad, has contributed some of the most interesting of recent clinical and pathological studies.

The disease attacks all classes and persons of all ages. It is probably communicated by contagion. Inoculation was successfully performed by Arning in a Hawaiian convict. Graham, who some years ago carefully investigated the Tracadie settlement, came to the conclusion that the disease was there probably transmitted by contagion; and A. A. Smith, the present medical officer, tells me that he knows of no facts which are opposed to that view. It is, however, only contagious in the same sense as syphilis, and just as accidental contamination with this virus is extremely rare so it is with leprosy. The closest possible contact may take place for years, as between parent and child, without transmission, and not one of the Sisters of Charity who have for more than forty years so faithfully nursed the lepers at Tracadie has contracted the disease. It is difficult to explain the rapid spread of the disease in the Sandwich Islands on any other view than contagion, and yet it is strange that there is no evidence of a primary lesion or external sore comparable to that of syphilis. Morrow states that "in the immense majority of cases the disease is propagated by sexual congress."

The disappearance of the disease in the middle ages no doubt resulted directly from the isolation enforced at that time. The disease has possibly in some instances been transmitted by vaccination. Hereditary transmission cannot be excluded, and there is no good reason why the disease should not be communicated, as is syphilis, from parent to child.

Jonathan Hutchinson believes that the disease is always associated with some special kind of food, particularly fish. Though he does not deny the specific nature of the disease or the possibility of contagion, he would make apparently the fish diet the *tertium quid* which renders the patient susceptible, or, if I gather aright from his recent communication, with which the poison may be taken. The facts which are manifest at the Tracadie settlement are very much opposed to this view. If a fish diet

could alone in any way induce the disease, by this time leprosy would be wide-spread in the counties along the Gulf of St. Lawrence, as fish is the main article of diet winter and summer. There is not the slightest difference in race, the mode of life, or in the surroundings of the inhabitants in the regions adjacent to Caraquet and Tracadie, and yet leprosy has been for nearly a century limited to two or three counties.

The Bacillus Lepræ.—Hansen, of Bergen, first discovered this organism, which has many points of resemblance to the *bacillus tuberculosis*, but can be differentiated from it. It occurs in extraordinary numbers in the tuberculous tissue. It has been cultivated successfully (Babes), but inoculation experiments on animals have been negative.

Morbid Anatomy.—The leprosy tubercles consist of granulomatous tissue made up of cells of various sizes in a connective-tissue matrix. The bacilli in extraordinary numbers lie partly between and partly in the cells. The growth gradually involves the skin, producing tuberous outgrowths with intervening areas of ulceration or cicatrization, which in the face may gradually produce the so-called *facies leontina*. The mucous membranes, particularly the conjunctiva, the cornea, the larynx, may be gradually involved. In many cases deep ulcers form which result in extensive loss of substance or loss of fingers or toes, the so-called *lepra mutilans*. In anæsthetic leprosy there is a peripheral neuritis due to the development of the bacilli in the nerve-fibres. Indeed, this involvement of the nerves plays a primary part in the etiology of many of the important features, particularly the trophic changes in the skin and the disturbances of sensation.

Clinical Forms.—(*a*) **Tubercular Leprosy.**—Prior to the appearance of the nodules there are areas of cutaneous erythema which may be sharply defined and often hyperæsthetic. This is sometimes known as *macular* leprosy. The affected spots in time become pigmented. In some instances this superficial change continues without the development of nodules, the areas become anæsthetic, the pigment gradually disappears, and the skin gets perfectly white—the *lepra alba*. Among the patients at Tracadie it was particularly interesting to see three or four in this early stage presenting on the face and forearms a patchy erythema with slight swelling of the skin. The diagnosis of the condition is perfectly clear, though it may be a long time before any other than sensory changes develop. The eyelashes and eyebrows and the hairs on the face fall out. The mucous membranes finally become involved, particularly the mouth, throat, and larynx; the voice becomes harsh and finally aphonic. Death results not infrequently from the laryngeal complications and aspiration pneumonia. The conjunctivæ are frequently attacked, and the sight is lost by a leprous keratitis.

(*b*) **Anæsthetic Leprosy.**—This remarkable form has, in characteristic cases, no external resemblance whatever to the other variety. It usually begins with pains in the limbs and areas of hyperæsthesia or of numbness.

Very early there may be trophic changes, seen in the formation of small bullæ (Hillis). Maculæ appear upon the trunk and extremities, and after persisting for a variable time gradually disappear, leaving areas of anæsthesia, but the loss of sensation may come on independently of the outbreak of maculæ. The nerve-trunks, where superficial, may be felt to be large and nodular. The trophic disturbances are usually marked. Pemphigus-like bullæ develop in the affected areas, which break and leave ulcers which may be very destructive. The fingers and toes are liable to contractures and to necrosis, so that in chronic cases the phalanges are lost. The course of anæsthetic leprosy is extraordinarily chronic and may persist for years without leading to much deformity. One of the most prominent clergymen on this continent has had anæsthetic leprosy for more than thirty years, which until recently has not seriously interfered with his usefulness, and not in the slightest with his career.

Diagnosis.—Even in the early stage the dusky erythematous maculæ with hyperæsthesia or areas of anæsthesia are very characteristic. In an advanced grade neither the tubercular nor anæsthetic forms could possibly be mistaken for any other affection.

Treatment.—There are no specific remedies in the disease, and general tonics combined with local treatment meet the only available indications. The gurjun and chaulmoogra oils have been recommended, the former in doses of from five to ten minims, the latter in two-drachm doses. The cases should be isolated, although the risk of catching the disease by direct contagion is extremely slight.

XXVIII. GLANDERS (*Farcy*).

Definition.—An infectious disease of the horse, communicated occasionally to man. In the horse it is characterized by the formation of nodules, chiefly in the nares (glanders) and beneath the skin (farcy).

Etiology.—The disease belongs to the infective granulomata. The local manifestations in the nostrils and the skin of the horse are due to one and the same cause. The specific germ was discovered by Loeffler and Schütz. It is a short, non-motile bacillus, not unlike that of tubercle. It grows readily on the ordinary culture media. For the full recognition of glanders in man we are indebted to the labors of Rayer, whose monograph remains one of the best descriptions ever given of the disease. Man becomes infected by contact with diseased animals, and usually by inoculation on an abraded surface of the skin. The contagion may also be received on the mucous membrane. In one of the Montreal cases a gentleman was probably infected by the material expelled from the nostrils of his horse, which was not suspected to have the disease.

Morbid Anatomy.—As in the horse, the disease may be localized in the nose (glanders), or beneath the skin (farcy). The essential lesion