Leprosy in India : summary of reports, furnished by the government of British India to his Hawaiian Majesty's government, as to the prevalence of leprosy in India, and the measures adopted for the social and medical treatment of persons afflicted with the disease.

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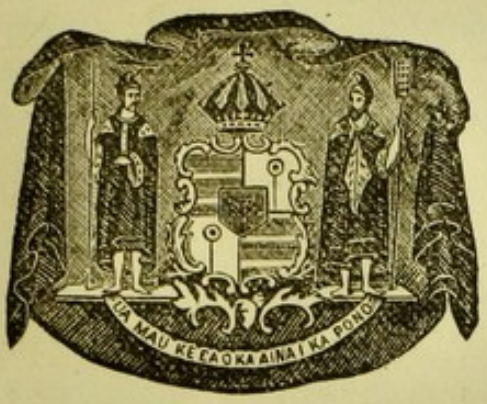
LEPROSY IN INDIA.

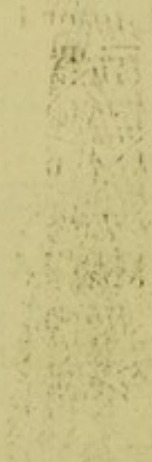


BY AUTHORITY.

SUMMARY OF REPORTS,

FURNISHED BY THE GOVERNMENT OF BRITISH INDIA TO HIS HAWAIIAN MAJESTY'S GOVERNMENT, AS TO THE PREVALENCE OF LEPROSY IN INDIA; AND THE MEASURES ADOPTED FOR THE SOCIAL AND MEDICAL TREATMENT OF PERSONS AFFLICTED WITH THE DISEASE.

HONOLULU, H. I., 1886.



INTRODUCTION TO REPORTS ON LEPROSY BY THE GOVERNMENT OF BRITISH INDIA AND OTHER FOREIGN POWERS.

It is about thirty years since Leprosy first attracted any serious attention in the Hawaiian Islands. Twenty years ago (1866) the dread disease had gained such a deadly hold upon the native race that the Hawaiian Government began to attempt to stamp out the scourge by segregation; for it had become a contest for the preservation or destruction of the aboriginal race. To judge by the number of cases in proportion to the population, the disease appears to be more virulent and malignant in the Hawaiian Archipelago than elsewhere on the face of the globe. What has been attempted and accomplished in this twenty years' struggle with a great national calamity appears elsewhere.

His Hawaiian Majesty's Government, anxious to provide every possible means for the treatment and understanding of the fearful malady, His Excellency Walter M. Gibson, His Majesty's Minister of Foreign Affairs and President of the Board of Health, addressed letters of enquiry to the Secretary of British India, to the Colonial Secretary of Ceylon, and to the Diplomatic and Consular representatives of the Hawaiian Kingdom in various parts of the world where Leprosy was known to exist, making enquiry in respect to the character and treatment of the disease.

The response to these enquiries has been most generous, more especially from governments of dependencies of Her Majesty Queen Victoria. In the accompanying pages will be found reports from every section of the vast Empire of India and its dependencies, from Ceylon, Hongkong, Siam, the Netherlands and their colonies, the Canary Islands, Norway, Spain, Mexico, Chili and Guatemala,

and an extremely interesting and valuable report from the famous leper institution of Tracadie, New Brunswick, Canada.

The report from the Secretary of India being so comprehensive and voluminous, it has been considered expedient to separate it from the other reports.

In grateful recognition of the sympathy of other afflicted nations, this collection of reports, together with the sad history of its own affliction, is presented to the world by the Hawaiian Government in the devout hope that the Almighty, in His great mercy, may ere long permit suffering humanity to find the means of mitigating the terrible scourge.

Honolulu, H. I., 1886.

CIRCULAR LETTER.

ADDRESSED TO HIS MAJESTY'S CONSULAR REPRESENTATIVES IN VARIOUS COUNTRIES IN WHICH LEPROSY PREVAILS.

DEPARTMENT OF FOREIGN AFFAIRS,
HONOLULU, February 5th, 1885.

SIR:—His Majesty's Government is engaged in the work of procuring, from all the best reliable sources, information as to Leprosy, and the social and medical treatment of lepers in other countries. I shall feel obliged if you will assist the Government in this matter by sending me such information as you may be able to obtain in ..... in regard to these subjects.

The points on which the Government is chiefly desirous of being informed are the following:

To what extent does Leprosy prevail in .....?

Has Leprosy been the subject of special legislation in .....? If so, please procure copies of the Statutes now in force.

Does the Government of ... . enforce segregation of Lepers? If so, what steps have been taken to provide for such segregation?

Do any hospitals or asylums for Lepers exist in ..... ? If so, please obtain full information as to those establishments and state whether they are supported by private charity or by the Government.

What is the prevalent popular opinion as to the contagiousness of Leprosy, and do healthy persons carefully avoid those who have the disease?

I enclose a number of copies of a printed list of questions which will form a useful guide in prosecuting this enquiry. I shall be obliged by your submitting them especially to any medical men who may have had opportunities of studying the disease as manifested in .....

I have the honor to be, Sir,

Your most obedient servant,

WALTER M. GIBSON,
Minister of Foreign Affairs.

[ENCLOSURE.]

QUESTIONS REGARDING LEPROSY.

The following interrogatories were prepared in 1862 for the British Government by a Committee of the Royal College of Physicians to assist in a similar enquiry to that now being instituted by the Hawaiian Government. Although some of them call for information of a technical character, which few persons are able to furnish, it has been thought desirable to produce them in full. The information more particularly desired is as to the prevalence of the disease, the way in which, by law or by custom, lepers are dealt with, the accommodation provided for them by the State or by private charity, and all available facts bearing on the question whether leprosy is or is not contagious in each stage of development:

1—Is leprosy known in .....? If so, be pleased briefly to describe it as it occurs there.

a. Are there several different forms or outward manifestations of leprosy? If so, by what names are they respectively known?

b. Are these several forms, in your opinion, only varieties of one common morbid state? or are they specifically distinct diseases, having no affinity with each other?

c. Please enumerate succinctly the more obvious and distinguishing characters of each form of leprosy which you have seen.

2—At what age does the disease generally manifest itself, and what are usually the earliest symptoms observable?

3—At what period of life and within what time does the disease usually attain its full development? and at what period of life, and after what time, does it usually prove fatal?

4—Is the disease more frequent in one sex than in the other? If so, in what proportion?

5—Is it more frequent among certain races? among the white, the colored or the black population? and in what relative proportions?

6—In what condition of society is the disease of most frequent occurrence, and what are the circumstances which seem to favor its development in individuals, or in groups of individuals?

Please to enumerate these circumstances under the following heads:

a. The character of the place or district where the disease most frequently occurs in respect to its being urban or rural, on the seacoast or inland, low, damp, and malarial, or hilly and dry.

b. The sanitary condition of the dwellings, and of their immediate neighborhood.

c. The habits of life, as to personal cleanliness or otherwise.

d. The ordinary diet and general way of living.

e. The occupation or employment.

7—What conditions or circumstances of life seem to accelerate or aggravate the disease when it has once manifested itself in an individual?

8—Does the disease appear often to be hereditary? Have you known instances where one member only of a family has been affected while all the other members remained free from any trace of it?

9—Have you reason to believe that leprosy is in any way dependent on or connected with syphilis, yaws or any other disease?

10—Have you met with instances of the disease appearing to be contagious, in the ordinary sense of the term, *i. e.*, communicated to healthy persons by direct contact with, or close proximity to, diseased persons?

a. If so, in what stage was the malady in the diseased person? Were there ulcerations with a discharge?

b. Please to describe briefly the case or cases of contagious communication which you have seen yourself.

c. Does the disease seem to be transmissible by secual intercourse?

11—Are persons affected with leprosy permitted in ..... to communicate freely with the rest of the community? or is there any restriction imposed, or segregation enforced, in respect of them?

12—What public provision is made for the reception and treatment of the leprous poor? Are they admitted into the general hospitals? or are there separate infirmaries or asylums provided for them?

Please to describe the structural and sanitary conditions of such buildings and the arrangements made for the medical and hygienic treatment of the sick in them.

13—Can you state the number of leprous persons maintained at the public expense in .....?

14—Have you reason, from personal knowledge, to believe that the disease has been of late years—say during the last 15 or 20 years—on the increase in ..... or otherwise. And, if so, please to state what, in your opinion, may be contributed to its increase or its diminution.

15—What results have you observed from the hygienic, the dietetic, or the medical treatment of the disease? Does leprosy ever undergo a spontaneous cure? and if so, at what stage of the disease?

Are you aware what proportion of the leprous poor treated at the public expense in ..... . recover wholly or partially?

16—What is the estimated population of .....? and when was the last census taken?

Is there a general and uniform registration of births and deaths, including the causes of death? and if so, how long has such a registration existed?

17—Can you state the name of the townships or districts in which leprosy prevails most, and give the number of lepers and the population in each of such townships or districts?

LEPROSY IN INDIA.

FROM A. MACKENZIE, ESQ., C. S.,
Secretary to the Government of India,

TO THE MINISTER OF FOREIGN AFFAIRS
TO HIS HAWAIIAN MAJESTY,
HONOLULU.

Home Department.
Medical.

SIMLA, the ..... October, 1885.

SIR:—I am directed to acknowledge the receipt of your letter, dated the 12th March, 1885, addressed to the Secretary to the Government of India in the Foreign Department, in which you desire to be furnished with information as to the prevalence of leprosy in India, and especially with regard to the measures adopted for the social and medical treatment of persons afflicted with the disease. It is observed that the Hawaiian Government proposes to publish the results of the general enquiries which are being instituted into the subject as soon as they have been collated.

2—In reply I am to forward a copy of the papers noted in the annexed schedule, giving the following particulars, in more or less detail, in regard to the leper asylums which at present exist in India:

(1) The number of such asylums;
(2) How each asylum is supported, that is, whether by public or private funds, or both;
(3) The number of lepers treated in each of the asylums during the years 1883 and 1884, with the results; and
(4) The structural and sanitary conditions of such asylums, and the arrangements made in them for the medical and hygienic treatment of the sick.

3—With reference to the questions asked in your letter of the 12th March, 1885, in respect to which the Hawaiian Government is chiefly desirous of being furnished with information, I am directed to say firstly, as regards the prevalence of leprosy in India, that the disease prevails to a greater or less extent throughout British India, but

that there appears to be at least three centres of comparatively intense prevalence, viz.:

(*a*) The Beerbhoom and Bancoora Districts in the Lower Provinces of Bengal;

(*b*) The Kumaun District in the Northwestern Provinces;

(*c*) The Deccan and Konkan in the Bombay and Madras Presidencies, respectively.

Details regarding the distribution of the disease throughout India will be found in the papers enclosed and in the tables attached to this letter, which have been compiled from the reports of the census taken in the beginning of the year 1881. These statistics cannot be accepted as absolutely correct, because the registration of lepers in general census operations is liable to error for the following amongst other reasons:

(*a*) That Leucoderma is apt to be classed as leprosy;

(*b*) That the disease is not recognized by natives until it is at an advanced stage; and

(*c*) That affected females of the house are carefully concealed, the disease being in some parts of the country regarded as one which entails disgrace.

The figures may however be taken to represent an approximation to the facts.

4—Leprosy has never been made the subject of special legislation in India, and no orders have been issued by the Government of India for the enforced segregation of lepers.

5—As regards the number of hospitals or asylums specially designed for the reception and treatment of lepers, I am to say that there are in all sixteen separate Leper Asylums in India, but that it is the practice in many places for lepers to be treated in separate wards of other institutions such as general hospitals and poor houses. In the District of Bancoora, in the Lower Provinces of Bengal, where the disease is specially prevalent, the lepers in the jail are kept apart in a special ward. Of the sixteen asylums which exist in India, five are maintained partly by public funds and partly by private charity, nine are entirely maintained by public funds, and two are wholly supported by private charity.

6—The Government of India is not in a position to say with certainty whether leprosy is generally regarded by the natives of India as contagious or not. Persons afflicted with it are without doubt regarded in most places with aversion, but this feeling is probably due rather to the disfigurement and mutilations occasioned by the

disease, than to any apprehension of its infectious character. In some parts of the country as above stated, sufferers from the disease are considered to be disgraced and are consequently shunned. On the whole, however, it is believed that the medical evidence tends to show that the disease is not contagious. In support of this view it may be mentioned that not a single servant of the asylum at Almora in the Kumaun District of the Northwestern Provinces appears to have contracted the disease during the thirty-one years for which there is information. Such evidence as is available tends to show that the disease is to a large extent hereditary, but that the influence of heredity is much more strongly marked in the female line of descent. For instance, it appears that the issue of a marriage between an affected woman and an affected man is far more likely to inherit the disease than the issue of a marriage between an affected man and an unaffected woman.

7—I am, in conclusion, to forward the reports mentioned in the annexed schedule, and to express the hope of the Government of India that they will afford assistance in the conduct of the investigations into the subject which are being undertaken under the orders of the Hawaiian Government.

I have the honor to be, Sir,

Your most obedient servant,

A. MACKENZIE,

Secretary to the Government of India.

INDIA.

FROM DR. W. J. MOORE, SURGEON-GENERAL WITH THE GOVERNMENT OF BOMBAY.

Extracts from Report of August 12th, 1885.

Having from time to time paid considerable attention to leprosy, I may perhaps be pardoned adding a few remarks to this report. Leprosy has been known from early times. In France, in 1226, Louis VII. left legacies to 2,000 leper houses, and old records show that leper houses were once common in France, Germany, Ireland, and England. At present the malady corresponds as regards intensity with the belt of maximum heat of the globe; or in other words with those countries where great heat, comparative scarcity of fresh vegetables, and manner of life generally amidst unsanitary conditions, exert the most depressant effect on the human system. Although leprosy occurs in Norway, Sweden, &c., it is not now the same inveterate disease observed in the East. Leprosy has been attributed to an insufficiency of salt, but I have seen the disease throughout the semi-desert districts of Western India where the principal product of every village is salt, and even on the shores of the Great Sambhur Salt Lake. It has been attributed to a vegetable diet, but it attacks meat eaters. A too exclusive fish diet has been thought to be the cause, but it prevails where the people never see fish. It has been attributed to new rice, but people suffer from it who living on bájri, only use rice as a luxury. It has been supposed due to malaria, but so have most other maladies, and it has never yet been proved that such an agent as malaria exists. It has been considered hereditary, and the evidence seems to show, that it like some other maladies may sometimes be hereditary. It has been regarded as contagious, and there are instances recorded which seem to demonstrate this view. It has been considered a form of hereditary syphilis, which we know to be both hereditary and contagious. Lastly, it has been attributed to unsanitary conditions generally.

The features of resemblance between syphilis, especially as seen in former years, and leprosy are so great that they cannot be ignored; and even those denying the identity of the diseases admit a form of leprosy which they term syphilitic leprosy. And it is an unquestionable fact that the decline of leprosy in various countries has proceeded *pari passu* with the progress of sanitary measures. And now I come to the reason I have ventured these curt remarks, which might be supported by many additional arguments and facts. If leprosy, is as I hold it to be, (except in the minority of instances when originating by contagion), a latent syphilitic inherited constitutional taint, developed into activity in certain constitutions by surrounding unsanitary conditions, the means of preventing leprosy is not in reviving the antiquated system of leper asylums, but by measures against the spread of syphilis and by sanitation in the fullest sense of the term. If leprosy is not what I hold it to be, we have still sufficient evidence that the great prophylaxis is sanitation. In sanitation I include the prevention as much as possible of whatever entails a state of human system below par, such as the cheapening of salt (an article of the greatest importance in the human economy), plentiful food, good clothing, suitable and above all dry lodging, drainage, conservancy—in short, everything tending to improve the condition of the population of a country. Leper asylums are good and charitable, but will not cure, eradicate or prevent leprosy. There is no known cure for leprosy when once contracted. Lepers taken into an asylum and well cared for often apparently recover, but the apparent recovery is this: The cathetic debilitated leper becomes temporarily a robust leper, but he remains a leper still, and the disease eventually breaks out again. Apart from charitable motives, therefore, I would not recommend the Government spending large sums on leper asylums—such, for instance, as would be entailed by a "State Leper Asylum," as mentioned in Government Resolution No. 2009, dated 11th June, 1883. A more certain, albeit slow progress will result from sanitation in the broadest sense of the term, which comprises the moral and material amelioration of the condition of the people.

CALCUTTA.

FROM BABU MADHUB CHUNDER GHOSE, L. M. S., MEDICAL OFFICER, LEPER ASYLUM.

Extracts from Report, 10 *July*, 1885.

In the present state of medical science, there is no specific by which the disease of leprosy can be completely cured. Palliative treatment only can be afforded; but even under this palliative mode of treatment the lepers are often very much improved in their condition,—their sores heal up, patches often disappear, and sensation is sometimes restored to the benumbed parts. Sometimes the improvement is so marked that it is difficult for a casual observer to determine whether the patient had ever been afflicted with leprosy; but there is a great drawback to the successful treatment of cases; that lepers as a rule, do not seek admission to the Asylum till they are in a very advanced stage of the disease, when their nearest relatives shun them and expel them from their homes, and for whom now the best medical treatment would avail nothing.

BENGAL.

FROM BABU R. M. BANERJEE, SUPERINTENDENT OF BANKOORA JAIL, BENGAL.

Extract from Report, 25*th July*, 1885.

The medical treatment of leprosy is not a very hopeful one. Believing as I do that leprosy when once thoroughly engraved in the constitution is perfectly incurable, I am not very sanguine in the

efficacy of drugs in its cure. The best thing we can do with such cases is to feed them on nourishing diet; and so long as we can keep them in good health, they can withstand the encroachment of the disease; but when from any cause their health breaks down, the disease breaks out in its terrible and horrid form, which no amount or excellence of medical substances can cure. Any intercurrent diseases are promptly attended to with suitable medicines.

CIVIL HOSPITALS.

FROM W. WALKER, ESQ., INSPECTOR-GENERAL OF CIVIL HOSPITALS, N. W. P. AND OUDH.

Extract from Report 26 *June*, 1885.

No results of special treatment, as I explained in my report for the year 1883, are available.

Medical men in these provinces have, after full investigation, *ceased to attempt a cure of leprosy*, and content themselves by endeavoring to retard the ravages of the disease by attention to diet and cleanliness of persons.

I quote the remarks above referred to, as they explain the position more fully:—

"I may say that medical treatment in the sense of attempting a cure of the disease has been abandoned, not only in these provinces, but all over India. Extensive experiments were made in 1875, 1876 and 1877, with regard to the efficacy of certain systems of treatment, and were found to be equally unsatisfactory. If the Government will refer to Proceedings in the Medical Department, Nos. 20 and 23, dated March 10, 1877, there will be found the results of a fair trial given to gurjan oil, once a vaunted cure for leprosy. The results of this experiment may be taken as a fair example of the conclusions which have been forced on all trustworthy observers—namely, that good nourishing diet, cleanliness and friction to the skin with any oil are the only satisfactory means of retarding the progress of the disease. No other specific treatment is now at-

tempted in any of our asylums. The patients are regarded as incurable, and are only subjected to medical treatment when attacked by complications which may be hopefully dealt with."

All attempt at specific treatment has been abandoned for some years as useless.—[*J. Fairweather, Brigade Surgeon, Inspector-General of Civil Hospitals, Punjab.*]

BURDWAN.

FROM SURGEON C. H. JOUBERT, M. B. F. R. C. S., BURDWAN.

I have ascertained that out of a population of 2,030,000 in the Burdwan District, inhabiting 5,181 villages or towns, 4,915 persons in 1,885 villages are classed as lepers. I say "classed" because I am certain that many cases of secondary and tertiary syphilis are looked upon by the natives of this part of the country as leprosy. Many lepers that I have examined have attributed the outbreak of their symptoms to syphilis or to salivation for the cure of syphilis, and a great confusion of the two diseases exists in the minds of most natives of this district.

We may, therefore, fairly consider that amongst these 4,915 cases are a considerable number of persons suffering not from leprosy but from syphilis, and put them against those lepers whose symptoms, if merely those of anæsthetic leprosy without eruption, and as yet unrecognized by their neighbors.

This number gives a percentage of 0.24 of the total population. Roughly the greatest percentages of cases appear to exist in the portions of the district on or bordering on the laterite soil and jungle lands, while the smallest percentages are found in the tharr-aho in the south and east of the district comprising the alluvial lands lying between and near the great rivers. The disease is less common among Mussulman than Hindus.

The proportion of females affected was not stated in all the returns: but out of 3,015 lepers 564 were females, or about one to every five males afflicted.

With regard to the propagation of the disease either by contagion or hereditary taint I may mention here that amongst 30 lepers whose cases were detailed, I only found 13 who acknowledged to any hereditary history of the disease. Of the 30 ten acknowledged to having had syphilis and twelve denied both syphilis and hereditary leprosy. As regards contagion, of the 30 only one man attributed his disease to having lived with other lepers and denied hereditary taint; but as he also stated that in his village (in Beerbhoom) there were ten or twelve other lepers out of a population of one hundred or so, the denial of hereditary taint is almost worthless.

In my opinion, I have seen nothing in the cases of leprosy that have come under my observation to support the popular idea that the disease is contagious, and the minute pathology of the disease, shewn by recent observers to be a disease of the nerve trunks, is strongly against any such theory. The purely tubercular form of the disease is much more rare than the anæsthetic. In my opinion, the disease is chiefly propagated by hereditary taint, appearing usually in adults.

HOOGHLY.

FROM DEPUTY SURGEON-GENERAL R. COCKBURN, HOOGHLY.

Leprosy is very rare in this district. The few cases that have come under notice are chiefly professional beggars coming to implore for alms. The Hindus, in the Sanskrit works, state four forms of the disease. I have seen only two varieties; in short, they are the same only in different stages. In one, the disease commences with tingling sensation of a patch or patches of skin in several places, which become benumbed or insensible, and the coloring pigment of the skin is removed, the part assumes a peculiar appearance tending to a pink or reddish hue, the skin becomes thickened, and thus the affected part appears circular; ultimately the tip of the nose and the lobes of the ears and the skin of the eyebrows become swollen and reddish, and the ends of the fingers and toes, especially the big toe, gets painful and flattened, swollen and become of reddish hue; and

in some the disease remains stationary in this stage for years, and even till death of the patient, or the disease advances to ulceration and loss of joints. The ulceration generally commences in the toes and fingers first, and as it advances the joints of the fingers and toes are separated. A sort of serum, like discharge, exudes through the ulcerated part, and the regular pus is not formed. When healthy pus is discharged from the ulcer it is generally considered that the ulceration stops and healing commences. The other variety is of the same nature in the first stage, but in the second stage dry gangrene sets in on the toes, in the finger or fingers and toe or toes, and it proceeds as far as where the ulceration commences; and if the progress of the disease is to stop, then healthy pus is seen, and the gangrene part is separated and the ulceration heals up with healthy granulations. I have seen in several cases the toes and the rest of the foot fall off by dry gangrene in this way of the ankle where the ulceration commenced and healed up.

The disease is generally observed to commence between the age of 25 and 50, but it has appeared in earlier years, but never seen by me to begin above the age of 50. The earliest manifestations are the tingling and benumbed state of the skin of some parts, or the swelling of the tip of the nose, lobes of the ears and its reddish hue with or without insensibility of the parts.

I have seen the full development of the disease generally in adult age and in some cases before puberty; I have rarely seen any cases to prove fatal. I have seen more lepers among men than in women, and more among Muhammadans than among Hindus, but it is hard for me to give the exact proportion of it. The leprosy is more frequently seen in the lower order of the people, such as beggars; but the disease has been seen among the richest also, and it appears to spare no condition of life.

The sanitary conditions of the dwellings of the inhabitants of this district are nearly all alike, and there is nothing peculiar in any part of the district deserving mention. The habits of life as to personal cleanliness, I can say that the Hindus of this district are generally most clean, daily bathing and washing their clothes and utensils and rooms; but the Muhammadans, excepting those who are in good condition, are not comparatively so clean as their Hindu brothers. They do not bathe, wash and clean every day.

The diet of the people is in general vegetables, milk, fish and ghee. In addition to these the Mohammadans at times eat meat.

Their modes of living, excepting a few young Bengalis, is very temperate; they touch neither wine nor stimulating liquor of any sort; they are in general a race of cultivators.

The disease is hereditary. I have invariably seen the children of a leper become lepers, and one thing is peculiar, that the children of the leper generally get the leprosy at the age of the parent when he first got the disease. I have seen one member of a family to be affected while other members remained free from it; but the man who had the disease generally ascribed it to his association with lepers. I have seen several cases of the leprosy arise as if it were the after consequences of syphilis.

I have every reason to believe the disease to be contagious. I have seen a wife with her two children contract the disease by remaining with her husband after he had the disease on him, while three other children who left him for the disease remained free. The disease of this man had not advanced to the stage of ulceration.

I know a boy who became a leper after having bought a pigeon from a leper and constantly handling it, though his parents were free from the disease, and he had no communication with any other leper. I have seen two healthy, strong, good constitutional men having no hereditary tendency for the disease become lepers after a year's attendance on the lepers in a leper asylum. One was attendant to supply food from the bazaar, and the other was a water-bearer in the leper asylum.

I cannot say whether sexual intercourse alone can give the disease or not; but when contact gives it, as a matter of course the sexual intercourse must communicate.

In the district of Hooghly lepers are not allowed to mix freely with the rest of the communality. The people shun a leper of their own accord, as they have a general belief in the contagion of it. There is no leper asylum in the district; in fact, it is not needed in the place, as there are very few lepers in the country.

SERAMPORE.

FROM DR. JAMES GREENE, SERAMPORE.

I have no doubt leprosy is propagated by sexual intercourse, as I have seen several instances at the Serampore Hospital, when the disease was acquired in this way and mistaken at first for venereal. Diet has also a great deal to do with its production; most of the sufferers are from the homeless classes, beggars, etc., who live by begging, and it is well known that these people are supplied with grain of the cheapest and worst kind. Grain dealers, as a rule, set aside damaged and worm-eaten grain for distribution to this class; they seldom get animal food, living principally on diseased grain and vegetables with a taste of rotten fish occasionally. As far as my observation extends, climate does not seem to have any great influence in the production of the disease, though there is no doubt that the disease is one of tropical origin.

BANKOORA.

FROM BABU B. L. DUTT, M. D., CIVIL SURGEON OF BANKOORA.

Leprosy is a common affection in this district. It is generally limited to the poorer classes, and is infrequently seen in the well fed and rich. The Bowrees and Southal castes suffer most, and the dark-skinned are more prone to the disease than the fair-skinned, but this may be due to the greater preponderance of the former over the latter. The pure Aryan, as represented by the high caste Brahmin, is least susceptible to the disease—a fact borne out of my limited observations in the Burdwan Leper Hospital and Pooree District. The pure or somewhat mixed aboriginal as the Southal or the

Bowree caste is, on the other hand, most susceptible as hereinbefore observed, and the intermediate castes appear to be more or less liable to the disease in proportion to the aboriginal blood in them. This, if proved by an extensive number of accurate observations, will establish an important fact.

Anæsthetic form of the disease is the most common, tubercular is rarely seen, but the mixed form is more frequent. Eruption is observed in most cases, attended often with considerable anæsthesia or diminished sensation. Atrophic changes, distortion, and finally ulceration, and loss of substance of the hands and feet were not absent in a single case I observed in this district.

Syphilis, venery, poverty and bad living are great exciting causes of the disease.

The treatment adapted in the Bankoora Dispensary was liberal diet, cleanliness, and the continual administration of tonics. Under this plan two of the cases improved, and the progress of the disease rendered slow; but as soon as the treatment was left off, or the patient was reduced in health by febrile attacks or other causes, the disease broke out afresh with renewed vigor.

MIDNAPUR.

FROM R. L. MATTHEW, ESQ., CIVIL SURGEON OF MIDNAPUR.

The native doctor in charge of the Ghatal Dispensary, in giving the details of a few cases that passed under his observation, states that the disease in three of the cases was due to hereditary influence, and in two was said to have been caused by contagion.

He reports that milkmen, washermen, weavers and silkspinners are the classes most frequently attacked.

Whether contagion plays an active part in disseminating the disease appears doubtful; but the vast majority of the people here consider it contagious, and will not, as a rule, hold any communication with persons so affected.

GHATTAL DISPENSARY.

FROM BABU RAJCUMAR DOSS, NATIVE DOCTOR IN CHARGE OF GHATTAL DISPENSARY.

As to the distribution and causation of leprosy within the precincts of this town and its immediate neighborhood, from careful investigation I have come to the conclusion that the disease was contracted in two ways, primarily and secondarily.

In primary attacks the disease had its origin from syphilitic disorders with an injudicious administration of mercurials by native quacks.

In secondary cases it has either occurred by contagion, or hereditary influence.

Most of the cases examined were milkmen, washermen, weavers and koibortos, depending on cocoon cultivation, all of whom have to deal with dirty things for the sustenance of their lives.

Cases cited. A weaver boy, aged 12, hereditary influence, mother's maternal uncle and a nephew diseased.

A male Hindu. His eldest brother, with whom he laid down and ate, was a leper; also the sister, aged 36, who contracted the disease at 13.

A male Hindu, aged 25, contracted the disease from another man with whom he worked and slept.

RUTHGORA.

FROM BABU BAMA CHUM CHATTERJEE, RUTHGORA.

True cases of leprosy with hereditary taint and special peculiarities to the locality in which the people live are wanting here. In the course of a year a very scanty number of patients, such as four

or five, attacked with ulcers simulating leprosy, are found to attend the dispensary. In most of these cases it is found on enquiry that they suffered from venereal disease, acute rheumatism or from any foul ulcer, for the cure of which they made bad use of mercurial preparations in the hands of quacks before the leprous ulcers broke out. In this quarter the abuse of mercury even in simple diseases tends to the development of ulcers simulating leprosy.

GURBETTA.

FROM BABU PROSURMO COOMAR SEIN, GURBETTA.

This disease is prevalent to a certain extent among the people of the village of Gurbetta. The cause is, I think, this place is comparatively crowded, and as the pilgrim road passes through it, it is the haunt of the persons from the different parts of India who bring with them the contagion of many sorts of diseases. After taking charge of this dispensary I have treated 20 lepers. To some of them this disease was hereditary, to some it was owing to the contagion, and to others it was the effect of using mercurial medicines.

CONTAI.

FROM BABU MODHOO MADHUB MOOKERJEE, CONTAI.

The lepra is a disease of the skin. It has two forms, tuberculated and non-tuberculated; the latter is the usual case in Bengal. As far as my knowledge goes, this disease is neither contagious or infectious; it is rather hereditary. If it be contagious or infectious, then it would have occurred among all the prisoners in the jail, as I have seen several cases of lepra patients in the Hooghly and Hazaribagh Jails, where they live with other prisoners. Some say the cause of the disease is uncleanliness and dirt, but I am not of that opinion. The gurjun oil treatment is the best for this disease.

MIDNAPUR.

FROM SITANATH GUPTO, MIDNAPUR.

This gentleman, a native doctor, cites the following case: The patient states that he was attacked with syphilis some twenty years before, and he freed himself from the disease with the use of mercurious vapor baths. But two years after this, i. e., some twenty years ago, a variety of eruptions appeared on the dorsal surface of the right hand; this was accompanied with local anæsthesia of the part. The eruptions healed with the use of some native oil, but the anæsthesia still exists. Six months subsequent to this surrul ulcers appeared on the ends of fingers and toes, and symptoms of true leprosy began to appear gradually.

MOORSHEDABAD.

FROM DR. S. M. SHIRCORE, C. S., MOORSHEDABAD.

Leprosy exists in an unusual degree in Moorshedabad, which stands fourth in the list of districts in the Provinces of Bengal, Behar and Orissa, as well as of Assam. Beerbhum is at the head of the list. Then come Bancoorah and Burdwan, and Moorshedabad is next.

Among a total population of 1,353,626, there were in the year 1872 1,776 lepers, namely, 1,534 males and 242 females, giving a percentage on total population of leper males, .2377; leper females, .0342; total, .1312. For all practical purposes these statistics are applicable to the present time.

The male portion of the population of this district, like that of other parts of India, suffer from leprosy greatly in excess of the

female. The normal population shows a considerable excess of females—the figures being, males 645,335; females, 708,291—and yet the proportion of male lepers to female lepers is 6.33 to 1.

As far as my knowledge of the lepers of this district extends, it appears that the disease is more common among the Muhammadans than the Hindus.

Leprosy exists to a far greater extent among the people who reside in that portion of the district which lies on the west of the River Bhageeruthu. The twelve thaunahs on the east of the River Bhageeruthu, with a total population of 612,203, have only 403 lepers. Whereas the 13 thaunahs on the west side of that river, with a total population of 741,423, have no less than 1,373 lepers.

As far as I have been able to ascertain, there is nothing peculiar in the condition or habits of the people who reside in that part of the district, where leprosy is localized to such an extent, that differ from those of the people of other parts. But there is a marked difference in the natural formation of the country, the soil of the one being totally different from the other.

The District of Moorshedabad is divided into two somewhat unequal portions by the River Bhageeruthu, which flows through it in a south-easterly direction. The country on the right bank (that is on the west of the river) is undulating, and generally well-raised above the highest flood level of the river; and the soil in its composition is decidedly laterite, and resembles that of the plains of Upper Bengal. Directly the river is crossed, the change is unmistakeably marked. The surface of the country is generally below high flood level, and the soil is composed of sand and sand mixed with clay, and is, in fact, identical with that of the Gangetic delta. The undulations disappear, except where old beds of the river occur, and a flat country takes its place.

I have stated that Beerbhum heads the list of districts in Bengal, Behar, Orissa and Assam in which leprosy exists to an unusual extent. With a total population of 695,921 there are in that district 2,872 lepers, giving a percentage of .4127 on total population; and it is deserving of remark that there are more lepers among the people who reside within the jurisdiction of the five thaunahs in this district—Bhurutpure, Khurgram, Ramporehaut, Nulhati and Pulsa, which border on Beerbhum, than there are among the whole population of the remaining twenty thaunahs.

As to the supposed cause of leprosy, my experience does not tend

to the belief that the disease is contagious in its nature unless by *direct* inoculation, and even then we are not necessarily in possession of sufficient evidence of crucial test to enable us to say positively that the disease would be transmitted from one person to another by means of direct inoculation.

On the other hand, there is no doubt that in a certain proportion of cases the cause of leprosy can be satisfactorily traced to heredity. Making, however, full allowance for these cases, there still remain a large number of cases which in the absence of any other known cause must be admitted to have engendered spontaneously, and for the origin of these cases we must look to some other causes. On the whole, I am inclined to the opinion that epidemic influences cannot be altogether absolved of a certain share in the production of leprosy. At all events, I think the facts I have given in this report sufficiently justify such an opinion, and suggest full and searching investigation in this direction.

DUMKA.

FROM THE OFFICIATING CIVIL SURGEON, S. P., DUMKA.

There are 515 lepers in this district, or, in other words, .0408 per cent. of the population are lepers. Out of this number 314 lepers were returned from Dumka and Jamtarrah sub-divisions, principally from the villages bordering the District of Beerbhum. These are chiefly Bengali villages. As a rule, the Bengali villages are crammed with houses with defective drainage and ventilation. The cowdung, house refuses and other sorts of filth are piled up close to the house in these villages. These are the main peculiarities of these villages. The sufferers are chiefly poor and low class people, who remain overcrowded in small huts which scarcely protect from the rain and the inclemency of the weather. During my inspections of the villages from which the largest number of cases were returned, I examined fifty-nine cases in twelve villages, and found that in thirty cases the disease was propagated by hereditary trans-

mission. In one case a woman got the disease about two years after her husband, from which it appears it was produced by cohabitation. Of the thirty-eight remaining cases, only four were attributed to syphilis and the use of mercury. Fish is scarce in the villages where leprosy is prevalent, and it cannot be traced that the use of putrid fish has anything to do in the causation of the disease in the parts of this district where it is prevalent. The poor people who subsist chiefly on rice, dall (kalacy, khesari, etc.,) and sag suffer most from the disease.

I have only seen very few cases of leprosy among the Sonthals, and I believe it is not so common among them as among the Bengalis; I mean the low class Hindus and Mussulmans. This may be probably owing to the difference of food, mode of life and better hygienic condition of the Sonthal villages.

The proportion of male lepers is a little more than three times than the females, and the anæsthetic variety of the disease is more common in the district.

Dr. Dougall's plan of treatment with gurjun oil was not so successful in my hands (in the few cases I tried) or in any of my subordinates in this district.

NUDDEA.

FROM C. E. W. BENSLEY, ESQ., M. D., C. S., OF NUDDEA.

From the cases which have come under my observation it seems to me that hereditary taint and the abuse of mercury in venereal diseases are the two main causes of this disease. Of these two, again, the latter appears to be the more common. Constant association might be the cause of the disease in some cases, but I am hardly in a position to give a definite opinion on the point.

The cases which came to the charitable dispensary for treatment were all treated with gurjun oil. A marked improvement was perceptible at first in a few of the cases, but the symptoms reappeared soon after the patients discontinued to use the medicine. There is one great drawback to the examination of the result of the treatment, and it is that no patient is patient enough to use the medicine for any considerable length of time.

RAJSHAHYE.

FROM E. C. BENSLEY, ESQ., C. S., OF RAJSHAHYE.

Doubtless the census figures (274 lepers, or a proportion of one to four, 783) of lepers are not strictly accurate. In the first place it is a disease which the people try to keep out of sight as much as possible, those only who are actually maimed by the disease being brought to notice, and again, the returns for females would be defective, because of the Zenana system prohibiting any strict scrutiny. I do not think it has anywhere been shown that males suffer any more from the disease than the females, and yet the census returns show 229 of the former against only 45 of the latter. These, then, are circumstances which would tend to understate the facts; but, on the other hand, there is no question whatever that a large number of the census cases were cases of a cutaneous affection, popularly known as "white leprosy," which is not leprosy at all. If these, then, were eliminated, and an allowance made for failure in recording female cases, I imagine the figures would not vary much from what they now stand.

Lepers, as a rule, represent to a great degree a floating population. They are much on the move, generally visiting places where shrines and holy places exist. In the District of Baraitch, in Oudh, there is a temple and a small pool of water which are visited yearly by a very large number of lepers. In the season these lepers, to the number of thirty or forty, may be seen closely packed in the pool with their heads above water, and about the same number or more around the pool ready to jump in directly vacancies occur, the water all the time being filthily dirty and highly offensive. The pool of water is said to be blessed by the Brahmins and to possess curative properties.

I am unable to enter into the causes that predispose to the disease. I think it is allowed on all sides that poverty, filth and impoverished diet are not important factors of the disease, and popular notion exists among the natives that a fish diet produces the disease and

aggravates it when it exists. The natives all believe in this disease being contagious, and one man was so impressed with this belief, as also with the loathsomeness of the disease, that he begged of me to keep him apart from the rest. This man was treated for a long time with chowlmoogra oil, and latterly with gurjun oil, and although there was no apparent improvement in the disease, the man had much improved in health, and the progress of the disease was arrested.

JULPAIGURI DISTRICT.

FROM W. DUNCAN, CIVIL SURGEON FOR JULPAIGURI DISTRICT.

The district lying under the Bhootan range of hills extends from Assam to the Darjeeling District, a distance of about 90 miles. From the foot of the hills the district extends southward, with a varying breadth of from 40 to 60 miles. The country is generally level; in the northern portion, or *terai*, covered with dense jungle of wood and grass, and in the south it is one extensive rice-cultivating tract. In the *terai* the inhabitants belong to the Mech tribe. There are also a considerable number of Neapaulese, and some few imported Dhangurs from Sonthal. The Mechs appear, looking to physical conformation, an admixture of the Mongolians and the races of the plains. The south of the district is peopled by Bengalis, Hindustanis, and a mixed breed from the two, and with the hill tribes. The people may be considered a rice-feeding population. Flesh and fish with milk, articles of food, are consumed extensively when obtainable. Some of the *terai* residents are said to be addicted to eating flesh in a putrid form. Rice, as usually found for sale, is of good quality; other and inferior varieties are, however, much in use. In the district the prevailing diseases are malarial fevers, dysentery, diarrhœa and resulting complications. About 50 per cent. of the population suffer from malarial cachexia in some form. Skin diseases, tinea and itch, are universally prevalent, few of the people being found without one or

the other, or frequently both. Elephantiasis of the extremities and scrotum is very common in all parts of the district. Cases of leprosy are to be met with in all parts of the district, and the disease is generally believed to be more common among the Mechs than among the other inhabitants. It is impossible to obtain accurate information as to the exact number affected among a given number of the population, the families in which the disease breaks out concealing it as long as possible; and, when concealment is no longer possible, the individuals afflicted are turned out of their homes and allowed to gain a livelihood in the best way they can. All enquiries are met with evasive answers or falsehoods, because the fact of there being a leper in the family attaches a social taint to it.

As bearing on the question of communicability of the disease, I give here notes of a case which came under my observation: A female, aged 28, admitted into hospital with gun shot wound of right thigh and comminuted fracture of femur in middle third. Woman well nourished and skin healthy, not related to a leprous family. She was accompanied by husband, aged 35, and two children, aged 7 and 3 years. Both children appeared healthy. Husband affected with leprosy, both hands ulcerating; had a brother with same disease. Woman recovered and able to move about; only a small fistulous opening remained. This opening now commenced to ulcerate and the skin to crack around, and both feet became affected, ulcerations spreading rapidly. At this period both children were affected, the disease exhibiting itself in the hands. In all the four members of the family the disease was in rapid progress, when they were lost sight of. Here it would appear that the disease, on account of its manifestation, almost simultaneously in three different subjects, must have been conveyed in discharges from sores. On the other hand, it is possible it may have been transmitted from husband to wife, and the children inherited it.

PURNEAH.

FROM L. PICACHY, CIVIL MEDICAL OFFICER, PURNEAH.

Dr. Picachy gives the history of "ten reliable cases," from which the following extracts are taken: Eight were males; parentage healthy in nine cases; an hereditary taint on the paternal side traceable in one; one leper says that he has two brothers—one is diseased and the other, as well as his parents, are healthy. Four out of ten are married. Wives and husbands are alive, and there is cohabitation between six. Where husbands are diseased, wives are healthy and *vice versa*. The progeny of lepers appears not to be numerous. Among the cases cited, none had more than three, mostly one and two. The children were healthy, to all appearances, and kept so up to eight years, and even to adult age, but were infected with a diathesis, probably, capable of development later. There was no issue from one couple, and a healthy offspring died shortly after birth, whether from tainted constitution or natural cause cannot be determined. Intercourse is un-restrained between the married, and no positive separation from their different sections. Three had primary syphilitic ulcers only, one had secondary eruptions, and one man had two attacks of each anterior to the present disease, i. e., half the number out of ten. Salivation was undergone in one case. Both native and European medicines were taken in one case, and wild herbs in a few. Among the native remedies valued are strychnia, bleeding, purgatives, the flower of a vegetable called ole, which has tubercular protuberances like leprosy. Contagion is clear in the case of the Bilasee, who contracted the disease from her husband; and in the case of Mowlabux, who was in the habit of coming always in contact with his brother; and of Secom Gowla, whose father was a leper. The assigned causes are cultivation and purchase of a plot of ground belonging to a leper, cohabitation with a diseased husband, hereditary transmission and contagion, and will of Providence. It may be stated that, if malaria was among the causes of leprosy, this district would furnish a large amount of cases which it does not, and the disease is not endemic in it either.

RUNGPUR.

FROM BABU K. D. GHOSE, M. D., M. R. C. S., CIVIL SURGEON OF RUNGPUR.

The disease is distributed over the whole district and certain portions of it, in point of its prevalence, present a remarkable contrast to others. These tracts of extreme prevalence and comparative immunity present a marked difference in their physical features and in the character of the people inhabiting them, as also in the circumstances under which they live. During my travels of enquiry I found the disease more common towards the rivers than in villages far removed from them; but when the immediate banks are high, it is almost altogether absent from them. A marked contrast of this kind I observed in one part of the River Teesta. Either bank here is inhabited by Hindus of the fishing castes, but being of different subcastes they do not intermarry or mix in other way. They follow the same occupation and live otherwise under similar circumstances. Among these fishermen on the left bank I could not find a single case, whereas among those on the right bank numbering about 80 individuals there were six lepers. In the laterite tract the majority of the lepers that I found were inhabitants of the alluvial portions of the tract. The villages where I found the diseases most prevalent are either on the banks of a river or surrounded by marshes and old river beds. Dry and high spots whether near a river or not enjoy a marked immunity from the disease. Other skin diseases such as itch, ringworm and psoriasis of a chronic character are very common in villages where lepers are found. The houses are low mat huts surrounded by dense jungle and clumps of bamboos. These latter overhanging the yards exclude the sun from them. In the occupation of fishing these people often immerse themselves in muddy water and smear themselves with mud for hours and pass sometimes a whole day in wet clothes. This constant contact of water with the skin, I fancy, has much influence in the production of the disease. It undoubtedly is a potent cause of the other skin diseases I found prevalent in these villages. In fact, the atmosphere

charged with vapor; their occupation requiring constant immersion in water; their damp, ill-ventilated habitations, and the want of clothing, all tend to interfere with the healthy functions of the skin. The people in these villages seemed to be extremely fond of their homes, and never emigrate. The population of a whole village I sometimes found related to each other, and married and intermarried among themselves and lived and died in it. I found a number of old people who told me that they never spent a night from home.

I examined and took notes of 378 cases, 253 males and 125 females; 286 were Hindus 92 Mussulmans. Only in eleven cases could I trace evidence of hereditary taint, but I have no doubt that there were others among them who either concealed the truth or were not aware of the fact of their parents or ancestors having suffered from the disease. In one instance I found that two brothers were diseased about the same time; but they could not inform me if any of their ancestors suffered from it. One cannot look into the circumstances of the origin of the disease in several of these cases without believing in contagion. That personal contact alone will not cause the disease is evident; but it may be said to be contagious in the same sense as typhoid fever or cholera is contagious, though not to the same degree. There is strong presumption that the malady is due to *contagium* or communicable germ, which takes root and flourishes under favorable circumstances, and these favorable circumstances are climate, soil and other hygienic conditions. These conditions alone cannot produce the disease; as under similar circumstances the disease does not originate. Again where the hygienic conditions are good, the disease, if introduced, will not spread, as it does not in some parts of the district, although so close to others infested with it.

Numbers of cases came to my notice in which the leprous individual remembers having lived in close proximity to some one else affected, or had distant relationship with other lepers, but there were 33 cases in which the persons lived in the same house with other lepers before getting it. In four of these 33 cases there was sexual intercourse with leprous individuals before the attack. In one village I found six individuals in different stages of the disease, more or less related to each other. A woman got leprosy first from a leprous husband who lived in another village. Her parents were not leprous. After her husband's death she came to live with her brother, and before she was a year in the house he got the disease.

In the course of six years three other individuals in the neighboring houses were affected. The oldest individual in this village assured me that before the woman returned home after her husband's death he had not seen a leper in that village.

DUIAGEPUR.

FROM J. W. W. WEBBER, CIVIL SURGEON OF DUIAGEPUR.

Leprosy is scattered throughout the whole district. The climate is bad, and there is only one mineral product in it, viz., lime, which lies in the form of Kunkur in scattered beds in several localities at various depths. The southern portion of the district is undulating; no mountains nor hills; a great deal of forest and barren land. The disease does not appear at all hereditary, most of those that I examined did not get the disease till long after puberty, and they said that they contracted it either from the wife or husband. As far as I could judge, most seemed to have got it through poverty, exposure, bad food and worse clothing—in fact, dirty habits. There are a good many well-off and even in independent circumstances suffering from the disease. Drinking water does not seem to have anything whatever to do with it. Scarcely anything has been done in the way of carrying out general treatment. Those coming under my own care have had the chalmoogra oil treatment with very little benefit I am sorry to record.

CHUMPARUN.

FROM THE CIVIL SURGEON, CHUMPARUN.

Tubercular leprosy among the known cases is of very rare occurrence. I have only seen three or four cases during my residence here. Two varieties of the non-tuberculated form are more common, viz., the anæsthetic and the leucopathic; none are in any way contagious, and there is generally an hereditary history. All the cases I have seen or heard of are middle aged; they are of various castes and classes, but mostly beggars.

BACKERGUNGE.

FROM W. F. MURRAY, ESQ., CIVIL SURGEON OF BACKERGUNGE.

Leprosy is chiefly found in the vicinity of the following villages,—Bagody, Sorikal, Matahar, Amanatgunge, Moolady, Burrisal and Rooparjur. It is not, however, confined to these places, but scattered throughout the district. Lepers live apart from their families. They do not take food with the other members, neither do they cohabit with their wives. Persons who have leucoderma are not, as a rule, subjected to these restrictions, but those afflicted with tuberculous and ulcerating leprosy suffer most in these respects. In some cases the disease is undoubtedly hereditary, in other cases the causes cannot be ascertained. It is believed by the natives to be contagious, but from my experience this belief is not borne out by facts. When taken in the early stage, the progress of the disease is greatly influenced by the application of gurjun ointment, which certainly is most beneficial, and in many cases effects a complete cure. It is looked on by the Native Kobirajes as a specific.

JESSORE.

R. T. WRIGHT, ESQ., M. D., CIVIL SURGEON, JESSORE.

Six hundred and nineteen lepers are reported in the Jessore District. The sex is not distinguished, but it appears that only 54 inherited leprosy while 565 had no idea of its cause. They believe the disease incurable, so it is difficult to persuade them to submit to treatment, and twenty, who were treated with gurjun oil, received no benefit.

DACCA.

FROM A. CROMBIE, M. D., CIVIL SURGEON OF DACCA.

Eight hundred and fifty-two lepers (723 males and 129 females), or 4.595 in every 10,000 of the population are affected with leprosy in this district. The disproportion between males and females is probably due to a certain extent to non-registration of female sufferers, but it is believed to be a considerable degree natural. It is most prevalent in the high laterite parts of the district and in the low water-logged thaunahs where there is little or no natural drainage, where the soil dries by evaporation, and those districts return the smallest number of lepers which are alluvial and of medium elevation, with a comparatively free natural drainage. A certain rough relationship seems to exist between leprosy and malaria. I do not place any reliance on the figures supplied by the census returns as regards the actual number of lepers in the district. The people habitually confound leucoderma with leprosy on the one hand, and many cases of constitutional syphilis are considered as cases of leprosy by the laity. I am inclined to believe that there is more leprosy in this district than the census returns show.

CHITTAGONG.

FROM R. D. MURRAY, ESQ., CIVIL SURGEON OF CHITTAGONG.

Leprosy is not common in Chittagong and it is very difficult to get accurate information regarding its extent. Gurjun oil, with equal parts of lime water, used both internally, was the treatment adopted in all of these cases, and gave "more or less relief." None of the patients attended sufficiently long to enable one to judge of the

effects of the treatment; for gurjun oil is decidedly a slow acting medicine, and in cases where it does good or effectually cures it is only after many months' assiduous use. The disease does not appear to be specially localized. It has been most observed in the town, and usually among badly-off, ill-fed, up-country men, rather than among the aborigines, fakirs and vagrants of various sorts. Next to these Muhammadan ryots; then low class Hindus; and lastly, Mughs, among whom the affection is very rare. No age is specially exempt; it has been observed as early in life as 19, and as late as 60 years of age. Next to the station itself Rangoonea in the north of the district would appear to yield the largest number of cases; but that is probably owing to the people of that locality having greater facilities of communication with the town, for they can come down the River Kurnafoolia by one tide, and, after visiting the hospital, can return by the next. Among the cases cited is that of a Muhammadan Lascar, aged 36, whose disease (tubercular) began 12 years ago and is not traceable to any hereditary or venereal taint. He states, however, that his wife and children have contracted the disease only recently, and that there are some more cases of leprosy in the village.

CUTTACK.

FROM SURGEON W. D. STEWART, CIVIL SURGEON OF CUTTACK.

The disease does not appear to prevail in Orissa to the same extent that it does in the Upper Provinces. It is confined chiefly to the poorer classes. When it is seen among the well-to-do it is generally due to hereditary transmission; the evidence of transmission is generally very clear. In those cases where the disease originates *de novo*, and no history of heredity is obtainable, the causes are traceable to error of nutrition arising from unwholesome food, such as stale, or salted fish, diseased meat, or to living in particularly low or marshy localities as at Pooree and other places near the sea coast. In such localities there is an increase also of elephantoid disease, which is a periodic fever attended with gradually increasing enlargement gener-

ally of the skin of leg and scrotum. Where this disease prevails, anæsthetic leprosy is commonly seen with more or less of the tubercular variety, etc.

When trying the treatment of gurjun oil, I collected a few cases in the neighborhood of the branch dispensary for the purpose. They attended regularly at first, but had not patience to continue. The disease, however, although the benefit in all was manifest cannot be cured by medicine alone, patients require sufficient and suitable food, and many of them are unable to afford this.

I give a brief outline of eight cases which will shew the history and result of treatment. In six there was hereditary transmission. There is a belief that syphilis occasionally develops the disease, and that the excessive use of mercury tends to the same effect; both would doubtless act in developing the disease if latent, or predisposing it by causing a deteriorated state of the blood and tissues.

A Brahmin has had anæsthetic and tubercular leprosy for past three years; father and mother alive, but have not the disease. On his mother's side, the uncle's son, his sister and her daughter, had the disease. Patient has a son, aged eight, no symptoms of complaint. Treatment, commenced with two drachmes of the gurjun oil emulsion twice a day and inunction once a day. In three months was much benefitted by it.

A woman aged 30. Her father died of the disease at 40. She had an only child that died after its birth. One brother died years ago of some other complaint. There are four sisters. She is the eldest, the two next are at present free from the disease; the third one's daughter has the complaint; the fourth sister is also ill. As before, the oil continued to do good so long as it was taken, the scaly eruption on legs disappeared, the skin of legs became smooth, and swelling of face, nose and hands considerably diminished.

A lad, aged 13, parents and brothers healthy, uncle diseased.

A prisoner, aged 30, father and grandfather diseased. His two wives and children and sister are free from the disease.

ORISSA.

FROM BABU JOGGO MOHUN ROY, ORISSA.

In the generality of the cases, especially among the Hindus, venereal diseases, and perhaps administration of mercury for their cure, have, I believe, been the cause of lepra. At least, in most of the instances that have come under my notice, the leprosy was clearly venereal. My view is further supported by the fact that the malady is to be met with more among people inhabiting and frequenting the towns than those living in the interior of the country, where the usual sources of the venereal diseases do not exist, at least to the extent they do in the towns. That the malady, as a rule, descends from father to children does not, I think, admit of a doubt, for I have seen several instances in which it has done so. I also know of a case in which it has done so. I also know of a case in which the husband has communicated the disease to the wife.

PATNA.

FROM BABOO RAMCHUNDER GOOPTA, PATNA.

Syphilis is another cause of leprosy. As far as my experience is concerned, leprosy is not contagious. I knew a man to have been suffering from tubercular leprosy for a period of twenty years, and all this time his wife was keeping close to him, and still she was quite free from the disease. Moreover, of the male patients at present under my treatment, two are married men and have been living with their wives for a long time, and the wives have not been suffering from leprosy.

BARRH.

FROM ZAHEERUDEEN, ASSISTANT-SURGEON, BARRH.

Leprosy exists, but not to a large extent, in the Barrh sub-division. The nature of the respective places in which the individuals laboring under this malady, and the conditions and circumstances under which they live, does not bear any peculiarity in its form, excepting that the majority of the persons are poor. Very few lepers are seen amongst the higher classes and well-to-do people. Most of the cases who attended the dispensary had previous attacks of syphilis. This disease was no doubt the only cause from which they eventually got the malady in question. In other cases the persons inherited the malady from their parents or forefathers.

MONGHYR.

FROM H. W. HILL, ESQ., M. B., CIVIL SURGEON, MONGHYR.

Leprosy is found mostly amongst the lowest classes of society. I believe it is much more common among the lower orders of Mahomedans than those of the Hindoos. This is due to the difference in habits and the nature of the food. The Hindoo, as a rule, is religiously enjoined to daily ablutions in the Ganges, where practicable, or in some other clean water; he seldom takes fish or meat; while the Masalman is dirty in his habits, does not care to take a bath, and lives mostly upon fish and putrid flesh, such as beef or buffalo's flesh.

In a few instances a hereditary transmission might be traced. I have met with no case in which contagion has been suspected as the cause. I am acquainted with several married lepers, but in none

was the disease transmitted by sexual intercourse. In many instances the disease has been attributed to *syphilitic infection*, and I believe this to be the most fertile cause of the disease in this district. There is no special locality to which it is confined, but it is equally distributed over the districts.

Anæsthetic variety is the most common; in fact nearly three-fourths of the cases belong to this class. Almost every day we meet with patients in the out-door dispensary complaining of patches of anæsthesia in several parts of the body. The color of the affected parts is fainter than the natural hue of the skin. This is known by the common name *sunbahiri* (i. e. anæsthesia). These patches rapidly increase in size, but in some instances they remain stationary for a long time. The tubercular variety is not so common, but in most of these cases both varieties are combined. This is the worst form of the disease.

Gurjan oil, which has been so much used of late years, does not hold out the prospect of bringing about a radical cure of the disease. No doubt, by long continued use, there would be an improvement.

The ulcers heal and the tubercular form disappears under its use. As soon as the oil is stopped all the symptoms reappear as before, no case of perfect cure being yet heard of here.

COOCH BEHAR DIVISION.

FROM DR. W. D. COMINS, ACTING CIVIL SURGEON, COOCH BEHAR DIVISION.

The cause of leprosy may, I think, be hereditary or acquired, and syphilis and scrofula appear to be the diseases which in the parent most frequently lead to the development of leprosy in the child. Notwithstanding Dr. Carter's adverse opinion, the number of cases which have a syphilitic family history afford a very strong presumption that there is a connection between the two diseases.

The people of this country feed principally on rice, vegetables, curries and fish, and, in the cold weather, *dahee* (curded milk) is

occasionally used, but from necessity not from prejudice. Except in the case of the cow, they are not a flesh-eating people. In the south of the State, however, I am informed that the Mahomedans who live near the border eat any cattle that may happen to die from disease or otherwise. This is interesting, for leprosy is much more amongst them in that part than with their neighbors the Hindoos.

The rice which is eaten by the lower classes is of inferior quality, which has been gathered only three or four months, and is therefore highly unwholesome and indigestible, and but little care is taken to remove the whole of the outer husk. How far this is a cause of leprosy I am unable to say. I do not think that much mouldy or decayed rice is eaten, though a case of gangrene of the extremities a few months ago was apparently due to this cause. Dall, on account of its price, is not eaten by the people generally, and cannot therefore be looked upon as a possible cause of disease. I am not able to discover that leprosy is less prevalent amongst the residents on the larger rivers, who drink the pure snow waters of the Himalayas, than with those who obtain their supplies from the nearest jheel.

It appears to be more common in the south than in the north of the State; more often met with on the borders than in the interior; more frequent amongst Mahomedans than Hindoos; amongst men than women and children; and amongst the poor and badly-fed than with the rich and well-to-do.

STATISTICS IN REGARD TO LEPERS.

The following tables are furnished by the Secretary to the Government of India in relation to the number of Leprous persons in British India:

TABLE I.—SHOWING THE NUMBER OF LEPROUS PERSONS, AND THE PROPORTION IN THE THREE PRESIDENCIES, TOGETHER WITH THE TOTAL POPULATION ON WHICH THE RATIOS HAVE BEEN CALCULATED.

	Total Population on which the Leper Ratios have been calculated.	Total Lepers.	Proportion of lepers in every 10,000 (ten thousand) of the population
Bengal Presidency.....	156,201,210*	98,017	6.3
Madras do.	31,170,631	14,525	4.7
Bombay do.	23,395,663	12,382	5.3
Grand Total in British India	210,767,504†	124,924	5.9

* Excluding British Burma, Ajmere and Coorg.

† Including Feudatory States.

TABLE II.—Showing the Distribution of Leprosy in British India.

Divisions.	Total number of Lepers.....	Proportion of Lepers in every 10,000 (ten thousand) of the population.....
Bengal and Assam.		
Bengal Proper { Burdwan	14,426	19.5
Bengal Proper { Presidency	5,633	6.9
Bengal Proper { Rajshahye	7,170	9.3
Bengal Proper { Dacca	4,934	5.7
Bengal Proper { Chittagong	1,473	4.1
Total	33,636	9.4
Behar ..... { Patna	8,343	5.5
Behar ..... { Bhaugulpore	5,060	6.3
Total	13,403	5.8
Orissa	4,661	12.5
Chota Nagpore	2,274	5.4
Assam	3,314	6.8
Feudatory States	2,549	9.0
Total	59,837	8.6
North-Western Provinces.		
Meerut	1,692	3.3
Rohilkhund	2,984	5.8
Agra	843	1.7
Jhansi	412	4.1
Allahabad	2,199	3.8
Benares	3,559	3.6
Kumaun with Garhwal	1,690	16.2
Feudatory States	433	5.8
Total	13,812	4.1

TABLE II.—Showing the Distribution of Leprosy in British India.—*Continued.*

Divisions.	Total Number of Lepers	Proportion of Lepers in every 10,000 (ten thousand) of the population .....
Oudh.		
Lucknow	1,419	5.4
Rai Bareli	1,107	4.0
Fyzabad	1,032	3.2
Seetapur	885	3.2
Total	4,443	3.9
Berar.		
Berar	3,748	14.0
Central Provinces.		
Nagpur	2,489	8.4
Jubbulpore	624	2.8
Narbada	930	5.2
Chattisgarh	2,400	5.2
Total	6,443	5.6
Punjab.		
Delhi	666	3.5
Hissar	337	2.6
Umballa	819	4.7
Jullundur	1,844	7.6
Amritsar	1,081	4.0
Lahore	338	1.5
Rawal Pindi	1,158	4.6
Mooltan	215	1.3
Derajat	153	1.9
Peshawar	269	2.3
Feudatory States	2,854	7.4
Total	9,734	4.3
Grand Total in Bengal Presidency	98,017	6.3

TABLE II.—Showing the Distribution of Leprosy in British India.—*Continued.*

Madras Presidency.	Districts.	Total Number of Lepers	Proportion of Lepers in every 10,000 (ten thousand) of the population
Sea Coast Districts	Ganjam	963	5.5
	Vizagapatam	856	3.4
	Godavari	1,037	5.8
	Kistna	626	4.0
	Nellore	396	3.2
	Madras City	435	10.7
	Chingleput	984	10.0
	South Arcot	1,208	6.7
	Tanjore	1,072	5.0
	Madura	812	3.7
	Tinnevelly	802	4.7
	Malabar	1,208	5.1
	South Canara	909	9.5
	Total	11,308	5.3
Inland Districts.	Kurnool	246	3.5
	Cuddapah	210	1.9
	Bellary	356	2.7
	North Arcot	1,161	6.4
	Salem	363	2.3
	Coimbatore	241	1.5
	Nilgiris	58	6.4
	Trichinopoly	495	4.1
	Puducottah Territory	87	2.9
	Total	3,217	3.3
	Grand Total	14,525	4.7

TABLE II.—SHOWING THE DISTRIBUTION OF LEPERS IN BRITISH INDIA.—*Continued.*

BOMBAY PRESIDENCY. Collectorates.		Total Number of Lepers	Proportion of Lepers in every 10,000 (ten thousand) of the population
Deccan.	Khandesh	1,748	14.1
	Nasik	593	7.6
	Ahmadnagar	765	10.2
	Poona	1,088	12.1
	Satara	1,179	11.1
	Sholapur	401	6.9
	Belgaum	289	3.3
	Dharwar	162	1.8
	Kaladgi	190	3.0
	Total	6,415	8.3
Konkan	Kanara	54	1.3
	Ratnagiri	928	9.3
	Kolaba	432	11.3
	Bombay	430	5.6
	Tanna	749	8.2
	Total	2,593	7.4
Gujerat.	Surat	383	6.2
	Broach	82	2.5
	Kaira	199	2.5
	Panch Mahals	70	2.7
	Ahmedabad	76	.9
	Total	810	2.8
Sind....	Kurrachee	88	1.8
	Haidarabad	91	1.2
	Thar and Parkar	12	.6
	Shikarpur	69	.8
	Uper Sind Frontier	17	1.4
	Total	277	1.1
	Feudatory States	2,287	3.3
	Grand Total	12,382	5.3

THE LEPER HOSPITALS OF INDIA.

According to the report of the Secretary to the Government of India sixteen separate lepers' asylums exist in India, of these five are maintained partly by public funds and partly by private charity:—Umballa and Kangra, in the Punjab; Calcutta in the Lower Provinces of Bengal and Almorah and Dehra Dun in the North-western Provinces. Nine are entirely maintained by public funds:—Jullundur, Amritsar, Sialkot and Rawalpindi, in the Punjub; Ratnagiri in the Bombay Presidency; Madras, Trichinopoly, Palliport and Agra in the North-western Provinces. The remaining two, Subathu in the Punjab and Bhandara, in the Central Provinces, are wholly supported by private charity.

Lepers are also treated in many places in separate wards of other institutions such as general hospitals and poor-houses. In the district of Bancoora, in the Lower Provinces of Bengal, where the disease is specially prevalent, the lepers in the jail are kept apart in a special ward.

The structural and sanitary conditions of a few of these asylums, and the arrangements made for the medical and hygienic treatment of the sick in them are given, as extracted from the reports of medical officers in charge.

LEPER HOSPITAL, MADRAS.

This hospital is wholly supported by Government. In 1884, four hundred and three patients were treated, of whom 52 died. One hundred and forty-five were "Relieved," with the "Remark," "disease incurable," and 206 remained on hand.

The hospital consists of several blocks of buildings erected on an extensive piece of ground with a railed enclosure. A portion of this ground has separate accommodation for females. One large

block consisting of three wards, joined to each other by a covered way, is for European and Eurasian male patients. Each ward contains eight beds, and has a bath-room attached; and two latrines are placed, at a convenient distance, for these patients. There are five separate wards for native patients; each accommodating 16 beds; and a block, divided into 6 wards, with beds for 30 patients. One of the former is used for the treatment of patients suffering from intercurrent diseases. All these patients have two separate bath-rooms and 4 latrines for their use. Besides the above, there are other buildings for the steward's office, and surgery, and there are three godowns, one used by the hospital contractor for stores, one for medicines, and the third as a lumber-room. The kitchen is divided into two cook-rooms; one for Europeans and one for natives. There is also a dead-room separated from the rest of the hospital buildings. In the female enclosure there are two large buildings; each is divided into two wards. In the European wards there are 16 beds, and in the native 24. Each building has a bath-room attached and a latrine placed at convenient distance. The hospital is supplied with water from the Red Hill Lake by taps placed in the bath-rooms, kitchen and gardens. A portion of the hospital compound is allotted to patients for cultivating country vegetables. Patients are visited by their friends between the hours of 10 A. M. and noon, and from 4 to 6 P. M.

Treatment.—All patients, not suffering from intercurrent diseases, are treated by the daily application of chaulmoogra oil, mixed with cocoanut oil, in the proportion of 1 of chaulmoogra oil to 12 parts of cocoanut oil, and this is carried out as follows:—

The European patients assemble in one of the verandahs at 7 A. M., and continue rubbing the oil into their bodies until 9 A. M., after which they take a bath. The natives begin the rubbing at 9 A. M., and continue it till 11 o'clock and then have their bath. All patients suffering from sores meet in a verandah set apart for the purpose at 7 A. M. and 2 P.M., and have their ulcers dressed. Rice flour poultice is the chief emollient application, but special dressings are as carbolic oil, iodo form, camphor turpentine, sulphate of copper, &c., used in the form of ointment or lotion. Patients are required to keep their own wards, and the hospital compound clean. Some well-behaved men are appointed captains of wards, whose duty is to ensure order and cleanliness among the patients, and, when required, the more healthy patients are employed as orderlies, who superin-

tend the cooking and look after bed-ridden patients. The night soil is removed from the latrines and deposited in a night-soil-cart, and removed by contract agreement at a cost of Rs 25 a month, whilst the surface drainage is accomplished by small drains leading into a main, which communicates with one of the town sewers.

The establishment of the hospital is as follows:—

1 Assistant Apothecary, 1 Steward and Writer, 1 Surgery Cooly, 2 Peons, 2 Dhobies, 1 Tailor, 3 Cooks, 1 Dressing Cooly, 2 Male Ward Coolies, 2 Watermen. 1 Gardener, 2 Female Ward Coolies, 3 Male Toties, and 2 Female Toties. A barber is engaged to shave the patients twice a month and is paid, according to the number that he shaves, from the contingencies.

The hospital has a small library of books and periodicals contributed by the public. A small gymnasium has also been provided for patients who are able and like to take this exercise.

D. R. Thompson, M. D.,
Surgeon, 1st District, in Charge Leper Hospital.

LEPER HOSPITAL, TRICHINOPOLY.

The old Leper Hospital is an old District Jail, situated in the centre of the town. There is more than sufficient accommodation for the number of in-door patients treated which is limited by the Municipality to 15. The building consists of two long blocks, each composed of 8 single wards for single patients, and 2 larger wards. I consider the hospital is capable of holding 40 with comfort were funds available. The sanitary condition is all that could be desired. Every part of the building being frequently white-washed and tarred. The conservancy arrangements are most carefully attended to, and the dry earth system fully carried out. Everything is removed daily by the Municipal carts. There is a well of excellent water within the enclosure. A hospital assistant is specially set apart for this work, whose salary is paid in part by the Municipality and the remainder by the Government. The medicines required are supplied from the Municipal Hospital. The patients bathe daily, and clean clothing is provided for them. I find that the so-called

unserviceable clothing from the Municipal Hospital answers admirably for this purpose.

L. C. Canney, Surgeon Major,
District Medical and Sanitary Officer.

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This Leper Hospital is entirely supported from public funds by the Municipality. The number of lepers treated here, were in 1883, 89; in 1884, 127; relieved in 1883, 60; and in 1884, 87; died 8 in each year and leaving 16 on hand.

PALLIPORT LAZARETTO.

The structural and sanitary condition of the hospital is satisfactory. The buildings provided for the lepers are built of laterite, are filed, and having been occupied since 1728 may be said to be old. They are kept in good repair, an estimate being framed annually and submitted for the sanction of the Surgeon-General before any work is undertaken. Of wards in the ordinary sense there are none, but the lepers live in rooms.

There are three blocks, one divided into 7 rooms, the third into 8, and the 2nd of about double; the dimensions of the former being a double block containing 15 rooms; of these one block is for females and two for males. The average dimensions of the rooms are 13 feet in length, 12 feet in breadth and 10 feet in height. The total number of rooms used by patients is 24. The maximum number of patients accommodated in one room is 2, and the minimum is 1. Besides these rooms, the blocks contain 2 kitchens, 2 chapels, one fumigating and one store-room. At the entrance to the Lazaretto from the backwater there are two rooms facing each other, one serving as a surgery and the other as a store-room. There are separate latrines for males and females, two bathing sheds, three wells, a tank, and quarters for the hospital assistant. No provision for drainage. The Lazaretto has a dwarf wall surrounding it, on which there are wooden railings, which require renewal from time to time.

Medicines are issued daily to the patients by the resident hospital assistant, who is also responsible for the discipline of the establishment; that the diets are supplied according to contract, that the medicines are regularly used, and that the patients take the baths, &c., as they are directed. Some of the inmates do a little gardening, but their existence is monotonous and but for the shelter, food and clothing they obtain in the asylum, their lot would be miserable.

The Palliport Lazaretto is entirely supported by public funds (Government). In 1883, forty-five lepers were treated, and in 1884 thirty-seven, three dying in the former and two in the latter year. The Medical Officer adds: "Disease incurable. Temporary improvement whether treated by gurjun, or chaulmoogra oil, or by carbolic acid gas fumigation."

There are usually thirty-four lepers under treatment, the diet of each costs 2½ annas a day, and they are supplied half-yearly with a mat and two yards of cloth each. Should any balance remain at the end of the financial year from the Budget allottment, two yards of blue cloth are given to each inmate.

W. H. Morgan, Brigade Surgeon,
Civil Surgeon, Cochin.

RATNAGIRI HOSPITAL.

Lepers only are received at this hospital which is conducted much the same as a dispensary. There is a committee of which the Collector is president. Civil Surgeon has the interior control under supervision of Medical Department. Annual allowance from Government of Rs 2,000 ($1,000). From local funds Rs 2,500. The first only available after grant from local funds is exhausted, and limited to maintenance repairs by Public Works Department at Government cost.

There are three large double wards in separate blocks—verandahs all round—built of laterite—space for 100 beds affording 800 cubic feet space each. One ward occupied by females. Wall running

across enclosure separates male and female wards. Four double cook-rooms and four latrines. Night soil removed as the site is rock for a long distance round, no trench possible. Bathing defective, one of the cook-rooms being used for bath-room. Well on premises, clothing and rations sufficient, hospital two miles from station, visited twice or thrice weekly by Civil Surgeon or when called. Resident Medical Subordinate.

SASSOON INFIRM ASYLUM, POONA.

This Asylum is for the poor and infirm of all kinds, and is conducted by a committee, the Collector of Poona being president. Two secretaries. The Municipality gives Rs 100 per mensem. A fund of Rs 51,200 invested. Donations also made towards its support. It is situated to the west of Poona in a spacious walled compound. There are eleven separate barracks capable of accommodating eight persons each, and fairly ventilated. Also office and dispensary very poorly supplied with medicines; cook-rooms and latrines. A native medical practitioner is paid Rs 10 for visiting twice or thrice a week. They do not profess to treat the lepers medically. The number of lepers in 1883-84 were 333, of whom 277 were males. In July, 1885, there were 80 inmates, of whom 36 were lepers. As a rule about half the number are lepers but no systematic records are kept.

SIR JAMSETJI JEEJEEBHOY DARMSHÁLA, BOMBAY.

This asylum is for the poor and infirm of all kinds and is conducted by a committee of the "District Benevolent Society of Bombay." It is supported by a grant of Rs 300 monthly interest on Endowment Fund of Rs 10,700. Donations (in 1884) Rs 991. The number of lepers in 1883 is reported as 116 and in 1884 as 138.

They receive no medical treatment. There are eight long blocks of buildings substantially built and said to be well ventilated. Conservancy cared for by Municipality on a payment of Rs 144 per annum. When I visited this asylum some time ago I considered the place cramped and crowded. No medical treatment is carried out. When inmates are very ill they are sent to the Bombay Hospitals.

JAMSETJI JEEJEEBHOY HOSPITAL, BOMBAY.

At this hospital all kinds of patients are received but lepers only in leper ward. It is under the management of the authorities of the Hospital and Medical Department. The ward where lepers are received is called the uncurable ward. It is a handsome detached building, well ventilated, and paved with encaustic tiles and preserved in the same sanitary condition as the rest of the Hospital ward in charge of an Assistant Surgeon under supervision of First Physician. Patients capable are encouraged to work in hospital grounds. In 1883 there were 114 lepers reported of whom 29 were relieved, 19 died and 44 remained. In 1884 there were the same number, 20 were relieved, 16 died and 38 remained.

SÁVANTVÁDI.

Lepers only are received in the leper ward and the hospital is conducted by the Darbár and Political Agent. The cost is borne by Native State; but lepers are expected to provide their own diet when able to do so. Expenditure included in that of Civil Hospital. It is situated on an elevated and well drained site half-a-mile from Civil Hospital. Three wards containing four beds each. Well ventilated. Food, clothing, water-supply, satisfactory. Outhouses of cook-room and latrine. Visited every day by Hospital Assistant, and twice a week by Civil Surgeon. In 1883 there were 5 lepers admitted, and in 1884 there were 10, two of whom were relieved and 5 absented themselves.

AHMEDABAD.

This hospital is controlled by the Municipality. Lepers only are received in leper ward, but cholera and small-pox in adjoining wards. The Municipality defray the cost of establishment Rs 52 per mensem. Provisions, clothing, contingent charges, are included in general accounts of Civil Hospital. It was originally a rest-house for travellers, situate in an open walled enclosure 140 by 152 yards; and 80 yards from one of the city gates. There are three blocks in different parts of enclosure with a well in the centre. The largest block is used for lepers; the other two for cholera and small-pox. Pensioned Hospital Assistant in charge. Visited frequently by Civil Surgeon. In 1883 there were 60 lepers of whom 47 were relieved, one died and 12 remained. In 1884, there were 62, of whom 1 died, 26 were relieved and 31 remained.

CALCUTTA LEPER ASYLUM.

The Calcutta Leper Asylum is situated on a spot of ground in Amherst Street, and is divided into male and female parts (by a wall intervening). In the female part there are two wards, with a latrine, cook-house and bath-room attached. The male part consists of three wards, with a latrine, cook-house and bath-room, and also a small garden. The wards of the asylum are built on a raised platform, with verandahs all round, and outside the wards there is a pucca drain for washing away all refuse matter. The wards are white-washed twice during the year, and are coaled with coal-tar twice a year, to the height of four feet from the floor. The wards are washed twice a month and also disinfected, the same being done to the drains and latrines daily; and when a leper dies, his clothes, bedding, blankets, &c., are burnt.

On the 15th October, of each year, European medicines are

indented from the Calcutta Government Medical Depot, and these are supplemented by monthly grants from the District Charitable Society of Calcutta, for the purchase of oils and indigenous drugs. There is a medical officer attached to the asylum, who visits daily, and also a Resident Apothecary. There are also two dressers attached, with three sweepers, three cooks (Hindu, Mahomedan and Christian), and one durwan.

Each leper has a good iron cot and a mattrass, and each year they are supplied with two dhoties and one warm blanket, and their clothing is always replaced when burnt. The clothing of the lepers is washed weekly by a phobee who is on the establishment.

The number of lepers treated in this asylum during 1883 amounted to 178, and the number of deaths to 22; of these deaths, 16 were amongst new cases admitted during the year, the remainder being old cases. During the year 1884, there was an increase in the number of lepers treated, viz., 200 treated. The number of deaths amounted to 26; of these deaths, no fewer than 20 were amongst new admissions, and only 6 amongst the old cases. This is rather satisfactory, as during the year, owing to overcrowding in the wards, there was an epidemic of erysipelas, which, I am glad to say, was soon checked by taking proper sanitary measures, as well as by the segregation of the lepers, but unfortunately six of the lepers fell victims to the disease.

At present the wards of the asylum are overcrowded, many lepers being refused admission for want of accommodation. Each leper on an average has a very diminished supply of cubic feet of air to breathe, instead of 1,500 cubic feet as allowed on the best hygienic principles. For instance, in the Hindu ward, which is by length 70 feet, breadth 18 feet, height 14 feet, and containing at present 28 inmates, it will be seem that only 630 feet of air is the allowance for each inmate, which is less than half the quantity which ought to be allowed. This is a very serious drawback and entails consequences which may be very deplorable in an outbreak of epidemic disease.

The former diet of the lepers at this asylum was poor and meagre. In June, 1884, new scales of diet were sanctioned, which are now on an equal footing to the diet of different native hospitals of Calcutta. The new diet has greatly improved the condition of the lepers. They have gained in flesh; they do not suffer so much now from foul sores; and it has reduced the mortality to a certain extent, as since its introduction up to the close of the year one only died from

the old patients, and six from the new cases, who were bought into the asylum in a moribund condition.

With the exception of a subscription of Rs 100 a month from the corporation of Calcutta, and an annual grant of European medicines from the Government Medical Store, the institution has been supported entirely by the District Charitable Society, and was a heavy charge on its "General Fund." But about two years ago, two legacies and a donation from Mr. Greece Dutt were made over to the Society for the purpose of forming a "Leper Asylum Fund," and this capital, amounting to Rs 34,900, is now invested in Government securities. The average monthly cost of the asylum is Rs 600, exclusive of municipal taxes and repairs.

BANKOORA JAIL, BENGAL.

The leper ward is a building consisting of three rooms, situated in a spacious and airy yard and separated from the rest of the jail. Conservancy is carried on upon the system of receiving excreta in pulverized dry earth, covering them with it, and removing them to a distance for burial. Water is supplied from wells in the jail, which require deepening, and is filtered. Clothing and food are supplied as to other prisoners, with such variations as the medical officer may think necessary. The present superintendent of the jail is a native Assistant Surgeon, who has a Civil Hospital Assistant under his orders. They treat the lepers as they would any other sick in the jail. I consider the jail at Bankoora the most healthy in the province.

The superintendent supplements the above report of Officiating Inspector-General of jails, E. V. Westmacott, Esq., by stating that the leper ward consists of two rooms with an ante-room. Of the two wards, one is larger than the other, the former measuring 648 cubic feet and accommodating 20 prisoners, the smaller measuring 500 cubic feet and accommodating 18. The ante-room is a small one, occasionally used for the isolation of bad lepers, where they are treated separately from the rest. The number of lepers treated in 1883 was 30, with one death, and in 1884 was 36, with only one

death. Of the rest, some are still in jail; the others were discharged on expiry of their sentence. They are all criminals. Every possible attention is paid to the hygienic condition of the lepers confined in this jail. The wards are large and rooms well ventilated, with opposite doors and windows, admitting air and light in more than sufficient quantity; situated in the midst of a large compound having perfect southern exposure, and separated from the main ward of the jail. The state of the conservancy and removal of the night soil is all that could be desired, and is done according to jail regulations. For purposes of cleanliness, bathing and washing they get sufficient water from a well situated in their compound, and get enough of wholesome filtered water for drinking purposes. They get their food according to scale No. 1 for laboring prisoners, with such varieties and extras best suited for their condition. They pass their days in the open air, being engaged in some light labor, chiefly hewing of grass and husking *nim* seeds, &c. They are well-clothed. By these comforts and attentions their condition after admission becomes considerably improved, and they go out in a better state of health than they came in. Outside the jail nothing can be more miserable than the state in which they live. Suffering from privations of all sorts, without any proper shelter to protect them from the inclemencies of the weather, without proper clothing, living as they generally do on begging, they scarcely get a full meal in their life; they readily succumb to the ravages of the disease.

ALMORA LEPER ASYLUM.

In the North-western Provinces there are only three Leper Asylums—that is to say, institutions devoted solely and entirely to the maintenance of lepers: these are the Almora, Dehra Dún, and Agra Leper Asylums. But besides these institutions, lepers are received into 22 poor-houses, situated at the headquarters of as many districts, along with blind and destitute poor.

The Leper Asylum at Almora is supported partly by the interest which accrues from a funded capital of Rs 30,000 and partly from private subscriptions. The chief portion of the capital fund was,

I believe, made over to the trustees of the asylum by the Government of the North-western Provinces many years ago, in the shape of a balance of a stock of tea left in the hands of Government, when it withdrew from the tea industry in Kumaun. During the past year (Report dated June, 1885), the income of the Almora Asylum was Rs 6,388, the principal sources being private subscriptions Rs 3,085, and interest on capital Rs 2,145. It may thus be said that of the income, exclusive of Rs 949 cash balance, the Government contributed 41 per cent., the Municipality 2 per cent., and private subscribers 57 per cent.

At Almora the lepers are housed in ranges of cottages built on a gently sloping hill side, the females being separated from the males by a low divisional wall. There is a small dispensary in charge of a locally-entertained Native Doctor—a store-room and grain go-down, and a small chapel, the institution being under the immediate supervision of the resident missionary of the London Independents. The whole of the asylum is surrounded by a low wall, and the grounds are planted with trees. In 1883, 137 were "benefitted" leaving 127 on hand, and in 1884, 130 were benefitted, leaving 107 on hand.

THE DEHRA DÚN LEPER ASYLUM.

This asylum was until last year supported entirely by private contributions. The late Mr. Wilson, of Mussooree, contributed a sum of Rs 20,000 to form the nucleus of a trust fund, and this has been added to until it now amounts to close on Rs 25,000. Since last year, the Government of the North-western Provinces and Oudh has made an annual grant of Rs 1,500 towards the support of the asylum; so that, taking the income of the past year as an index to its resources, the Dehra Dún Leper Asylum receives from private subscriptions, 27 per cent.; from interest on securities, 27 per cent.; from the Municipalities of Mussooree and Dehra, 17 per cent. and from the Government, 29 per cent.

The asylum is divided into a male and female side, each consisting of an enclosure surrounded by a wall, and having lean-to sheds erected against the walls as dwellings for the lepers.

The Hospital Assistant, attached to the jail and police, prescribes for the sick of the asylum, and for the purpose visits it daily, the whole being under the supervision of the Civil Surgeon. In 1883, the number of lepers benefitted was 92, leaving 51 on hand, and in 1884, 71 were benefitted, and 53 left on hand.

THE AGRA LEPER ASYLUM.

This asylum is supported entirely by the Municipality, and is situated in an old garden enclosure on the banks of the Jumna, the house for the lepers being lean-to erections against the outer enclosure walls. The Hospital Assistant of the Chhatta charitable dispensary visits and prescribes for the sick. In 1883, twenty-three lepers were benefitted, leaving a like number on hand, and 1884, thirty-three were benefitted, leaving 24 on hand on December 31st.

POOR-HOUSES AND ASYLUMS.

In the Poor-houses, which receive lepers as well as blind and helpless poor, the lepers are supported by the funds raised for the genral purposes of the charity. Of the Poor-houses in which lepers are also received, it may be said that they all have the services of the Hospital Assistants whose sphere of work is nearest to them, and there is generally a clerk or daroga in charge of the accounts. I must repeat, however, that no special medical or hygienic treatment is now attempted for the cure of lepers, although they receive when sick, the same attention as the other inmates of the Poor-houses.

These Poor-houses are located at Allahabad, Bareilly, Benares, Bahraich, Bara Banki, Bánda, Cawnpore, Farukhabad, Fyzabad, Gházipur, Gonda, Hardroi, Kheri, Lucknow, Meerut, Moradabad, Muttra, Orai (Jalaun), Rae Bareli, Saháranpur, Sháhjahánpur, Sitapur and Sultánpur. At these places there were benefitted in 1883, 465 men, 200 women and 35 children, leaving 148 men, 47 women and 4 children on hand. In 1884, there were benefited 457 men, 151 women and 42 children, leaving 151 men, 55 women and 7 children on hand on December 31st.

UMBALLA ASYLUM.

There are seven Leper Asylums in the Punjab Province, namely, Umballa, Kangra, Jullundur, Amritsar, Sialkot, Rawalpindi and Simla.

This asylum is near the Umballa City. It is an American Mission Institution, and is under the sole control of the missionaries. It is supported partly by Municipal and District Funds, and partly by private subscriptions. Of the total income of Rs 2,052 for 1884, including a balance of Rs 351 from the previous year, Municipal and District Funds contributed Rs 1,100 or more than a half.

The asylum consists of a block of 5 buildings, viz., 3 low-built Kutcha barracks, a "Prayer-room," and a building containing a room for the compounder and chaukidar. The barracks are about 70 feet long by 16 broad, divided into 23 rooms of about 12 feet by 10 each, with a 6 feet wide verandah. The "Prayer-room" is 30 feet by 18, and here the lepers assemble for religious instructions by the missionaries. Dr. Bateson, Civil Surgeon, thinks there is a great want of ventilation in the barracks. There is no latrine; but as the asylum is in an unfrequented place near sand-hills, the Civil Surgeon thinks one hardly necessary. The Civil Surgeon visits the asylum once a week, or oftener if necessary. No specific treatment is now adopted. Such medicines as are required are supplied gratis from the City Dispensary. The number of lepers treated during the years 1883 and 1884, were as follows: 1883, 40; 1884, 48; of these, 2 died in 1883, and 12 in 1884, leaving 35 remaining.

THE KANGRA ASYLUM.

This asylum is situated in a beautiful spot in the centre of a tea garden, about a mile from the Dharmsala Jail, and at an elevation of over 4,000 feet above the sea. It is supported by District and

Provincial Funds, and by the interest of Rs 5,800 which have been gradually invested in Government 4 per cent. promissory notes. The foundation of this Endowment Fund was a sum of Rs 1,500, which was given by Colonel Lake, formerly Commissioner of the Division, and it has gradually been increased by donations and subscriptions, chiefly from the visitors of Dharmsala and the residents of the Kangra Valley, both European and native, which have been collected by successive District Officers of Kangra. The expenditure last year was Rs 857. During 1884, 21 lepers were treated, 2 dying, 1 leaving and 18 remaining.

The asylum buildings consist of two parallel rows of barracks, built of stone and roofed with rough slates. They face each other and are separated by a bit of garden ground. One room of barracks is occupied by males and the other by females. The huts are kept fairly clean, but there is a want of ventilation in them. Their situation, however, on a pine covered ridge, at an altitude of 4,000 feet or more above the sea, renders free ventilation not so necessary or desirable as in the plains. On the whole, the lepers here seem as comfortably situated as their miserable condition will admit of. A spring in the neighborhood supplies them with plenty of good drinking-water.

A hakmi, who also knows European medicine, is employed to superintend the asylum and to minister to the lepers' ailments; but no special method of treatment has been tried for some years. The Civil Surgeon of Dharmsala visits the asylum at times.

THE JULLUNDUR ASYLUM

Is at a place called Dakni Sarai, about 5 miles from the town of Nakodar. It is supported by "malba" or village funds, collected with the land revenue. The cost of maintenance of the lepers belonging to other districts is recovered from the districts concerned, the cost of maintenance of each leper being calculated at Rs 5 per mensem. The number treated in 1883 was 69, of whom 4 died, 20 left and 45 remained at the end of the year. In 1884, 89 were treated, 6 dying, 21 leaving of their own accord and 62

remaining at the end of the year. The mortality for the two years has been 6.32 per cent. of the total treated. The building in which the lepers are accommodated is an old Badshahi Sarai, which is large enough to hold 200 if required. It is on the banks of the Eastern Beyn, and is favorably situated for drainage. A compounder on Rs 12 a month is employed to look after the lepers, and under him there are a chaprassi, a bhisti, and two sweepers. The place is kept clean, and the dry earth system is carried out. No special treatment is adopted. The Civil Surgeon frequently inspects the asylum.

THE AMRITSAR ASYLUM

Which is the largest and best provided in the Province, is situated about a mile from the town of Tarn Taran, 12 miles south of Amritras. It is supported by Amritsar Municipal Funds, which pay all expenses; and at the close of the year, the amount is recovered from the districts to which the lepers belong. In 1883, 349 lepers were treated here, 23 died, 100 left of their own accord and 226 remained over; in 1884, 305 were treated, 33 died, 40 left of their own accord and 232 remained at the end of the year. The mortality was 8.56 per cent. of the total treated.

The leper settlement or colony at Tarn Taran consists of three lines of huts running parallel, but without plan or order, of all sizes and shapes, with kutcha walls and roofs. There is no enclosing wall, so that the lepers are at liberty to roam about as they please, and to picket their cattle in the open near their houses. There are about 140 huts, some having small enclosures During the past 15 years, much has been done to increase the accommodation, baths have been appended to the wells, latrine accommodation has been built, and a house for the Hospital Assistant and a large garden have been provided. So far as isolation of the leper goes, there is no provision whatever, because he is constantly absconding or obtaining leave. Nor can the present arrangement be considered in any sense as a hospital. It is impossible for the Civil Surgeon to supervise it. There have been spasmodic attempts made at different

times in regard to the treatment of the disease, viz., the use of garjan oil, and sweet oil and nerve stretching. The sexes mingle, and the rising generation of lepers may be seen running about in the colony. The huts are, as a rule, filthily dirty and untidy, and the general aspect of Tarn Taran Leper Asylum depressing to a degree. The sick and urgent cases are provided with medical treatment, there being both a Hospital Assistant and a dresser resident, with a well-stocked dispensary ready for emergencies. Rs 3 per month are given to each adult, and Rs 1—8 to each child, from the Municipality of Amritsar. A liberal supply of blankets is furnished in the cold weather, and there is a staff of bhisties and mehters. The Rev. Mr. Guildford, who lives at Tarn Taran, now takes considerable interest in the lepers.

THE SIALKOT ASYLUM

Is situated at a place called Baba Lakhan, about 8 miles from the town of Sialkot. It is maintained entirely from District Funds. In 1883, 49 lepers were treated, of whom 2 died, 6 left of their own accord and 41 remained; in 1884, 46 were treated, 7 died, 2 left of their own accord and 37 remained at the end of the year. The mortality for the past two years has been 9.47 per cent. of the total treated. The asylum building consists of three double barracks of pucca brick, with accommodation for 72 lepers. It is well situated, and the sanitary conditions are satisfactory. There are two good wells and a garden attached to it. The establishment consists of a compounder, cook, kahar and sweeper.

THE RAWALPINDI ASYLUM

Is situated in a pleasantly wooded place, about half-a-mile to the north-east of the city. It is supported by District and Municipal Funds. The total amount expended during the year 1884, was Rs 1,904-6-11, of which District Funds contributed Rs 686-3-5 and Municipal Funds, Rs 1,218-3-6. In 1883, 49 lepers were treated,

2 died, 6 left and 36 remained at the end of the year; in 1884, 45 were treated, 2 died and 39 remained at the end of the year.

The buildings consist of eight separate barracks, one of which contains 8 rooms, five contain four rooms each, and two (which are in a ruinous state) have 2 rooms each. The large barrack containing 8 rooms is in good repairs, having been built only a year ago. It has two roomy verandahs, one on each side, and the apartments are comfortable and fairly ventilated. One of the barracks containing four rooms being occupied by the servants of the asylum, there remains accommodation for only 24 patients, while the number now in the asylum is 49.

Rs 1,200 has been budgetted for to build a new block capable of holding 8 lepers; but as yet no arrangements have been made to carry out the work. The latrine arrangements are now reported to be good, there being a separate latrine for males and females, each supplied with iron utensils and the dry earth systems adopted. The drinking-water is got from a pucca masonry well, and is much esteemed by the people of the town, who largely resort to it for their domestic supply. The Assistant Surgeon in charge of the Civil Dispensary affords medical aid when required, but there is no attempt at any special treatment, An establishment is kept up consisting of a dresser, a cook, a kahar, a chaprassi, a bhisti, and a sweeper.

THE SABATHU ASYLUM

Is another institution which is entirely under the management of the American Presbyterian Missionaries. It is supported by private funds collected in India, Great Britain and the United States of America. The total income for the past two years has been Rs 6,752 and Rs 6,842, and the expenditures Rs 2,284 and Rs 2,834.

The lepers receive a monthly allowance in cash of Rs 3 to Rs 3-8 each, from which they supply themselves with food, clothing and fuel; but warm clothing and blankets are given to them extra during the winter. From the fact, as shown by the accounts, that considerable sums are found on the lepers after death, it would appear that

the allowance given is ample for their wants. In 1883, 112 were treated, of whom 13 died, and in 1884, 104, of whom 10 died. The asylum is situated not far from the American Mission House at Sabathu on a breezy, sunny ridge. The houses consist of a series of barracks arranged in a row along the ridge and divided into compartments large enough to lodge two lepers in each. They are said to be well ventilated, and have a verandah in front. The sexes are strictly kept apart in different barracks, and they have patches of garden ground which they cultivate themselves when able to do so. Latrines are erected at convenient distances, and are attended to by a sweeper. Bhisties are employed to bring water to the lepers.

Dr. Newton, American Missionary, who was for many years in charge of the asylum, and who took the keenest interest in lepers, died in 1880, and the Rev. A. Rudolph is now in charge, assisted by a native Christian compounder, who attends to the ailments of the lepers. All attempt at specific treatment has been abandoned for some years as useless. During 1883-4, 1,346 lepers have been treated in the asylums of this Province (Punjab) of whom 118 have died, giving a mortality for the two years of 8.76 per cent. The highest mortality has occurred in the Umballa Asylum, 18.9 per cent., and the lowest 4.25 per cent. in the Rawalpindi Asylum.

TREATMENT OF LEPROSY IN INDIA.

EXTRACTS FROM REPORT ON CASES OF LEPROSY TREATED BY SURGEON C. T. PETERS, AT BELGAUM, DATED BOMBAY, JUNE, 1879.

The people were very sceptical as to their ever being cured, or even relieved, of such a dreadful malady as leprosy, for which they have been cast out by friends and society, and made dependent on charity for their daily bread. One of them, however, a Goanese, in whom the disease had only existed for a couple of years, was selected for treatment. He was made to attend at the Civil Hospital daily, where he had a bath at about 9 A. M., with soap and warm water, which was followed by an inunction of carbolic oil (in 20

parts), and the open sores dressed with a somewhat stronger carbolic oil (in 10 parts). Internally, he was treated with chalmogra oil (five minim doses), and occasionally iodide of potassium. After having assiduously taken these remedies for about six months, he fully recovered the sensibility in the extremities, the sores healed, and in every other respect he felt so well that he left the asylum to join his relatives in Goa with a feeling of deep gratitude. (An appended note states: "Six years later (in 1877) this man returned to the asylum with aggravated symptoms of leprosy, said to have recurred since the famine set in.") The others in the asylum had not so much confidence, and it was very difficult to get them to attend regularly.

On my being transferred to Poona in 1873, I undertook the charge of a leper, whom I commenced to treat in the same way. He was improving slowly, when details of the treatment by Dr. Dougall with gurjun oil reached me. I at once tried the application of the balsam unmixed with any other ingredients, with the happy result of closing the deep ulcers which had been festering for months; but as I had to leave the station soon, I lost sight of the patient.

On my return to Belgaum, I gladly accepted the offer of Reverend G. T. Bridges, S. J., the Roman Catholic Chaplain, to treat the lepers now under his charge, and they have been under my charge from July, 1876, to November, 1878.

Twenty-nine cases were treated, 18 males, 11 females, of these these, three were children under 14 or 15 years, two females and one male; four were under 25 years, one female, three males; and the rest above 25 and under 45 years of age. Of the total number of cases treated, including those from the outside, two were Brahmins and one Jain, who were in good circumstances of life, two of them being Karkoons, and one a grain merchant, one Mussalman, and the rest Hindus of the lower classes. In many of them there was leprosy in the family, such as father and son were leprous, and brother and sister in another instance. A few of the patients attributed it to marriage with leprous subjects; whilst in a few either there appeared to be a reluctance to acknowledge that the disease was hereditary, or that no cause could be assigned; the disease appearing *de novo* after a general failure in health, or accidental injury to the hands or feet while cutting something, or walking along a rough gravelly ground, and the wound thus caused becoming the seat of the disease. Several patients suffered from both the tuber-

cular and anæsthetic forms at the same time. In some it was associated with syphilis. The disease, as is generally attributed, was not traceable to the consumption of fish; fish being not so easily procurable in Belgaum; while in the three high caste Hindu patients it was quite out of the question, as they never eat fish. No particular kind of diet, in fact, can be said to give rise to this disease.

The patients, generally, complained of dyspepsia, attended with a burning sensation in the procardial region, voracious or capricious appetite which is not easily satisfied, and want of sleep at night, (Note. "These prominent symptoms are not generally described in books,") besides general malaise pains and ache in the joints and different parts of the body, resembling chronic rheumatism, attended with feverishness, and among those who were very much debilitated, diarrhœa and dysentry prevailed. In some advanced cases lung complications, attended with high fever, were present; probably due to tubercules (leprous) forming in the lung tissue, and terminating fatally. In one case an attack of high fever was followed by the permanent development of brownish-black spots all over the trunk as far as the waist. One patient who had ulceration of the throat, and whose voice was reduced to a whisper, suffered frequently from fits resembling spasmodic croup, which yielded to the administration of iodide of potassium in combination with ether and ammonia. The amount of anæsthesis present in the fingers and toes rendered them liable to be burned with fire while cooking, or they were knawn by rats at night, without their owners being aware of it at the time.

My plan of treatment has been, first to make the patients rub carbolic acid and sweet oil, (1 in 40) early in the morning for a couple of hours all over the body, and then bathe at about 9 o'clock with soap and warm water. Afterwards to rub an emulsion of gurjun oil (made according to Dr. Dougall's formula, viz., gurjun oil one part, lime water three parts, churned, so as to form a thin ointment of a creamy consistence) over the affected parts, and fill in the ulcerations with the cotton wool smeared with the emulsion. The ulcers healed rapidly, but the anæsthetic parts and tubercules remained much the same; and except in one or two instances, where it was alleged by the patients that the tubercules were softening, I noticed no change in them.

This induced me to try the cashew nut oil which has been so successful in the hands of Dr. Beauperthy.

The result of my trial was so far satisfactory that some of the

oldest patients, who had no hope of being ever relieved in the slightest degree, took to it hardily, in spite of the pain and discomfort arising from the blisters which the application of this oil over extensive surfaces gave rise to; and on seeing that they were benefitted they sent for their friends, not in the asylum, and placed them under treatment.

Briefly, then, I have used *externally*,—

(1) as a general application, *carbolic oil* (1 in 40) rubbed over the whole body to promote healthy action of the skin, followed by soap and warm water ablution;

(2) for the ulcerated parts, an emulsion of *gurjun oil* and *lime water* (1 in 3) applied by means of cotton wool and bandage, as well as by friction;

(3) for the anæsthetic parts and tubercular growths the application of *cashewnut oil*.

Internally—chalmogra oil in five minim doses in combination with bi-carbonate of soda, five grains, and peppermint water, one ounce, and, in particular cases, iodide of potassium in three grain doses.

I shall now briefly consider the remedies used:—

1.—*Gurjun Oil.* I used this for a time, both internally and externally, as recommended by Dr. Dougall, but I was obliged to give up its internal administration in consequence of its ill effects upon the digestive system. In some cases it aggravated the symp- of indigestion, which I find is invariably present in leprous subjects, whilst in others it gave rise to diarrhœa; and I did not consider it desirable to weaken the strength of the patients by continuing its administration while we have a much better remedy in chalmogra oil, especially as the weaker patients were liable to attacks of diarrhœa and dysentery.

As an *external* application, however, gurjun oil is very valuable in the treatment of chronic leprous ulcers, which heal rapidly under its action; and I do not remember seeing in any single instance the cicatrices open out when it has been discontinued, although fresh ulcers break out in other parts of the limbs, which are similarly healed under its use.

This emulsion also keeps the skin in a soft condition, and so prevents cracking, which is often the commencement of an inveterate ulcer. It has, moreover, the advantage of keeping away flies which infest leprous patients, and in the absence of cleanliness, give rise to maggots, which increase the extent of the ulcer, but under its use

the lepers, as well as their rooms, presented a very clean appearance.

As a proof of its efficacy, it may be stated that the patients always asked for more of this emulsion than the quantity they were allowed.

Not only in leprosy, but in chronic (scaly) skin diseases, the gurjun oil seems to be a very valuable remedy applied as an emulsion in combination with lime water. It is, besides, a cheap article of commerce.

The advantages of gurjun oil, then, are the following:—

(1) Its rapidly healing action on chronic leprous ulcers.
(2) Softens the skin.
(3) Prevents the collection of flies.
(4) Its cheapness.
(5) Its efficacy in the treatment of chronic skin diseases.

I may here mention that, made into an ointment with sulphur, gurjun oil rapidly cures certain skin diseases, such as *tinea circinata*, which are due to the presence of *fungus*.

2.—*Cashewnut Oil.* In this we have a potent remedy for the dispersion of tubercules. I was induced to try this, as gurjun oil did not give any satisfactory results. It is applied with a feather daily over the tubercules until blisters are formed, when it is discontinued. This causes the tubercules to soften and disappear, discharging in some cases an ichorous matter, and leaving an open ulcer. To the ulcerated surface thus formed the gurjun oil emulsion is applied, under which it cicatrizes rapidly.

The application of cashewnut oil has to be repeated when the skin has healed. Until total absorption of the tubercules has taken place, care should be taken that it does not run over the healthy skin, or into the eyes.

3.—*Chalmogra Oil.* I find this oil most useful as an internal remedy, inasmuch as it acts as an alterative stimulant tonic, given in combination with carbonate of soda and peppermint water. It relieves the distressing burning sensation in the stomach arising from dyspepsia, and the constant morbid craving for food of which lepers generally complain; at the same time it improves the appetite and promotes digestion, and thus leads to the healthy assimilation of food. Some of the patients who have been in the habit of taking alcoholic stimulants have asserted that they experienced a similar effect from its use, and for these reasons, combined with its not an

unpleasant taste, they preferred it to gurjun oil. Chalmogra oil, moreover, has a direct influence in reducing the tubercules, as seen in cases where cashewnut oil had not been applied, and is therefore particularly adapted in the treatment of leprosy.

4.—*Carbolic Oil.* I have used carbolic acid in combination with sweet or cocoanut oil as a general application with a view to promote the healthy action of the skin, and also as a substitute for gurjun oil when I have not had a supply of the latter; but it is more expensive and less efficacious than gurjun oil.

5.—*Iodide of Potassium.* I have used it with advantage, especially in those cases which were associated with a syphilitic taint, and I believe it promotes the absorption of the newly-formed effusion of the peculiar substance from the different structures.

Diet.—The patients in the asylum received rice and dall as their principal meal. Mutton once a week, and occasionally fresh fish. Potatoes and some of the ordinary country vegetables were also allowed, but they were forbidden to take brinjals, pumpkin and salt-fish, or meat of any description.

During the famine, the quality of food was very inferior, as good grain was not procurable in the bazaar, except at very high prices, and this would require greater funds than were available; the asylum being kept up by local contributions collected monthly by the Roman Catholic chaplain for its support. Owing to the deterioration in the quality of food, several of the inmates suffered from an aggravation of the symptoms during the famine months.

Concluding Remarks.—After what has been described in the foregoing pages of this report, it will appear that, although gurjun oil has no specific curative effect on leprosy, it certainly does ameliorate the condition of the poor lepers, combined with the other remedies detailed above; but, in order that they should receive the full benefit of medical treatment, it is highly desirable that some central asylums should be opened by Government where the patients could be brought more fully under medical supervision, where sanitary rules could be better enforced, and the diet better regulated than in any private asylum.

Judging from Mr. McCorkhill's figures, there were not less than 22.8 per cent. of population, in the Belgaum Districts alone, afflicted with some form or other of leprosy; and considering that it is a disease which is liable to be transmitted from father to son, and propagated by marriage, it calls urgently for the adoption of such meas-

ures as will not only palliate, if not entirely remove, the suffering of the afflicted, but in all probability prevent the spread of this loathsome disease.

I am indebted to G. McCorkhill, Esq., C. S., for the following statistics of leprosy in the Belgaum Districts from the census of 1872:—

In this collectorate, the total number of those disabled by infirmity is 4,131, or 44 per cent., or 44 per cent. of the entire population. The proportion of male infirmities to female is 60.8 to 39.2. Of the total number of infirm, 61.2 per cent. are either deaf, dumb or blind; and 22.8 per cent. are affected with one or other type of leprosy.

NOTES OF CASES TREATED.

In Dr. H. Vandyke Carter's paper on leprosy, an abstract of fifteen cases is given from notes takes in 1876 and 1877, and certified by Dr. Peters. A few of these cases are as follows, three of the patients, subsequent to marked improvement, dying of diarrhœa:—

CASE I.—Alkous Sarson, nine years in the Leper's Home (1876). Ill 20 years; body covered with brownish-black patches, which are anæsthetic; fingers and toes contracted. The knee-joints and wrists more or less stiff, and has been a cripple for years. The disease first commenced in white and brownish-black patches on the thigh; while in the asylum five years ago had a violent attack of fever, which subsided on a rash breaking out over the whole of the body which still covers the trunk.

Treatment.—The cashewnut oil was applied along the knee-joints, and the contracted fingers and the ulcers healed with gurjun oil emulsion. He has been able since to walk better and go over a mile to the Roman Catholic Chapel.

This man who has been the oldest inmate of the asylum, was a great sceptic, and would not take any medicines at first, but seeing that his comrades were improving, he took to treatment, and even went so far as to apply the cashewnut oil all over the legs and thighs, not minding the blisters caused thereby. He then sent for his son, who was born a year before the disease first broke out in him, and was at this time suffering from anæsthem patches, like his father, on different parts of the body, to place him under treatment.

This man is reported to have died during the famine season.

Case II.—Luxmon. Leprosy for ten years, and in the home for eight, (1876).

Nostrils affected; tips of fingers and toes destroyed. No hair in the eyebrows, but that of the head and face good. Had three sores on the sole of right foot, six on the left foot; of these, two in the left and one in the right have now closed under the use of gurjun oil ointment. The largest and the oldest one is nearly healed; a small ulcer, however, has recently appeared on the left foot. Had tubercules over both arms, which have now disappeared. States that sensation has returned in the left foot, but that the right foot and both arms are still more or less anæsthetic.

14th October, 1877. Fresh sores on the left foot; the old ones have healed. 22nd November, 1877. Sores almost healed.

Case III.—Kanuba. Ill seven years; four years in the home, (1876).

Six months after treatment commenced the sore on the left ankle was nearly healed, that on the right ankle was contracting; tubercules in the lobes of the ears very much less, and face improved in appearance.

18th October, 1877. Old sores on the left foot perfectly healed; new sores formed on the right foot.

Case IV.—Isram Parub. Two years in home, (1876). Has three ulcers on right foot and one on the left, one on the left hand; fingers of the right hand contracted; left hand partially so. All the toes are contracted; could not walk on account of stiffness of the knee-joints. Has been applying ing the cashewnut oil to the joints and the gurjun oil over the sores, and can now walk great distances. All but one sore completely healed; the one remaining open appears to be connected with a piece of diseased bone in the dorsum of the foot.

14th October, 1877. Sore in the right wrist healed. There is a burn mark on the left hand middle finger, caused accidentally by fire. Right foot still troublesome on account of the diseased piece of bone.

Case V.—Yellappa. Right leg was first affected. There are anæsthetic patches scattered all over the body. Tips of three fingers of the left hand ulcerated and contracted. Ankle-joints stiff, to which cashewnut oil has been applied. There was a sore over the left thigh for nearly a year; gurjun oil was applied, and it has closed since. Feels lighter generally.

Remark.—This man died in September, 1877, during the famine. He is stated to have suffered from chronic diarrhœa.

Case VI.—Poonajee. Four years in the home. Ill seven years; disease first appeared in the calf of right leg. Left eye destroyed by the growth of tubercules two years ago, (1876). There are tubercules in the forehead and cheeks; fingers swollen; legs also swollen and ulcerated.

The big ulcer in the calf of the right leg healed, but fresh ulcers broke out in the feet, and the patient died of diarrhœa in July, or August, 1877, during the famine.

Case VIII.—Purasnam, aged about 25 years. Ill eight years. In the home two years, (1876); father's father suffered from leprosy.

Left foot, right hand, left hand, right foot, became successively affected, which are ulcerated.

Six months after the use of the gurjun oil emulsion, some of the sores of the feet had healed, another was healing, but a finger in each hand was ulcerated, and two phalanges have been exposed for a month. These came away eventually, and the ulcer closed.

14th October, 1877. Has suffered for nearly two months and a half with an excessive gangrenous ulceration of the left fore-arm, from whence a large *sphacelus* has separated. He was very low, and his strength has to be kept up with stimulants while the ulcer was dressed with gurjun oil emulsion. The patient is now well and able to use his arm and move about. A deep cicatrix now marks the spot.

23rd November, 1877. Has walked over himself about a mile's distance to my house. No more sores in the feet, hands and arms. Quite free from sores.

CASE X.—Krishnee. Ill ten years. In the female asylum four years. Father had leprosy; died four years ago. Used bitter *neem* leaves (*arader-achta indica*) both internally and externally. Has lost all the fingers some five or six years ago, some of them were eaten by rats.

Has got a sore at the sole of the right foot. There is loss of sensation in the extremities.

The sore very nearly healed, and sensibility had returned at the extremities to such an extent as to enable her to feel the pain if anything got into the sore of her foot while walking.

CASE XI.—Gunga has been in the female asylum for five or six years. Became afflicted with leprosy shortly after her marriage some five or six years ago. Child died three days after birth.

Face and hands slightly affected, but the legs have chronic ulcers, one in particular over the skin, which, she says, has been in existence for several years.

In this very interesting case all the sores healed under the use of gurjun oil, including the old ulcer over the skin; and up to the time that I was in Belgaum, (November, 1878) no fresh ulcers had formed.

CASE XV.—Jairam Loobroo, aged about 25 years, ill about four years. Father's mother had leprosy, sister also leprous, and now in the female asylum.

Had syphilis; tubercules on the cheeks, lobes of the ears and glans penis. Hands and feet anæsthetic, commenced with a papular eruption over the hands and feet, then the face.

Treated himself with lemon oil and kapila powder (powdered *nux vomica* seeds) without avail.

N. B.—*Nux Vomica* seeds powdered are given with lemon juice in dyspepsia to promote the appetite and increase the digestive power. Under treatment the skin assumed a healthy appearance; the tubercules remained much the same.

DR. DOUGALL'S TREATMENT WITH GURJUN OIL.

Dr. Dougall, M. D., Surgeon-Major, Officiating Senior Medical Officer, Port Blair, in his Medical Report of April, 1874, presents 24 cases treated by him in six months. He says, "As to the therapeutic value of gurjun oil in the treatment of leprosy, I can only speak from my own observation here, as I never heard and nowhere read of it being used in this disease; and in fact the only medicinal use I had read of it being applied to was in cases of gonorrhœa, where it is said to act like copaiba. Of the 24 cases under treatment here during the past six months, every one of them has decidedly benefitted by its use, every ulcer without exception has healed up and not broken out again, but the most marked benefit has been derived by those suffering from the anæsthetic form of the disease."

The plan of treatment is thus described by Dr. Dougall:—

"They turn out at daylight (say 5.30 A. M.), after a little time they supply themselves with a small quantity of dry earth finely pulverised, which is kept ready in a tub under the hospital; with this dry earth they all proceed to a small stream in the neighborhood where they thoroughly wash themselves using the dry earth as a detergent; having accomplished this task, they return to the leper ward by 7 A. M., where they sit in a row, and each man is then served with his morning dose of 4 drachms of wood-oil and lime water mixed in equal proportions. Having seen this swallowed by all of them, the apothecary sees that each man has some small vessel (usually half of a cocoanut shell) into which the compounder puts a quantity of the gurjun ointment, and with this they proceed to rub themselves all over, not merely by smearing it on, but thorough and continuous friction is kept up for two hours, and the compounder all the while is walking up and down the line armed with a tin of the ointment and a spatula for distributing more of it as it is required amongst the patients, and no limit is placed upon the amount given further than that whatever is given must be well rubbed in. The rubbing is thus continued till 9 A. M., then the men set about getting their food, and latterly they trim the ground

around their own quarters and excavate earth-work, and it is pleasing to see the will with which men who for years had not been able to handle a walking stick on account of loss of fingers and numbness in the arms now set about this sort of work, and they are evidently proud of being again able to work, when such a hope had been abandoned long ago.

At 3 P. M., the lepers fall in and get their second dose of half ounce of the gurjun emulsion internally and then the gurjun ointment is supplied to them as in the morning as already described; the rubbing is kept up from 3 to 5 P. M. The prolonged rubbing is not only insisted on for the sake of the action of the ointment upon the skin, but because I consider any gentle employment combined with exercise is beneficial both physically and mentally: by physical exercise the whole system is improved in tone, and the mind is benefitted by their attention being withdrawn from their former hopeless condition and they are led to compare the present with their past.

The preparation referred to above is made as follows: Lime water, 3 parts; gurjun oil, 1 part; mix and agitate them violently until they thoroughly unite and form a substance of the consistence of Indian butter. This I have named gurjun ointment. At the same time I prepared a thinner mixture for internal use composed of equal parts of lime water and gurjun oil, and this combination is not disagreeable to the palate; and although the lepers now get half ounce doses of the emulsion night and morning, they constantly ask for more.

The change the tubercules undergo in the process of reduction is worthy of notice. After the lapse of some time the tubercle seems to become more moveable and loose at the base and it is felt to be softer there than at the apex, this softening process gradually approaches the surface and at last a watery bleb forms, and this bleb soon bursts and allows a thin serous, clear fluid to escape, and a marked diminution is then observed as regards the size of the tubercle as compared with its former dimensions. This may take place two or three times, until the tubercle is quite reduced. I found it expedited matters very much to puncture these watery vesicles with the point of a lancet, and it allowed the fluid to escape without pain or inconvenience to the patient and did not interfere with the rubbing process. I have seen a tubercle on helix of ear entirely subside after one formation of this vesicle.

The gurjun ointment, though thoroughly rubbed on the surface of

the body for four hours every day, produces no vesications directly from its action and causes no pain whatever. It seems to be through its constitutional effects that the tubercules soften from within outwards. I have rubbed it over my own arm, and it did not cause the slightest pain or redness though allowed to remain on all night.

The emulsion is not disagreeable to the palate, and at first it had no well marked influence upon the digestive system; but when the dose was increased to one drachm twice a day it improved the appetite and at the same time acted as a mild laxative.

It has also a distinct diuretic effect; and the larger dose (4 drachms) twice a day caused several large healthy motions, in fact acted as a powerful diuretic and evacuant.

The duration of the present investigation was arbitrarily limited by myself to 6 months. The time has been long enough to show that leprosy, both tubercular and anæsthetic, cannot only be arrested, but the condition of the lepers can be greatly ameliorated; and men here who have not for years been able to do more than drag out a a miserable helpless existence are now able and willing to work, and every sore is quite healed. In some instances the sores have been healed up for more than three months and show no tendency to reopen; and these desirable results have been attained simply by the use of gurjun oil and lime water, substances which are so cheap as to be within the reach of all.

No change whatever has been made even in the most minute particular in regard to the diet of the lepers from what they have been getting for years past, and they get their fish four times a week as usual. I always thought and still consider the men underfed, still I made no change in order to avoid complications and to test the gurjun oil on its merits. It is not the lime that has the beneficial effect, because the improvement commenced before the lime was given at all, and has continued in cases where only the oil and lime water mixture was given.

Any medicine that can ameliorate the condition of the lepers throughout the various countries where the disease exists is not less likely to be brought into common use because it is cheap, easily prepared and applied, and the supply inexhaustible, and many poor lepers may be able to use these preparations who might find it difficult to obtain a liberal diet, fresh meat, milk, wine and foot-baths of hot cocoanut oil with the skilled attendant and his thermometer to look after the temperature. None of the above are required in this

plan of treatment. I have had the lepers washed daily with water and dry earth, using the dry earth not only because it is cheaper than bran or soap, but because it is a better detergent than either.

The gurjun ointment keeps well, especially when uot too freely exposed in bulk to the atmosphere, because the Co2 in the air is apt to convert a small portion of the Ca H2 O2 into Ca Co3 X H2 O. I keep it in here a large jar with a wooden lid.

TREATMENT AT BANKOORA JAIL.

Babu R. M. Banerjee, Snperintendent of Bankoora Jail, (July 25th, 1885), says: "In the time of one of my predecessors, oil of garjan was chiefly used, both internally and externally; but it was given up, and arsenic was substituted in its place, and *nim* oil is rubbed externally; I am in the habit of giving them arsenic in the following combination: Arsenic, 60 gr.; sulphate of iron, 60 gr.; with extract of gentian, which is divided into 60 pills and one to be given twice a day after meals."

EXTRACTS

FROM A REPORT BY T. R. LEWIS, M. B., AND D. D. CUNNINGHAM, M. B., SPECIAL ASSISTANTS TO THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF INDIA, 1877.

The report of these gentlemen was based upon clinical observations made at the Almora Leper Asylum, and investigations in the Kumaun District. In the asylum eighty lepers were subjected to the closest scrutiny; 49 proved to be cases in which anæsthesia presented the most prominent feature; 12 in which the presence of tubercules in the skin was the most marked peculiarity; in 15 cases

the two former conditions were so equally evident that they were classified as "mixed;" and in 4 cases an eruption formed the most pronounced symptoms. The ratios which these yield agree generally with the proportion in which the different varieties of the disease have been observed to occur in other countries.

The average age at which the outset of the disease was observed was found to be between 23 and 24 years; even the decimals obtained by calculating averages in the case of male and female lepers were found to be almost identical. There was, however, a range of from 3 years to 60. The average duration of the disease was nearly 14 years. The form in which anæsthesia was the prevailing feature was the most chronic, the average duration of the "tuberculated" cases being shorter by nearly six years.

The history of the asylum gives no support to the doctrine that leprosy is a contagious disease, but strong evidence to the contrary. The reverse has been stated with regard to the history of the asylum, but it will have been seen, from the information elicited, that not the slightest foundation existed for such a statement.

But with reference to the probable influence of heredity in the propagation of leprosy, the facts elicited and which may, we believe, be accepted as trustworthy, give forth no uncertain sound. There can, we think, be no very substantial argument adduced in the face of the figures which have been collected in connection with this asylum alone to contra-indicate the influence that hereditary taint exercises a most important influence in the transmission of the pest.

Taking into consideration, therefore, the prominent part undoubtedly played by heredity, and the fact that the disease but seldom manifests itself until after puberty, it is evident that any attempt at "stamping it out" by the compulsory segregation of leprous persons would prove wholly impracticable; for, it would not only be necessary to segregate those suffering from developed disease, but also those hereditarily disposed to it. How, and by whom, could the predisposition be determined? It would, indeed, be even more important to secure the latter class, and such persons as are only manifestly affected to a slight extent; for it would appear that persons of this description furnish by far the greater portion of the children who are, so to speak, potentially leprous,—time and circumstance alone being required for the development of the disease.

In intimate relation with this question is that of the probability or otherwise of an increase in the prevalence of the disease amongst

such a leprous community as exists in Kumaun. Fortunately it would appear that, *pari passu*, with the active manifestation of the disease, a tendency to sterility is also induced; moreover, the mortality among the children of lepers (even among such of them as are born before leprosy has manifested itself in the parents) appears to be abnormally high, so that the probable aggregate number of the offspring of lepers is to a very appreciable degree less than that furnished by non-leprous individuals. It is therefore evident that unles there be influences other than heredity at work in the locality, tending towards the production of the leprous condition, no serious increment need be apprehended.

Leprosy in Ancient India. The disease has been known to exist in India for at least 3,000 years, but comparatively little was definitely known regarding its localisation in the various parts of the country until the results of the censuses of 1872 had been published. Very important advances have, within the last few years, been made in the acquisition of knowledge regarding the pathology of leprosy; but with regard to our definite knowledge of its actual causation, it is to be feared that we have not, except phraseologically, advanced very much on the etiological views recorded by Atreya many centuries B. C., which were to the following effect: "When the seven elements of the body become vitiated through the irritation of the wind, the bile and the phlegm, they affect the skin, the flesh, the spittle, and the other humours of the body. These seven are the causes respectively of the seven varieties of *kushta*, (leprosy)."

Atreya I., who is supposed to have lived probably nearly 2,000 years B. C. continues in the *charaka sanpita on the pathology of leprosy.*

"The kushta thus produced cause much pain and suffering. None of these varieties result, however, from the vitiation of a single humour. Kushtas are of seven, of eleven, or a larger number of a kind; and these constantly irritating the system become incurable. We shall give a brief account of these as they are produced by the vitiation of the different humours. The wind, the bile, and the phlegm, being vitiated, re-act on the skin, &c. When the wind is most vitiated it produces the *kapala kushta*, the bile the *audumbara*, the phlegm the *mandala*, the wind and the bile the *rishyajihva*, the bile and the phlegm and the wind the *sidhma*, and the three together the *kakanaka*.

Excessive physical exercise after exposure to too much heat or too much cold; taking food after surfeit; eating of fish with milk; using barley with several other grains, such as hayanaka, dalaka, karodusa, &c., along with venison, milk, curdled-milk and butter-milk; excessive sexual intercourse; long protracted excessive fear or labor; fatigue, interruption of catarrh,

&c., vitiate the phlegm, the bile and the wind; hence the skin and the three others become slackened. Thus irritated, the three elements corrupt the skin and others, and produce *kushta*.

The premonitory symptoms of kushta are as follow: want or excess of perspiration, roughness, discolouration, itching and insensibility of the skin, pain, horripilation, eruption and excessive pain on the parts that are about to fall off.

Some *kushta* eruptions are red, rough, spreading and small; they cause horripilation, slight itching, pain, and discharge of matter and sanies. These are caused by wind, and are called *kapala kushta*, (scaly).

Those that are of a coppery colour, which discharge matter, blood and sanies, cause itching pain, inflammation and burning, and produce worms, are also caused by wind. They appear like the ripe fig, and are hence called *audumbara*, (fig like).

Some are cold to the touch, raised, hard, reddish-white, clammy, itching and infested with worms. These two are caused by wind; they are called *mandala* (circular).

Those which are rough, red, white, yellow, blue or coppery, producing itching pain, worms, burning sensation, and insensibility, are also caused by wind. They have the appearance of the tongue of an antelope, and are hence called *rishyajihva*.

Those which are white or red, spreading and elevated; which discharge blood, pus and sanies, and produce itching, are also caused by wind. They appear like the leaves of the white lotus, and hence are called *paundarika*.

Those that are rough, red, thin, internally cold, sometimes reddish-white, which cause slight pain, itching, burning, and discharge of pus and sanies, are also caused by wind. They appear like the flowers of the pumpkin and are called *sidhma*.

Katnaka and others have all the symptoms of *kushta*. They are incurable, while others are curable. That which is incurable can never be cured, and those which are curable sometimes become incurable.

The wind causes coppery-red, roughness, pain, inflammation, shrinking, horripilation, and insensibility of the skin. The bile produces burning, perspiration, pain, discharge of blood, and suppuration. The phlegm causes whiteness, coldness, itching, and confluent pimples.

The worms that form in leprous eruptions destroy the flesh, skin, veins, muscles and bones. When affected by them, the patient suffers from spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning, weakness, disrelish and indigestion. Then *kushta* becomes incurable. The man who neglects the disease at its commencement is sure to die. He, who at the first breaking out of the disease tries to get rid of it, may be sure of its being cured.

PREVENTION OF LEPROSY BY SEGREGATION.

BY BRIGADE-SURGEON H. V. CARTER, M. D., 1884.

The following brief memoir is the third I have compiled for submission to the authorities of British India; and, like its first predecessor, it is based upon unique experience acquired through the enlightened proceedings of the Government of Norway.

By the kindness of Dr. G. A. Hansen, the able Superintendent of of the Leper Department, I am enabled to offer the latest known statistical data; and by the courtesy of the Director of the Civil Medical Service in Norway, I have been supplied with a series of reports in continuation of those described in my earliest communication to the India Office, 1873. Since 1875, some changes in these have been made; and in future, only quinquennial reports will be issued: the next being due in 1885.

Considering afresh the information thus accruing, I propose, in the interests of India, to discuss: (1) The present state of the leper question in Norway; (2) the probable explanation of amendments noted; and, (3) Hygienic measures suitable for India. An illustrated note on the pathology of leprosy is also subjoined.

PART I.

PRESENT STATE OF THE LEPER QUESTION IN NORWAY.

The methodical isolation of lepers has, during the past 25 years, been carried on with unremitting effort; the result being a decided diminution of the sick throughout this period. On initiation of the restrictive measures sanctioned, it was not anticipated that marked effects would quickly follow; and hence no dissatisfaction is

expressed at the moderate and gradual amendment which has ensued. Recognizing from the first the incurability of leprosy, the State limited its attempts to opposing the hitherto continuous reproduction of disease; and such anticipatory sphere of action admits only of radical rather than showy achievements. How much longer these somewhat costly measures may have to be maintained cannot yet be said; but it has been learnt that restrictive means ought, if possible, to be extended, and could be remitted only at imminent risk of renewed spreading of disease.

Registration of the affected being an essential preliminary, I note that properly it includes, besides an enumeration of the lepers, a due record of their history and movements. In Norway the district medical men have always been aided, under express injunction, by "all clerical and secular officials and functionaries" of Government; and the peasantry not opposing, it might be expected that the yearly register would be fairly exact. In this matter, however, precision is everything; and it has long been apparent that so simple a result as a strictly accurate list of lepers is hard to be obtained. Thus the malady in question begins obscurely and proceeds slowly; it seldom early disables; being at first set down as a blemish, it is disregarded by patients and their friends; and since, in addition, many bad subjects purposely evade registration, it results that of the "fresh addition" brought to light year by year only 1-6 are "new cases" of quite recent origin, whilst 5-6 are entered as "overlooked" cases dating back 2, 3 or several years to the beginning of illness. As to the possible number of such latent *residua*, Dr. Loberg, in 1870, liberally estimated them at 300 (*vide* my first report, p. 17); whereas by the adjusted tables of 1880 it appears there must have been then at least 500 unrecognised or undetected lepers in the country, or one-quarter more in excess of the 2,050 actually known. This datum illustrates the difficulties of registration which are met with in Norway, and which also, I may add, obtain in Western India; since *e. g.*, instead of the census (1871) number of 158, I found there were at least 472 lepers existing in Káthiáwár during 1876, most of whom had of course been overlooked (*vide* Káthiáwár Report, p. 65). The Norse Tables show separately the number of asylum inmates (duly known and named) and of home-dwelling sick (only approximately ascertained); these combined numbers furnishing a plain total, which, for convenience, is added in column 10 of the statement below. Such ordinary enumer-

ation is not, however, of more than very limited value; and in 1870 the tables supplied an adjusted list of lepers, combining in addition the numbers who, to judge from their aspect and ascertained duration of illness, must for varying periods have been all along living unregistered in the country districts.

Such numbers are still considerable—*ex. gr.* On comparing the list below, column 3, with a later one for 1881, I have been privately favoured with, it appears that during this last year alone no fewer than 74 "overlooked" cases were found which had to be incorporated with the figures in the preceding year's list at dates corresponding with the beginning of illness as follows:—17 of 2 years' duration, 17 of 3 years', 10 of 4 years', 2 of 5 years', 4 of 6 years', 8 of 7 years', 3 of 8 years', 1 of 9 years', 1 of 10 years', and so on; 4 being referred back so far as 25 years. Besides these, there were 16 strictly "new" cases brought to light in 1881: the total "fresh additions" (as I here use the term) in that year amounting, therefore, to 90. The latest issued table in the amended form is the one for 1880, which is copied below in columns 1 to 9 inclusive:—

Tabular Statement of the Number and Movements of all the Lepers known in Norway during the Years 1856–1880 *inclusive.*

Year.	Total at Beginning of Year.	New Cases.	Diminution both In and Outside Asylums.			Remaining at End of Year.		Total at end of Year.	Total at end of Year, by old Enumeration.
			Died.	Dischargd	Cured.	At Home.	In Asylum		
Column 1	2	3	4	5	6	7	8	9	10
1856....	....	...	...	..	..	2,628	235	2,863	2,113
1857 ...	2,863	242	293	16	2	2,367	427	2,794	2,060
1858....	2,794	235	225	4	2	2,323	475	2,798	2,082
1859....	2,798	249	213	8	7	2,296	523	2,819	2,095
1860....	2,819	226	253	9	2	2,242	539	2,781	2,068
1861....	2,781	246	238	14	4	2,060	711	2,771	2,096
1862....	2,771	201	212	12	4	2,046	698	2,744	2,119
1863....	2,744	189	195	6	4	1,979	749	2,728	2,162
1864....	2,728	213	202	9	1	1,948	781	2,729	2,182
1865....	2,729	200	205	9	5	1,938	772	2,710	2,136
1866....	2,710	220	213	10	3	1,909	795	2,704	2,126
1867....	2,704	185	182	7	5	1,898	787	2,685	2,137
1868....	2,685	215	211	7	6	1,888	788	2,676	2,119
1869....	2,676	167	200	16	8	1,832	787	2,619	2,104
1870....	2,619	160	230	13	3	1,769	764	2,533	2,055
1871....	2,533	153	238	16	3	1,682	747	2,429	1,987
1872....	2,429	126	205	9	5	1,628	708	2,336	1,943
1873....	2,336	122	177	18	8	1,583	672	2,255	1,874
1874....	2,255	135	183	10	5	1,549	643	2,192	1,832
1875....	2,192	123	203	14	5	1,470	623	2,093	1,771
1876....	2,093	110	187	6	2	1,395	613	2,008	1,731
1877....	2,008	90	165	7	3	1,294	629	1,923	1,704
1878....	1,923	90	139	10	9	1,237	618	1,855	1,681
1879....	1,855	39	162	11	4	1,115	602	1,717	1,642
1880....	1,717	29	150	7	7	965	617	1,582	1,606

REMARKS ON THE ABOVE TABLE.

The headings of the several columns mostly explain for themselves. Only the figures in columns 4 (deaths), 5 and 6 (discharged and cured), and in column 8 (asylum inmates), are certain and fixed; all the other numbers being approximate, or liable to rectification in course of time.

A.—DECLINE OF LEPROSY.

This fundamental point is capable of being established in various ways. Thus, according to the enumeration in column 10, at the end of 1856 there were known 2,113 lepers, and in 1880 only 1,606: showing a diminution of 507 in the course of 25 years. But if (as in the adjusted lists) all overlooked cases whose duration dated 2 or more years back be added in their due place, there must have been at least 2,863 lepers (*vide* column 9) in 1856; and in the succeeding years a corresponding number gradually declining until the latest, when the same annual enumeration is found in both columns—the small difference here of 24 referring to lepers sent to the asylums without ever being registered in the country districts. According to the new reckoning, therefore, the total decline of lepers amounts to 1,281; but this estimate probably is nearly as excessive as the other was defective, because no allowance is made for cases still remaining undetected in 1880. What the precise decline of leprosy has been cannot indeed yet be learnt, and strictly not until the demise of every leper in the country will it be ascertainable: this drawback being inherent to the exacter method of registration. Probably the diminution has amounted to near 1,000, or about one-third of the total known in 1856; and this would be a very notable result to attain in so short a time.

Confirmation of the opinion now expressed, is the following:—According to the above tabular statement the total of new cases (column 3) has been 3,965, while the total outgoings (colums 4, 5 and 6) have amounted to 5,246, leaving a deficiency of 1,281, which being far too considerable to be attributed to oversight becomes explicable only on the inference of a real decline of disease. Again, some details of column 3 not here shown, are, I find, very significant: thus, in former years there were about 250 "fresh additions" annually registered, now only about 130; of these upwards of 100 used to be of quite recent origin, whilst now only 25 in the mean are "new" cases. And although successive years might vary, yet

registration continuing at least as efficient as ever, this datum becomes conclusive of real amendment; and that in the best possible direction. So also the following:—The proportion of "new cases" to total "fresh additions" used to be 40 per cent., the remainder being made up of "overlooked" cases of more or less prolonged duration; whereas now only 16 per cent.: that some overlooked cases will hereafter come to light is inevitable, but it is of good augury that these already form the very large majority of fresh additions, the strictly new cases becoming both relatively and absolutely smaller by degrees, and indubitably less.

Lastly, some indirect evidence may be adduced. Relying on the immutable figures in column 4, I note that the mean annual deaths of lepers is now 180 instead of 244 as formerly; whence, on the presumption that the leprous disease has remained unchanged, it becomes evident there are now fewer subjects affected by it. According to column 10, the annual death-rate has declined from 14.2 per cent. in 1857 to 9.3 per cent. in 1880; and there being no proof or belief in Norway (so far as I am aware) that the pest is in character so much less severe or fatal now than formerly as these two ratios would imply, it follows that in earlier years there were more lepers living than are entered in column 10: those entered in the amended column 9, with a nearly uniform death-rate throughout of 9 per cent., giving manifestly the correcter estimate. Supposing, therefore, leprosy to be in Norway the same scourge now as ever, on this basis I reckon there may have taken place a diminution of about 30 per cent. in the total number of its victims.

The above data, in general, concur; and there being none to my knowledge adverse, the point in question must be regarded as affirmed.

B.—MOVEMENTS AMONGST THE LEPER COMMUNITY: COLUMNS 4, 5 AND 6. —COLUMN 4, MORTALITY.

For the whole 25 years the mean annual deaths are 202; of late about 160 only, of which 87 in asylums and 73 in the districts. Formerly, when the afflicted were more numerous, the deaths also were commoner and rather most frequent in the districts. The mean death-rate of leprosy in Norway is 8—9 per cent. per annum: amongst the incarcerated (who include the worst and most advanced cases) the mean death-rate rises to 9.14 per cent. per annum, whilst among home-dwelling sick it may be estimated at 5.7 per cent. per

annum. For many years past there has not occurred any marked or progressive change in the mean death-rates; thus, in 1862 that of asylums was 13 per cent. and of districts under 6 per cent., whilst in 1880 the former was 11.3 per cent. and the latter also under 6 per cent. The greater range among asylum inmates than outside these institutions is owing, as appears, to occasional brief outbreaks of local sickness (see below).

COLUMN 5.

In the mean about 10 subjects yearly leave the asylums uncured, or outside become lost sight of; equal to about ½ per cent. of the totals known. In Norway, as elsewhere, lepers are subject to home-yearning, secretiveness and impatience of control; but there are fewer facilities for evasion or decamping here, than would be in India.

COLUMN 6, THE HEALED.

The Norwegian authorities have always candidly recognized and published a paucity of results under this heading, which of itself betokens the present hopelessness of a cure for leprosy, and the need of sole reliance on preventive measures, for mitigation of this scourge. In the table are entered only 107 as healed, the total annual mean being 4 or 5 cases reported from both districts and asylums; equal to 1.63 per cent. of grand total of lepers 6,918, or yearly less than ¼ per cent. Nevertheless, the systematic use of drugs is practised in the asylums, and particularly in Lungegaard Hospital under charge of the venerable Dr. Danielssen, where are admitted cases specially adapted for early and energetic treatment. It appears from reports that most recommended remedies have been fairly tried, yet without any uniformly successful result; and some partial mitigation of suffering is as yet all that drugs can effect. I also note that the detailed tables have a column for cases relapsing into sickness after 'healing'; and from observation everywhere, it is known that the more prominent marks of disease may spontaneously subside, more or less, and remain in a *quasi* latent state for several months, or years. In confirmed cases, some evidence of the infection may at all times be detected; so that 'cure' becomes a provisional expression. And, lastly, I see in these European documents a reflex of Indian experience; in the occasional disappearance of skin disease termed leprous, but really of a different and more amenable character.

C.—THE ISOLATED AND NON-ISOLATED: COLUMNS 7 AND 8.—COLUMN 7, HOME-DWELLERS.

Necessarily, from their large numbers, all lepers in the country could not be relegated to asylums; but the aim has been to isolate as many as practicable under existing conditions. The result is, according to the table, that the series of district-residents is a steadily diminishing one, now amounting to only 37 per cent. of its earliest sum. At successive decennial periods the numbers in columns 7 were as follows:—1860, at home 2,242 or about 80 per cent. of total lepers then known; in 1870, at home 1,769 equal to about 70 per cent.; and in 1880, at their homes 965 or about 61 per cent. of all afflicted then known. By the year 1885 it is anticipated that 50 per cent., or one-half the entire leper-community, will be isolated; and by 1895 it is hoped that 75 per cent. may be so separated, leaving only 25 per cent. at unrestricted liberty amongst healthy persons. That there really has taken place this most desirable diminution in the number of free home-dwelling sick is shown inferentially by the lessened proportion of deaths therein occurring; thus, whilst during 1860-70 the numbers dying both within and without asylums were nearly identical, during 1870-80 the proportion of asylum-deaths rose to 71.6 per cent. and that of district-deaths sank to 28.4 per cent. of total declining loss of life from leprosy in Norway is due solely to lessening of home-mortality; and the smaller this becomes, obviously the better for the common weal.

COLUMN 8, THE IMMURED.

In a population of any size the amount of asylum-accommodation must be so limited, that only a part of all lepers can be segregated from the sound. In Norway, three large and two smaller institutions—of which three at Bergen and two further north—comprise the valuable means of isolation; capacity equal to lodgment of 800 sick: total population of country about 2,000,000, total lepers still near 2,000. The minimum of incarcerated was 235 in 1856, the maximum 759 ten years later; and thence a slow decline to 617 in 1880. This decline is not due to lessening of accommodation, but to persistent unwillingness of the peasantry to send in their sick; and I learn it is now contemplated to seek more compulsory legal powers of segregating lepers, if not in the asylums then at their own homes. That a real and continuous progress of isolation has, however, already been affected is evident:—thus, at first in 1856,

only about 8 per cent. of sick were immured; in 1860, the figures were 539 in 2,781, or 19 per cent.; and in 1870 they had risen to 764 in 2,533, equal to 30 per cent. In 1880 the figures were 617 in 1,582, or 39 per cent.; but this datum is an uncorrected one, and it may be that the ratio of immured to free has not of late much increased. If this surmise be as correct as it seems there is, I would remark, additional reason to urge isolation at home in aid of the more public means. The numbers yearly admitted into the asylums during the past 20 years has varied from 173 to 112: during the last quinquennium it has been about 125, a minute proportion of these being due to transfer and re-admisions. The outgoing by disease amongst the immured also varies, their occasionally happening brief epidemics of erysipelas, pneumonia or diarrhœa, though such signs of 'hospitalism' are not, I think, commoner in Leper-Asylums than in other collections of sick persons. Further details regarding these institutions will be found in my earlier report; and here I will only add that amongst their inmates there is commonly a slight predominance of women (319 females to 298 males in 1880); whilst outside, men are most numerous—843 males to 763 females in 1880.

PART II.

PROBABLE EXPLANATION OF AMENDMENTS NOTED.

According to the preceding Section, in Norway there has of late years occurred a distinct decline in the number of lepers, and this under opposite conditions; namely, on the one hand a continuous production of new cases, and on the other a large effacing death-rate. A third important condition, however, intervenes; and that is, the complete isolation of a large proportion of the affected persons. Other possible agents in the amelioration noted will also be alluded to below.

In limine, I should state that the 'cure' of leprosy by purely medical treatment has not practically contributed anything towards obliteration of the disease. To rely, therefore, for a general amendment upon any of the varied remedial measures often confidently

put forward would be to indulge in fallacies hurtful as well as deceptive, and to encourage a kind of anticipation hitherto shown by experience to be futile.

Next, that the disease is subsiding from a 'natural' cessation of its growth seems to be disproved by the following consideration:—Supposing no re-production of the malady, its decline would be much quicker than is now happening; for with a death-rate of 10 per cent. per annum the 2,863 cases alive in 1856 would in the course of 7 years have been reduced about one-half and at the end of 14 years to about 650, and so on, till, at the end of 25 years, there would remain only about 200 lepers, whose mean age would not be less than 60 years—assuming the mean age at starting to be 35 years. In reality the rate of decline would be more rapid than this, because the death-rate rapidly rises with advancing years: thus the Norse Tables show that not less than 40 per cent. of all lepers die between 31 and 50 years of age, 17.2 per cent. dying earlier at 21-30 years. But the same tables prove that there has not occurred any such rapid diminution of the pest; there now being known at least nine times as many lepers living as should be, on the hypothesis of a direct dying out of disease in the country. Moreover, that leprosy in Norway really displays any natural tendency to subside is disproved by the researches of Dr. Hansen (report of 1880, pp. 17-8), who shows that in most of the affected districts the death-rate is not by any means in excess of the increase-rate; the very reverse, indeed, being the fact—which indicates that the natural tendency of leprosy is more or less rapidly to extend.

Thirdly, the decline of disease might be attributed to mitigation of various hurtful agencies, popularly associated with its origin: *e. g.*, to the lessened use of a fish diet, to a less harsh and insanitary mode of life, or to the extended cultivation of an originally noxious soil, or to some climatic improvement. But, whilst the coast-dwelling peasantry of Norway, in comparison with other (not all) countries of Europe, have admittedly long dwelt in a backward hygienic condition, living much on fish and potatoes, intermarrying freely, and being subject to overcrowding during their long winters; still, on the other hand, it is notorious that they are an unusually well-developed and long-lived race: and besides, individual lepers are, as often as others, even robust people. Generalized statements, therefore, not sufficing to uphold the view suggested, it ought to be shown when and where hygienic improvements have had an exclu-

sive connection with the decline of leprous disease inside limited areas, often placed wide apart; as well as with its diminution during short periods of time. Evidence of this kind, however, I have not met with; and on further comparing the conditions under which leprosy now flourishes in other parts of the globe, I fail to find any cogent evidence that this disease is essentially dependent upon mal-hygienic states, resembling those long prevalent in Norway. Experience here (as elsewhere), rather points to its dependence on personal conditions; for where most abundant the disease is there it is most irregularly distributed: thus, amidst healthy spots in Norway there are adjoining ecclesiastical areas with about 2,000 people (all living under closely similar states and habits), where the number of lepers was known to vary as much as 80, 30 and 8—these figures being now reduced respectively to 17, 15 and 0, without any noteable change in population: and to attribute such striking local variations solely to widely operating agency seems to me both rash and, in the presence of a closer acting influence, needless. Nor to my mind, any more satisfactory is the assumption of some vague individual predisposition amongst the affected.

In his report for 1875, Dr. Hansen discusses this subject in the only suitable way, namely by reference to examples: he remarks (p. 60) that if mal-hygiene operated as a direct, or (through rousing hereditary taint) as an indirect cause of leprosy, there should before the asylums were erected have been proceeding a decided hygienic improvement, the effects of which were manifest just when the practice of isolation began; such improvement also ought to have preceded or attended, at least, the after course of disease; hereditary influence, too, then being checked, as well as the spontaneous appearance of new cases. But of all this there is no evidence, the facts known tending rather to disproof. In more detail, the districts of Tromso and Trondhjem should present a remarkable picture of hygienic progress: thus, during 1857-60 little or no isolation and an advent of new cases in 1856-60 and 1861-65 almost identical of 352 and 361 respectively—also no sign of hygienic advance; but in 1861-65 there were sent 293 lepers into the asylums, and during the following 5 years the new cases declined by 37—a number almost precisely corresponding to the estimate, which might have been made from the prior rate of increase proportionate to number of home-dwellers. Is it imaginable, here, that any culture-amendment had then suddenly culminated and found expression? Next comes

the fact that, in general, leprosy still continues to progress at its former *ratio;* which would show that hygienic changes, even if concurrently made, can have had little or no influence on the progress of the disease. And further, were hygiene (in the ordinary sense of the word) really so operative as is urged the isolation of lepers must offer scanty promise of good, as not itself materially lessening hurtful conditions; but this inference is contrary to other reasonable deductions. Some of the above remarks apply to hereditary influence, as a source of leprous infection; for in not a few examples of local decline of disease submitted to analysis there has been found too prompt and decided an amelioration in families to permit of this slow-acting agency being regarded as mainly influential. And in sum, so far as appears to me, leprosis can be directly mitigated by dietetic, hygienic or climatic influences only to the same extent as, and no further than, the analogous chronic infections of man, known as syphilis and tuberculosis.

Lastly, failing other explanation, it may be asked if the decline of leprosy in Norway be not nearly connected with the practice of isolating the sick in the asylums erected for their use. These institutions, I would remark, were originally intended, by segregating apart the more vigorous lepers of both sexes, to aid in checking the propagation of disease through marriage; they were also meant to accommodate the worst cases, or those a burden to their friends; and to a minor extent they were to serve as hospitals for curative treatment. Though founded so far back as 1856, it has only of late become possible to estimate their influence over the general progress of this very chronic pest; and owing to the inevitable obstacles to correct registration alluded to in Part I., the data suitable for satisfactory analysis are still but limited. Dr. Hansen's observation in his quinquennial reports for 1875 and 1880 may, I think, be regarded as the earliest attempts scientifically made to determine the real effect of the isolation of lepers in a community: his main conclusions are summarized below. I have also considered the recorded opinion of preceding Norse physicians; and, on the whole, prefer the later view. In Part I. it is shown that leprosy is not declining simply by a process of dying out, but that there is continually taking place a certain reproduction of disease; and it is only when and where this last proceeds at a lesser rate than the death-loss that the pest can be said to be subsiding. A third condition, however, concurs; *viz.*, a contemporary removal from the districts and isolation in asylums of

many old and new cases of infection; and the question now arises, how does this isolating process influence the others? or these failing, itself account for the amendment proved in Part I.? Within the asylums there occurs a higher death-rate than outside, whilst in them no new cases can arise; on the other hand, in the country districts there obtains a lower death-rate, and here alone do new cases appear. The asylums serve as a means of partially evacuating the infected districts, abstracting particularly the worst examples of disease; and they are not necessarily, it might be said, otherwise concerned in the general progress of disease. But would such assertion be correct? Let it be agreed that to clearly comprehend the course of leprosy, attention must be directed to conditions obtaining in the districts; amongst which the chief one is the number of "new" cases which arise, proportionately to the total of "home-dwelling" sick: for if the accretion-rate of new cases exceed the death-rate of home-dwellers, then disease is on the increase; and *vice versa*. Now, in his report for 1875, Dr. Hansen shows that up to 1870, in only one easterly district had the death-rate exceeded the production-rate; whilst everywhere else the accretion-rate was highest. There had everywhere been removals to the asylums, and hence a diminution of the mortality outside these institutions: still, had no such emptying of the districts taken place the death-rate would nowhere, with the exception named (itself doubtless open to explanation), have exceeded the production-rate, and the total of lepers in the districts at the close of 1870 would in all probability have been quite as great as in 1856—or "in some places unquestionably greater." Elaborate tables are given, from which it appears that the yearly increment of new cases in a district regularly declines just according to the larger number of lepers removed to the asylums. Thus, *e. g.*, in Sogn-district, whilst these increments proportionately to the numbers living at home remain the same in 1856-60, 1861-65, and 1866-70, yet by removal to asylums, the numbers at home being continuously reduced, there has occurred a concomitant reduction of new cases, as shown in the successive yearly sums of 89, 64 and 59; which still display a definite and fixed ratio to the immediately preceding totals of home-dwellers. No exception to the above rule has been found; and from close and rigid scrutiny of the data alone, it seems clear that the diminution of new cases in the districts goes, *pari passu*, with the lessening number of home-dwelling sick: at least, amongst all the several data, no other relationship is so clear and invariable as this one.

In his report for 1880, with matured statistics coming down to 1875, Dr. Hansen is not less emphatic; and finding a determinate ratio between the number of new cases, and the immediately preceding number of home-dwelling lepers in a district (taking 5-yearly periods for each), he employs such ratio to make a forecast of the future progress of leprosy in Norway. The particular data adduced in support of these views are certainly remarkable and seem to me adequate; they are, however, too elaborate for reproduction here.* Once more, it is shown that in Norway the proportionate growth of leprosy is by no means diminishing; and hence an inference that the conditions for extension of the disease, are in no way more unfavourably now than formerly. Since, therefore, the total of lepers is certainly lessening, this cannot be due to amendment (if any) in home-conditions; and the figures quoted are quite conclusive against the view that leprosy persists only as the result of ordinary mal-hygiene or a hurtful clime. In 1880, as previously, it is found that in the great majority of affected districts the death-rate of lepers lies below their increase-rate—the exceptions being one, or at most two, out of nine such districts; and as regards the other seven or eight, Dr. Hansen remarks the death-rate is so far below the production-rate, (*viz.*, from 2 to 6 per cent. lower,) that the condition of these localities would have been most grievous had there not taken place a large emptying of the sick thence into the Asy-

* Dr. Hansen's figures refer to separate districts in the total affected area. On analysis of column 3 (new cases) and column 7 (lepers at large) of the large table above, embracing the whole area, I find, after excludimg the incomplete data of later years, that during the earlier years 1856-70 inclusive, the annual ratio between new cases and sick home-dwellers is, in the mair, very near 1 to 10. This implies the yearly advent of 1 new case to every 10 lepers at large; which is a ratio larger than the mean death-rate of such lepers. Precise figures for the three included quinquennial periods, are successively as follows:—Mean annual number of lepers at large 2,371, of new cases 239 : 1,994 and 204; 1,859 and 177. Subsequently to 1870, the ratio of new cases gradually declines; doubtless because their numbers have not yet been sufficiently ascertained. These data might have been introduced into the text of Part I., but they were reserved for this place as confirming the inference of Dr. Hansen, who does not, however, (that I see) state his estimate to be the same as that here independently elicited. Whilst well aware that several conditions must intervene, I am still of opinion that here is evidence of a quite definite influence; and I agree with Dr. Hansen that the Norwegian statistics contain no more constant *datum* than this one, of a distinct proportion between lepers at large and the newly-made lepers.

lums:—"Indeed, except Nordfjord, everywhere would the actual production-rate have been greater than ever before, without such prior isolation as has been available; and incomplete as this is and always has been, we may congratulate ourselves that it was practicable, and ought to feel grateful to those who by their zealous labours for the public weal have effected the establishment of the existing Asylums" (p. 18).

Briefly, analysis of the official statistics proves that the affected districts are becoming emptied of their sick, not by excess of deaths but by abstraction and isolation in Asylums and at home of many affected persons. Dr. Hansen also very reasonably adds that on the supposition of leprosy spreading by contagion, one can readily understand the disease may be subsiding generally, in spite of a sustained production-rate; since, consequent on removal to the Asylums and on isolation at home there must necessarily remain at large a smaller number of contagion-bearers capable of infecting the hitherto sound. Indeed, except upon the hypothesis of contagion, no other explanation of events seems possible.

Respecting the varying amount of disease, old and new, which prevails in individual areas, Dr. Hansen refers to the corresponding differences met with in abundance of the mild (smooth) and severe (nodular) forms of leprosis; showing in detail that where the worse form is commonest, there arise the largest proportion of new cases. Though somewhat recondite, this explanation I regard as probably valid.

SUMMARY OF PART II.

The amendment of public health under notice cannot be satisfacrily accounted for by reference solely to a general improvement in diet, dwellings, soil or climate; nor has purely medical treatment ever proved curative; and so far from leprosy in Norway showing a natural tendency to subside, there is ample evidence of a present activity equal to that displayed by the disease 25 years ago. Some influence might, therefore, be assigned to the special measure of isolating lepers; and, in point of fact, amongst all the available data, to none does amendment bear such definite relation—fixed or progressive—as it does to that lessening of lepers at liberty which results from the practice of enforced isolation. I admit that demonstration of such essential relationship is to be had only through a perfect acquaintance with every detailed instance adduced; yet with present information, I submit the evidence is enough to prove its reality, and

to indicate the true *modus operandi* of leper-isolation as practised in Norway. More than a single beneficial influence may, indeed, be at work; but predominant is this exclusive dealing with the individual leper as himself the source of ill to others. So much being granted, it remains only to add that the transmission of personal ailment is necessarily effected either promptly by contagion, or slowly through communication to offspring—the intimate mode of transmission being essentially the same in either instance; and here, Nowegian experience seems to indicate the usual predominance of contagion.

PART III.

PREVENTIVE MEASURES SUITABLE FOR INDIA.

Both social and humanitarian motives would inculcate the systematic relief of the leprous sick, whose malady to themselves is so grievous and abiding and to others so offensive or even hurtful. To all who recognise a claim thus founded, the experience patiently and not uncostly accruing in Norway must appear equally interesting and encouraging. Being scientifically acquired, the principles hereby evolved become applicable under conditions so widely diverse as those of Norway and India. First, as to country and clime, there is no reason whatever to suspect that leprosy anywhere differs in origin or nature, any more than it differs in signs, course of consequence; and this consideration at once disposes of pre-conceivable objections to the best line of treatment being the same in both countries named. Analogy with other chronic diseases common to Europe and the East serves to confirm this view. Next, as to collateral circumstances, these are but subsidiary; only in India the people being subject, more ignorant, apathetic and prejudiced, it is for their leaders and the ruling powers to initiate the needful preventive measures, and to uphold these until by spread of knowledge and experience of good effected the public approval becomes assured.

General treatment of the leprous as a peculiarly affected class may be either ordinary or stringent. Thus, the sick may be collected

and dealt with as ordinary hospital patients; without, that is, regard to prevention or future amendments. Or, for permanent relief, they should be strictly isolated from the rest of the community, and amongst themselves the sexes kept apart—isolation of this kind being practicable at the homes of lepers, but better carried out in asylums. Evidently, this last method is the only one likely to check and lessen disease: it has, in Norway, proved to be beneficial in both these directions, as well as by awakening the people to a sense of rational self-help and a willingness to co-operate further. Such a cogent and attractive stimulus is much needed in India, where the foundations of public hygiene have yet to be laid.

Segregation is practicable in three modes, either separately or combined:—

1.—By erecting plain asylums at certain centres, each of which would be a refuge common to several districts; and a place of detention, under due management and supervision.

2.—By founding Leper Colonies or village communities mainly of the affected, who, while allowed more liberty of movement, should yet be prevented from mingling with the peasantry around: hence still the need of strict supervision. Many spots would thus serve—such as deserted forts, decayed villages, and places now waste yet not far from other sources of supply, or not without near resources easily resuscitated.

3.—By requiring the strict isolation of leprous subjects retained in their homes at express wish of friends. Suitable separate lodgment would be indispensable; unsuitable shelter is even now sometimes supplied. Joining of such home-isolation with more public measures should not be overlooked; for to it experience in Norway seems to point as a means essential to complete success within a moderate period of time; and in India it would have to be still more largely resorted to.

For carrying out the above, in addition to funds, legislative authority is needed to take up the vagrant sick, to remove the sorely diseased who is insufficiently guarded at home, and at times to enforce continued isolation of the infected until medical sanction of liberty be granted. Such authoritative interference will, I am aware, be differently regarded by many and disliked by the masses; yet it cannot at present be dispensed with, and sufficient precedent exists in several British enactments against small-pox and contagious diseases of men and animals. Besides, as analogues, special insti-

tutions already exist for the permanently disabled, the blind and the insane; also, in most civilized countries, for those incurable affected with cancer and consumption. At one time, indeed, asylums for lepers were common all over Europe, where now the disease generally has become eradicated; whilst Norway still presents a number of these peculiar establishments, adapted to modern requirements, and, as I have tried to show, not less than formerly of decided efficacy.

APPENDIX.

NOTE ON THE PATHOLOGY OF LEPROSY.

I have long regarded this malady as one of the great chronic infective diseases of the human race; and such view I hold to be confirmed by Hansen's discovery that in leprous structures there is always to be found an algoid growth—a *bacterium*, which is absent from both healthy and differently diseased structures. In its fresh state I once saw this organism at Bergen (1873), and soon after at Bombay: and quite recently it has been repeatedly studied on the Continent of Europe. With the aid of new re-agents its presence is easily demonstrated; and I offer the appended illustration as an original one, corresponding closely with descriptions given of European specimens. In June last I excised a small 'nodule' from the arm of a leper; and after immediate hardening in alcohol made sections for double staining after Ehrlich's method. All these fragments show crowds of *bacilli* and several large collections of granules (? spores), which when untinted no doubt correspond to the "brown cells" figured as characteristic in Plate XII. of my large work on leprosy (London, 1874): besides, there are seen cells and nuclei belonging to the common tissues of the nodule. See Fig. 1. Here the patient was in fair health, the cutaneous eruption of several months standing, and quiescent or slowly subsiding. The minute organisms could not possibly have been accidently introduced; their number is immense, and they seem to be growing actively, the products, doubtless, being eventually absorbed. As contrasted with the violent symptoms attending pathogenetic bacteria of acute infections, the little irritation, local or general, commonly attending *bacillus leprœ* is remarkable; yet occasional exacerbations of disease do occur, during which there is fever and wide reproduction of the nodules; and thus the general analogy of leprosis to syphilis and tuberculosis becomes apparent. European observers have found both bacilli and spores in lymphatic glands and the blood; also in diseased nerve-trunks, liver, spleen and testes: the evidence of systemic infection being then complete. It is known that the organism

will grow outside the body, and there is evidence that its germs (like those of tubercle) are freely given off from the persons of lepers; and by comparative experiment it is further ascertained that although general disease fails to appear, yet leprous material inoculated in animals slowly leads to a real—if imperfect—local reproduction of the leprous processes taking place in man. As systemic infection with a visible eruption occurs only at prolonged and irregular intervals in him, in the lower animals (themselves possibly less fit subjects) these intervals may be so long as to require a year, or more, for such outward manifestation. At present, proof of contagiousness of leprosy is mainly inferential; but further experiments may further positive data, like those now being acquired in the instance of tuberculosis, which so nearly resembles leprosis (*vide* large work, p. 176). This similitude holds good not only in a general clinical sense, but also as regards the attendant parasitic organism; and, in evidence, I have drawn some figures of the *bacillus tuberculosus* on the same scale as those of the lepra-growths: see Plate, Fig. 2. This second specimen was taken from the lung of a consumptive patient, who died in the J. J. Hospital: similar appearances have been seen in the sputa of other phthisical patients, and they correspond to English descriptions. The *b. leprœ* I find to be usually shorter and more variable in dimensions—length 1-16000 to 1-6000 in.; less bent, oftener bulging in centre and thinning at the ends; oftener dotted in aspect or composed of distinct granules in linear series, the number and site of which differ considerably. The amount of small rods and signs of spore-production greatly exceed what has been seen in tuberculated tissues; yet the general characters and processes appear much alike in both sets of specimens. Other particular features as shown in the drawings, made as accurately as possible with the aid of a 1-10 in. water-immersion lens, eye-piece B, and achromatic condenser of Swift.

(Signed) H. V. Carter, M. D., (Lond.)

Bombay, November, 1883.

By order of His Excellency the Right Honourable the Governor in Council,

J. Nugent, Secretary to Government.

LEPROSY IN OTHER COUNTRIES.

Answers to Questions Asked by the Hawaiian Government.

QUESTION 1.

1.—Is Leprosy known in.....? If so, be pleased briefly to describe it as it occurs there.

A.—Are there several different forms or outward manifestations of Leprosy? If so, by what name are they respectively known?

B.—Are these several forms, in your opinion, only varieties of one common morbid state? or are they specifically distinct diseases, having no affinity with each other?

C.—Please to enumerate succinctly the more obvious and distinguishing characters of each form of Leprosy which you have seen.

REPLIES.

CANADA, (New Brunswick.)—It occurs there in the three parishes, Tracadie, Caraquet and Poukemouche which are situated on a peninsula between the Bay of Chaleurs and the Miramichi River.

a. There are two forms; Tubercular and Anæsthetic Leprosy.

b. These two forms are but varieties of a common morbid state.

c. The tubercular form is distinguished by the presence of tubercules of various shapes and size which appear on the surface of the skin; most frequently on face. These tubercules enter atrophy or ulcerate.—Dr. J. E. Graham.

Leprosy is known in the two counties of Gloucester and of Northumberland, in the north-eastern part of the Province of New Brunswick, in Canada; that section of the country borders the Baie des Chaleurs, the Gulf of St. Lawrence and the lower portion of the River Miramichi.

Elephantiasis græcorum presents itself in New Brunswick precisely as it does everywhere else, as a chronic disease of a specific character. It is manifested externally by insensibility, maculæ and various extensive colorations of the skin, pemphigus, atrophy, alopecia

(not generalized), ulcers and ulcerations, small tumours (tubercules), adenic troubles, pyretic accesses, loss of extremities and other disorders, some of which are peculiar to the disease, and some simply concomitant lesions of more or less frequent occurrence in the course of the malady, the whole ending by suffocation, syncope, coma, marasmus or cachexia.

a. I have observed, in New Brunswick, what is meant by the words "tubercular leprosy" and "anæsthetic leprosy" of many authors, or by the words "phymatod leprosy," of other writers. What I have to say on this question applies also to other distinctions, made by not a few, under the various titles of "macular leprosy, *lepra mutilans*, "mixed leprosy," &c. All these classifications are based on the presence, absence or more or less conspicuous appearance of certain symptoms.

b. These so-called forms, in my opinion, are the result of one common morbid state.

Anæsthesia is invariably present, to a greater or lesser degree, in some part of the body, in all cases of leprosy; it is therefore difficult to understand how it can be made to characterise any particular form. It was from the consideration of the uniform presence of the analgesic state in some portion of the accessible surface of the body of the leper that the College of Physicians of London, in their report on leprosy, proposed to substitute the term "non-tuberculate" for the term "non-anæsthetic." Tubercules are often times absent; but inasmuch as those small tumours are only one of the manifestations of a process which affects, not simply the skin, but also the nerve structures and other tissues, the absence or presence of these papules, at a given moment or at any time, seems hardly sufficient to warrant an addition to the nomenclature. All this, however, is said without losing sight of the great importance of that symptom.

My answer to the second part of question *b* is easily surmised, from what I have already expressed. That which does not constitute, in my opinion, different forms of the distemper, cannot be for me "specifically distinct diseases, having no affinity with each other." Leprosy to my mind, is one indivisible morbid entity, so to speak, although, as in other ailments, its outward manifestations are not all produced in every case, and never to be all met together at a given moment, in the same individual. It is not, moreover, anæsthesia, maculæ, pemphigus, tubercules, destruction of substance,

which constitute *per se* the essence of leprosy; these trophic lesions are seen in other diseases; they succeed traumatism of the nerves; they are produced on animals by nervous irritation. What characterises the disease is the specific labor which produces them, in the particular way they present themselves in this affection—to the medical observer in shape, color, odor, mode of evolution—to the medical philosopher in analogies, differences, causes, effects logically deduced from evidence and history.

c. I have already given the more obvious characters of leprosy which I have seen; but I do not take any of them as distinguishing different forms of the disease. Most of the outward symptoms of leprosy are apt to be absent, to appear, disappear and reappear, succeeding and, as it were, supplanting each other, under the operation of one specific irritative force, during the long course of the sickness. I opine, with all due deference for the opinions of others, that such a succession and change of phenomena, all due to the same exciting agency, constitute a morbid unity, and cannot establish a basis upon which these forms can be built. To burden the study of the disease with such distinctions and names, is I humbly but firmly hold, complicating matters, without any adequate compensation, especially when attempts are made to carry these distinctions so far as to separately describe the progress of the disease throughout.—Dr. J. C. Tache.

Leprosy has existed in the Province of New Brunswick, Canada, for many years. It is a specific disease, characterized by the slow development of nodular growths in connection with the skin, mucous membranes and nerves, and in the latter case, by the supervention of anæsthesia, and a tendency to ulcerative destruction.

a. The tubercular and anæsthetic.

b. I agree with Dr. Taché in his statement that these are varieties of one morbid state.

c. The specific phenomena develop themselves according as the skin and mucous membrane on the one hand, or the nerves on the other, are principally affected; although in some cases all these tissues are implicated simultaneously or in succession.—Dr. A. C. Smith.

CANARY ISLANDS.—Yes, since the conquest. *Lepra tuberculosa* and *Lepra mutilans*. They are varieties of the same morbid condition and can be transmitted hereditarily.—Dr. A. Navarro Torrens.

CEYLON.—True leprosy is known in Ceylon and has been recognized since the Dutch occupation of the islands. It exists in every form and phase, the anæsthetic being perhaps the most frequent among the fish-eating population on the seaboard and in Colombo, the chief city of the island. It is considered a constitutional disease *sui generis*, and occurs in the principal forms, which, in my opinion, are only varieties of one common morbid state.—Dr. W. R. Kynsey.

GUATEMALA.—Yes; tuberculous, anæsthetic and one which is a combination of both of these. It is one and the same disease, with different symptoms.—Drs. Valladores and Yela.

HONG KONG.—It does not prevail to any extent in this colony. There are cases amongst the lowest class of Chinese which, however, have not been treated by European practitioners.—Consul-General Keswick.

MEXICO.—There is in Mexico a malady known as the "Mal de S. Lázaro," the symptoms of which correspond with the disease commonly known under the name of *Elephantiasis Græcorum*, and which some European doctors have called leprosy. There are three forms, tuberculous, anæsthetic and macular. It is believed they are varieties of the same disease; they combine one with the other, two in one and the same individual.—Dr. J. M. Gomez.

NETHERLANDS.—Leprosy occurs not only in the Netherlands but also in the East and West Indian Netherlands' possessions. The disease presents itself in the three forms of maculosa, tubercular and anæsthetica. The persons in whom leprosy is observed in the Netherlands are such as have returned from the Indies. I have noticed unmistakeable symptoms of leprosy on such persons on landing and sometimes not till two years afterwards. In the East and West Indies leprosy is endemic but whilst the disease is of more frequent occurrence in the Moluccas than on the Island of Java, it is not epidemic in the latitudes first mentioned, the number of sufferers there being always very small.—Dr. J. van Deventer.

NETHERLANDS, (Colonies.)—The disease appears in all parts of the Indian Archipelago except the little Sunder Islands and the northern part of Celeb, also in Surinam and Curaao.—Colonial Minister.

(2) (Holland.)—Leprosy is rare in the Netherlands, and even then is almost invariably seen in persons coming from the colonies. Isolated cases are known in which the disease is hereditary.—S. Egeling.

NORWAY.—Yes, there are two different forms of leprosy known by the names of *glat spedalskhed* (glet smooth spedalskhed leprosy) *Elephantiasis lavis* and kindred spedalskhed, (kindred knotty cumyry), *Elephantiasis tuberculosa*. These two forms are varieties of the same disease and are often found in the same person; the disease beginning with one form and afterwards developing to the other.

E. Lavis—spots, (maculæ) of various sizes and shapes of a reddish-purple color and often combined with the loss of feeling (anæsthesia).

E. Tuberculosa, knots or lumps (tuberculæ) of the size of a pea to a spanish nut, sometimes spread over various parts of the body, sometimes confluent to larger masses, especially in the eyebrow and other parts of the face.—Consul-General.

SIAM.—Leprosy prevails but little in Siam, more so amongst the Chinese than Siamese population.—Consul Kurtzhalss.

SPAIN.—Leprosy is rare in Spain and generally presents itself endemically and in the tuberculous form.—The Faculty. Barcelona.

QUESTION 2.

2.—At what age does the disease generally manifest itself, and what are usually the earliest symptoms observable?

REPLIES.

CANADA, (New Brunswick.)—May appear at any age; in Tracadie as young as eight, and as old as eighty. The earliest symptoms are generally debility, pain in the limbs and occasionally fever, and general feeling of malaise. The appearance of maculæ is generally the earliest possible sign.—Dr. J. E. Graham.

The disease generally manifests itself after puberty, in grown up adults and middle-aged individuals; but it comes at almost all ages; early infancy, however, seems to be entirely exempt from the malady. Children are not frequently attacked by leprosy, and it is rarely observed to begin in old age.

The incipient symptoms are general uneasiness, drowsiness, irrepressible instinctive anxiety, undefined and not very severe pains,

followed by hyperæmia, hyperæsthesia, insensibility, maculæ, pemphigus, atrophic manifestations and alopecia, especially of the eyebrows.—Dr. J. C. Tache.

When resident physician I admitted boys of eight years of age, and one woman who was a septuagenarian. The disease, however, is chiefly confined to young adults.

The premonitory symptoms often continue for a long period, and may include lassitude and depression, accompanied by a constant inclination to steep, even when at work; then follow pains in different parts of the body simulating rheumatism, and in turn followed by a train of symptoms described by Dr. Taché in his reply to this question.—Dr. A. C. Smith.

CANARY ISLANDS.—Between infancy and manhood and sometimes even in infancy.—Dr. A. N. Torrens.

CEYLON.—At all ages from childhood to advanced life. I have not seen children born with the disease but have observed anæsthetic leprosy in a child of three years, and well-marked tubercular leprosy in children of nine and eleven years. There is at present a female inmate in the asylum who has clearly manifested the disease in her fifty-seventh year, long after her two sons were affected with it.

The earliest symptoms in the anæsthetic form are usually indicative of some nerve lesion as shooting or darting pains in the limbs, loss of morbidity of the fingers, burning sensations in the feet, formication all over the body followed some time after by loss of cutaneous sensibility, contraction of the little fingers and the appearance of tawny colored, benumbed spots on the face, trunks and limbs.

In the tubercular form the premonitory symptoms generally observed are a feeling of malaise, unusual drowsiness, vertigo, epastaxis, profuse sweating on the least exertion, the appearance of livid blotches attended with rigors, and tumefaction and thickening of the lobes of the ears.

In well-marked mixed-leprosy, the fever and erythematous rash are generally associated with commencing numbness of the fingers or a benumbed discolored patch on the body and the occurrence of blebs on the extremities.—Dr. W. R. Kynsey.

GUATEMALA.—The disease is most frequently met with between the age of twenty and forty. I have met with only two patients of tender age, one of six and one of seven years of age, but I have heard of two or three cases where the afflicted were twelve to fifteen years of age.—Drs. Valladores and Yela.

MEXICO.—It generally appears from seven to thirty years of age, but there are cases in which it has appeared at forty and fifty. The first symptoms are, ordinarily, a cessation of the transpiration of the perspiration of the feet and legs with increased sweat on the rest of the body, dryness in the nasal fossœ and falling of the external part of the eyelids. Accompanying these phenomena are a burning sensation in the members and body and a little anæsthesia. —Dr. J. M. Gomez.

NETHERLANDS.—Leprosy shows itself among children as well as among adults. In the Indies the disease may last for five years then it ends fatally. In the Netherlands it continues much longer up to fifteen years.—Dr. J. van Deventer.

NORWAY.—The disease generally manifests itself in the mature age, but appears also in children. The earliest symptoms are usually, a change in the person's temper and mind; a change in the features of the face and then the appearance of maculæ or tubercula.—Consul-General.

SPAIN.—Lepers have presented themselves from twenty to forty years of age.—The Faculty. Barcelona.

QUESTION 3.

3.—At what period of life, and within what time, does the disease usually attain its full development? and at what period of life, and after what time, does it usually prove fatal?

REPLIES.

CANADA, (New Brunswick.)—The disease usually develops in three or four years. It usually proves fatal in seven or eight years. —Dr. J. E. Graham.

The period of life at which the disease attains its full development and at which it proves fatal, depends on the period at which it has made its first appearance, combined with the length of its sickness. The progress and duration of the malady vary very considerably: in some cases it destroys its victims in a few years, in other cases it lasts many years, and in a few cases a long period of time. I have not

yet sufficiently worked the problem to attempt to give an average, inasmuch as many considerations are to be had in the discrimination of the facts from which it would be logical to strike a fair mean. Women seem to be possessed of a greater power of resistance to the disease than men. Nine to twelve years are not an uncommon duration in both sexes. There are instances of such a slow progress and of such an attenuated malignity of the ailment that life, and even general fair health, are enjoyed for many years. There are now living, in the Lazaretto of New Brunswick, two women who have had leprosy with a constant show, although at times somewhat obscure, of the characteristic symptoms, for the respective periods of at least forty-six and thirty years. In these two cases there are yet no signs observed of a profoundly impaired health, far less of a near destruction. A woman died a few days ago who had had the disease for twenty-two years.

The development of leprosy can hardly be subjected to a regular exposition of stages, so capricious is it in its manifestations and duration; many of its symptoms are susceptible of complete disappearance and re-appearance as already stated. The ailment may be said to be in full development when some of its pathognomonic symptoms, and the process by which they are produced, are clearly discernable. I am led to believe that the time of invasion is to be counted by months, during which, and a long time after, the patient may ignore, or knowing, may conceal his situation, if he chooses to do so. As there are no sure rules to indicate the phases of the disease, this obscurity, and the circumstances of the benignity of the first symptoms and of the persistency of the incipient trouble through the whole course of the sickness, have induced to assign an excessive length for the stage of invasion, that is, for that period of languor which is premonitory to the outward signs of the disease.

Leprosy, however, may be said, *grosso modo*, to present three periods subsequent to the prodromic phases:—1st, the progressive period; 2nd, the sickly period; 3rd, the destructive period. The first may last a very long time, and may include series of pretty severe manifestations; the second may indure for months or years, and offer frequent intermissions of accesses and comparative repose; the third is of comparatively short duration, which may, nevertheless, mean more than a year.

This division, which I venture, and the names I give to its periods are suggested to me by the character of the disease, its degrees

being in reality, susceptible of distinction only when measured by the general results on the whole system.—Dr. J. C. Tache.

This depends on the age and constitutional vigor of the individual. The duration of the anæsthetic variety seems to be much longer than that of the tubercular. In New Brunswick as elswhere, an essential feature in its life history is its extreme chronicity.—Dr. A. C. Smith.

CANARY ISLANDS.—It generally reaches its full development at adolescence. It commonly terminates in death at the adult age or in incipient old age.—Dr. A. Navarro Torrens.

CEYLON.—The disease attains its full development sooner or later, according to the circumstances and condition of the patient and the state of his general health. From 10 to 15 years is about the usual period; rarely the disease remains normally arrested for years. It usually proves fatal at middle age; the longest duration of the disease recorded in the asylum for the tubercular form was 16 years, anæsthetic, 28 and mixed, 21 years.—Dr. W. R. Kynsey.

GUATEMALA.—The development of the disease has no fixed time; the younger the patient, the more rapid the progress of the disease. As a rule, the disease terminates fatally in from four to eight years.—Drs. Valladores and Yela.

MEXICO.—The greater number of cases occur in youth or at a mature age. The diseased who suffer from the macular form die within ten years, counting from the date of the appearance of the disease; those from the tuberculous within fifteen, and those with the anæsthetic may linger for thirty years or more.—Dr. J. M. Gomez.

NETHERLANDS.—In the Indies it may last for five years and in the Netherlands for fifteen before its fatal termination.—Dr. J. van Deventer.

NORWAY.—The disease attains its full development in the mature age.—Consul-General.

SPAIN.—Cases are too few in number to form any exact opinion. —The Faculty Barcelona.

QUESTION 4.

4.—Is the disease more frequent in one sex than in the other? If so, in what proportion?

REPLIES.

CANADA, (New Brunswick).—The disease is as frequent in the male as in the female sex.—Dr. J. E. Graham.

Leprosy is more frequent in men than in women. The proportion is not constant; it varies considerably from time to time, and evidently, from place to place; but there can be no doubt that the greater prevalence of leprosy among men than among women is one of the features of the disease.—Dr. J. C. Tache.

It is much more frequent in the male.—Dr. A. C. Smith.

CANARY ISLANDS.—I believe it is equally frequent in both sexes.—Dr. A. Navarro Torrens.

CEYLON.—This disease appears more often in men than in women in the proportion, based on the figures in the records of the asylum, of eight to one.—Dr. W. R. Kynsey.

GUATEMALA.—Amongst men. Nine men to six women.—Drs. Valladores and Yela.

MEXICO.—More frequent in the masculine sex in the proportion of eight to five.—Dr. J. M. Gomez.

NORWAY.—No.—Consul-General.

SPAIN.—Apparently more frequent in males.—The Faculty. Barcelona.

QUESTION 5.

5.—Is it more frequent among certain races? Among the white, the colored, or the black population? and in what relative proportions?

REPLIES.

CANADA, (New Brunswick.)—Not confined to any particular race.—Dr. J. E. Graham.

It is historically proved that the disease attacks all races. In

New Brunswick there have been lepers of French, Scotch, English and Irish descent, and lepers of mixed origin. I have had no occasion to personally observe the existence of the malady in other races, as there are none, or hardly any, of other blood in the counties of Gloucester and Northumberland than the four mentioned, except Indians. The frequency of the disease does not, in my opinion, depend on race, but is proportionate to the exposure of the people to the causality of propagation.

By far the greatest number of lepers in New Brunswick is counted among the French and the people of mixed origin, and for many years past the malady was, and is, exclusively limited to these two categories. The disease has become endemic only in five localities, namely:—Tracadie, Nigaouek, Pokmouche, Chipagan and Caraquette, in which the French population is to all others as nine to one. There never was any case of leprosy among the Indians, although one of their principal villages is located in the endemic section, being contiguous to the parish of Nigaouek.—Dr. J. C. Tache.

The disease is at present confined to persons of French descent. In former years several persons of other nationalties have been affected, doubtless through contagion.—Dr. A. C. Smith.

CANARY ISLANDS.—I have only seen it in individuals of the white or Caucasian race.—Dr. A. Navarro Torrens.

CEYLON.—In this colony it is not exclusively confined to any community, but is more frequently observed among the Sinhalese and Tanils. Seldom among the Eurasians, and more rarely among Europeans.—Dr. W. R. Kynsey.

GUATEMALA.—It is an almost unheard of thing for an Indian to be afflicted with leprosy; my patients have all been Ladinos. (Descendants of Spaniards and Indians).—Drs. Valladores and Yela.

MEXICO.—No preference of this disease has been noted for any special race or color; except, it may be stated, that no negro with this disease has yet presented himself at this hospital.—Dr. J. M. Gomez.

NETHERLANDS.—Leprosy is found equally amongst Europeans, Chinese, Arabs and native Indians.—Dr. J. van Deventer.

NORWAY.—There is no colored population.—Consul-General.

QUESTION 6.

6.—In what condition of society is the disease of most frequent occurrence, and what are the circumstances which seem to favor its development in individuals, or in groups of individuals?

Please to enumerate these circumstances under the following heads:—

A.—The character of the place or district where the disease most frequently occurs in respect of its being urban or rural, on the sea-coast or inland, low, damp, and malarial, or hilly and dry.

B.—The sanitary condition of the dwellings, and of their immediate neighborhood.

C.—The habits of life, as to personal cleanliness or otherwise.

D.—The ordinary diet and general way of living.

E.—The occupation or employment.

REPLIES.

CANADA, (New Brunswick.)—It is of most frequent occurrence among people whose dwellings are small and unhealthy and whose food is poor in character. In Tracadie stale fish is eaten freely.

a. It occurs frequently on the sea-coast and low, damp countries.

b. In Tracadie sanitary condition bad; dwellings small and unhealthy.

c. Not cleanly. Lazy and slovenly.

d. Diet: potatoes, salt meat and stale fish; very little change of diet.

e. Farmers, fishermen.—Dr. J. E. Graham.

The disease in New Brunswick, has occurred among the ordinary working classes of varied means, none of the families in which it has been met being in affluence and none in misery, all being provided with the necessaries of life. The circumstances which favor the development of leprosy, in individuals, are the close intimacy of family life and the great sociability of the people.

a. The places where the malady has occurred are rural, with one exception; all the places are upon the sea-coast or in close proximity to it. The interior of the counties of Gloucester and Northumberland is not settled. The country is undulating, generally dry, well-drained, well-provided with good water and not at all malarial.

b. The sanitary condition of the dwellings vary, and do not differ in their variety from those of the neighboring parishes, counties and provinces similarly situated. The dwellings of many of the affected families are good and well-disposed, others are not. The conditions of the immediate vicinity of the houses are very good as a rule.

c. The habits of life are those generally met with among people of the same class and following the same occupations. The domestic and personal cleanliness vary; some are clean and some are not.

d. The diet has always been good and abundant. The way of living, so far as it affects the moral and the physic of people, is better described by the results than by fanciful or prejudiced descriptions; the population is well-behaved, intelligent, laborious, remarkably healthy, robust and long lived; they are not subject to any widely prevalent disease of any kind. The natural increase of population, among these people, is exceptionally great.

e. The ordinary occupations are farming, by far the most important, fishing and lumbering, and a mixture of them. All lepers have been from families connected with these occupations except one merchant, one the daughter of a miller and a few who belonged to the class of artisans.

Several families were and are reduced, some very much, in circumstances, on account of the existence of leprosy in their midst; the malady was, or is, the cause of the poverty, not the poverty of the malady.

I have said before that the Indians have been the only race, of those inhabiting these localities in any number, which have remained, so far, exempt from leprosy; it is well, then, to recite the conditions of their existence as connected with the purport of the question I am now answering. The places in which the Indians dwell bear precisely the same character as those inhabited by their neighbors, among whom the ailment has exercised its ravages. The occupations of these aborigines are farming, on a very small scale indeed, fishing, hunting, lumbering and cognate interests; these people are provided with the necessaries of life; they are well-behaved, intelligent and uncommonly healthy, although not generally long lived; they are much more subject to scrofula and consumption than all the other races, and have no great power of resistance to sickness, as a rule; they do not increase in number; their dwellings with few exceptions, are very poor, much inferior, save such exceptions, to

the very worst houses of the white population. In one word, their circumstances are, at best, equal and generally inferior to those of the poorer whites. The only reason I can see for the complete immunity they have enjoyed is that although friendly with the other races, they do not socially come in close intercourse or contact with them. Every race, as a rule, keeps the closest company with their own blood, and the most intimate social relations are seen with the French amongst themselves.—Dr. J. C. Smith.

During my residence in Tracadie, I observed that the disease appeared only among the poorer class. In one of my reports, I stated that "as the condition of the people improved, bringing with it a more nourishing diet, the disease would eventually disappear." Poverty, *per se*, cannot cause the disease, but, because of the depressing influence, it seems to favor its development in persons *who are predisposed to it by hereditary taint.*

I fully agree with Dr. Taché in his statement that "the circumstances which favor the development of leprosy are the close intimacy of family life and the great sociability of the people."

a. Tracadie is on the sea-coast.

b. The people are settled on farms; consequently, the dwellings are isolated and healthy.

c. The habits of life are good. The people are religious and marry young.

d. There is now abundance of healthy food to be obtained. The indolent ones are, of course, the poorer ones, and their diet is seldom wholesome. I have frequently noticed that when such persons are ill from serious disease they readily succumb.

e. Fishing and farming.—Dr. A. C. Smith.

CANARY ISLANDS.—Sea-coast, and city and country, indiscriminately, having at all times different conditions of soil. This diversity in the dwellings of lepers is in obedience, in my judgment, more to a conjunction of special circumstances than that the localities favor the development of the disease, owing to the fact that it is not a common thing for them to leave the towns in which they originally established themselves, on account of the horror their miserable appearance inspired strangers to them, thus perpetuating in the places referred to, leprosy by heredity. I do not desire to be understood, by this observation, that I do not believe it to be possible for leprosa to be spontaneous—since several cases of it have been recorded—but the rather to accentuate the importance which, in my opinion, heredity holds.

b. The dwellings belonging to the poorer classes are generally unhealthy.

c. Ordinarily, they have little personal cleanliness.

d. The food usually consists of salted fish, baked or roasted; maize roasted and ground into flour, which they eat in great quantities dry or kneaded with water, milk or herb broth; also baked potatoes and several kinds of vegetables.

e. Some are fishermen but the greater part laborers.

Among the predisposing causes are the severe changes of temperature, and the abrupt checking of sweat by sudden plunges into the water.—Dr. A. Navarro Torrens.

CEYLON.—Chiefly among the poorer classes such as cultivators or field laborers, mechanics, cartdrivers, coolies or day laborers, fishermen and others whose occupation expose them to vicissitudes of weather and extremes of heat and cold.

It occurs more frequently on the western and southern sea-board of the island and in Colombo, the chief city; on the banks of rivers and littoral lakes, in low, more or less damp malarial localities.

Sanitation is not much observed among the poorer natives, whose dwellings are usually small thatched huts, ill-ventilated and crowded, with the immediate neighbourhood filthy and strewn with mouldy and rotten vegetation and excremental deposits; their clothing deficient; their diet poor from insufficiency of nitrogenuous elements, consisting chiefly of dry and salted or badly preserved fish, often in a rotten state, and inferior grain and vegetables; and their occupation that of cultivators or coolies.—Dr. W. R. Kynsey.

GUATEMALA.—On the sea-coast which is low, and in the department of Quezaltenango, which lays 6,000 feet above the level of the sea, and which is the coldest region of this republic, leprosy is but little seen. Near the capital, where the climate is very variable, is the spot where leprosy most exists.

b. The dwellings are generally of adobe; brick tiled.

c. People of the lowest class, who live on the cheapest kind of food and give no attention to cleanliness.

d. Plaintains, bananas, black beans, fried in lard. Work only when necessity compels them.

e. Farm hands.—Drs. Valladores and Yela.

MEXICO.—It afflicts almost entirely the poorer classes and generally such persons as frequently expose themselves to moisture and heat alternately.

a. It is most frequent in small populations and in the country, in places near to the coast, in the bays and in moist and marshy spots.

b. The condition of the dwellings may have some influence.

c. The habit of taking considerable alcohol appears to influence the development of the disease in persons predisposed to it.

d. The larger number of cases are noted where pork is freely used for food.

e. The lazars are mostly herders, out-door men, or laborers who are for the best part of their lives close to a fire and frequently exposed to the cold air and dampness.—Dr. J. M. Gomez.

NETHERLANDS.—It is more prevalent on the sea-boards than in the mountain ranges. Dr. J. van Deventer.

NORWAY.—Nearly only amongst the poorer classes.

a. The disease appears only along the sea-coast and its immediate neighbourhood. The district is mostly hilly, rocky and dry. Malaria is not known in Norway.

b. The sanitary condition of the dwellings is, as a rule, good.

c. The personal cleanliness is not always as good as it ought to be.

d. The ordinary diet is fish—often salt or dried, but seldom or never rotten, potato and porridge, prepared of barley-meal and water.

e. Fishermen, sailors and small farmers.—Consul-General.

QUESTION 7.

7.—What condition or circumstances of life seem to accelerate or aggravate the disease when it has once manifested itself in an individual?

REPLIES.

CANADA, (New Brunswick.)—Previously mentioned condition. —Dr. J. E. Graham.

There are no conditions nor circumstances of life that seem to accelerate or aggravate *per se* the disease, beyond what applies to all ailments. Everything calculated to depress the moral or physi-

cal forces renders the individual sick less able to resist the ravages of this malady, and, therefore, quickens its development and its fatal termination; but the idea that the eating of a particular article of food, the use or non-usage of certain articles of habilment, can influence the production and spread of leprosy, is in my humble opinion, quite inadmissible. There are no more reasons, that I see, to attribute the disease to, or connect it with climate, dwellings, food or habits of life, than there is as regards small-pox, syphilis, measles and other universal distempers, specific in their character; of course crowding, and all which favours close contact, necessarily multiply the risks of contagion and infection for all specific diseases, as well as isolation is a preventive against the spread of such ailments. I cannot take up here the question of common (not banal) causes possibly being factors in the spontaneous elaboration of viruses, nor can I here enter into the study of the theory of micro-organisms in connection with specific diseases.—Dr. J. C. Tache.

Similar to Dr. Taché's.—Dr. A. C. Smith.

CANARY ISLANDS.—I know of no others than the lack of hygiene.—Dr. A. Navarro Torrens.

CEYLON.—Insanitary and unhygienic conditions associated with intemperance, sexual excesses, neglect and exposure; want of personal cleanliness; improper treatment by native practitioners and the abuse of mercury and opium. Most of the patients admitted into the hospital with the disease in its most aggravated form had been previously salivated or were habitual opium eaters.—Dr. W. R. Kynsey.

GUATEMALA.—Want of fresh air; the custom (amongst the poor class) of whole families sleeping in one room; want of cleanliness, and use of alcoholic liquors.—Drs. Valladores and Yela.

MEXICO.—Abuses of all kinds; excess in eating and drinking, exposure to intense and cold encourage the symptoms of the disease and hasten its fatal termination.—Dr. J. M. Gomez.

NORWAY.—Drunkenness and want aggravate the disease.—Consul-General.

QUESTION 8.

8.—DOES THE DISEASE APPEAR OFTEN TO BE HEREDITARY? HAVE YOU KNOWN INSTANCES WHERE ONE MEMBER ONLY OF A FAMILY HAS BEEN AFFECTED WHILE ALL THE OTHER MEMBERS REMAINED FREE FROM ANY TRACE OF IT?

REPLIES.

CANADA, (New Brunswick.)—It is apparently hereditary. It is doubtful as to whether it is really hereditary.—DR. J. E. GRAHAM.

The disease does not appear to me to be hereditary, that is transmitted, *de toutes pieces*, from parents to offspring by procreation, or stored in the blood of individuals or generations, in its morbid nature and potential energy, without show of its presence. I doubt not, however, that the greater or lesser susceptibility to contract or acquire the distemper forms part of constitutional inheritance. Families may have received from parents and ancestors innate organic peculiarities, which render their members, or some, or many of them, not necessarily, but eventually, easier preys to the disease, when the exciting cause is brought, with effective force, to act upon them.

I know many instances where one member only of a family has been affected with leprosy, while all the other members remained free from any trace of it. In this connection, it is not idle talk to remark that the mere fact of the appearance of several cases of a disease in one family is, *prima facie*, no more suggestive of hereditary than of contagious transmission. The significance of the occurrence is a matter of medical and philosophical criticism, which has to consider the character of the malady, the order of time, and the circumstances and surroundings of each ease.—DR. J. C. TACHE.

I am unable to adduce *proofs* of the hereditary nature of the disease, but hold that the theories of *hereditary transmission* and *contagion* are not incompatible. The disease frequently skips over a generation. I have known many instances where one member only of a family was affected.—DR. A. C. SMITH.

CANARY ISLANDS.—Hereditariness figures principally as the predisposing cause from first to last.—DR. A. NAVARRO TORRENS.

CEYLON.—A hereditary taint is frequently admitted by the patients in the asylum and several instances are on record of one or two members of a family being affected while others remain exempt from any trace of the disease.—DR. W. R. KYNSEY.

GUATEMALA.—Yes; I think it is often hereditary, but I know of three instances; two of which, in which the father, and one in which the mother were afflicted with leprosy. They cohabited and the children are not diseased, but in one case the daughter's child had it. I am convinced that the disease will appear in the second generation.—Drs. Valladores and Yela.

MEXICO.—It is hereditary, and is assuredly transmitted by the mother; but if the mother is healthy it has not yet been determined how it is transmitted. I know a family in which only one of its members has any symptoms of the anæsthetic form; the family consists of four persons. The father died of the disease, the mother is healthy.—Dr. J. M. Gomez.

NETHERLANDS.—In the few Indian Islands set apart for the treatment of lepers, the sufferers are living together. These lepers produce perfectly healthy children, out of whom are sometimes born leprous infants. This proves the hereditary tendency of leprosy at least in the form of atavism.—Dr. J. van Deventer.

NORWAY.—The disease is very often hereditary. Yes, have known such instances.—Consul-General.

SIAM.—The Siamese as well as the Chinese assert that the disease is hereditary but not catching, and are therefore not afraid of being near a leper.—Consul Kurtzhalss.

QUESTION 9.

9.—Have you reason to believe that leprosy is in any way dependent on, or connected with syphilis, yaws, or any other disease?

REPLIES.

CANADA, (New Brunswick.)—It is not connected with syphilis. —Dr. J. E. Graham.

Leprosy is certainly neither dependent on nor connected with syphilis. It cannot be dependent on any other malady, it being a specific disease, quite distinct, therefore, from all other distempers. A leper may become syphilitic as he may become phthisical, he may catch small-pox as he may catch the itch; he may die from any inter-

current ailment, as he may be killed by accident; equally, in such and other similar cases, the event is not of leprosy, but in addition to it. There never was any trace of syphilitic affection discovered in any of the lepers in New Brunswick; small-pox never happened among them; the itch made its appearance in the Lazaretto on few occasions.—Dr. J. C. Tache.

I have no reason to suspect that leprosy in any way depends on, or is connected with any other disease;—it is a disease *sui generis*.—Dr. A. C. Smith.

CANARY ISLANDS.—I do not believe that leprosy has any relation with the other affections called syphilitic, scrofulous or eruptive.—Dr. A. Navarro Torrens.

CEYLON.—I have sometimes found it connected with scrofula, syphilis and parang; but have no reason to believe that it is in any way dependent on these diseases. Leprosy also occurs associated with scabies, eczema, psoriasis and other diseases among the fish-eating population of the islands. I have seen it in connexion with *Elephantiasis Arabum*.—Dr. W. R. Kynsey.

GUATEMALA.—I know of only one leper, who was syphilitic before being attacked with leprosy; my other patients have had no syphilis. I have observed that a mercurial treatment aggravates the disease.—Drs. Valladores and Yela.

MEXICO.—I do not believe this disease has any connexion with syphilis. Anti-syphilitic treatment breaks down.—Dr. J. M. Gomez.

NETHERLANDS.—It cannot be proved that leprosy is in any correllation with such other diseases as syphilis, framboesia, etc.—Dr. J. van Deventer.

NORWAY.—No.—Consul-General.

QUESTION 10.

10.—HAVE YOU MET WITH INSTANCES OF THE DISEASE APPEARING TO BE CONTAGIOUS, IN THE ORDINARY SENSE OF THAT TERM, *i. e.*, COMMUNICATED TO HEALTHY PERSONS BY DIRECT CONTACT WITH, OR CLOSE PROXIMITY TO DISEASED PERSONS?

A.—IF SO, IN WHAT STAGE WAS THE MALADY IN THE DISEASED PERSON? WERE THERE ULCERATIONS WITH A DISCHARGE?

B.—PLEASE TO DESCRIBE BRIEFLY THE CASE OR CASES OF CONTAGIOUS COMMUNICATION WHICH YOU HAVE SEEN YOURSELF.

C.—DOES THE DISEASE SEEM TO BE TRANSMISSIBLE BY SEXUAL INTERCOURSE?

REPLIES.

CANADA, (New Brunswick.)—Have known of cases, but have not seen any.

c. It is communicable by sexual intercourse.—DR. J. E. GRAHAM.

I am aware of many instances of the disease appearing to be contagious, in the ordinary sense of that term; I mean instances in which heredity cannot be invoked and in which contagion is the only cause capable to reasonably account for the propagation of the malady. The typical character of leprosy, the category to which it consequently belongs in the nosological table, its general history and what I have ascertained in New Brunswick leave no doubt in my mind about the contagiousness of the disease. I firmly believe it is communicable from the diseased to the healthy. I do not think, from what I have observed, that proximity, no matter how close, nor mere touch, can convey the contagion. In my opinion, there must be an adequate contact of some kind, mediate or immediate, of course, with an individual susceptible of contracting the malady, and, at the time, so circumstanced as to be in a situation to receive it. I hold contagion as the cause of the *propagation* of the disease; and in so saying I do not lose sight of the fact of the occasional spontaneous *production* of leprosy; *importation*, of course, means contagious spreading into one country, when it extends beyond immigrants sick, and their descendants.—DR. J. C. TACHE.

I have not met with instances of the disease of which I could affirm that they had been communicated by diseased persons; but I am convinced that leprosy is contagious, although not to the extent of other contagious disease. The people of the leprous district

intermarry very freely, and it is difficult to exclude hereditary taint. But I am confident that in former years persons free from hereditary taint contracted the disease, while living in Tracadie.—Dr. A. C. Smith.

CANARY ISLANDS.—I do not know of any case of contagion of leprosy by means of contact, more or less direct,—including sexual intercourse.—Dr. A. N. Torrens.

CEYLON.—It is not considered contagious in Ceylon. It is, in my opinion, not contagious as syphilis, parang, or the exanthematous diseases. There is no conclusive evidence in the hospital records of communicability by direct contact with, or close proximity to diseased persons. It certainly does not appear to be transmissible by sexual intercourse.—Dr. W. R. Kynsey.

GUATEMALA.—I have not. I think it is transmissible by sexual intercourse.—Drs. Valladores and Yela.

MEXICO.—There is not a single case of contagion either direct or through proximity to the disease. There has been no case of transmission of the disease by sexual intercourse.—Dr. J. M. Gomez.

NETHERLANDS.—Not one case of contagion has ever been recorded. In some families though both parents are pure Europeans, and had never been in India before, one of many children was seized with leprosy without any assignable cause.—Dr. J. van Deventer.

NETHERLANDS, (Colonies.)—In the East Indies they think that leprosy is not contagious, and in the West Indies that it is. The natives in the Netherlands Indies are indifferent in regard to the disease.—Colonial Minister.

Leprosy in the only forms in which we see it in the Netherlands is not transmitted from one person to another, except as hereditary disease.—Dr. Egeling.

NORWAY.—No.—Consul-General.

SIAM.—The prevalent opinion as to the contagiousness of leprosy is that the disease is not catching. I have many times seen families sitting together, or people crowded in a public gambling or other house amongst whom was a leper and no notice was taken of him.—Consul Kurtzhalss.

SPAIN.—Have been unable to observe any case of contagion, but it must be taken into account that the malady has not presented itself under any other form than the endemic.—The Faculty. Barcelona.

QUESTION 11.

11.—ARE PERSONS AFFECTED WITH LEPROSY PERMITTED IN * * * * TO COMMUNICATE FREELY WITH THE REST OF THE COMMUNITY? OR IS THERE ANY RESTRICTION IMPOSED, OR SEGREGATION ENFORCED, IN RESPECT TO THEM?

REPLIES.

CANADA, (New Brunswick.)—In Tracadie they are kept in a lazaretto, but they have liberty to see their friends.—DR. J. E. GRAHAM.

Persons affected with leprosy are segregated in New Brunswick, and do not communicate freely with the rest of the community when the existence of the disease is fully ascertained, and their entry in the Lazaretto has been secured; there has been, however, a few accidental exceptions to this rule; I do not speak here of the occasional visits of relatives and friends, which are allowed under certain restrictions.

For years past the segregation has not been enforced by violent measures, but the exertions, particularly on the part of the clergy, to induce the sick to enter the Lazaretto have been unceasing, and the result has been that for many years all lepers, with only two exceptions that I know for certain, have resorted to the Lazaretto and have remained there till death, or are there yet. The two exceptions are of one girl, who a few years ago, went abroad, and of one married woman, who, after a very short sojourn in the Lazaretto, was taken out by her husband and died at home. It was only in 1844 that a lazaretto was established, there were no means before to isolate the lepers; for some years after several lepers died out of the Lazaretto.

The difficulties of early removals, apart from the painful severance of family ties, apply to cases in which the labor or services rendered by the lepers are still of great importance for their families. It would be almost a necessary complement to the establishment of Lazarettos to provide some little means to lessen such difficulties when they do occur.—DR. J. C. TACHE.

It is not at all times easy to secure prompt removal of affected persons to the lazaretto, but once admitted, segregation is complete and permanent.—DR. A. C. SMITH.

CANARY ISLANDS.—The law places no obstacles in the way of marriage between lepers; there exists no other obstacle to a union of

such except the repugnance inspired in the minds of the healthy by their appearance.—Dr. A. Navarro Torrens.

CEYLON.—There is no restriction imposed or segregation enforced by legislative enactment or otherwise in respect of lepers in this colony. A partial restriction is perhaps observed among the home-dwellers in villages.—Dr. W. R. Kynsey.

GUATEMALA.—No: they are strictly segregated. Refers to Question 8.—Drs. Valladores and Yela.

MEXICO.—Those sick from the disease, of both sexes, are placed in different wards.—Dr. J. M. Gomez.

NETHERLANDS.—At one time, when leprosy was held to be infectious, persons afflicted with the disease both in the Netherlands and the colonies were isolated either in special institutions or even on certain islands dedicated for that purpose. Now-a-days such isolation has ceased to exist, no restriction being put upon the leper's liberty. Only in cases of *lepra mutilans* is the patient avoided on account of his unsightly appearance. In the Netherlands persons attacked with leprosy are admitted to the common hospitals, where they are ranged by the side of other patients.—Dr. J. van Deventer.

Previous to the year 1865 there were in the Netherlands East Indies local and provincial regulations enforcing separation for lepers. In 1868, however, because it was thought to be proved after long experience that leprosy must be considered to be not contagious, it was determined on part of the Government that there was no reason for forcing the lepers to separate themselves in the hospitals or dwell in retired places. In the West Indies where the disease is considered to be contagious separation is carefully enforced. Persons suspected of this disease who go among the public are arrested by the police and thereupon examined by a special medical committee. If they are found to be infected they are sent to the establishment set apart for the purpose. In the Colony of Surinam they go a step further by removing infected persons to the asylum even if they have not gone among the public.—Colonial Minister.

Leprosy has not been the subject of special legislation in the Netherlands as there was no reason for it. A long time ago, driven through insufficiently grounded fear, some lepers were transported from Brombeck to Vreenhuisen and there forcibly segegated.—Dr. Egeling.

NORWAY.—Yes. The only restriction is that when lepers are so poor, that they want public support, they are obliged to seek it in public asylums, and are not supported in their homes in the parishes as other poor.—Consul-General.

SIAM.—The Government of Siam does not enforce segregation of lepers, but there exist certain temples here, the priests of which specially devote themselves to attending to paupers and lepers by supplying them with food and allowing them to camp on the premises of the temple.—Consul Kurtzhalss.

SPAIN.—Communication between lepers and healthy persons is not restricted in Spain.—The Faculty. Barcelona.

QUESTION 12.

12.—What public provision is made for the reception and treatment of the Leprous poor? Are they admitted into the general hospitals? or, are there separate infirmaries or asylums provided for them? Please to describe the structural and sanitary conditions of such buildings and the arrangements made for the medical and hygienic treatment of the sick in them.

REPLIES.

CANADA, (New Brunswick.)—A separate infirmary is provided by the Government.—Dr. J. E. Graham.

An institution, supported at the public expense, is provided for the lepers, where these unfortunates are under the care of Sisters of Charity, ministered by a chaplain and visited by a physician. The leprous sick are not sent to general hospitals.—Dr. J. C. Tache.

Dr. A. C. Smith refers to Dr. Taché's reply.

CANARY ISLANDS.—In the hospital (Las Palmas de Gran Canaria) there is no compulsory segregation, but voluntary. It is only when the lepers dedicate themselves to medical treatment that the authorities compel them to be secluded.—Dr. A. Navarro Torrens.

CEYLON.—An asylum has been in existence prior to the commencement of the present century. It is wholly supported by the Government at an annual cost to the colony of Rs 15,400.—Dr. W. R. Kynsey.

MEXICO.—There was formally a special hospital but now the lazars occupy wards in a civil hospital.—Dr. J. M. Gomez.

NETHERLANDS.—The old leper houses in the Netherlands have long been converted into hospitals for chronic diseases, but in the pauper (?) colonies of Ommerschaus and Vreenhuisen there is a shed or special ward affording accommodation for twelve persons; though as a rule not more than six beds are occupied.—Dr. J. van Deventer.

(Colonies.)—In the East Indies there yet existed in 1865 fourteen asylums for lepers, but, in consequence of the regulation of that year, eight of them were gradually abolished. The six which still exist serve for voluntary asylums for lepers. In Surinam there exists one asylum for lepers; in Curaçao three. In the East India hospitals there were 189 lepers at the end of 1883 and in the West Indian 144.—Colonial Minister.

No, unless Vreenhuisen is considered such.—Egeling.

NORWAY.—There are public asylums where all lepers that seek admittance are received free; in these asylums marriage, of course, is prohibited and the two sexes kept apart. Lepers are also admitted into general hospitals, but then only when suffering from other disease.—Consul-General.

SIAM.—No royal or private hospitals or asylums for lepers exist in Siam as far as my informants and myself are aware of.—Consul Kurtzhalss.

SPAIN.—The hospital, which, in Barcelona, is designed for lepers, contains two wards, one for men and the other for women, together with accessory departments, and is a branch of the Hospital-General of the Holy Cross.—The Faculty. Barcelona.

QUESTION 13.

13.—Can you state the number of Leprous persons maintained at the public expense in.....?

REPLIES.

CANADA, (New Brunswick.)—About 24 or 25.—Dr. J. E. Graham.

The number of inmates in the Lazaretto on the 15th May, 1885, was twenty-two, of whom one, a girl, is not a leper; she is afflicted with lupus. Of these twenty-one lepers, eleven were men, and ten women. The annual grant is $3,200, and includes the small remuneration of the chaplain, the indemnity of the visiting physician, the allowance to the sisters and the wages and board of two servants. —Dr. J. C. Tache.

The number at the close of 1884 was twenty-two.—Dr. A. C. Smith.

CANARY ISLANDS.—At the present time there are fifty-four in the Las Palmas Hospital, twenty-three males and thirty-one females; forty-seven having the tuberculosa form.—Dr. A. Navarro Torrens.

CEYLON.—The daily average of lepers in the asylum maintained by the Government for the last year was one hundred and twenty-five.—Dr. W. R. Kynsey.

GUATEMALA.—Nine men and six women.—Drs. Valladores and Yela.

MEXICO.—Ordinarily there are thirty patients in the two wards. —Dr. J. M. Gomez.

SPAIN.—From four to ten a year.—The Faculty. Barcelona.

NORWAY.—In 1880, six hundred and seventeen in Public Asylums.—Consul-General.

QUESTION 14.

14.—Have you reason, from personal knowledge, to believe that the disease has been of late years,—say during the last 15 or 20 years,—on the increase * * * * or otherwise? And if so, please to state what in your opinion may have contributed to its increase or its diminution.

REPLIES.

CANADA, (New Brunswick.)—Somewhat on the decrease.—Dr. J. E. Graham.

Since the establishment of a lazaretto, in 1844, leprosy has been, more or less, kept in check in New Brunswick, and for several years

past, especially during the last few years, it has undergone a notable diminution. The check and the decrease are in ratio of the more or less prompt resort to the lazaretto; segregation is, in my opinion, the cause of the diminution of the disease.—Dr. J. C. Tache.

It is on the decrease. At one time there were nearly forty inmates of the lazaretto. To the improving condition of the people, *and the segregation of those affected*, I attribute the diminution.—Dr. A. C. Smith.

CANARY ISLANDS.—I believe that the disease is diminishing in direct correspondence with the improved condition of the poorer classes.—Dr. A. Navarro Torrens.

CEYLON.—The disease, I have reason to believe, has decidedly increased since 1862. I have no doubt that a certain reproduction of the disease is going on whatever the factors are at work, and that the proportionate growth of leprosy in the colony is by no means diminishing.—Dr. W. R. Kynsey.

GUATEMALA.—The disease has increased in Central America, because the lepers were not, until lately, segregated and members of families known to have leprosy were allowed to marry; while it is a known fact, that although the son or daughter of a leper may bear no visible traces of this disease, the grand children are sure to be leprous.—Drs. Valladores and Yela.

MEXICO.—This malady has beeen known in Mexico from the time of the Conquest, since Herman Cortés founded a hospital especially for the lazars. As regards the increase or decrease of this disease there has been no noticeable change.—Dr. J. M. Gomez.

SPAIN.—The disease appears destined to disappear from the people with the advance of civilization and the assiduous cultivation and perfecting of the practices of hygiene.—The Faculty. Barcelona.

NORWAY.—The disease is diminishing yearly. The higher civilization, better sanitary habits and the Public Asylums contribute to the diminution. The known number of lepers was, in 1856, 2,113; 1860, 2,068; 1870, 2,055; and 1880, 1,606.—Consul-General.

QUESTION 15.

15.—What results have you observed from the hygienic, the dietetic, or the medicinal treatment of the disease? Does Leprosy undergo a spontaneous cure? and if so, at what stage of the disease? Are you aware what proportion of the Leprous poor treated at the public expense in * * * * recover wholly or partially?

REPLIES.

CANADA, (New Brunswick.)—No good results from medical treatment. Much may be done by attending to the general health of patients.—Dr. J. E. Graham.

The results I have observed from good hygienic and dietetic treatment are that the influence of the disease is lessened and life is prolonged. This has been rendered very apparent of the Lazaretto, especially since the year 1880, that the buildings were made more ample and comfortable, other improvements were provided for, and the entire management of the dietary was transferred to the care of the sisters, from the former direction of a functionary who was called keeper-cook. Those beneficial results of good sanitary measures are, nevertheless, only a respite of a few years at best.

The various and multiplied attempts made at different times, in New Brunswick, by medical men, or under medical guidance, to cure the disease, have all failed, as have also failed several empiric methods and vaunted medicines.

Remedial attendance to common functional disorders, palliative treatment of the painful manifestations of leprosy, and attentive nursing of the patients, although no cure, are, nevertheless, highly beneficial, and are constantly resorted to at the New Brunswick Lazaretto.

I have never seen a spontaneous cure of leprosy; nor has there been any, so far, in New Brunswick.—Dr. J. C. Tache.

As the result of long observation, I am convinced that good hygienic measures, including a regular system of healthy diet, has great power in checking rapid progress in the disease—life is thereby prolonged.

I have never observed more than a temporary amelioration from any medicinal treatment, and only such as might be attributed to the influence of the mind over the body. My predecessor used colored water—accompanied by strong assurances of benefit there-

from, and in every instance found a temporary improvement, equal in degree to any apparent benefit he found from the use of medicinal agents. I know of no spontaneous CURE of the disease, although I know instances of temporary abeyance of the disease, lasting, in some cases, during a considerable period.—DR. J. C. SMITH.

CANARY ISLANDS.—I have not seen any positive and evident case of a radical cure by medical treatment. I believe that leprosy is incurable (at least in the two forms which I have studied). But it sometimes happens that the evolution of the disease is arrested leaving the patient for a considerable time in a condition very compatible with health. Without denying that medical treatment can materially contribute to this condition I consider that dieting is of great efficacy.—DR. A. N. TORRENS.

CEYLON.—No treatment as yet has been found of any permanent benefit. The best results have been obtained from hygienic and dietetic treatment alone.

There is at present in the asylum a Malabar patient in general good health, admitted with anæsthetic leprosy, in whom the disease had been fully developed, whose case may be considered as a spontaneous cure; no further symptoms having appeared during the last six years, the disease having apparently exhausted itself. I cannot confidently assert that any patients have recovered under treatment but have been benefitted.—DR. W. R. KYNSEY.

GUATEMALA.—Lepers should have plenty of fresh air, wear flannel clothing, bathe every day in tepid water, eat roast meat, thick soups and milk. I have never seen or heard of leprosy undergoing a spontaneous cure; of my patients in the hospital, two were partly cured in the third stage, and one radically in the second stage. The two former anæsthetic and the latter one tuberculous.—DRS. VALLADORES AND YELA.

MEXICO.—The only favorable results obtained have been an alleviation of the sufferings of the sick. Hygienic measures are very useful and necessary. Nitrogenuous food and the deprivation of all alcoholic beverages have also been found beneficial, and with regard to the medicinal treatment, outside of the systematic, I have only noted any decided improvement when the sick have been treated by the sudorific method. I have never seen a spontaneous cure of this malady. During 12 years at this hospital not a single case has been restored to health except one who subsequently died.—DR. J. M. GOMEZ.

NETHERLANDS.—The therapeutic as well as the dipterocarpic method of treating the disease have hitherto been ineffectual. In the case of a child Dr. Van der Star saw a case of leprosy yield, but atrophy of the skin and stenosis set in. On other parts of the body the blotches disappeared but atrophy of the skin remained.—Dr. J. van Deventer.

NORWAY.—In 1880, of the 617 lepers in the Public Asylums, 7 recovered. From 1857 to 1879, 102 are known to have recovered. —Consul-General.

SPAIN.—A great number of medicines have been tried to combat this disease but, in almost all cases, without result, except that the iodic treatment internally and externally appears to have done some good. The patients are afforded a good hygienic and dietetic regimen, allowed to walk around, are kept in perfect cleanliness of body and supplied with healthy food and of good quality.—The Faculty. Barcelona.

QUESTION 16.

16.—What is the estimated population of.....? and when was the last census taken?

Is there a general and uniform registration of births and deaths, including the causes of death? and if so, how long has such a registration existed?

REPLIES.

CANADA, (New Brunswick.)—The population of the whole Province of New Brunswick, according to the last census, was, on the 4th April, 1881, 321,233 souls. The population of the county of Gloucester was 21,614, and the population of the county of Northumberland 25,109. There is a uniform registration of births and deaths, but it is not general, being only carried on among the Catholic population; it does not, however, include the causes of death.—Dr. J. C. Tache.

CEYLON.—February 17th, 1881, the population was 2,759,738. There is a uniform registration of births and deaths, including the causes of deaths, existing since 1867, kept at the office of the Registrar-General.—Dr. W. R. Kynsey.

GUATEMALA.—Republic, 1,400,000, of which two-thirds are full blood Indians. Capital, 60,000 last year. Yes; since eleven years ago.—Drs. Valladores and Yela.

NORWAY.—1,851,438. The last census was taken December 31st, 1875, for the Provinces; in Christiana every year there is a general registration of births and deaths including the causes of death. Such a registration has been kept up for centuries.—Consul-General.

QUESTION 17.

17.—Can you state the name of the townships or districts in which Leprosy prevails most, and give the number of Lepers and the population in each of such townships or districts?

REPLIES.

CANADA, (New Brunswick.)—Leprosy has made its appearance in the town of Chatham, in the parishes of Nelson, of Northesk and of Alnwick, in the county of Northumberland, and in the parishes of Saumarez, of Inkerman, of Chipagan and of Caraquette, in the county of Gloucester.

Names of Localities.	Population, 1881....	Lepers in Lazaretto, 1885	Lepers Outside, 1885	Total Lepers, 1885..
Tracadie	2,819	13	2	15
Pokmouche.....	1,804	4	..	4
Chipagan	2,322	3	..	3
Caraquette	3,837	..	1	1
Nigaouek	* 2,646	1	..	1

* This is the total population of Alnwick, of which about 200 are to be added to Tracadie, about 500 to other circumscriptions, leaving the balance to the ecclesiastical parish of Nigaouek.—Dr. J. C. Tache.

CEYLON.—In the Western Province including Colombo, the chief city of the Islands, with a population of 897.329, and the Southern Province, including the township of Galle, with a population of 433,520. Leprosy is very infrequent in the hilly districts of the central and is but rarely observed in the other Provinces of the Island.—Dr. W. R. Kynsey.

REPORTS ON LEPROSY.

Enquiry Made by the Hawaiian Government.

CANADA, NEW BRUNSWICK.

ANSWERS TO THE INTERROGATORIES SUBMITTED BY HIS EXCELLENCY THE MINISTER OF FOREIGN AFFAIRS OF THE KINGDOM OF HAWAII, THROUGH MR. C. ELLIOTT ANDERSON, HAWAIIAN CONSUL-GENERAL IN CANADA.

Answers of Mr. J. C. Taché, M. D. & L. D., Titulary Professor of the Laval University, Knight of the Legion of Honour, Deputy Minister of Agriculture, and of Dr. A. C. Smith, M. D. & C. M., Member of the Medical Council of New Brunswick, Visiting Physician of the Tracadie Lazaretto.

OTTAWA, June, 1885.

Mr. Taché's answers:—

A. 1.—Leprosy is known in the two counties of Gloucester and of Northumberland, in the north-eastern part of the Province of New Brunswick, in Canada; that section of the country borders the Baie des Chaleurs, the Gulf of St. Lawrence and the lower portion of the River Miramichi.

Elephantiasis græcorum presents itself in New Brunswick precisely as it does everywhere else, as a chronic disease of a specific character. It is manifested externally by insensibility, maculæ and various extensive colourations of the skin, pemphigus, atrophy, alopecia (not generalised), ulcers and ulcerations, small tumours (tubercules), adenic troubles, pyretic accesses, loss of extremities and other disorders, some of which are peculiar to the disease, and some simply concomitant lesions of more or less frequent occurrence in the course of the malady, the whole ending by suffocation, syncope, coma, marasmus or cachexia.

a. I have observed, in New Brunswick, what is meant by the words "tubercular leprosy" and "anæsthetic leprosy," of many authors, or by the words "phymatod leprosy" and "aphymatod leprosy," of other writers. What I have to say on this question applies also to other distinctions, made by not a few, under the various titles of "macular leprosy," *lepra mutilans*, "mixed leprosy," &c. All these classifications are based on the presence, absence or more or less conspicuous appearance of certain symptoms.

b. These so-called forms, in my opinion, are the result of one common morbid state.

Anæsthesia is invariably present, to a greater or lesser degree, in some part of the body, in all cases of leprosy; it is therefore difficult to understand how it can be made to characterise any particular form. It was from the consideration of the uniform presence of the analgesic state in some portion of the accessible surface of the body of the leper that the College of Physicians of London, in their report on leprosy, proposed to substitute the term "non-tuberculate" for the term "anæsthetic."

Tubercules are often times absent; but inasmuch as those small tumours are only one of the manifestations of a process which affects, not simply the skin, but also the nerve structures and other tissues, the absence or presence of these papules, at a given moment or at any time, seems hardly sufficient to warrant an addition to the nomenclature. All this, however, is said without losing sight of the great importance of that symptom.

My answer to the second part of question *b* is easily surmised, from what I have already expressed. That which does not constitute, in my opinion, different forms of the distemper, cannot be for me, "specifically distinct diseases, having no affinity with each other." Leprosy, to my mind, is one indivisible morbid entity, so to speak, although, as in other ailments, its outward manifestations are not all produced in every case, and never to be all met together at a given moment, in the same individual. It is not, moreover, anæsthesia, maculæ pemphigus, tubercules, destruction of substance, which constitute *per se* the essence of leprosy: these trophic lesions are seen in other diseases; they succeed traumatism of the nerves; they are produced on animals by nervous irritation. What characterises the disease is the specific labour which produces them, in the particular way they present themselves in this affection—to the medical observer in shape, colour, odour, mode of evolution—to the

medical philosopher in analogies, differences, causes, effects logically deduced from evidence and history.

c. I have already given the more obvious characters of leprosy which I have seen; but I do not take any of them as distinguishing different forms of the disease. Most of the outward symptoms of leprosy are apt to be absent, to appear, disappear and reappear, succeeding and, as it were, supplanting each other, under the operation of one specific irritative force, during the long course of the sickness. I opine, with all due deference for the opinions of others, that such a succession and change of phenomena, all due to the same exciting agency, constitute a morbid unity, and cannot establish a basis upon which these forms can be built. To burden the study of the disease with such distinctions and names, is, I humbly but firmly hold, complicating matters, without any adequate compensation, especially when attempts are made to carry these distinctions so far as to separately describe the progress of the disease throughout.

A. 2.—The disease generally manifests itself after puberty, in grown-up adults and middle-aged individuals; but it comes at almost all ages: early infancy, however, seems to be entirely exempt from the malady. Children are not frequently attacked by leprosy, and it is rarely observed to begin in old age.

The incipient symptoms are—general uneasiness, drowsiness, irrepressible instinctive anxiety, undefined and not very severe pains, followed by hyperæmia, hyperæsthesia, insensibility, maculæ, pemphigus, atrophic manifestations and alopecia, especially of the eyebrows.

A. 3.—The period of life at which the disease attains its full development and at which it proves fatal, depends on the period at which it has made its first appearance, combined with the length of the sickness. The progress and duration of the malady vary very considerably: in some cases it destroys its victims in a few years, in other cases it lasts many years, and in few cases a long period of time. I have not yet sufficiently worked the problem to attempt to give an average, inasmuch as many considerations are to be had in the discrimination of the facts from which it would be logical to strike a fair mean.

Women seem to be possessed of a greater power of resistance to the disease than men. Nine to twelve years are not an uncommon duration in both sexes. There are instances of such a slow progress and of such an attenuated malignity of the ailment that life, and

even general fair health, are enjoyed for many years. There are now living, in the Lazaretto of New Brunswick, two women who have had leprosy with a constant show, although at times somewhat obscure, of the characteristic symptoms, for the respective periods of at least forty-six and thirty years. In these two cases there are yet no signs observed of a profoundly impaired health, far less of a near destruction. A woman died a few days ago who had had the disease for twenty-two years.

The development of leprosy can hardly be subjected to a regular exposition of stages, so capricious is it in its manifestations and duration; many of its symptoms are susceptible of complete disappearance and reappearance, as already stated. The ailment may be said to be in full development when some of its pathognomonic symptoms, and the process by which they are produced, are clearly discernable. I am led to believe that the time of invasion is to be counted by months, during which, and a long time after, the patient may ignore, or, knowing, may conceal his situation, if he chooses to do so. As there are no sure rules to indicate the phases of the disease, this obscurity, and the circumstances of the benignity of the first symptoms and of the persistency of the incipient trouble through the whole course of the sickness, have induced to assign an excessive length for the stage of invasion, that is, for that period of langour which is premonitory to the outward signs of the disease.

Leprosy, however, may be said, *grosso modo*, to present three periods subsequent to the prodromic phases: 1st, the progressive period; 2nd, the sickly period; 3rd, the destructive period. The first may last a very long time, and may include series of pretty severe manifestations; the second may indure for months or years, and offer frequent intermissions of accesses and comparative repose; the third is of comparatively short duration, which may, nevertheless, mean more than a year.

This division, which I venture, and the names I give to its periods are suggested to me by the character of the disease, its degrees being, in reality, susceptible of distinction only when measured by the general results on the whole system.

A. 4.—Leprosy is more frequent in men than in women. The proportion is not constant; it varies considerably from time to time, and, evidently, from place to place; but there can be no doubt that the greater prevalence of leprosy among men than among women is one of the features of the disease.

A. 5.—It is historically proved that the disease attacks all races. In New Brunswick there have been lepers of French, Scotch, English and Irish descent, and lepers of mixed origin. I have had no occasion to personally observe the existence of the malady in other races, as there are none, or hardly any, of other blood in the counties of Gloucester and Northumberland than the four mentioned, except Indians. The frequency of the disease does not, in my opinion, depend on race, but is proportionate to the exposure of the people to the causality of propagation.

By far the greatest number of lepers in New Brunswick is counted among the French and the people of mixed origin, and for many years past the malady was and is exclusively limited to these two catagories. The disease has become endemic only in five localities, namely: Tracadie, Nigaouek, Pokmouche, Chipagan and Caraquette, in which the French population is to all other origins as nine is to one. There never was any case of leprosy among the Indians, although one of their principal villages is located in the endemic section, being contiguous to the parish of Nigaouek.

A. 6.—The disease, in New Brunswick, has occurred among the ordinary working classes of varied means, none of the families in which it has been met being in affluence and none in misery, all being provided with the necessaries of life. The circumstances which favour the development of leprosy, in individuals and in groups of individuals, are the close intimacy of family life and the great sociability of the people.

a. The places where the malady has occurred are rural, with one exception; all these places are upon the sea-coast or in close proximity to it. The interior of the counties of Gloucester and Northumberland is not settled. The country is undulating, generally dry, well-drained, well-provided with good water and not at all malarial.

b. The sanitary conditions of the dwellings vary, and do not differ in their variety from those of the neighbouring parishes, counties and provinces similarly situated. The dwellings of many of the affected families are good and well-disposed, others are not. The conditions of the immediate vicinity of the houses are very good as a rule.

c. The habits of life are those generally met with among people of the same class and following the same occupations. The domestic and personal cleanliness vary; some are clean and some are not.

d. The diet has always been good and abundant. The way of

living, so far as it affects the moral and the physic of people, is better described by the results than by fanciful or prejudiced descriptions; the population is well-behaved, intelligent, laborious, remarkably healthy, robust and long-lived; they are not subject to any widely prevalent disease of any kind. The natural increase of population, among these people, is exceptionally great.

e. The ordinary occupations, are farming, by far the most important, fishing and lumbering, and a mixture of them. All lepers have been from families connected with these occupations except one merchant, one the daughter of a miller and a few who belonged to the class of artisans.

Several families were and are reduced, some very much, in circumstances, on account of the existence of leprosy in their midst; the malady was or is the cause of the poverty, not the poverty of the malady.

I have said before that the Indians have been the only race, of those inhabiting these localities in any number, which have remained, so far, exempt from leprosy; it is well, then, to recite the conditions of their existence as connected with the purport of the question I am now answering. The places in which the Indians dwell bear precisely the same character as those inhabited by their neighbours, among whom the ailment has exercised its ravages. The occupations of these aborigines are farming, on a very small scale indeed, fishing, hunting, lumbering and cognate industries; these people are provided with the necessaries of life; they are well-behaved, intelligent and commonly healthy, although not generally long-lived; they are much more subject to scrofula and consumption than all the other races, and have no great power of resistance to sickness, as a rule; they do not increase in number; their dwellings, with few exceptions, are very poor, much inferior, save such exceptions, to the very worst houses of the white population. In one word, their circumstances are, at best, equal, and generally inferior to those of the poorer whites. The only reason I can see for the complete immunity they have enjoyed is that, although friendly with the other races, they do not socially come in close intercourse or contact with them. Every race, as a rule, keeps the closest company with their own blood, and the most intimate social relations are seen with the French amongst themselves.

A. 7.—There are no conditions nor circumstances of life that seem to accelerate or aggravate *per se* the disease, beyond what

applies to all ailments. Everything calculated to depress the moral or physical forces renders the individual sick less able to resist the ravages of this malady and, therefore, quickens its development and its fatal termination; but the idea that the eating of a particular article of food, the use or non-usage of certain articles of habiliment, can influence the production and spread of leprosy, is, in my humble opinion, quite inadmissible. There are no more reasons, that I see, to attribute the disease to, or to connect it with, climate, dwellings, food or habits of life, than there is as regards small-pox, syphilis, measles and other universal distempers, specific in their character; of course crowding, and all which favours close contact, necessarily multiply the risks of contagion and infection for all specific diseases, as well as isolation is a preventive against the spread of such ailments. I cannot take up here the question of common (not banal) causes possibly being factors in the spontaneous elaboration of viruses, nor can I here enter into the study of the theory of micro-organisms in connection with specific diseases.

A. 8.—The disease does not appear to me to be hereditary, that is transmitted, *de toutes pieces*, from parents to offspring by procreation, or stored in the blood of individuals or generations, in its morbid nature and potential energy, without show of its presence. I doubt not, however, that the greater or lesser susceptibility to contract or acquire the distemper forms part of constitutional inheritance. Families may have received from parents and ancestors innate organic peculiarities, which render their members, or some, or many of them, not necessarily, but eventually, easier preys to the disease, when the exciting cause is brought, with effective force, to act upon them.

I know many instances where one member only of a family has been affected with leprosy, while all the other members remained free from any trace of it. In this connection, it is not idle talk to remark that the mere fact of the appearance of several cases of a disease in one family is, *prima facie*, no more suggestive of hereditary than of contagious transmission. The significance of the occurrence is a matter of medical and philosophical criticism, which has to consider the character of the malady, the order of time, and the circumstances and surroundings of each case.

A. 9.—Leprosy is certainly neither dependent on nor connected with syphilis. It cannot be dependent on any other malady, it being a specific disease, quite distinct, therefore, from all other distempers.

A leper may become syphilitic as he may become phthisical; he may catch small-pox as he may catch the itch; he may die from any intercurrent ailment, as he may be killed by accident; equally, in such and other similar cases, the event is not of leprosy, but in addition to it. There never was any trace of syphilitic affection discovered in any of the lepers in New Brunswick; small-pox never happened among them; the itch made its appearance in the Lazaretto on few occasions. Only two lepers are known to have died from intercurrent diseases: one, a girl, from phthisis; the other, a man, from pleurisy. Of course, the invasion of an accompanying chronic ailment may be anterior or posterior to the development of leprosy in the individual. In the case alluded to, of the phthisical girl, phthisis showed itself in the course of leprosy, and exercised over the latter affection a decided revulsive and depurative action.

A. 10.—I am aware of many instances of the disease appearing to be contagious, in the ordinary sense of that term; I mean instances in which heredity cannot be invoked and in which contagion is the only cause capable to reasonably account for the propagation of the malady. The typical character of leprosy, the category to which it consequently belongs in the nosological table, its general history and what I have ascertained in New Brunswick leave no doubt in my mind about the contagiousness of the disease. I firmly believe that it is communicable from the diseased to the healthy. I do not think, from what I have observed, that proximity, no matter how close, nor mere touch, can convey the contagion. In my opinion, there must be an adequate contact of some kind, mediate or immediate, of course, with an individual susceptible of contracting the malady, and, at the time, so circumstanced as to be in a situation to receive it. I hold contagion as the cause of the *propagation* of the disease: and in so saying I do not lose sight of the fact of the occasional spontaneous *production* of leprosy; *importation*, of course, means contagious spreading into one country, when it extends beyond immigrants sick, and their descendants.

There is a case, the facts of which are established beyond possibility of cavil, in which the disease appears to me, as well as it did to those who witnessed it, to have been produced by the absorption of liquid matter discharged from the body of a woman who had died in a cachectic state from leprosy. At the funeral of that woman the body was carried (according to a then long-standing custom, which has been since abandoned on account of what, I am now

reciting) on the shoulders of four strong young men. The day was hot, and, on a sudden, liquid matter began to oose out through a joint of the coffin, wetting the shoulder of one of the carriers. The wet, combined with the heat and the pressure of the sharp edge of the coffin, produced an abrasion of the skin of the young man. The contact of the liquid matter with the abraded surface lasted a part of the time of the procession and the whole length of the service, as it was only on his return home that the young man washed his sore shoulder and changed his clothing. Some months after, that man, whose health had always been robust, began to feel unwell; in a short time the symptoms of leprosy made their appearance, and he died of the disease eleven years after the occurrence. There had never been any case of leprosy in his family, whose ancestral genealogy is traced for several generations back; in fact, the disease was not yet known as leprosy, being of recent appearance in the locality and among these people; he was the fourth case in that place, the three others being the woman spoken of, the husband and the sister of the woman, in the ancestry of whom there had never been, neither, any trace of the disease; the fifth case in that locality was the sister of that young man. The woman's husband and sister had the disease a few years before her death, and the young man's sister a few years after the commencement of the disease in her brother.

a. The woman spoken of had ulcerations, with abundant discharge, at the time of her death. This would be a case of the well-known survivance or posthumous persistency of the malignity of virulent matter.

b. I have not seen, myself, any case of contagious communication, if by that is meant the eye-witnessing of the application of the contagium, whatever that may be, followed by the development of the disease. I have never tried to inoculate or otherwise produce leprosy. The contagious character of a disease, especially when the disease is of slow development and of great lastingness, can be and must be proved, according to my ideas, by the study of the intimate nature of the ailment, of its appearance, spread and disappearance, within certain areas and in relation to groups of population. It is the principle of circumstancial evidence applied to etiology, a kind of evidence which, in such matters, I, for one, consider much surer than the testimony of few or several witnesses, who possibly may delude themselves or be deluded. The negative proofs are of some value only when general in character, and, at the same time, not

contradicted by positive facts. This negative evidence has been invoked in the case of the most evidently contagious diseases.

The way in which leprosy disappeared from countries where it formerly prevailed, the common consensus of nations, as proved by their legislation and the means taken by Church and State to eradicate the disease, are witnesses to the contagiousness of leprosy; what I have ascertained and observed myself, in New Brunswick, is in full confirmation of the truth of that belief. It cannot be expected to have such a subject treated in the short answers to an interrogatory. I intend to do so in a work, the materials of which I have been collecting for many years, if I am spared to complete my investigations and to finish the labour now far advanced.

c. One husband of a leprous woman and one wife of a leprous husband have, so far, had the disease in New Brunswick. The sexual organs, in both sexes, are apt to show several of the manifestions of leprosy; the logical inference is, that if the malady can be communicated by contact or inoculation, such a contact as is produced in sexual intercourse, may give effect to the transmissibility of the affection; provided the local lesions of the diseased are such as to produce the transmission, and the healthy subject is susceptible of acquiring the malady.

It is proper to remark here that there never was, in New Brunswick, a marriage contracted by a leper, man or woman; but married people have continued to cohabit after the appearance of the disease in one of the conjoints. The details which would be necessary to judge of the extent of the exposure have not been, and could hardly be investigated, except in two cases in which, I believe myself sufficiently informed of the fact, there were no apparent local lesions. In these two cases the same conjoints did not get leprosy, and the children born from that cohabitation are not lepers.

A. 11.—Persons affected with leprosy are segregated, in New Brunswick, and do not communicate freely with the rest of the community when the existence of the disease is fully ascertained, and their entry in the Lazaretto has been secured; there has been, however, a few accidental exceptions to this rule; I do not speak here of the occasional visits of relatives and friends, which are allowed under certain restrictions.

For years past the segregation has not been enforced by violent measures, but the exertions, particularly on the part of the clergy, to induce the sick to enter the Lazaretto have been unceasing, and

the result has been that for many years all lepers, with only two exceptions that I know for certain, have resorted to the Lazaretto and have remained there till death, or are there yet. The two exceptions are of one girl, who, a few years ago, went abroad, and of one married woman, who, after a very short sojourn in the Lazaretto, was taken out by her husband and died at home. It was only in 1844 that a Lazaretto was established, there were no means before to isolate the lepers; for some years after several lepers died out of the Lazaretto.

The difficulties of early removals, apart from the painful severance of family ties, apply to cases in which the labour or services rendered by the lepers are still of great importance to their families. It would be almost a necessary complement to the establishment of Lazarettoes to provide some little means to lessen such difficulties when they do occur.

A. 12.—An institution, supported at the public expense, is provided for the lepers, where these unfortunates are under the care of Sisters of Charity, ministered by a chaplain and visited by a physician. The leprous sick are not sent to general hospitals.

The building devoted to lepers, located in the parish of Tracadie, officially called Saumarez, in the county of Gloucester, occupies a pretty situation; it is a wooden structure, comprising three divisions, one for the sisters, one for the male and another for the female patients; each division is again sub-divided in wards and rooms. There is a small inside chapel.

The sanitary conditions are, we may say, good. There have been very few cases of complication of the disease with other serious ailments; of course, I do not take symptomatic diarrhœa and other symptomatic catarrhal affections as distinct intercurrent diseases. The establishment is provided with a pharmacy, baths and other minor contrivances. The whole is on a very modest scale indeed, but has answered the purpose. It is much better now than it formerly was.

The attendance and nursing are all that could be desired, such as religious motives can inspire and charitable commiseration can bestow. Notwithstanding the economy of the annual grant, the inmates of the Lazaretto are made as happy as they can be under the direful visitation to which they are submitted, and to which they do submit with admirable resignation: truly, they obey the precept given by the church, to their brethren of the middle-age—*Sis mortuus mundo iterum Deo vivens.*

A. 13.—The number of inmates in the Lazaretto on the 15th May, 1885, was twenty-two, of whom one, a girl, is not a leper; she is affected with lupus. Of the twenty-one lepers eleven were men and ten women. The annual grant is $3,200, and includes the small remuneration of the chaplain, the indemnity of the visiting physician, the allowance to the sisters and the wages and board of two servants.

A. 14.—Since the establishment of a Lazaretto, in 1844, leprosy has been, more or less, kept in check, in New Brunswick, and for several years past, especially during the last few years, it has undergone a notable diminution. The check and the decrease are in ratio of the more or less prompt resort to the Lazaretto; segregation is, in my opinion, the cause of the diminution of the disease.

The population of the Lazaretto has undergone oscillations of numbers from a larger to a smaller figure and *vice versa*, on account of the variations in the annual number of deaths and on account of the success of the exertions to bring in all known cases of the disease: therefore it would not do to rely on the number of inmates of the Lazaretto, at a given moment, to judge of the comparative prevalence of the malady, from year to year; the outdoor lepers must be counted as well as the indoor patients.

The diminution in the number of persons affected by the disease, in New Brunswick, has been slow but steady for a good many years. I repeat, this is entirely due to stricter outer precautionary measures and to effective insulation. The absolute number of lepers is reduced, and the diminution in ratio of the population is still greater.

I give here two tables, showing the absolute numbers and the entire movement of the leper population, in New Brunswick, for the last decenniad.

TABLE I.—STATEMENT OF THE NUMBER OF PATIENTS IN THE LAZARETTO, LEPERS AND NOT LEPERS, THE NUMBER OF LEPERS OUTSIDE OF THE LAZARETTO, AND THE TOTAL NUMBER OF LEPERS IN THE PROVINCE OF NEW BRUNSWICK ON THE 1ST JANUARY OF EACH YEAR MENTIONED.

1875–1885.

Years.	Patients in the Lazaret.		Total Patients in the Lazaret.	Not Leprous in the Lazaret		Total not Leprous in the Lazaret.	Lepers in the Lazaret.		Total in the Lazaret.	Lepers Outside.		Total Lepers Outside.	Lepers in New Br'nswick.		Total Lepers in New Br'nswick
	M.	W.		M.	W.		M.	W.		M.	W.		M.	W.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1875.....	15	6	21	1*a*	1*b*	2	14	5	19	6	11	17	20	16	36
1876.....	14	8	22	1*a*	1*b*	2	13	7	20	6	10	16	19	17	36
1877.....	10	6	16	.....	1*b*	1	10	5	15	7	12	19	17	17	34
1878.....	6	9	15	.....	1*b*	1	6	8	14	7	9	16	13	17	30
1879.....	9	9	18	.....	1*b*	1	9	8	17	5	7	12	14	15	29
1880.....	8	8	16	.....	1*b*	1	8	7	15	4	8	12	12	15	27
1881.....	6	10	16	.....	1*b*	1	6	9	15	5	8	13	11	17	28
1882.....	8	14	22	.....	1*b*	1	8	13	21	5	3	8	13	16	29
1883.....	11	15	26	.....	1*b*	1	11	14	25	4	1	5	15	15	30
1884.....	10	13	23	.....	1*b*	1	10	12	22	4	1	5	14	13	27
1885.....	10	12	22	.....	1*b*	1	10	11	21	3	1	4	13	12	25

REMARKS.—The figures marked *a*, in Table I., column 5, referred to a young boy sent to the Lazaretto on suspicion of leprosy. He was not a leper, and was, consequently, discharged in 1876, The figures marked *b*, in Table I., column 6, concern a young girl affected with lupus; she has been allowed to remain under the care of the sisters. The figure marked *c*, in Table II., column 9, relates to a married woman who died at her own house, and whose disappearance influences tee result of the leper population at large, but not that of the Lazaretto.

TABLE II.—MOVEMENTS OF THE POPULATION OF THE LAZARETTO OF TRACADIE, AND OF THE WHOLE LEPROUS POPULATION OF NEW BRUNSWICK, DURING EACH YEAR OF THE LAST DECENNIAD, WITH NUMBER REMAINING ON THE 31ST DECEMBER OF EACH YEAR.

Years.	Entered in the Lazaret.		Total Entrd	Deaths in the Lazaret.		Total Deaths in the Lazaret.	Deaths Outside.		Grand Total of Death	New Cases		Total New Cases.	Lepers in the Lazaret.		Total Lepers in the Lazaret, Dec. 31.	Lepers Outside, Dec. 31.		Grand Total Lep'rs
	M.	W.		M.	W.		M.	W.		M.	W.		M.	W.		M.	W.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1875.....	1	2	3	2	.....	2	.....	.....	2	1	1	2	13	7	20	6	10	36
1876.....	.....	.....	.....	3	2	5	.....	....	5	1	2	3	10	5	15	7	12	34
1877.....	2	4	6	6	1	7	.....	.....	7	2	1	3	6	8	14	7	9	30
1878.....	4	3	7	1	3	4	.....	1*c*	5	2	2	4	9	8	17	5	7	29
1879.....	2	1	3	3	2	5	.....	.....	5	1	2	3	8	7	15	4	8	27
1880.....	.....	2	2	2	.....	2	.....	.....	2	1	2	3	6	9	15	5	8	28
1881.....	2	5	7	.....	1	1	.....	.....	1	2	.....	2	8	13	21	5	3	29
1882.....	3	2	5	.....	1	1	.....	.....	1	2	.....	2	11	14	25	4	1	30
1883.....	.....	.....	.....	1	2	3	.....	.....	3	.....	.....	.....	10	12	22	4	1	27
1884.....	1	.....	1	1	1	2	.....	.....	2	.....	.....	.....	10	11	21	3	1	25
	15	19	34	19	13	32	.....	1*c*	33	12	10	22	.....	.....	.....	.....	.....	.....

MOVEMENTS BETWEEN THE 1ST OF JANUARY AND THE 15TH OF MAY, 1885.

1885.....	1	.....	1	.....	1	1	....	.....	1	.....	.....	.....	11	10	21	2	1	24

It is not useless to repeat that the history of Lazarettoes alone is not a complete history of leprosy in the countries where these hospitals are established, and that the history of cases, as inmates of such hospitals, is not a full history of those cases, and it is for this reason that the preceding tables are made to take in the lepers at large as well as the lepers inhabiting the Lazaretto.

The figures of columns 11, 12 and 13, in Table II., may be somewhat defective, not in total numbers, but in the distribution of cases as appertaining to each particular year, on account of the extreme difficulty to ascertain with some precision the exact time of the beginning of the disease. They may also be deficient in so far as there might possibly exist one or two cases of leprosy not yet detected. But such little defects, if there are such defects, cannot materially influence the grand results, nor can they at all alter the significance of these tables: the broad facts would remain, with their distinctive features, in spite of the greatest possible deficiency of some details.

No leper, in New Brunswick, ever entered the Lazaretto on the first year of the outbreak of the disease; very few, if any, on the second year of the existence of the malady; several on the third year; many on the fourth, several on the fifth, and some at a still more advanced period. The patient hereinbefore mentioned, who has now been at least forty-six years a leper, expended only nine years of that time in that institution, on two distant occasions; she had been about six years sick when the Lazaretto was established.

The two tables concern altogether 58 patients, 32 men and 26 women; of these 58 cases, 36 are anterior to the first of January, 1875, and 22 are posterior to that date. The tables show that the disease has undergone, on the whole, a considerable diminution; notwithstanding the fact that the mortality has been, comparatively as well as absolutely, much less during the last five years of the decenniad. Another gratifying fact revealed by these tables, a fact which I consider connected with the decrease of the malady in the relation of cause and effect, is that a much greater proportion of the leper population existing at a given moment has been, for some years past, segregated in the Lazaretto than was formerly the case.

A. 15.—The results I have observed from good hygienic and dietetic treatment are that the influence of the disease is lessened and life is prolonged. This has been rendered very apparent at the Lazaretto, especially since the year 1880, when the buildings were

made more ample and comfortable, other improvements were provided for, and the entire management of the dietary was transferred to the care of the sisters, from the former direction of a functionary who was called keeper-cook. These beneficial results of good sanitary measures are, nevertheless, only a respite of a few years at best.

The various and multiplied attempts made at different times, in New Brunswick, by medical men, or under medical guidance, to cure the disease, have all failed, as have also failed several empiric methods and vaunted medicines.

Remedial attendance to common functional disorders, palliative treatment of the painful manifestations of leprosy, and attentive nursing of the patients, although no cure, are, nevertheless, highly beneficial, and are constantly resorted to at the New Brunswick Lazaretto.

I have never seen a spontaneous cure of leprosy; nor has there been any, so far, in New Brunswick, where all lepers have died of the disease who are not still alive, with the exception of one death from intercurrent phthisis and one from intercurrent pleurisy. There have been discharges, especially of children, from the Lazaretto, of several who had been received on mere suspicion or unconfirmed diagnosis, and many years ago of a few lepers who were reported cured, but who have all come back with the disease. One of these, now in the Lazaretto, is the woman I have before mentioned as having had the disease for at least forty-six years. This case is so very remarkable in many respects that I think it well to recite it. This woman was born in 1813, and was married in 1832. She was strong and healthy, and the mother of two children, when the disease made its first appearance in her system—about 1838. She nevertheless continued to cohabit with her husband, to attend to her household, to enjoy fair health, and had three children after the outbreak of the disease; the last of these, the fifth, so far, was at the breast, nursed by the mother, when both were forced to enter the Lazaretto, on its opening in 1844. During her sojourn in this institution her general health was good, but the malady made local progress, at first fearfully mutilating her hands and feet. Then she entered a period of quasi suspense, during which, after having been submitted to a medical treatment, she was declared cured, and discharged in 1849. Being returned to her husband she got a child in 1850, and another, the seventh, in 1854. She lived at home with

her husband, who died in 1874, and then with her son till 1880. Then she entered the Lazaretto for the second time. During the thirty-one years that elapsed between her exit from and her return to the Lazaretto, she was an enigma for all her relations and neighbours; some said she was cured, some said she was not; at times she appeared well, at other times she did not look so well. I visited her at home on several distant occasions, and this is what I have been able to observe and gather:—A very slow, but still apparent, progress of the morbid process in the appendages of her eyes; pains in the bones, which she attributed to rheumatism. I succeeded in getting, in spite of her unwillingness to account for herself, some information of the presence of anæsthesia fixed in her mutilated hands and feet, and undergoing changes of localisation in other parts of her body; these must have been followed by other occasional outward manifestations; she would not, however, admit any such thing. I felt sure that the malady was still in her, and told the Sisters that, if she did not die from some other cause before, she was sure to come again in the Lazaretto, where she is now, yet strong enough for her seventy-two years of age, but with characteristic anæsthesia, bone-aching and the occasional development of small leprous ulcers.

The husband was, to his last days, perfectly free from any sign of leprosy. Of her children, grandchildren and great grandchildren, only one has been the victim of the malady—her last child, a girl, who died a few days ago at the Lazaretto. That girl was attacked by the disease in 1863, in her ninth year of age, and is the patient I have mentioned in whom the ailment has lasted twenty-two years. The father and mother of the old woman, as well as her ancestors, were all free from the disease to their deaths; but a sister-in-law, with whom she was in intimate relation, died of leprosy; and two of her younger brothers, also, fell victims of the malady.

The case of that woman proves that leprosy may attack a person free from any hereditary taint; it proves that fecundity of women can be preserved even when the malady had lasted for a long time, although it is not so in every case; it proves that cohabitation may not communicate the disease, although it may in certain cases; it proves that children are born healthy, notwithstanding the existence of leprosy in parents, although they may acquire it. As regards the question of hereditary and contagious transmission, this remarkable case offers an interesting subject of study, which I intend to take up, with several other cases, in my projected work on leprosy.

A. 16.—The population of the whole Province of New Brunswick, according to the last census, was, on the 4th of April, 1881, 321,-233 souls. The population of the county of Gloucester was 21,614 and the population of the county of Northumberland 25,109.

The total area of New Brunswick covers 17,393,410 acres of land. The superficies of the county of Gloucester amount to 1,077,960 acres, and the area of the county of Northumberland is 3,046,640 acres, as approximately ascertained by geographical measurements made in connection with the census.

The superficies occupied, that is comprised in the inhabitants' holdings, amounted to 189,346 acres in the county of Gloucester and to 265,148 acres in the county of Northumberland.

The extent of cleared land in the county of Gloucester was 48,639 acres, and in the county of Northumberland 53,416 acres; the rest of the superficies of the holdings was in its primitive forest state.

I annex to these answers a small map representing a portion of the two counties of Gloucester and Northumberland, and especially the section where leprosy did occur or is still in existence: the red colouring indicates the particular localities visited by the scourge. All these localities are along the littoral of the Gulf of St. Lawrence and of the lower part of the River Miramichi; but no deduction can be drawn from this fact, as regards the alleged influence of the vicinity of masses of water on the spread and prevalence of leprosy, for the simple reason that the interior of the two counties is not settled.

There is a uniform registration of births and deaths, but it is not general, being only carried on among the Catholic population; it does not, however, include the causes of death. The registration has existed since the earliest settlement of the country by the French. Although many of the registers are not complete records, owing to the circumstance that, for certain periods of time, these populations were ministered by missionaries or priests having several localities to attend, yet they are such that the ancestry of the French-Acadian families can, as a rule, be traced back to their first appearance on this continent, by having recourse to the series of Acadian registers of various times and places.

In the absence of registration among the Protestant population, I have had to carry on enquiry with the relatives, friends and old acquaintances of the Protestants who have fallen victims of leprosy, being nine in number. The information thus gathered by me, in

addition to written accounts of the commencement of the disease, is sufficient, in every respect, to elucidate the essential facts relating to the history of each case, although it is impossible to trace the ancestry very far back, and although dates cannot be given with the same precision as such as concern the cases which have appeared among the Catholic population.

A. 17.—Leprosy has made its appearance in the town of Chatham, in the parishes of Nelson, of Northesk and Alnwick, in the county of Northumberland, and in the parishes of Saumarez, of Inkerman, of Chipagan and of Caraquette, in the county of Gloucester.

The names of Saumarez and of Inkerman are the political official names, but the popular, historical and ecclesiastical names are respectively Tracadie and Pokmouche. Again, within the limits of the official parish of Alnwick there are several localities bearing particular designations. Two of these localities are connected with the history of leprosy, namely, Nigaouek and Tabouchemtek, in the north-eastern extremity of the county of Northumberland. There is to be remarked, also, that a portion of Tabouchemtek forms part of the ecclesiastical parish of Nigaouek, and that the rest is annexed to the parish of Tracadie.

I have given the names of all the places where the disease has made its appearance; but it has not become endemic in all these localities. The malady has fixed itself in Nigaouek, Tracadie, Pokmouche, Chipagan and Caraquette. Caraquette has furnished only few occasional cases, Nigaouek, Pokmouche and Chipagan a good many, and Tracadie the great bulk of them. In fact, this latter place has been, and remains, the focus of the malady, the centre from which it has radiated; several cases which have occurred in the other localities just now mentioned have originated in Tracadie. The two first cases of leprosy in New Brunswick do not, however, as well as several others, come within that catagory of Tracadian origin.

In the following small table are given the names of the localities to which all the lepers existing in New Brunswick on the 15th of May, 1885 belong, with the population of each place, as ascertained by the census on the 4th of April, 1881:—

Names of Localities.	Population, 1881....	Lepers in Lazaretto, 1885	Lepers Outside, 1885	Total Lepers, 1885..
Tracadie	2,819	13	2	15
Pokmouche.....	1,804	4	..	4
Chipagan	2,322	3	..	3
Caraquette	3,837	..	1	1
Nigaouek	* 2,646	1	..	1

* This is the total population of Alnwick, of which about 200 are to be added to Tracadie, about 500 to other circumscriptions, leaving the balance to the ecclesiastical parish of Nigaouek.

Before closing this brief memorandum, in answer to the interrogatories put to me, I think it necessary to mention that numerous mistakes, of various kinds, and very serious errors of facts, have found their way in papers, reports and books on leprosy, as regards the history and features of the disease in New Brunswick. I say so, simply to warn against such mistakes and errors and to show that the statements made here, contradictory to such, are not made in ignorance of what has been enunciated before.

FROM DR. A. C. SMITH.

A. 1.—Leprosy has existed in the Province of New Brunswick, Canada, for many years. It is a specific disease, characterized by the slow development of nodular growths in connection with the skin, mucous membranes and nerves, in the latter case, by the supervention of anæsthesia, and a tendency to ulcerative destruction.

a. The tubercular and anæsthetic.

b. I agree with Dr. Taché, who has kindly allowed me the privilege of reading his replies to these questions, in his statement that these are varieties of one morbid state.

c. The specific phenomena develop themselves according as the skin and mucous membrane on the one hand, or the nerves on the other, are principally affected; although in some cases all these tissues are implicated simultaneously or in succession.

A. 2.—When resident physician I admitted boys of eight years of age, and one woman who was a septuagenarian. The disease, however, is chiefly confined to young adults.

The premonitory symptoms often continue for a long period, and may include lassitude and depression, accompanied by a constant inclination to sleep, even when at work; then follow pains in different parts of the body simulating rheumatism, and in turn followed by a train of symptoms described by Dr. Taché in his reply to this question.

A. 3.—This depends on the age and constitutional vigour of the individual. The duration of the anæsthetic variety seems to be much longer than that of the tubercular. In New Brunswick as elsewhere, an essential feature in its life history is its extreme chronicity.

A. 4.—It is much more frequent in the male.

A. 5.—The disease is at present confined to persons of French descent. In former years several persons of other nationalities have been affected, doubtless through contagion.

A. 6.—During my residence in Tracadie I observed that the disease appeared only among the poorer class. In one of my reports I stated that "as the condition of the people improved, bringing with it a more nourishing diet, the disease would eventually disappear." Poverty, *per se*, cannot cause the disease, but, because of the depressing influence, it seems to favour its development in persons *who are predisposed to it by hereditary taint.*

I fully agree with Dr. Taché in his statement that "the circumstances which favor the development of leprosy are the close intimacy of family life and the great sociability of the people."

a. Tracadie is on the sea-coast.

b. The people are settled on farms; consequently, the dwellings are isolated and healthy.

c. The habits of life are good. The people are religious and marry young.

d. There is now abundance of healthy food to be obtained. The indolent ones are, of course, the poorer ones, and *their* diet is seldom wholesome. I have frequently noticed that when such persons are ill from serious disease they readily succumb.

e. Fishing and farming.

A. 7.—I beg to refer to Dr. Taché's reply to this question, inasmuch as mine would necessarily be similar to it.

A. 8.—I am unable to adduce *proofs* of the hereditary nature of the disease, but hold that the theories of *hereditary transmission* and *contagion* are not incompatible. The disease frequently skips over a generation.

I have known many instances where one member only of a family was affected.

A. 9.—I have no reason to suspect that leprosy in any way depends on, or is connected with any other disease—it is a disease *sui generis.*

A. 10.—I have not met with instances of the disease of which I could affirm that they had been communicated by diseased persons; but I am convinced that leprosy is contagious, although not to the extent of other contagious diseases. The people of the leprous district intermarry very freely, and it is difficult to exclude hereditary taint. But I am confident that in former years persons free from hereditary taint contracted the disease, while living in Tracadie.

A. 11.—It is not at all times easy to secure prompt removal of affected persons to the Lazaretto, but once admitted, segregation is complete and permanent.

A. 12.—To Dr. Taché's reply to this question I would refer for full particulars, which it is unnecessary to repeat.

A. 13.—The number at the close of 1884 was twenty-two.

A. 14.—It is on the decrease. At one time there were nearly forty inmates of the Lazaretto. To the improving condition of the people, *and the segregation of those affected*, I attribute the diminution.

A. 15.—As the result of long observation, I am convinced that good hygienic measures, including a regular system of healthy diet, has great power in checking rapid progress in the disease—life is thereby prolonged.

I have never observed more than a temporary amelioration from any medicinal treatment, and only such as might be attributed to the influence of the mind over the body. My predecessor used coloured water, accompanied by strong assurances of benefit therefrom, and in every instance found a temporary improvement, equal in degree to any apparent benefit he found from the use of medicinal agents. I know of no spontaneous *cure* of the disease, although I know instances of temporary abeyance of the disease, lasting, in some cases, during a considerable period.

As. 16 and 17.—Answers to these questions being a simple matter

of ascertained statistical facts, my reply to each would be a repetition of Dr. Taché's reply. I therefore beg to refer to his statements.

FROM DR. J. E. GRAHAM, TORONTO.

1.—In New Brunswick; it occurs there in the three parishes, Tracadie, Caraquette, and Pokmouche which are situated on a peninsular between the Bay of Chaleurs and the Miramichi River.

a. There are two forms. Tubercular and anæsthetic leprosy.

b. These two forms are but varieties of a common morbid state.

c. The tubercular form is distinguished by the presence of tubercules of various shape and size which appear on the surface of the skin; most frequently on the face; these tubercules enter atrophy or ulcerate.

2.—May appear at almost any age; in Tracadie as young as eight, and as old as eighty; the earliest symptoms are general debility, pain in the limbs and occasionally fever; general feeling of malaise. The appearance of maculæ is generally the earliest positive sign.

3.—The disease usually develops in three or four years. It usually proves fatal in seven or eight years.

4.—The disease is as frequent in the male as in the female sex.

5.—Not confined to any particular race.

6.—It is of most frequent occurrence among people whose dwellings are small and unhealthy and whose food is poor in character. In Tracadie stale fish is eaten freely.

a. It occurs frequently on the sea-coast and low damp countries.

b. In Tracadie sanitary condition bad; dwellings small and unhealthy.

c. Not cleanly. Lazy and slovenly.

d. Diet; potatoes, salt meat, and stale fish. Very little change of diet.

e. Farmers, fishermen.

7.—Previously mentioned condition.

8.—It is apparently hereditary; it is doubtful as to whether it is really hereditary.

9.—It is not connected with syphilis.

10.—Have known of cases, but have not seen any.

e. It is communicable by sexual intercourse.

11.—In Tracadie they are kept in a Lazaretto, but they have liberty to see their friends.

12.—A separate infirmary is provided by the Government.

13.—About 24 or 25.

14.—Somewhat on the decrease.

15.—No good results from medical treatment. Much may be done by attending to the general health of patients.

CANARY ISLANDS.

DR. ANDRES NAVARRO TORRENS, DOCTOR IN CHARGE OF THE PROVINCIAL HOSPITAL FOR ELEPHANTIASIS OF LAS PALMAS.

1.—Without being enabled to assure ourselves to-day of the date when leprosy first appeared in this Province there are reasons for believing that the disease dates back to the conquest of these islands only. The most ancient chroniclers make no mention of the fact of the natives suffering from such disease or indeed from any other one analogous to it.

a. At the present time there are, in this hospital only two kinds of leprosy; that is to say:—

1. *a.* *Lepra tuberculosa*, (Oliver) *Elephantiasis Græcorum-Leontiasis-Satyriasis-Lepra Tuberculosa Leontina.*

2. *a.* *Lepra Mutilans.* Lepra ad manum pedumque articulos conversa (Frank), St. Anthony's Evil, (so-called by the common people of these islands).

b. In my opinion, these are varieties of the same morbid condition; apart from the symptoms, which are common the one to the other, the two forms meet at times in one person and can be transmitted hereditarily indiscriminately.

c. 1st.—*Lepra Tuberculosa* presents maculæ somewhat reddish-violet, circular, raised above the skin, at first isolated and afterwards more or less confluent, to which frequently succeed rugosities and tubercules of the same color, tumefaction of the skin widely spread,

accompanied by squamous patches, general loss of hair, almost constant disappearance of that of beard as well as of the eyebrows and eyelids; notable deformity of the features occasioned by the coloration and swelling of all of the teguments of the face; anæsthesia which not only affects the tuberculous part of the skin but also all that which is hypertrophied and scaly.

2nd.—*Lepra Mutilans* presents the fingers and toes arched in permanent semiflexion, with atrophy of the extensor muscles of the same; sanious peri-articulated ulcers terminating with the falling off in turn of the plalanxes, skin shiny and squamous in defined regions and almost constantly in the elbows and knees; anæsthesia which affects the squamous part of the skin.

2.—Between infancy and manhood and sometimes even in infancy.

Lepra Tuberculosa begins with papular eruptions (similar to the pustules raised by the bite of the mosquito) commencing very frequently in the cheeks, lobes of the ears, elbows and knees, thus giving, from its beginning a peculiar appearance to the patient on account of the almost universal accompaniment of the puffing up of the skin of the face.

Lepra Mutilans. In this the patient begins to feel at the commencement of the disease a sensation of titillation in the joints of the fingers; to this follows anæsthesia of the same and the beginning of contraction.

3.—It generally reaches its full development at adolescence.

It commonly terminates in death at the adult age or in incipient old age.

4.—I believe it is equally frequent in both sexes.

5.—I have only seen it in individuals of the white or Caucasian race.

6.—*a.* The dwellings of these unfortunates in this Province have been indiscriminately sea-coast, and city and country places having at times diverse conditions of soil.

This diversity in the dwellings of the lepers is in obedience, in my judgment, more to a conjunction of special circumstances than that the localities favor the development of the disease, owing to the fact that it is not common for them to leave the towns in which they originally established themselves on account of the horror their miserable appearance inspired strangers to them; thus perpetuating, in the places referred to, leprosy by hereditary. I do not desire to be understood by this observation that I do not believe it to be possi-

ble for leprosy to be spontaneous,—since several cases of it have been recorded—but the rather to accentuate the importance which in my opinion heredity holds.

b. As all the immense majority of the afflicted belong to the poor classes, it follows that generally their habitations are not healthy.

c. d. e.—Ordinarily they have little personal cleanliness so far as regards washing their bodies or clothing.

Some of the sufferers are fishermen but the greater part are occupied in field labor.

The food usually consists of fish salted, baked or roasted with a piquant sauce. The poor people also frequently use maize roasted and ground into flour (gofio) which they eat in great quantities dry or kneaded with water, milk or herb broth; also baked potatoes and several kinds of vegetables are eaten. With the exception of the salt fish the basis of the food is farinaceous.

As predisposing causes, besides those indicated and at times converting them into fixed facts, a prominent place must be occupied by the severe changes of temperature; and above all by the abrupt suppression of sweat by a sudden plunge of the body into water.

7.—I know of no others than the lack of hygiene.

8.—Hereditariness figures principally as the predisposing cause, from first to last.

I have seen issue by the same marriage, of which some have acquired the disease and others have not.

9.—I do not believe that leprosy has any relation with the other affections called syphilitic, scrofulous or eruptive.

10.—I do not know of any case of contagion of leprosy by means of contact more or less immediate, including sexual intercourse.

11.—The law places no obstacle to a union of such except, the repugnance inspired in the minds of the healthy by their appearance.

12.—In this hospital which has a provincial character there does not exist compulsory separation but a voluntary one since the former is at the present time forbidden by law. It is only when the lepers dedicate themselves to medical treatment that the authorities compel them to be secluded in this establishment.

Lepers are admitted exclusively to said hospital which in early times was created for them. It is divided into two large departments arranged for the separation of the two sexes. Viewed as a

building excellent conditions are united in it, but its internal arrangements forbid a convenient application of a good hygienic and medical treatment.

13.—At the present time there are the following inmates:—

Male.	Lepra Tuberculosa	20
	Lepra Mutilans	3
Female.	Lepra Tuberculosa	27
	Lepra Mutilans	3
	Lepra Tuberculosa-Mutilans	1
	Total	54

14.—I believe to the contrary that far from the disease referred to showing any increase here it is diminishing in direct correspondence with improved condition of the poorer classes.

15.—I have not to this day seen any positive and evident cure of a radical cure by medicinal treatment. I believe that leprosy is incurable, (at least in the two forms which I have studied). But, it sometimes happens that the evolution of the disease is arrested, leaving the patient for a considerable time in a condition very compatible with health. Without denying that medical treatment can materially contribute to this condition I consider that dieting is of great efficacy.

In this hospital it has been observed that the disease has remained stationary in a few cases but it has never disappeared.

16 and 17.—It is not possible for me to reply to these two last questions the import of which I do not understand.

Las Palmas de Gran Canaria, June 1st, 1885.

CEYLON.

FROM DR. W. A. KYNSEY.

1.—True leprosy is known in Ceylon and has been recognized since the time of the Dutch occupation of the island, the earliest record of the disease being connected with the asylum founded and

transfered to the British Government by a Dutch lady who was herself a leper. It was known to the Sinhalese from a remote period as a skin disease under the name of "Gaja Charma" or Elephant-Skin, in association with other cutaneous disorders and has been more recently mixed up with "Parange" a prevalent local disease, having a close resemblance to the "yaws" of the West Indies. It exists in every form and phase, the anæsthetic being perhaps the most frequent, among the fish-eating population on the sea-board and in Colombo, the chief city of the island.

It is considered a constitutional disease "sui generis" and occurs in three principal forms, which in my opinion, are only varieties of one common morbid state.

The tubercular variety is recognized by the appearance of tubercules, erythematous raised patches and infiltrations of the skin involving the face, forehead and ears, lending the countenance its sinister aspect, and the trunk and extremities, with little or no diminution of sensibility, by the characteristic nasal voice, fissured and tuberculated condition of the tongue and palate: tumefaction of the fingers and toes, ulceration of the matrices and falling off of the nails;—swelling and hypertrophy of the feet and legs. With these are associated febrile reactions with eruptions of livid swellings (elephantoid fever) and frequent ulcerations and healing of tubercules.

The anæsthetic form is usually distinguished by maculæ or spots of a tawny color on a level with the skin which is usually scaly, dry and wrinkled in appearance, normally sensitive at first but gradually becoming benumbed in their centres, and inclined to spread and coalesce, forming extensive serpiginous patches generally following the course of nerves and often symmetrically arranged on the trunk and extremities. There is numbness commencing at the great toe or in the course or distribution of the ulnar and median nerves, involving subsequently the whole of both extremities up to the elbow and knees, flexion of the fingers on the palms, followed by the appearance of blebs or bullæ spontaneously or by proximity of the limb to a fire; and the supervention of unhealthy ulcerations resulting in necrosis and exfoliation of the bones and loss of fingers and toes, and ending in gangrene. Dry munification of the extremities is frequently noticed with a shrivelled and fissured condition of the nails. A characteristic indolent ulcer is often found on the plantar surface of the great toe on the metatarsophalangeal joint, or at the

heel. The ulnar and median nerves are felt enlarged and thickened at the elbow and wrist. With loss of cutaneous sensibility there is also loss, sooner or later, of thermic and pain sensations; atrophy of the muscles of the arm and hand giving the latter its talon-like form, known as the bird-claw hand; and distortion of the feet with luxation at the ankle. The glands of the groin are invariably enlarged and prominent. In its permanent stage muscular paralysis and wasting supervene the arbicularis muscles, and muscles of the arms and legs become affected; extropion, eversion of the lips, wrist-drop, Keratitis with loss of vision and atrophy of the structures of the eye usually ensue. There are no febrile attacks with livid eruptions pathognomonic of tubercular leprosy in this form of the disease.

The mixed variety has, most if not all, the characteristic phenomena of the preceding forms, and is found more frequently associated, as the records of the Asylum show, in hereditary cases. Mutilations occur, but are not so extensive as in the anæsthetic variety, the loss of cutaneous sensibility is markedly evident in the extremities; the tubercles ulcerate and heal, but there is no supervention of gangrene. Death usually occurs in leprosy from diarrhœa, dysentery, general dropsy, tuberculosis and from exhaustion from long continuance of the disease itself.

2.—At all ages from childhood to advanced life. I have not seen children born with the disease, but have observed anæsthetic leprosy in a child of three years, and well marked tubercular leprosy in children of nine and eleven years. There is at present a female inmate in the Asylum who has clearly manifested the disease in her fifty-seventh year, long after her two sons were affected with it.

The earliest symptoms in the anæsthetic form are usually indicative of some nerve lesion, as shooting or darting pains in the limbs, loss of morbility of the fingers, burning sensations in the feet, formication all over the body, followed sometime after by loss of cutaneous sensibility, contraction of the little fingers, and the appearance of tawny-colored, benumbed spots on the face, trunk and limbs.

In the tubercular form the premonitory symptoms generally observed are a feeling of malaise, unusual drowsiness, vertigo, epastaxis, profuse sweating on the least exertion, the appearance of livid blotches with fever, attended with rigors, and tumefaction and thickening of the lobes of the ears.

In well-marked mixed leprosy, the fever and erythematous rash

are generally associated with commencing numbness of the fingers or a benumbed, discolored patch on the body and the occurence of blebs on the extremities.

3.—The disease attains its full development, sooner or later, according to the circumstances and condition of the patient and the state of his general health. From ten to fifteen years is about the usual period; rarely the disease remains normally arrested for years. It usually proves fatal at middle age; the longest duration of the disease recorded in the Asylum for the tubercular form was sixteen years, anæsthetic twenty-eight, and mixed twenty-one years.

4.—The disease appears more often in men than in women in the proportion based on the figures in the records of the Asylum of eight to one.

5.—In this colony it is not exclusively confined to any community, but is more frequently observed among the Sinhalese and Tamils, seldom among the Eurasians, and more rarely among Europeans.

6.—Chiefly among the poorer classes such as cultivators or field-laborers, mechanics, cart-drivers, coolies or day-laborers, fishermen, and others whose occupation expose them to vicissitudes of weather and extremes of hot and cold.

It occurs more frequently on the western and southern sea-coast of the Island and in Colombo, the chief city, on the banks of rivers and littoral lakes, in low, more or less damp and malarial localities.

Sanitation is not much observed among the poorer natives, whose dwellings are usually small, thatched huts, ill-ventilated and crowded, with the immediate neighborhood filthy and strewn with mouldy and rotten vegetation and excremental deposits; their clothing deficient; their diet poor from insufficiency of nitrogenous elements, consisting chiefly of dry and salted or badly preserved fish, often in a rotten state, and inferior grain and vegetables; and their occupation, that of cultivators or coolies.

7.—All the above insanitary and unhygienic conditions associated with intemperance, sexual excesses, neglect and exposure; want of personal cleanliness; improper treatment by native practitioners and the abuse of mercury and opium. Most of the patients admitted into the hospital with the disease in its most aggravated form had been previously salivated or were habitual opium-eaters.

8.—A hereditary taint is frequently admitted by the patients in the Asylum, and several instances are on record of one or two members of a family being affected while others remain exempt from any trace of the disease.

9.—I have sometimes found it connected with Scrofula, Syphilis and Parangi; but have no reason to believe that it is any way dependent on these diseases. Leprosy also occurs associated with Scabies, Eczema, and Psoriasis, and other skin diseases among the fish-eating population of the island. I have seen it in connection with Elephantiasis Arabum.

10.—It is not considered contagious in Ceylon, and lepers are not generally shunned by their relatives or friends for fear of infection, but are often maintained by them in their own houses. It is in my opinion not contagious as Syphilis, Parangi, or the exanthematous diseases. There is no conclusive evidence in the Hospital records of communicability by direct contact with or close proximity to diseased persons. The attendants of the Hospital have for years been in close association with the lepers in all stages of the diseases, the head-servant for more than twenty years, and the washing of the establishment has been performed by a family in the neighborhood for four generations, but not a trace of the disease as I have reason to know has been observed among them.

It certainly does not appear to be transmissible by sexual intercourse, as there are numerous instances to my personal knowledge of leper wives and husbands who have not contracted the disease from each other.

11.—There is no restriction imposed or segregation enforced by legislative enactment or otherwise in respect of lepers in this Colony, who are allowed to mix freely with the people and are frequently met with in crowded localities in town as mendicants, and only brought into the Asylum when they become physically disabled and can no longer follow their lucrative calling in the streets. A partial restriction is perhaps observed among the home-dwellers in villages which are as a rule sparsely populated, a single family being afflicted and remaining voluntarily isolated from the rest of the community.

12.—An Asylum has been in existence prior to the commencement of the present century, probably from the time of the British occupation of the Colony, transferred to the Government, it is believed, by a Dutch lady as a home for lepers. It occupies a beautiful site in an isolated locality, four miles from the fort of Colombo, on the bank of the Kelani river in close proximity to the sea, and is well adapted, since the recent improvement it has undergone, for the seclusion and treatment of lepers. It consists of twelve wards having accomodation for 159 patients in separate blocks or

pavillions, well lighted and well ventilated, to which are attached latrines worked on the dry earth system and lavatories for hot and cold baths; the female wards being separated and isolated from the male by a partition wall. The Asylum is in charge of a resident medical officer under the supervision of the Principal Civil Medical Officer, and is wholly supported by Government at an annual cost to the Colony of Rs15,400. The dieting of the patients is according to the dietary scale for all the hospitals in the island, but more variety is observed in the distribution of the diet to suit the dyspeptic tendencies and voracious appetites of the patients, while extras are also liberally supplied when necessary, cleanliness is strictly enforced, river and sea-bathing are constantly practiced; the clothing changed twice a week, and the bedding aired as often as possible. The adult males are daily employed, excepting Sundays, in various occupations as ward attendants, etc., and in the gardens which they cultivate with vegetables for their own use; the females are occupied in sewing or in plaiting cadjans, and the children attend schools under leper teachers. A Roman Catholic chapel and Budhist temple have also been provided them for religious purposes by the charitable contributions of their friends.

Lepers are not usually admitted into the general hospitals of the island, but are sometime,detained in them till they can be sent to the Asylum.

13.—The daily average of lepers in the Asylum maintained by the Government for the last five years was 125.

14.—The disease I have reason to believe, has decidedly increased since 1862, as the number of patients then in the Asylum was 63, but it has since increased to 151, being the maximum number treated since the beginning of the present year. Its increase among the general population cannot be established with precision owing to the absence of an exact registration enumeratiug lepers. Cases of strictly recent origin are relatively more frequent judging from the admissions into the Asylum, and the numerous instances that have come under my personal observation among the general community. I have no doubt that a certain reproduction of the disease is going on whatever the factors are at work, and that the proportionate growth of leprosy in the Colony, is by no means diminishing. Immigration from India of Malabar coolies infected with the disease has, in a great measure, contributed to the increase of pauper lepers in the island.

15.—No treatment as yet has been found of any permanent benefit, Chaulmoogra oil (Oleum Gynocardiæ Odorata) has given beneficial results in the amelioration of some of the symptoms, such as the absorption of tubercles and healing of ulcers, Gurjun or wood oil, obtained from various species of Dipterocarpi used externally and internally, appears to retard the progress of the disease, but has never in any instance proved curative. Carbolic oil inunctions (1-40 Cocoanut oil) and vapor baths, Quinine and Iron, dilute Nitro; Hydrochloric acid in bitter infusions, Liq. Arsinicalis and Sulphur, where there are skin complications, and the Ferri. Iodid are the usual remedies employed in the Asylum, and have been found useful in improving the general health and amending the constitutional taint. As frequently the best results have been obtained from hygienic and dietetic treatment alone.

There is at present in the Asylum a Malabar patient in good general health admitted with anæsthetic leprosy, in whom the disease had been fully developed, whose case may be considered a spontaneous cure, no further symptoms having appeared during the last six years. The disease having apparently exhausted itself.

I cannot confidently assert that any patients have recovered under treatment, but a large proportion has been benefited and taken their discharge, and a great many more are now in the Asylum in ordinary good health without the appearance of fresh symptoms or any further progress of the disease for some years.

16.—By the last census on February 17th, 1881, the population was 2,759,738. There is a uniform registration of births and deaths, including the causes of deaths, existing since 1867, kept at the office of the Registrar General.

17.—In the Western Province including Colombo, the chief city of the Island, with a population of 897,329, and the Southern Province, including the township of Galle, with a population of 433,520. In the absence of statistical records on the subject, I am unable to give the number or proportion of lepers in these townships and districts. Leprosy is very unfrequent in the hilly districts of the Central and is but rarely observed in the other Provinces of the Island.

CHILI.

FROM D. THOMAS, ESQ., H. H. M'S., CHARGE D' AFFAIRES FOR CHILI.

SIR:—I have the honor to acknowledge receipt of Your Excellency's dispatch No. 1, under date of 25th March, the contents of which have had my attention.

Leprosy.—After making full enquiries from the principal medical gentlemen of this country, I have received the same answer from all, viz., that leprosy does not exist in Chili. It would be useless therefore to forward all the answers I have received, I therefore only enclose the one I received from Dr. J. J. Aguirre, Dean of the Faculty of Medicine of Santiago, Chili, with a translation.

"It would appear that leprosy does not exist in Chili. In none of the scientific publications do we find any case mentioned of this disease. In our own practice we have never observed any cases that could even vaguely appear as leprosy. We have consulted with sundry colleagues on the subject and from all we have received an answer in the negative. Consequently there does not exist in Chili laws or institutions relating to this subject.

(Signed.) "J. JOAQUIN AGUIRRE,
"Deacon of the Faculty of Medicine."

FRANCE.

DISCUSSION BEFORE THE ACADEMY OF MEDICINE, PARIS, ON THE TRANSMISSIBILITY OF LEPROSY. (LE TEMPS, PARIS, OCTOBER, 1885).

Is Leprosy contagious? This is the question which M. Vidal, medical director of the St. Louis Hospital proposed to solve in a memoir which he has presented to the Academy.

M. Vidal believes in the contagious propagation of leprosy, and in this he only follows the general opinion. Both in Europe and in the East in the Middle Ages the leprous were secluded in special establishments, with the object of isolating them and extinguishing the malady.

An European doctor, who was in the East, has proved that in fourteen cases of leprosy the malady had not been transmitted by heredity.

On the other side, it is alleged that lymphatic influence and scrofula have their weight in producing leprosy.

Practical experiments in the inoculation of animals with leprosy have given no result up to the present date. Nor is phthisis, in spite of its being contagious, inoculable.

Without doubt, the medical faculties assure us that in North America the propagation of leprosy is so constant and so regular that contagion alone can explain it.

In the Hawaiian Islands leprosy was unknown until the year 1848, when it was introduced by the Chinese; to-day it has attacked a twentieth part of the population.

Practical observations on the Island of Mauritius, analagous to those to which I have just referred, also prove its contagiousness. Leprosy was there also unknown until the year 1765; now it has attacked the inhabitants by the thousands.

In the Middle Ages, the isolation and the treatment employed in the hospitals victoriously combatted the disease, which had then become endemic. In the fifteenth century leprosy disappeared in the European countries, but even to-day persistently remains in Scandinavia. Without doubt, thanks to the improvement in hygiene, the malady is diminishing; in the space of twenty years, from 1860 to 1880, the number of lepers have decreased in Norway from 3,000 to 1,498, and nearly all of them have acquired the disease through heredity.

M. Vidal thinks that the prophylactic resources employed against leprosy should be in proportion to the grade of civilization of the people; they should be energetic if those for whom they are applied have not the knowledge of the efficacy of the necessity for hygienic rules, and always having for an aim the convincing of the public mind of the importance of hygiene.

M. Hardey puts a side question in regard to the etiology and the propagation of leprosy.—He wished, he said, to abide by clinical

facts; leprosy, according to him, is not contagious in those countries in which it habitually reigns. He had observed in Paris numerous cases of leprosy which in the absolute had been contagious. In order that the contagion of the disease should establish itself, special local conditions were required which were wanting in our boundaries.

"Be it so," replied M. Vidal, "in France the climatic conditions and the regular habits and cleanliness, constitute, it may be, insuperable obstacles to the propagation of leprosy."

"In my recent visit to Constantinople," said M. Dujardin-Beaumetz, "I had an opportunity to observe some 3,000 lepers, of which number a part were in the hospitals and the rest wandered free about the streets. One could visit, without great difficulty, the hospitals, although they are not often visited by the superstitious people who believe that visiting the lepers attracts to their hearths all manner of diseases. It is not a rare thing to see lepers marry with healthy women, without contagion resulting to the women or children.

"The lepers who wander around the streets, roughly calculated at 200, more or less, are many with healthy women, or with lepers like themselves. There are authors who vacilate by saying that leprosy may be héreditary; and without any doubt, I have seen lepers, the children of lepers.

"The experimental physiologists say that since there exists a microbe of leprosy there must of necessity exist contagion. I am not of this opinion; there may very well exist the microbe, without there necessarily being contagion. Thus, for example, intermittent fever, which has its microbe, is not contagious; but above all, we must not forget that even now the existence of a leprous microbe must be proved."

M. Paul Constantine said, that the problem of contagion swayed between two contrary opinions. Medical authorities worthy of respect, denied the contagiousness; European doctors all followed this theory, and what is certain is, that inoculations have given no results; it is left therefore for us yet to judge from testimony from farther abroad, and this is not very well proved.

M. Leroy de Méricourt testified that M. Brassac, Naval Surgeon, who had carefully studied leprosy, would not admit its contagion but believed in its hereditary transmission.

M. Lagneau observed that in early times there existed in Western Europe a firm opinion that leprosy was peculiar to the people of the North.

Baron Larrey said that his father, who had the opportunity of studying the disease in Egypt, did not believe in its contagiousness.

M. Vidal in replying to his opponents, said, that in the Hawaiian Islands leprosy generally is not hereditary; that the malady could not be attributed to misery nor to the use of decomposed fish; that in India there were 102,000 lepers who absolutely did not consume fish; that leprosy could not be attributable to the climate since it existed in every country; that it is not inoculable; that it could be contagious in a lingering manner, and even latent, as has been proved in many cases; and finally, that the opinion in regard to contagion stood, as they say, in *secular* possession of the scientific domain, and that it behooved its adversaries to refute it.

THE NEXT SESSION.

M. Leroy de Méricourt continued the discussion on the question whether leprosy was contagious or not, the discussion commencing at the previous session. M. Vidal, to prove propagation by contagion of this malady in the Sandwich Islands, produced a memoir by Mr. Woods, an American doctor. M. Leroy de Méricourt analyzed and criticized the most notable passages in the memoir, and his criticisms resulted that the opinion of Mr. Woods lost much of its weight by a considerable conjunction of facts. In the year 1555 the Portuguese had visited those distant shores, and there is no doubt that later on the expedition of Captain Cook carried there syphilis, it being a well known thing to many doctors, that leprosy is but a transformation from "syphilitic cachexia." The Hawaiian Islands are under the tropic of Cancer; its climatic condition, the licentious customs of the inhabitants, favored there the development of all infectious diseases; and, in a word, if leprosy had been imported into those Islands, it must have been at a very remote epoch, and that the case to which they referred of a Chinaman who was the first to be attacked by this disease in 1848, must be regarded as a tale. Syphilitic cachexia and scrofula have existed in Hawaii and the other Islands of the Pacific for a much longer time.

M. Leroy de Méricourt was not altogether assured of the recent importation of leprosy in the Island of Mauritius; from very remote times there had existed very frequent commercial relations with the Indies and all the western coast of Africa.

Leprosy is a bacillarial malady, whose propagation remains buried in obscurity; its hereditariness, certainly cannot be denied as being

one of the forms of its propagation; these may also be the introduction into the blood of morbid materials, proceeding from the leprous ulcers; but leprosy is not contagious in the sense we give to that expression, in the same way as small-pox, typhoid fever and cholera.

The microbian doctrines have caused the evil of propagating through all parts the idea of contagion, producing among the public a true and very serious pre-occupation. For their part, these doctors have seen on every side whole armies of morbid germs, and this illusion has made them carry out the isolation of the diseased even to the very limits of ferocity. If this movement is not restrained, we shall arrive at seeing as many wards of isolation as there are different diseases in existence. It is about time that we cast away from ourselves all these notions, and moulded ourselves to new ideas more in harmony with truth and reflection.

M. Vidal replied to all this: Leprosy and syphilis should not be confounded in their manifestation; that both could be presented at the same time and in the same subject and mutually develop; and that the word syphilis could not be translated into that of leprosy, according to the authors whose testimony he had invoked. M. Vidal insisted on believing in the cases pointed out by Mr. Woods, as having occurred in Hawaii, and that they could not be explained either by spontaneous generation, resulting from alimentation, misery, etc., nor by heredity; they had their origin, without doubt, in the importation of the plague in the year 1848. The rapid development of leprosy from this date, necessarily implies the existence or the possibility of contagion. In the opinion of M. Dujardin-Beaumetz a bacilarial malady, the marsh fever, for example, may be bacilarial but not contagious, not even by inoculation. Might I not record, said M. Vidal, recent experiments which appear to indicate the possibility of inoculating the marsh fever.

M. Leroy de Méricourt supported the opinion of all the Naval Surgeons, who had observed the malady in every latitude and did not consider it contagious.

M. Jules Rochard observed that, in his opinion, it was not certain that leprosy had been imported into the Sandwich Islands in 1848, since M. Quoy had seen it there since 1819, when he made his voyage of circumnavigation.

M. Vidal replied that the terms of M. Quoy's statement apparently referred to syphilis and elephantiasis more than to leprosy.

GUATEMALA.

FROM DR. MIGUEL VALLADORES, PHYSICIAN OF THE LAZARETTO, AND DOCTOR JOAQUIN YELA, DIRECTOR OF THE PURLIC HOSPITAL AND ASYLUM, GUATEMALA.

1.—Yes.

a.—Three; tuberculous, anæsthetic, and one which is a combination of both of these.

b.—It is one and the same disease, with different symptoms.

c.—In the tuberculous form, enlargement of the ears (which is the place where the disease generally first begins to show itself,) the complexion of the face is changed to a copper hue, eyelashes and eyelids and brows fall off. In the anæsthetic form the patient has no sense of touch or temperature; pricking him with a needle, he does not feel it; eyelashes and brows fall off, also lower eyelid; he suffers from muscular atrophy.

2.—The disease is most frequently met with between the age of twenty and forty. I have met with only two patients of tender age, one of six and one of seven years of age, but I have heard of two or three cases, where the afflicted were twelve to fifteen years of age.*

The first symptoms are: rose-colored spots on the face and other parts of the body; these spots grow darker and gradually change to a purple color; when these spots disappear, the skin thickens where these spots have been. In the anæsthetic form these spots do not appear; this form immediately commences with insensibility with the lower or upper parts of the body.

The development of the disease has no fixed time; the younger the patient the more rapid the progress of the disease. I know of cases where the patients have neither improved nor become worse for several years, but as a rule, the disease terminates fatally in from four to eight years.

*The doctor speaks of the patients he has treated in the Leper Hospital; well-to-do families contrive to secrete an afflicted member of the family in some remote place; this to my personal knowledge. --H. H. M's. Consul.

4.—Amongst men; nine men to six women.

5.—In Guatemala it is an almost unheard of thing for an Indian to be afflicted with leprosy; my patients have all been "Ladinos," (descendants of Spaniards and Indians†).

6.—*a.* On the sea coast which is low; and in the Department (or province) of Quezaltenango, which is 6,000 feet above the level of the sea, and the coldest region of this republic, leprosy is but little seen.

Near the ‡Capital, where the climate is very variable, is the spot where leprosy most exists.

b.—The dwellings are generally a house of two or three rooms; houses built of "adobe" and covered with brick tiles, slanting roof.

c.—People of the lower class, who live on the cheapest kind of food and give no attention to cleanliness.

d.—Plantains, bananas, beans, (fried in lard); work only when absolute necessity compels them.

e.—Farm-hands.

7.—Want of fresh air; the custom (amongst the poor class) of whole families sleeping in one room; want of cleanliness, and use of alchoholic liquors.

8.—Yes; I think it is often hereditary; but I know of three instances, two of which, in which the father, and one, in which the mother, were afflicted with leprosy, and although the parties were well aware of their disease, they cohabited, and the children bear no trace of the disease; but in one of these cases, (where the father was a leper) the daughter married, and her child had the disease.

I am convinced that the disease will re-appear in the second generation. I know of several instances, where a member of a family had this disease, and the other members of the family were exempt from it.

9.—I know of only one leper who was syphilitic before being attacked with leprosy; my other patients have had no syphilis, moreover, I have observed that a mercurial treatment aggravates the disease of leprosy in a patient.

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†By H. H. M's. Consul. This statement, although verified by other doctors, must be taken "cum grano salis," as there are plenty of Indian villages and settlements, which are rarely, if ever, seen by a doctor.

‡5,000 feet above the level of the sea, and where there are scarcely any pure Indians.—H. H. M's. Consul.

10.—I have not.

10.—*c.* I think it is; refer to question 8.

11.—No; they are strictly segregated.§

13.—Nine men and six women.

14.—The disease has increased in Central America, because the lepers were not until lately segregated, and members of families known to have leprosy were allowed to marry; while it is a known fact, that although the son or daughter of a leper may bear no visible traces of this disease, the grand-children are sure to be leprous.

15.—Lepers should have plenty of fresh air, wear flannel clothing, bathe every day in tepid water, eat roast meat, thick soups and milk.

I use in the treatment, astringents both internally and externally. Two grammes tanuid, and one of extract of ratania, make twenty pills, to take four per day. Exterior treatment: one gramme acido fenico, with thirty of glycerine, and fifty centi-grammes borato de soda; to be well rubbed in twice a day for about half an hour each time; for ulcers, two grammes iodoformo and thirty of vasaline. This is my treatment of the tuberculous form. In the anæsthetic form, I have noticed that internal astringents are of great benefit, also electric currents ascending the back-bone.

I have never seen or heard of leprosy undergoing a spontaneous cure; of my patients in the Hospital, two were partly cured in the third stage, and one radically in the second stage, the two former anæsthetic, and the latter one tuberculous.

16.—Republic, 1,400,000 (of which two-thirds are full blood Indians).

Capital 60,000 last year.

Yes; since eleven years ago.

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§See question No. 2. –H. H. M's. Consul.

HOLLAND.

FROM DR. EGELING, STATE MEDICAL INSPECTOR FOR THE PROVINCE OF YNID.

Leprosy is rare in the Netherlands, and even then is almost invariably seen in persons coming from the Colonies. Isolated cases are known in which the disease is hereditary.

In May 1867 the Medical Inspectors assembled and discussed the question of leprosy as exhibited by the appearance of the patients at Brombeck. The results of their investigations are to be found in their report, volume 1, folio 233-235; also in the annual report of the State medical inspection for the same year, folio, 199-242.

I remember that it was proved in an enquiry held by the Royal Academy in 1847, that no cases of hereditary leprosy could be shown in twenty-five years.

In order to gain further information in regard to the appearance of leprosy in the Netherlands, I made enquiries as to the cases in the larger hospitals of the country at Amsterdam and Rotterdam. For that reason I have been unable to reply sooner. From Amsterdam I am informed that the number of cases is so few that there is not one a year reported, and such as there are, are invariably from the Indies.

The presiding physician of the hospital at Rotterdam who has been at the head of this establishment forty-two years has not seen a single leper in that time.

Another physician, who had been even longer at this Hospital, remembered a man whose disease was elsewhere thought to be leprosy, but according to his convictions it was not leprosy but syphilis. This man came from Borneo.

Leprosy has not been the subject of special legislation in the Netherlands as there was no reason for it.

It is not necessary to speak of the laws of centuries ago concerning the lepers of Melaatschen. These were for the most part sufferers from syphilis.

The Consul asks whether the Government enforces separation? A

long time ago, driven through unsufficiently grounded fear, some lepers were transported from Brombeck to Veenhuisen and there forcibly segregated.

I do not know whether this still happens. Other lepers, dwelling at Brombeck, who did not go to Veenhuisen, have rejoined common society without any harm resulting therefrom.

In the fourth place it is asked, do any hospitals or asylums for lepers exist in the Netherlands or its colonies? This question must be answered negatively unless the Veenhuisen incident is considered.

Fifthly and finally the Consul asks, "What is the prevalent popular opinion as to contagiousness of leprosy, and do healthy persons carefully avoid those who have the disease?"

The conviction, it can easily be seen, of all whose opinion has any value (for in such a case the popular idea of the ignorant is certainly quite unreliable) is that leprosy in the only forms in which we see it in the Netherlands, is not transmitted from one person to another, (except as hereditary disease).

And since the disease so seldom occurs, there is little need for avoiding those who are afflicted with it. It proves nothing that some people are afraid of a leprous patient.

The Inspector for the State Medical Bureau, for the Province of Ynid, Holland.

(Signed.) EGELING.

HONGKONG,

FROM HON. WM. KESWICK, HIS MAJESTY'S CONSUL GENERAL AT HONGKONG.

To His Excellency WALTER MURRAY GIBSON,

Minister of Foreign Affairs, Honolulu.

SIR:—Referring to my letter of the 12th of March, I have now the honor of laying before you the result of my enquiries as to Leprosy.

It does not prevail to any extent in this Colony.

The only legislation with regard to it is in the following section of an Ordinance:

"Every master of a junk, vessel, or boat, bringing into the Colony or from one part of the Colony to another, any person who shall in the opinion of the Court before which the offence shall be tried have come to the Colony for the purpose of mendicancy, or any person suffering from leprosy or any contagious disease, shall incur a penalty not exceeding ten dollars for every such person so brought by him as aforesaid."

There are cases amongst the lowest class of Chinese which however have not been treated by European practitioners. I am therefore unable to return the printed form filled up as you desired.

I have the honor to be sir, your most obedient servant,

WM. KESWICK.

MEXICO.

DR. JUAN M. GOMEZ, DIRECTOR OF THE LAZAR DEPARTMENT, JUAREZ HOSPITAL.

There is in Mexico a malady known as "Mal de S. Lázaro," (St. Lazarus' evil) the symptoms of which correspond with the disease commonly known under the name of *Elephantiasis Græcorum*, and which some European doctors have also called leprosy.

The following replies refer to the "Mal de S. Lázaro:"

1.—The "Mal de S. Lázaro" exists in Mexico, and principally in its western regions.

a.—This disease shows itself under the following forms; tuberculosa, anæsthetica, and Maculosa:

The tubercular form; characterized by the dropping of the external part of the eyelids, and by the existence of tubercules which appear on the forehead, the face, the supraciliary region, the ears and on the outward face of the arm, and the back of the forearm.

The anæsthetic form has as its characteristics the reabsorption of

the tarsal cartilages; of the muscular masses of the thenar and hipothenar regions; and the retraction of the muscles and tendons of the flexors of the fingers.

And last, the macular form: this is characterized by the appearance of irregular maculæ which generally appear on the limbs, and by falling out of the hair; much more notable in these diseases since the complete falling off of the eyebrows and the hair of the breast has been observed.

b.—It is believed they are varieties of the same disease; they combine one with the other; for instance, two in one and the same individual.

c.—There is anæsthesia in the three forms; in the macular, gangrenous, even-speckled maculæ; in the tuberculous, hard tubercules similar to syphilitic tubercules; and in that called anæsthetic there is a reabsorption of the osseous texture, and of certain cartilages (the tarsal) and the anæsthesia is more extended and profound.

2.—It generally appears from seven to thirty years of age, but there are cases in which it has appeared at forty and fifty. The first symptoms are ordinarily a lack of the transpiration of the perspiration of the feet and legs with increased sweat on the rest of the body, dryness in the nasal fossæ, and falling of the external parts of the eyelids. Accompanying these phenomena are a burning sensation in the members of the body and a little anæsthesia.

3.—The greater number of cases occur in youth or at a mature age. The diseased who suffer from the macular form die within ten years, counting from the date of the appearance of the disease; those from the tuberculous form within fifteen years, and those with the anæsthetic form may linger for thirty years or more.

4.—The "Mal de S. Lázaro" is more frequent in the masculine sex; in the proportion of eight to five.

5.—No preference of this disease has been noted for any special race or color; except, it may be stated, that no negro with this disease has yet presented himself at this hospital.

6.—The "Mal de S. Lázaro" afflicts almost entirely the poorer classes of the people, and generally affects such persons as frequently expose themselves to moisture and heat alternately.

a.—It is most frequent in small populations, and in the country, in places near to the coast, in the bays and in moist and marshy spots.

b.—The condition of the dwellings may have some influence over the development of this disease, taken in connection with the substance of the reply in No. 6.

c.—The habit of taking considerable alcohol appears to influence the development of the disease in persons predisposed to it.

d.—The larger number of cases of "Mal de S. Lázaro" are noted in those places where pork is much used for food.

e.—The "lázarinos" (lazars or lepers) are mostly herders, outdoormen, or laborers who are for the best part of their lives close to a fire, and frequently exposed to the cold air and dampness. Abuses of all kinds, excesses in eating and drinking, exposure to intense heat and cold encourage the symptoms of the disease and hasten its fatal termination.

8.—The "Mal de S. Lázaro" is hereditary, and is assuredly transmitted by the mother; but if the mother is healthy it has not yet been determined how it is transmitted. I know a family in which only one of its members has any symptoms of "Mal de S. Lázaro" of the anæsthetic form; the family consists of four persons. The father died of the disease, the mother is healthy.

9.—I do not believe this disease has any connection with syphilis. Anti-syphilitic treatment breaks down.

10.—There is not a single case of contagion either direct or through proximity to the disease.

a.—(No reply).

b.—(No reply).

c.—There has been no case of transmission of the disease by sexual intercourse.

11.—Those sick from this disease, of both sexes, are placed in different wards.

12—There was formerly a special hospital for those suffering from this malady, but now they occupy wards in a civil hospital.

The sanitary conditions of the hospital in which they at present reside are good. The sick occupy rooms well ventilated and ample in size, and have also an open yard or garden, in which they can spend a few hours of the day according to the directions of the medical attendant.

13.—Ordinarly there are thirty patients in the two wards.

14.—This malady has been known in Mexico from the time of the conquest, since Hernan Cortés founded a hospital specially for the lazars. As regards the increase or decrease of this malady there has been no notable change.

15.—The only favorable results obtained have been an alleviation of the sufferings of the sick. Hygienic measures are very useful and necessary. Nitrogenous food and the deprivation of all alcoholic beverages have also been found beneficial, and with respect to the medicinal treatment, outside of the symptomatic, I have only noted any decided improvement when the sick have been treated by the Sudorific method, with hot air and vapor baths and by the administration of medicines which directly excite the perspiratory glands.

I have never seen a spontaneous cure of this malady.

During the whole of the time I have had charge of the lazar department (twelve years) not a single case has been restored to health, except one of the tuberculous form to which supervened intense albumenuria, and having treated this latter disease with appropriate remedies, the patient was cured of it, and at the same time there was noted a suspension of the "Mal de S. Lázaro," the reabsorption of the obstinate tubercules and the general aspect of the patient differed from the rest. This patient remained in a satisfactory state for eighteen months, and died at the end of that time in consequence of an attack of pleuro-pneumonia.

(Signed.) DR. JOAQUIN M. GOMEZ,

In charge of the Lazar Department of the Juarez Hospital.

Mexico, April 27th, 1885.

MEXICO.

FROM THE SUPERIOR COUNCIL OF HEALTH, MEXICO.

[*Received February 14th, 1866.*]

1.—Leprosy has been known in Mexico from very remote times, and it exists in the present day.

a.—There are three different forms of leprosy in Mexico known under the following names: the macular form, the tuberculosa, and the anæsthetic; and even the common people distinguish them by

giving the name of *leoninos* to the tuberculous, *antoninos* to the anæsthetic and *lazarinos* to the macular form, using, at times, the last to designate the three forms.

b.—In the opinion of the Council they are varieties of one morbid state, although the symptoms, defining them, differ to such an extent that a superficial observer, or one who has not seen a large number of cases, might consider them as distinctive forms of one morbid entity, if not as entirely different diseases.

c.—*Elephantiasis tuberculosæ* is characterized by the presence of tubercules in the skin of the face, of the arms and the legs, especially in the trunk. These tubercules are sometimes found ulcerated in a special manner.

Elephantiasis anæsthetica is characterized by the lack of sensibility, more or less complete, of the extremities of the members, and more than all by the elimination of the proportions of the necrosed bones, or by the re-absorbtion of the bony tissue in these same extremities, by the atrophy of the muscles of the thenar and hypothenar eminences, and by the re-absorbtion of the lower tarsi of the eyes. The insensibility although most strongly marked in this form, is not exclusive to it.

The macular form has for its special characteristic the presence of red and painful maculæ in the legs and arms, exceptionally in the face and very rarely in the trunk; these maculæ resolve or ulcerate leaving then peculiar cicatrices.

2.—According to our observations the age at which it manifests itself is from eleven to twenty-five years. The earliest symptoms are different in each of the forms in which the sickness is seen; thus in the macular form in the earliest beginning of the disease, when even not defined, there is generally a suppression of sweat, numbness and formication in the hands and feet, which in a little time spreads to the rest of the members, which symptoms precede the anæsthesia which becomes more or less complete although the anæsthesia is analgesia, because the sensibility of touch although imperfect is conserved throughout the whole sickness. Afterwards follows the falling out of the eyebrows, eyelids, and the hair of the arms and body, and extremely rarely that of the head; there presents itself also the drying up of the nasal mucous and obstruction of the nose. Generally the suspension of the sweat, the insensibility in the members, the drying up and obstruction of the nasal fossæ are the early symptoms of this form which becomes marked in two or three years by the appearance of maculæ.

In the tuberculous form the same symptoms present themselves as in the former. Suppression of sweat, anæsthesia although not marked as in the macular form, the dropping out of the eyebrows and of the soft hair, although the dropping of the former is not so complete, some hair always being preserved in the inner side of these, and it appears that the falling out is in proportion to the number of tubercules which make their appearance; on the breast of the tuberculous there may be found soft hair, on that of the macular form, never. After a longer or shorter period appear the characteristic tubercules; by mere sight these cannot be recognized; but if the hand is passed over the skin where they are about to appear, the inequalities presented are noticed; they are liable to appear, sometimes on the lower or upper limbs, and at other times on the face, where they are constant when the disease is in its complete development; in this last case they commence by the eyebrows (when fallen) and by the lobe of the ears, its volume varying from the size of a pin's head to that of a bean.

In the anæsthetic form is presented the lack of sweat with the same conditions as in the preceding forms; but the sensibility (analgesia) reaches a maximum at such a degree that very rarely some of the diseased are noted as having burned scars caused by placing the members to the fire and sometimes so intense, that the cellalur tissue and the muscles, and the inflammation developed are found carbonized, which from the burn causes an intense pain in the persons who have not felt the action of the fire. In this form there is no alopesia, there is no deformity in the features; but there are two notable symptoms, the fissures in the soles of the feet, which appear very early and great white maculæ, true discolorations of the skin, of the trunk, arms and head, which when it shows have a tendency to spread, the skin in its neighborhood assumes a roseate color which is not seen when they are stationary.

3.—The period of life when the disease generally appears is at puberty, although exceptionally it presents itself in childhood. In the macular form the duration is very variable but as a rule ranges from six to eight years, rarely more. The tuberculous continues from fourteen to twenty years, and the anæsthetic up to thirty years. Death is the usual end of these three forms, and supervencd through the lesions caused by them or by the complicatians to be hereafter spoken of.

4.—In regard to the sex there is no difference in frequency

with which the disease appears, since in the hospital there is almost always an equal number of men and women.

5.—The black race is not scattered through Mexico where the hybrid and pure indigenous races predominate; in them leprosy is most frequent, but the whites are not exempt.

6.—In Mexico it prevails among the poor. Among the causes of the disease we ought to count in the first place, heredity, then comes the action of moisture; dwelling in the damp places, the repeated action of the water on the body appears to favor the development, thus, almost all of the diseased have noticed the first symptoms of the disease appear after a heavy rain; but we believe that perhaps it is necessary to have a certain condition of climate which makes the action more energetic, because in the north of this Republic there are cold and damp places in which it may be said that the disease scarcely exists at all, and, on the contrary, in the south it is much more common where the temperature is much higher, therefore we believe that the elevation of the temperature united to the moisture of the atmosphere are favorable conditions for the development of leprosy.

7.—The observation of the sick is made in the Capital whence they come to be healed principally from places situated at a short distance,as Chalco, Santa Arita, Yxtacalco, Mexicalcingo, Ayatha; the most part of these places are low, damp, and situated on the banks of streams or lakes; some may be considered as rural and others as urban, but subject to malaria. The majority of the inhabitants have their dwellings damp, their laborers consequently are in a bad hygienic condition, badly clothed and badly fed, and most parts of this Republic in which the malady has been observed, as dominant, are found to possess analagous circumstances.

8.—Generally up to the very last moment the disease becomes more aggravated, the malady is also developed by a neglect of the hygienic methods, and the influence of this is such that the diseased who leave the hospitals much improved in health return after a few days much worse, without this aggravation can be possibly attributed to the natural course of the disease, it is due to the derangement of their habits. It is probable that alcoholic excesses contribute to the aggravation of the malady.

9.—The malady is frequently hereditary, the influence of the maternal hereditariness being more notable than that of the paternal. We do not know any family where one member only has

been affected while all the other members remained free, but we have known families in which some have been attacked and others not.

10.—There is no reason to believe so, in substantiation it might be said that there have been cases in which syphilis has attacked lepers, and followed its regular advance without interfering with the leprosy which has continued its ordinary advance after syphilis has been cured.

11.—Up to date we have no proof that the disease is communicated by direct contact between healthy persons with the diseased, nor to those who come in close proximity with them. Not one of the cases that have been observed would incline one to believe that it is transmissible by sexual intercourse.

12.—To-day persons afflicted with the disease are permitted to communicate freely with the people without any restriction whatever, but in very early times they were segregated in a special hospital.

16.—Anciently, there was in this city a hospital exclusively dedicated to lepers, but it has been suppressed altogether for more than twenty years. Since that time a special department has been instituted in the Juarez Hospital, consisting of twenty beds for men and as many for women; but in other hospitals there are several afflicted with this disease who are scattered around without any law interfering with them.

16.—Benevolence maintains those who are treated in the Juarez Hospital, and also those who are found scattered around in the other Hospitals, and there is no fixed number, for all who apply are admitted.

15.—The malady has existed in Mexico from a period anterior to the conquest by Fernando Cortés, and the Conqueror believed it to be necessary to establish a hospital especially for lepers; but in the seventy-five years that we have been independent, we believe the number of lepers has decreased, because the public necessities are amply covered by the before mentioned department of the Juarez Hospital, and in the case of the few sick in the other hospitals, notwithstanding the daily increase in the general population. As regards the causes which have produced this dimenution of the disease we are unable to designate them.

16.—We do not know of an instance of a spontaneous cure of the malady, in the absolute meaning of the word.

A substantial and strengthening food, composed principally of flesh, farinaceous food, and milk as a dietetic regimen, has given good results; where the lepers have been treated in a moderate temperature, in dwellings with a good locatior, well ventilated and dry, a noticeable improvement has been observed.

In the medical treatment there has been employed successively and without result, mercurials, hidrocotila sciatica, guano, yodadurados, arsenic, sarsaparilla, and tarantula as diaphoretic measures.

In the civil practice of Drs. Liciaga and Reyes it was observed that in the first four cases in which very good results were obtained, the oil from the seeds of the *gynocardia odorata chalmogva* was used internally and externally, and in other four cases a notable improvement was obtained by the use of the fluid extract of *rhus bituminosus michoacanense.*

In one of the cases it was noticed that eight years after the treatment not one of the symptoms of the disease had returned.

17.—No census has been taken recently; the population is estimated at 350,000 inhabitants.

18.—There exists a general and uniform register of births and deaths, together with the causes of death from the year 1866 to date.

19.—We have not sufficient data to reply to this question with exactness, but there are some small populations in the east and southwest of the Republic where the disease, it is noted, presents itself with greater frequency.

NETHERLANDS AND COLONIES.

DR. VAN DEVENTER, AMSTERDAM. DIRECTOR OF THE SUBURBAN HOSPITAL.

Leprosy occurs not only in the Netherlands, but also in the East and West Indian Netherlands' possessions.

The disease presents itself in the three forms of maculosa, tuberculosa and anæsthetica.

The persons in whom leprosy is observed in the Netherlands, are such as have returned from the East or West Indies. I have noticed unmistakable symptoms of leprosy on such persons, at times on their landing, and at others not until two years afterwards.

Most of the patients delared that they had never known themselves to have been in contact with sufferers from leprosy; neither did they know what leprosy was, nor had they ever met with lepers at all.

In the East and West Indies leprosy is endemic, but whilst the disease is of more frequent occurence in the Moluccas than on the Island of Java, it is not epidemic in the latitudes first mentioned, the number of sufferers there being always very small.

At one time when leprosy was held to be infectious, persons afflicted with the disease, both in the Netherlands and the Colonies, were isolated either in special institutions or even on certain islands dedicated for that purpose.

Now-a-days such isolation has ceased to exist, no restriction being put upon the leper's liberty.

The old leper houses in the Netherlands have long since been converted into hospitals for chronic diseases, but in the pauper Colonies of Ommerschaus and Vrenhuisen there is a shed or special ward affording accomodation for twelve persons: though as a rule no more than six beds are occupied. This establishment dates from the year 1867, when in a casual way some lepers were discovered among the returned and pensioned soldiers from India in Brombeck Asylum. These were transferred to the new establishment in which they were all treated separately.

In the few Indian Islands set apart for the treatment of lepers, and still open to persons so afflicted if they choose, the sufferers are living together. These lepers produce perfectly healthy children, out of whom are sometimes born leprous infants. This proves the hereditary tendency of leprosy—at least in the form of atavism.

Since the lepers are no longer compelled to live in isolation, one does not notice any dread of contagion among the native population of the Indies; the people move amidst them as if they were healthy persons.

Only in cases of *lepra mutilans* is the patient avoided on account of his unsightly appearance. In the Netherlands persons attacked with leprosy are admitted to the common hospitals, where they are ranged by the side of other patients.

Not one case of contagion has ever been recorded.

Leprosy shows itself among children as well as among adults. In the Indies the disease may last for five years—then it ends fatally. In the Netherlands it continues much longer, up to fifteen years.

Leprosy is found equally amongst Europeans, Chinese, Arabs and native Indians; it is more prevalent on the seaboards than in the mountain ranges. In some families though both parents were pure Europeans, and had never been in India before, one of many children was seized with leprosy without any assignable cause for the phenomenon.

It cannot be proved that leprosy is in any correlation with such other diseases as syphilis, framboesia, etc.

The therapeutic as well as the *dipterocarpic methods of treating the disease, have been hitherto ineffectual.

In the case of a child, Dr. Van der Star, privat-docent in dermatology, saw a case of leprosy yield, but atrophy of the skin and stenosis of the mouth set in. On other parts of the body the blotches dissappeared, but atrophy of the skin remained.

The causes of death from leprosy are exhaustion, tuberculosis, diabetes, enteritis and others.

*Dipterocarpus (Bot). A genus of trees found in the East Indies, which afford an abundance of resinous juices.

THE NETHERLAND'S COLONIES.

THE MINISTER FOR THE COLONIES, GRAVENHAGE.

In response to the request contained in your letter of May 16th, paragraph No 45 w., I have the honor to communicate to Your Excellency the following answer to the enquiries of the Consul for Hawaii at Amsterdam, in his letter of May 13th, E. C. No. 22., concerning the occurrence of leprosy in the Netherland's Colonies.

1.—To what extent does leprosy prevail in the Netherlands and its Colonial possessions? Complete information cannot be given because it is only the number of patients in the hospitals that is known. It

may however be stated that the disease appears in all parts of the Indian Archipelago except the little Sunda Islands. and the northern part of Celebes, also in Surinam and Curaçao.

2.—Previous to 1865 there were in the Netherlands East Indies, local and provincial regulations enforcing separation for lepers. In 1868 however, because it was thought to be proved after long experience, that leprosy must be considered to be not contagious, it was determined on the part of the Government that there was no reason for forcing the lepers to separate themselves in the hospitals, or dwell in restricted places. In Surinam the matter is regulated by the Ordinance of 1830, (Government paper No. 13) modified by the Ordinances of 1831, (Goverenment paper No. 12), 1834 (Government paper No. 13), and 1853 (Government paper No. 2); in Curaçao by the Proclamation of 1830, No. 148 and 1864, No. 7.

3.—In the East Indies separation of lepers is not enforced, (compare the second question). In the West Indies, where the disease is considered to be contagious, separation is carefully enforced. Persons suspected of this disease who go among the public are arrested by the police and thereupon examined by a special Medical Committee. If they are found to be infected they are sent to the establishment set apart for the purpose. In the Colony of Curaçao they go a step further than in Surinam, by removing infected persons to the Asylum, even if they have not gone among the public.

4.—In the East Indies there yet existed in 1865 fourteen Asylums for lepers, but in consequence of the regulation of that year, eight of them were gradually abolished. The six which still exist serve for voluntary Asylums for lepers. In Surinam there exists one Asylum for lepers, in Curaçao three. The annexed table gives a list of the Asylums with a statement of the number of patients, and of the manner in which they are supported.

5.—As has been said above, they think in the East Indies that leprosy is not contagious, and in the West Indies that it is. The natives in the Netherlands Indies are indifferent in regard to the disease.

Copies of the Surinam Government Papers, and the Curaçao Proclamations, referred to above, are enclosed.

The Minister for the Colonies.

(Signed.) SPRENGER VAN EYK.

To His Excellency The Minister of Foreign Affairs.

ASYLUMS FOR LEPERS (VOLUNTARY) IN NETHERLANDS EAST INDIA.

ASYLUMS AT.	Number of Lepers at the end of the year 1883.	The Expenses are Paid by
Pelantoengan (Samarang)	36	The Government.
Lowano (Djohjokarta)	39	Contributions of prominent persons of Java.
Wangkoeng (Soerakarta)	65	Idem.
Benkoelen	12	The Government.
Kemang Pampang (Palembang)	22	Idem.
Tandjong Pinang (Riouro)	15	By Chinamen. The servants are paid by the Government.
Total	189	

ASYLUMS FOR LEPERS IN NETHERLANDS WEST INDIA.

ASYLUM.	Number of Lepers	Expenses are Paid by	REMARKS.
Establishment "Batavia" on the Coppename (river in Surinam).	102†	The Government.	†At the end of 1883 there were 37 European lepers, 56 natives and 9 immigrants from British India.
On the Island Curaçao.	13‡	Idem.	‡At the end of 1884.
" " St Martin.	10‡	Idem.	
" " St. Eustatius.	19‡	Idem.	

NORWAY.

FROM SOREN CASPERSEN ESQ., CONSUL GENERAL FOR SALVADOR, CHRISTIANIA, NORWAY.

.—Yes.

a.—There are two different forms of leprosy known by the names of glat spedalskhed (glet smooth spedalskhed leprosy—Elephantiasis lavis and knuded spedalskhed knuded, Knotty, Cunyry)—Elephantiasis tuberculosa.

b.—These two forms are varieties of the same disease and are often found in the same person, the disease beginning with one form and afterwards developing to the other.

c. 1—E. lavis—;spots (maculæ) of various sizes and shapes, of a reddish-purple color and often combined with the loss of feeling (anæsthesia).

c. 2—E. tuberculosa, knots or lumps (tubercula) of the size of a pea to a Spanish nut, sometimes spread over various parts of the body, sometimes confluent to larger masses, especially in the eyebrow and other parts of the face,

2.—The disease generally manifests itself in the mature age, but appears also in children. The earliest symptom are usually a change in the person's temper and mind, a change in the features of the face and then the appearance of maculæ or tubercula.

3.—The disease attains its full development in the mature age. The following table shows the age of deceased lepers in Norway in 1880:

Age of the deceased.	Men.	Women.	Both sexes together
11 to 15 Years old	1	.....	1
15 to 20 " "	2	4	6
21 to 30 " "	17	8	25
31 to 40 " "	16	10	26
41 to 50 " "	24	8	32
51 to 60 " "	19	9	28
61 to 70 " "	8	7	15
71 to 80 " "	4	5	9
81 to 90 " "	.....	2	2
91 to 100 " "	.....	1	1

4.—No.

5.—There is no colored population in Norway.

6.—Nearly only amongst the poorer classes.

a.—The disease appears only along the sea coast and its immediate neighborhood. The district is mostly hilly, rocky and dry, malaria is not known in Norway.

b.—The sanitary conditions of the dwellings are as a rule good.

c.—The personal cleanliness is not always as good as it ought to be.

d.—The ordinary diet is fish, often salt or dried, but seldom or never rotten, potatoes and porridge, prepared of barley-meal and water.

e.—Fishermen, sailors and small farmers.

7.—Drunkenness and want aggravate the disease.

8.—The disease is very often hereditary. Yes.

9.—No.

10.—No.

11.—Yes. The only restriction is that, when lepers are so poor, that they want public support, they are obliged to seek it in public asylums, and are not supported in their homes in the parishes as other poor.

12.—There are public asylums where all lepers that seek admittance are received free; in these asylums marriage of course is prohibited, and the two sexes kept apart. Lepers are also admitted into general hospitals, but then only when suffering from other diseases.

13.—In 1880, 617 in public asylums.

14.—The disease is diminishing yearly. The higher civilization, better sanitary habits, and the public asylums, contribute to the diminution.

The known number of lepers was in			1856	2,113.
"	"	"	1860	2,068.
"	"	"	1870	2,055.
"	"	"	1880	1,606.

15.—In 1880 of the 617 lepers in the public asylums seven recovered. From 1857 to 1879 one hundred and two are known to have recovered.

16.—1,851,438. The last census was taken the 31st of December, 1875, for the provinces; in Christiania every year.

There is a general registration of births and deaths, including the cause of death. Snch a registration has been kept for centuries. Births and deaths by the parish clergyman, the causes of death by the physicians.

17.—The following table shows the distribution of lepers in the provinces in Norway the 31st of December, 1880, and the population of the provinces:

Provinces.	Population	Men.	Women.	Both sexes
City of Christiania	119,407*	.....	.....	.....
Smalenems	107,804	.....	.....	.....
Akershus	97,550	.....	1	1
Buskernds	102,186	.....	.....	.....
Jarslberg and Laurvigs	87,506	1	.....	1
Hedemarkens	120,618	3	3	6
Christians	115,814	3	2	5
Bratsbergs	83,171	.....	.....	.....
Nedenos	73,415	.....	.....	.....
Lister and Mandals	75,121	4	1	5
Stavanger	110,965	49	40	89
South Burzentrus	114,560	74	90	164
City of Berym	38,573	11	11	22
North Burzentrus	86,208	117	100	217
Romsdals	117,220	82	55	137
South Throndhjems	116,804	58	42	100
North Throndhjems	82,271	51	35	86
Nordlands	104,151	79	50	129
Tromso	54,019	13	14	27
Trumarkens	24,075	.....	.....	.....
.....		545	444	989
In the public asylums				617
In the Kingdom of Norway	1,851,438			1606

*The population is in Christiania from the census of 1880. From the provinces 1875.

SIAM.

FROM A. KURTZHALSS ESQ., HIS HAWAIIAN MAJESTY'S CONSUL AT BANGKOK.

To His Excellency WALTER M. GIBSON,
Minister of Foreign Affairs, Honolulu.

YOUR EXCELLENCY: Since my most respectful letter of the 15th of September, 1884, I have had the honor to receive Your Excellency's despatch of the 28th of December, 1884, referring to leprosy in Siam to which I beg to to reply as follows:

I have consulted with the first medical European and the first medical Siamese doctor of the place, and their information concurs with the result of my own experience of many years residence here, namely:

1.—Leprosy prevails but very slightly in Siam, more so amongst the Chinese than Siamese population.

2.—It has not yet been the subject of special legislation in Siam.

3.—The Government of Siam does not enforce segregation of lepers, but there exist certain temples here, the priests of which specially devote themselves to attending to paupers and lepers by supplying them with food and allowing them to camp on the premises of the temple.

4.– No royal or private hospitals or asylums for lepers exist in Siam as far as my informants and myself are aware of.

5.—The prevalent popular opinion as to the contagiousness of leprosy is, that the disease is not catching. I have many times seen families sitting together or people crowded in a public gambling or other house amongst whom was a leper, and no notice was taken of him. The Siamese as well as the Chinese assert that the disease is hereditary but not catching, and are therefore not afraid of being near a leper.

I have the honor to be Your Excellency's most obedient servant,

(Signed.) A. KURTZHALSS,
Consul.

SPAIN.

REPLIES TO INTERROGATORIES REGARDING LEPROSY, GIVEN BY THE FACULTY OF THE HOSPITAL OF THE HOLY CROSS OF BARCELONA.

The Faculty of this Hospital to whom was handed the collection of questions presented through you in order that they might formulate their opinion and consider the replies which they ought to give to the formulated questions, have discharged their duty in the following manner:

This Faculty having carefully studied the collection of questions regarding leprosy, opportunely forwarded through this Honorable Department at the request of the Consulate General of Hawaii in Spain, before replying to any of the questions which are therein framed, believe it to be a duty to inform the Honorable Administration that the actual rarity in Barcelona of the disease which appears destined to disappear from the people with the advance of civilization, and the assiduous cultivation and perfecting of the practices of hygiene, prevents this faculty from replying to all the questions propounded as they desired. The scant number of cases which they are enabled to observe in the Hospital of Saint Lazarus, devoted to lepers, as well as in private practice, the endemic form in which the same present themselves, are circumstances which make impossible the formation of a complete and exact judgment to practically elucidate certain questions relating to the epidemic and invading forms of this malady which in Spain, fortunately, we have had no occasion to watch.

1.—*a*. Leprosy is rare in Barcelona and in Spain, and generally presents itself endemically, and generally in the tuberculous form. One of the subscribers has seen in his private practice, *one case alone*, of leprosy of the anæsthetic form. To judge of the rarity of this disease it should be noted that in this Hospital of S. Lazarus, designed for lepers, there are in the whole year from four to ten admissions, some of them repeat the entries for the same sickness, and consisting for the most part of cases of Elephantiasis of the extremities, (Elephantiasis of the Arabs) accompanied by elephantinacial ulcers, that ought not to be considered as cases of leprosy.

2.—*a*. In reference to age they have presented themselves from twenty to forty years.

2.—*a*. From the few cases noticed it would appear to affect in greater proportion males than females.

10.—*a*. Have been unable to observe any case of contagion, but it must be taken into account that the malady has not presented itself under any other form than the endemic.

11.—*a*. For the preceding considerations communication between lepers and healthy persons is not restricted in Spain.

12.—*a*. The hospital which in Barcelona is designed for lepers, contains two wards exclusively; one for men and the other for women, entirely independent, having besides several accessory departments (refectory, kitchen, dwellings for employees, wardrobes,

offices, etc.) and forms a branch of the Hospital General of the Holy Cross. It has for attendance on the sick a Sister, one male and two female nurses, and the medical assistance is under the charge of the supernumary physicians of the Hospital of the Holy Cross who take it by monthly turns.

13.—*a*. It is difficult to be able to exactly compute the number of lepers in Barcelona, it is safe to say they are very scarce. At the Hospital, from one to three a year present themselves.

15.—*a*. A great number of medicines have been tried to combat this disease, but in almost all cases without result, except that the iodic treatment, internally and externally, appears to have given some result; but as this affection always presents itself in light forms, the patients are allowed to come and go from the Hospital without an opportunity being afforded for the completion of observations. At any rate it ought to be stated that of the number of deaths that have taken place in the Hospital of St. Lazarus, there have not been any resulting from leprosy but from intervening diseases.

The patients are afforded a good hygienic and dietic regimen, and allowed to be up all the day and walk about, are kept in perfect cleanliness of body, and supplied with healthy food and of good quality, without making any predilections in regard to special nutritious aliments whose use is permitted under the authorization of the Faculty. This is about all that has been observed with the small number of lepers. It may be stated that this Faculty regarding this collection of questions propounded by the Consul General of Hawaii, and in their answers thereto have held to the practical character of the questions, and avoided entirely any scientific digression on the said subject.

By resolution of the Faculty this is addressed to your honorable department as the result of their deliberation.

I have the honor to present it to you, with the sincerest hope, that it may be of some use in connection with the humane intentions which animate the Hawaiian Government. God preserve you for many years.

(Signed.) JUAN COLL Y PUJOL,
The Administrator in charge.

BARCELONA, September 12th, 1885.

UNITED STATES OF AMERICA,

REPORT OF THE AMERICAN DERMATOLOGICAL ASSOCIATION.

In the transactions of the American Dermatological Association for 1883, a report by Drs. Fox and Graham is given which embodies the results of their combined investigations. The following ten propositions were submitted by them as their deductions from the facts observed:

1.—Leprosy is a constitutional disease, and in certain cases appears to be hereditary.

2.—It is undoubtedly contagious by inoculation.

3.—There is no reason for believing that it is transmitted in any other way.

4.—Under certain conditions a person may have leprosy and run no risk of transmitting the disease to other of the same household or community.

5.—It is not so liable to be transmitted to others as is syphilis in its early stages. There is no relation between the two diseases.

6.—Leprosy is usually a fatal disease, its average duration being from ten to fifteen years.

7.—In rare instances there is a tendency to recover after the disease has existed for many years.

8.—There is no valid ground for pronouncing the disease incurable.

9.—Judicious treatment usually improves the condition of the patient, and often causes a disappearance of the symptoms.

10.—There is ground for the hope that an improved method of treatment will in time effect the cure of leprosy, or at least, that it will arrest and control the disease.

IOWA, ILLINOIS, MINNESOTA, WISCONSIN.

EXTRACT FROM REPORT OF THE STATE BOARD OF HEALTH OF IOWA ON LEPROSY; J. F. KENNEDY, M. D., DES MOINES, SECRETARY. 1885.

In March, 1883, a letter from Dr. F. Eklund, Stockholm, Sweden, was received at the office of the State Board of Health, making inquiry as to the number of lepers in Iowa. This was the first intimation that the disease existed in the State.

An investigation was made resulting as explained in the following correspondence:

DECORAH, IOWA, August 29th, 1883.

Dr. R. F. Farquharson, Des Moines, Iowa.

DEAR DOCTOR:—Your letter to Dr. Bulis regarding leprosy in this country was referred to me for action, and in reply will say: I interviewed all the prominent Norwegians living in our city, and who are thoroughly acquainted through the whole county, also having been in the practice of medicine in this and adjoining counties for twenty-seven years, but had never heard of a case of leprosy. Not being able to get any definite information I was about giving up the inquiry when the thought struck me to see our County Auditor, Mr. Egge, a Norwegian, and he informed me, when he was a small boy, one day Dr. J. A. Holmboeck and Rev. Wm. Koren, from Bergen, Norway, dined at his father's house. Dr. Holmboeck was looking up cases at that time, and they were talking about it. Thus getting a clue, I drove out to the house of Mr. Koren and gathered the following information from him:

He stated that in the year 1863 Dr. Holmboeck visited this country and made an inspection through it regarding leprosy among the Norwegians. Both gentlemen were familiar with the disease in Bergen, Norway, a hospital having been erected there two hundred years ago. The doctor asked Mr. Koren for information, and Johannes Simonsen was pointed out to him. Simonsen was then living on East Prairie, but is now living in Military township, two miles north of Ossian. Both gentlemen knew him in Norway. (This is Hoelm-

boe's second case). He is seventy-five years old, comes from a leprous family, but he has never had any symptoms of leprosy, nor any of his family.*

The Doctor witnessed the death by leprosy of one man twenty years ago, and he is thought to have been Knud Ericksen, the party you mentioned as living in Locust Lane.

Mr. Dale, of Madison township, was also from a leprous family, but it never developed in his case, nor any of his family. He died a number of years ago.

Mr. Koren further stated that he had had a case in his congregation—a certain N. N. Romme—who died April 6, 1877. He had lived in this country fourteen years before the disease made its appearance. He was a horse doctor, camped out, and lived on poor food. None of his family, however, have been affected.

I saw another case, said Mr. Koren, and think that it was the same one that Dr. Holmboeck saw die twenty years ago.

The Rev. gentleman further stated that for thirty years he has traveled all of northern Iowa and southern Minnesota, and with three exceptions, he has never seen nor heard of another case, and it is his opinion, as it is also mine, that there is not a single case of the disease in northern Iowa or southern Minnesota.

Respectfully yours,

R. Small, M. D.
Health Officer, Decorah.

Des Moines, Ausust 31, 1883.

F. Eklund, M. D,, 8 Sheppeholm, Stockholm, Sweden.

Dear Sir:—Your kind favor of the 31st ult. came duly to hand, and you will please accept my sincere thanks for the information afforded. Following the clew given in your letter, I have investigated the matter, and with the following result:

In 1863, the time of the visit of Dr. A. J. Holmboeck, the Rev. Mr. Koren, was the Norwegian clergyman in Winneshiek county, and from him the following was learned:

1. Johannes Simonsen in 1863 lived on East Prairie, and was pointed out to Dr. Holmboeck by the Rev. Mr. Koren, as of a leprous

*There is some error here, for Dr. Helmboe knew leprosy well, and could not have been mistaken; neither could the patient recover—such an event being unknown. The mistake arises from the custom among the Scandinavians of transposing and repeating both Christian and surnames.

family; however, he has never yet had the disease, but is alive now, 75 years old, and in good health.

2. According to Mr. Koren, Dr. Holmboeck witnessed the death of a man by leprosy twenty years ago, and he thinks it was Knud Ericksen, of Locust Lane.

3. The case of Ljar Peterson cannot be traced.

4. Rev. Mr. Koren further stated that he had a case in his congregation, a certain N. N. Romme, who died April 6, 1877. He had lived in this country fourteen years before the disease had made its appearance. He was a horse doctor, camped out and lived on poor food. None of his family, however, had been affected.

The Reverend gentleman further stated that for thirty years he has traveled all of Northern Iowa and Southern Minnesota, and with these exceptions, he has neither seen nor heard of any other case, and it is his opinion that there is not a single case of the disease in Northern Iowa, or Southern Minnesota, and this opinion is endorsed by Dr. Small, Health Officer, Decorah, a medical practioner of 27 years.

Yours truly,

R. J. FARQUHARSON,
Secretary.

DR. R. J. FARQUHARSON,
Secretary State Board of Health, Des Moines.

With the post of yesterday I have got in good order the valuable information that you have brought together and sent me concerning the fates of my poor leprous countrymen and brothers. A copy of your esteemed paper I send with the same mail to the honored society of Norwegian physicians for to be inserted in their transactions. Please accept my humble, sincere thanks.

With high esteem, your humble, obedient servant,

DR. F. EKLUND.

Sweden, Stockholm, 8 Shippeholm, 1883.

NORWAY, Minn., July 17, 1883.

Dr. Chas. N. Hewitt.

DEAR SIR:—In answer to enclosed letter from Dr. Eklund, Stockholm, Sweden, I have to state: Last year I sent a circular to Norwegian physicians and the Norwegian clergymen in this State, whose names I found on the roll of members in the yearly reports of their different synods, inquiring about the leprous they knew of, their

number and condition. I got answers from about twenty of the persons applied to, living in eleven of the densest populated counties, and I have reason to believe that they who did not return any answer, omitted to do so, because they did not know of any suffering from that kind of disease.

In the answers received, I got the names of three men supposed to be leprous, but to judge from the symptoms described, I would take only two to be suffering from the disease, and in the anæsthetic form, both natives of Norway. One had it already in the old country, but was first seriously attacked seven years after he came to this country, *i. e.* nine years ago. He has grown children, all well. The other had a brother who died of leprosy. He had no children. The third person named as infected is a native of Temtland, Sweden, but the symptoms described do not support the supposition of leprosy being the disease.

Besides these two (or three) I know of three more cases living in my neighborhood, one woman and two men. They have all brought the disease with them from the old country. Two of them have children, and one also grand-children—all of them are well.

In the course of the last ten years I have seen some other cases, who have applied for treatment, but they did not reside here, and I have lost track of them. Some of them belonged to another State, and were traveling for work. Within the same time five leprous have died in my vicinity, but in one of then (Prof. Wm. Boeck's observation No. 2) the disease had stopped years before. They were all men, three were not married; the other two left large families and full-grown children; one also grand-children. All of them are, as far as I know, in good health. Of the eighteen leprous Prof. Wm. Boeck met with, when he in 1869 and 1870, visited this country, four are marked down as living in Minnesota. Two of them (observation 2d and 3d) have since died, while one (observation 1st) is living yet. The fourth (observation 13th) I have heard nothing from.

Most likely there are several more leprous in the State than those above named, but it is not so easy to get the track of them. The population is moving, some few coming in every year mostly from the old country, many more going west. Many of those afflicted with the disease try to conceal it as far as it is possible. Even if they apply to a physician for relief, they will sometimes try to deceive him in regard to the nature and history of the case. When

questioned about the health of their relatives they will assert that they never knew of any leprosy among them; pressed closer, they will remember that an uncle or a brother has died in the leproserie.

The number of cases would, so it seems, be less every year, and the disease soon disappear, were it not for the new importations; the generations born in this country seem to be exempt. Under present circumstances, while the immigration continues with the same strength, as in the last generation, there is reason to believe that the disease will rather diminish than otherwise.

The immigration has been going on for about two generations, and been considerable in the last, while the disease in the later years, in the old country has been better controlled, and is steadily decreasing. In Norway at the end of 1878, the number of persons suffering from this disease was 1,681, while in 1874 it was 1,832, and in 1856, 2,113, which figures for the latter dates ought to be made larger yet, as the investigation then was not carried on as strictly as in later years, and many diseased were overlooked, who have been added to the number of the following years. It is then probable that we in the future will have fewer cases imported.

This my dear doctor is, although not much, what I have to remark in regard to the occurrence of leprosy in Minnesota, and in answer to the letter you transferred to me.

Very truly yours,

CHR. GRONVOLD.

Norway, September 11, 1883.

NORWAY, Minn., September 11, 1884.

Dr. Chas. Hewitt.

DEAR SIR:—In answer to Dr. Farquharson's inquiries, I have the honor to report, that of the eighteen cases Prof. Wm. Boeck, in 1869-70, found in the three Northwestern States,

4 were living in Minnesota,

3 were living in Iowa,

2 were living in Illinois,

9 were living in Wisconsin, if Highland Prairie is there, for one. That is all the locality named.

The 3 cases in Iowa were:

Anæsthetic form. Boeck, 7th observation. *Edward Wilson Taraldsgaard*, Winneshiek county, Hesper township, was then (1869), 23 years old, two years in America; brought the disease with him from

Norway, where he got it nine to ten years before. Had in that country leprous relatives.

2. *Mixed form.* Boeck, 9th observation. *Ole Torkildson Fosse* is put down as living in Minnesota, Winneshiek county, Pleasant township, but as there is no county of that name in Minnesota, he belongs most likely to Iowa—then thirty years old; got the disease three and one half years after the arrival in this country; had in the old country leprous relatives.

3. *Anæsthetic form.* Boeck, 10th observation. *Ole Iverson Dale*, Winneshiek county, Iowa. Then, in 1869, forty-three years old; brought the disease with him from Norway. Does not know of any leprous relations.

These are the three (3) cases I find in Prof. Boeck's report, residing in Iowa. But as it is thirteen (13) years ago, they may be dead, all of them, or gone West somewhere else.

Of the four (4) Prof. Boeck found in Minnesota, three are dead (I have now traced the third, also), while one, as far as I know, is alive yet.

The report I speak of, and from which I have taken the above, is written by Prof. Wm. Boeck, Christiania, Norway, some years after having returned from America.

It is written in the Norwegian language. I have one copy in my possession, and shall be happy to give you any information out of it that you may wish.

Dr. Boeck did not believe in contagion, and explains the disease as depending upon heredity, in the three cases above, as in the rest of the lepers he found here, with the exception of one, "where we might think of contagion, as there are found no lepers in the family," as was stated; but then he adds: "All that we have observed in our country has, so far, kept that (contagion) away from our thoughts, but I am not, therefore, blind to facts. Although the experience on the Sandwich Islands, Madagascar, and other places, seems to demonstrate the contagiousness of the disease, scientifically speaking, and practically too in many places, specially in tropical seashores and islands, there seems in the light of existing facts to be very little risk of the disease spreading by contagion in our country, and what little risk there may be of contagion, will probably be completely removed by regard to the common rules of cleanliness."

Respectfully yours,

CHR. GRONVOLD,

Among the deaths reported from Story county for 1883, was one caused by *Elephantiasis græcorum*. A request was sent to the attending physician to furnish a history of the case, to which he made the following reply:

NEVADA, Iowa, February 21, 1885.

L. F. Andrews, Secretary State Board of Health.

DEAR SIR:—In answer to your inquiries regarding a case of leprosy in this county, I have ascertained that Ole K. Hill came from Olen (pronounced nearly like "Airlen"), District of Bergen, Norway, in the year 1866. First located at Des Moines, and soon after at Cambridge, in this county. Upon his election as County Recorder in 1874, he came to this place, where he remained until his death, in 1883. In Norway his occupation was that of a fisherman. Was attacked with the disease about 1873, which he recognized at once, having been familiar with it in Norway. A sister (I think) died of it there many years ago. His was a typical case of the tuberculated variety of *Elephantiasis græcorum* (*lepra tuberculosa elephantiasis*) and therefore needs no special description.

His wife (an American lady) lives at Cambridge, Iowa. His father, mother, one brother and two sisters, live in this county (farm name-Haugé), and betray no symptoms of the disease.

Respectfully,

P. W. FARRAR, M. D.

Thus we have eight cases of leprosy in Iowa in the past twenty years, all now dead, the last dying in August, 1883.

These cases may be tabulated thus:

AUTHORITY.	YEAR.	COUNTY.	NO.	NAME.
Hoelmbœ.....	1863	Winneshiek.	1	Ljar Peterson.
Hoelmbœ.....	1863	Winneshiek.	2	Johannes Simonssen.
Hoelmbœ.....	1863	Winneshiek.	3	Knud Eriksen.
Koren.....	1877	.....	4	N. M. Romme.
Bœck.....	1870	Winneshiek.	5	Edward Nielson Taraldsgaard
Bœck.....	1870	Winneshiek.	6	Olo Torkinson Fosse.
Bœck.....	1870	Winneshiek.	7	Ole Iverson Dale.
Farren.....	1883	Story.....	8	Ole K. Hill.

In 1880 Winneshiek county had a population of 23,938, of whom 7,862, were Scandinavians (Swedes and Norwegians) numbering

4,095, or 52 per cent. There were in the whole State 39,145 Scandinavians, so that Winneshiek county contained about ten per cent.

It may be thought by many that the danger from the spread of this disease is slight, but as Dr. Billings remarks: "the danger is no doubt small—that is to say there is a very small risk of a very great danger—but it exists, and now is the time to guard against it."

The causes of leprosy are believed by eminent writers and practical observers to be many and different. The modes of propagation may be reduced to two, contagious* and hereditary transmission-† That it it is contagious, is evidenced by the established fact (Gradle) that it has a peculiar bacillus. If not, it is a strange exception to its kindred, glanders, tuberculosis, etc. But it is not contagious in the usual acceptance of the term. It requires actual inoculation of pus or blood into the circulation through open vessels or abraded surfaces, and there must then be a favorable cachectic condition to the action of the virus. Cohabitation is also a source of infection, so also "inhibition of the excreta of lepers."†

MASSACHUSETTS.

EXTRACTS FROM THE FOURTH ANNUAL REPORT OF THE STATE ROARD OF HEALTH, JULY, 1883. SAMUEL W. ABBOTT, M. D., OF WAKEFIELD.

In December, 1882, a former resident of Salem, who had been absent several years from his native city, chiefly at the Sandwich Islands, returned to Salem, having contracted leprosy during his absence. At the invitation of the local board of health, he was visited by members of the State Board, and also by Drs. White and Wigglesworth of Boston, who confirmed the diagnosis.

The statement of the leper, together with that of other persons who had known him in former years, showed that he had contracted

*Carter, Hillebrand, Wilson, Jones, Helmbœ, ‡Carter, Bœck, Virchow, Danielssen. †Liveing.

the disease while living in Honolulu, and that it had first made its appearance upon him several years before he came home.

On his arrival in Salem in December last, the external marks of the disease were very evident. The skin of the face, especially of the forehead, the ears, the nose, and eyebrows, the hands and the feet, was greatly disfigured with tubercles of variable size. The skin of the thighs, the chest and abdomen was mottled and discolored. The toes were ulcerated and suppurating. The pharynx and the soft palate presented an inflamed and tubercular appearance. The voice was altered. His eyesight was also dimmed. The sight of one eye was gone, and he could only read coarse print with the other by means of a strong light. The large nodules were mostly devoid of feeling. His general condition was feeble. His appetite was impaired.

He was placed in the Salem almshouse in an isolated apartment, and soon after a temporary house was constructed for him outside the almshouse, where he remained, gradually failing, until his death in the following March.

Since the disease clearly comes within the meaning of the act relating to contagious diseases, and since no allusion has thus far been made to it in previous reports of this Board, a brief account of its history and prevalence may not be deemed out of place at the present time.

History.—The existence of leprosy may be traced backward into the remotest ages of written history. From its early existence in Egypt and Syria, it may be traced into Persia, Hindostan, Turkey, and also into all the countries of Europe. Emigration spread it widely from the east to the west, and from the south toward the north.

The return of the Crusaders appears to have played an important part in its distribution. In the thirteenth and fourteenth centuries there was scarcely a town in which it did not exist; and leper-houses were numerous where the order of St. Lazarus devoted their lives to the care of the sick. There were at one time nineteen thousand such houses in Europe intended for the isolation of the sick.

In all European countries it was the policy of Church and State, in the fourteenth and fifteenth centuries, to stamp out the disease. Bulls were issued by Popes, and stringent laws were passed as to the medical examination, condemnation and status of lepers. The

leper was made legally and politically a dead man. His marriage ties were dissolved, the services for the dead was performed over him, and he became an outcast. These measures had their effect in rapidly lessening the disease; but it has never been entirely eradicated from the nations of the earth.

In proof of an identity of type, at least for nearly four centuries, there is still in existence a painting by Holbein at Munich, dated 1516, representing a group of lepers. It faithfully portrays a man whose face is covered with round, reddish knobs. There are also other lepers in the group, in various stages of the disease, whose external characteristics agree very closely with the modern figures of Danielssen and Boeck, and the descriptions of our modern writers. Virchow says that these pictures must have been painted from studies of actual lepers in a leper-house of the mediæval period.

Present Distribution.—Leprosy is endemic at the present day in many parts of the inhabited world, under divers conditions as to climate, degree of civilization and habits of life.

It exists chiefly in India, China, the Malay Archipelago, Egypt, Palestine, Turkey, the Grecian Islands, the Coast of the Black Sea, certain Mediterranean ports, Spain, Portugal, Norway, Russia, Iceland, Scotland, Madeira, the Canaries, New Brunswick, Canada, Brazil, Mexico, Central America, Madagascar, Africa, Mauritius, the Seychelles, New Zealand, and the Sandwich Islands. It is increasing in Crete and the Sandwich Islands.

This wide distribution in many places where it had no ancient history is attributed to the tide of immigration which followed the era of Portuguese and Spanish discovery.

In North America, it is known at New Orleans, at San Francisco, Charleston, New Brunswick, and in Scandinavian settlements in the North-western States. Twenty cases have been observed at Sacramento, and several were returned from San Francisco to China by the health authorities.

A peculiar interest attaches to the history of leprosy as existing in the Hawaiian Islands, and also at Tracadie in New Brunswick.*

In consequence of its slow and insidious progress, it is not possible to fix the exact date of its first appearance at Hawaii. Its existence there may be safely stated as less than half century, and it had

*Although neither of these localities is within the limits of the United States, our commercial relations with these nations are such as to awaken a greater interest in their condition.

made but little progress until within the past twenty-five years. Its prevalence is now so general as to threaten the existence of the nation, which, from this and other causes, has diminished rapidly within the past century of its existence.

As a proof of national decline, may be adduced the vital statistics of the Islands:

†In 1870 the births were 2,413, and the deaths 3,819. In 1871, births, 2559; deaths, 3,502.

Here in a native population of but little over 40,000, we find an enormous death-rate, and an excess of deaths over births of 2,349 in two years, or 47 per cent.

Leprosy appears to be confined almost exclusively to the native population in the Sandwich Islands, a few foreigners only being affected.

* * * * *

United States.—Within the domain of the United States, leprosy has not at any point made active progress. The rapid immigration of the past two years must, however, introduce into the country a greater or less number of persons in the incubative or doubtful stage of leprosy. On our Eastern coast, such cases may be looked for among the Scandinavian immigrants, especially those from Norway, where there are still about two thousand lepers. These people have settled chiefly in the Northwestern States, Minnesota alone having 100,000 Scandinavian settlers. Thus far, however, leprosy does not appear to have found a foothold among them, and no persons born in the Northwestern settlements have as yet been found to be affected.

Dr. Bendeke of Minneapolis says: "It occurs in much less proportion here among the emigrants than in Norway; and I ascribe this only to the better hygienic situation of the people as to food, clothing, exposure, etc."

On our Western coast, the chief source of the disease is China. A leper hospital has been established at San Francisco, and fifty-two cases have been admitted in ten years, all of whom with a single ex-

†A typographical error in the Report of the Board of Health for 1870 gave eleven hundred deaths too many. This important mistake was discovered by Dr. Arthur Mouritz while compiling his Report. In regard to the numbers quoted it should be stated that in 1870-1871, the Islands were visited by a fatal fever. In the year 1872-1873 the deaths were 6,065, and the births 4,710, thus reducing the excess of 2,349 deaths over births to 1,355.

ception were Chinese; and no case has been reported of a native citizen of California acquiring leprosy.

Other foci of the disease have been observed at Charleston, S. C., and also in Louisiana. In the former city, Dr. Geddings has observed sixteen cases in the past thirty-five years, and published a report of the same in the Transactions of the International Medical Congress held at Philadelphia in 1876.

Occasional cases have also been reported in the Gulf States during the past and present centuries.

* * * * * *

Leprosy has been recognized as early as the third year, but it is rarely diagnosticated before the age of puberty, from which time it occupies an average period of ten years in attaining its development. In the anæsthetic form the effect on the duration of life is not so marked as in the tubercular.

Lepers are very susceptible to the influence of colds, and are often affected with pulmonary diseases, erysipelas, nephritis and ascites, and succumb easily to a want of proper food.

Death usually takes place from intractable diarrhœa, or dysentery, either acute or chronic.

Leprosy in its relation to Public Health.—The questions which render leprosy a matter of special interest as affecting public health are those of etiology, modes of propagation, and the question of contagion.

The causes of leprosy have been sought for in the peculiarities of climate, soil, diet and habits of life. As regards climate and soil, the wide geographical distribution of the disease would seem to preclude them as elements or factors of causation. Opinions differ much as to the question of diet. The eating of tainted fish has been strongly urged as a cause. Leprosy is found in a most aggravated form among fish-eating people, as in Norway and Crete, and, on the other hand, it also prevails in inland districts where fish is but little used.

Doubtless an improper diet and bad hygienic surroundings aggravate the disease.

All these causes acting together for centuries did not produce the disease in the Hawaiian Islands, nor was it known there until some time after the islands were open to foreign trade and commerce with other nations. Hence it is reasonable to suppose that it was imported from other places. The first leper in Hawaii was not recog-

nized till 1853. The natives attribute its origin to China, and this belief is confirmed by history and observation.

Inheritance.—There can be but little doubt as to the question of inheritance of leprosy. Its decided influence on the disease is maintained by nearly all writers on the subject. Hereditary influence is universally accepted in China, and intermarriage of lepers is there forbidden. On the other hand, it is not safe to accept the theory of inheritance as the only mode of propagation. The history of the disease in the Sandwich Islands may again be adduced in opposition to an exclusive theory of inheritance, since scarcely a single generation has elapsed from the time of its appearance in the Islands. The theory of inheritance must necessarily require a much longer time for its proof. Especially is this true of a disease whose incubative stage is measured not by days or months, but by years.

The relation of Leprosy to Syphilis.—The careful study of medical men has been favorable to the belief that syphilis is a predisposing cause only, and productive of a condition favorable to the reception of leprosy in an individual. A recent report of the Hawaiian Board of Health contains an article by Dr. Fitch of Honolulu asserting that leprosy is a fourth stage of syphilis. The weight of professional opinion, however, is to the contrary.

Contagion.—As to the part played by contagion, Dr. White says, in his excellent article:* "Heredity as the only, or an important factor, is entirely out of the question. It would have required several generations to have accomplished such results. We must look, then, to the customs of the race as exceptionally favorable to inoculation as the only possible explanation,—such as the crowding together of large families in small huts, sharing the same mats and blankets, eating poi with the fingers from the same calabash, drinking of ava from the same vessel, passing the pipe from mouth to mouth, their licentious habits, the absence of all fear or disgust of the disease as a bar to ordinary association, cohabitation or marriage."

The contagious nature of leprosy, although vehemently denied by a few, has certainly been recognized from the earliest ages. In proof of this view are the rigid Levitical enactments of the ancient Jews; the stringent work of both Church and State, in the four-

*"The question of Contagion in Leprosy." Am. Journal of Medical Sciences, October, 1882.

teenth and fifteenth centuries, to stamp out the disease by isolation, dissolution of marriage ties, and social ostracism; and, in the present day, the forcible segregation of lepers from their homes, their relatives and their friends, by sanitary legislative action. These measures have had a salutary effect wherever they have been introduced and enforced for a long period of time, and doubtless contributed to the general disappearance of the disease in the sixteenth and seventeenth centuries throughout Europe.

†In the Hawaiian Islands the disease is made a subject of legislation by "An Act to prevent the spread of leprosy."

* * * * * * *

As an evidence of the importance of this branch of their duties, the Hawaiian Board of Health expended for the execution of the Leper Act, and for the support of the Leper Colony, in 1872, the sum of $31,000, out of a total of $51,000 for all health expenses. In 1874, $55,000 for the Leper Colony. In 1880, $85,000 out of a total of $174,500. In 1882, $90,000, out of a total of $237,500.

Sanitary science has been regarded as new, and in fact, has made the most of its progress within the past twenty-five years; but so far as leprosy is concerned, it has existed for centuries. The necessity of isolation was recognized and rigorously enforced in the patriarchal era, three thousand years since; and wherever the disease has invaded and menaced the public safety of a nation, the same principle has been recognized in the construction of leper-houses, lazerettos, asylums, etc., the enactment of laws requiring isolation, the prohibition of intermarriage, and confiscation of property. The same principle was recognized in the Middle Ages in Europe, and also exists at the present day in a varying degree in all places wherever leprosy has gained a foothold.

A careful consideration of the history of leprosy as now existing in two different countries, Norway and the Hawaiian Islands, may afford additional light upon the subject of contagion. In the former country, in 1856, there were 2,863 known cases of leprosy, of which number 235 were in hospitals, and the remainder living in their homes. In later years a dimunition of the whole number to 2,704 in 1866, of which number 795 were in hospitals. In 1876 there were 2,008 cases, and there has been a regular decrease since that date to 1,582 cases in 1880, a total decrease of 45 per cent. in twenty-five

†See Section of Report "Leprosy in Hawaii," page 8.

years. ‡This result has been attributed in a great measure to more careful isolation.

On the other hand, in Hawaii the disease has rapidly increased during the same period. Although it has not been known in the Islands more than forty or fifty years at the most, there are now at least 800 lepers, an enormous number when compared with the small indigenous population of 40,000. This people appear to have been extremely susceptible to the introduction of any infectious disease. Syphilis, leprosy and small-pox have made sad havoc among them. At least 500 died of small-pox in 1881.

The excessive death rate already mentioned threatens the life of this little nation, which must sooner or later be wiped out of existence unless the decimation of the people is arrested.

If it be urged that isolation and other sanitary measures have not succeeded in controlling the spread of leprosy in the Sandwich Islands, it should also be stated that in the earlier years of sanitary control the execution of the law was opposed very generally, especially by concealment and deceit.

Again a great obstacle to the thorough understanding of the contagion of leprosy consists in its indefinite and lengthy period of incubation. The shortest time of development is one year, and it has appeared as late as nineteen years after inoculation.* So long a range is unknown in the case of any other disease. In small-pox, scarlet fever and other diseases, the period of incubation is short, decisive and well defined, and hence the active cause is readily recognized. But when this period is measured by years instead of days, the actual facts and conditions of exposure are apt to be forgotten or denied *in toto*.

As a matter of vital importance to the safety of the Hawaiian nation, a Board of Health was organized as early as 1865;† and in accordance with the provisions of the act already cited, a hospital for temporary detention and examination of lepers was established—

‡See Dr. Vandyke Carters's report, "Leprosy in India," page 82.

*As an instance illustrating the doctrine of contagion, and also of extremely long period of incubation, Dr. Hillebrand narrates a case in Borneo, where a boy of European parentage was accustomed to play with a leprous child of color. The native boy thrust a knife into the anæsthetic part of his body, which act was immediately repeated by the white lad with the same knife. The latter was soon after sent to Holland, where he grew to maturity, and nineteen years later developed the disease, returning to Borneo a confirmed leper.

†Reorganized is more correct, as a Board of Health was established in 1850.

a sort of probationary station to which all suspected lepers were taken and examined, or placed under surveillance until they were determined to be either lepers or non-lepers.

After the establishment of the Kalihi hospital, the next move was the purchase of a portion of the Island of Molokai for a colony whence all those who had been determined to be lepers at the Kalihi hospital should be transferred for a permanent residence.

There had been examined up to 1872, 1,288 persons, of which number 570 were discharged at once, and 145 subsequently; 529 were sent to Molokai. Deducting loss by death and other causes, 385 remained March, 31, 1872.

The number of admissions in the following year appears to have greatly increased, for Dr. Trosseau's report states the number in the settlement as 800, or 2 per cent. of the entire population.

The commitments in 1874--1876 were 297, and the deaths from leprosy 299.

The entire admissions to Molokai in ten years were 1,570, an annual average of 157. The deaths in the same time were 872.

The settlement at Molokai is admirably adapted to isolation, which is naturally afforded by the topographical character of the place. A precipitous wall 2,000 feet in height on the one hand, and the sea on the other, render escape almost impossible.

In some villages among the Islands leprosy appears to be much more prevalent than in others.

* * * * * * *

Dr. Piffard urges the necessity of a national central lazaretto; the confining therein of all lepers now in the country; and the watching of immigration, and giving each leprous immigrant the option of returning to the country whence he came or of entering the lazaretto. This will have to be done sooner or later, and the sooner the less difficult the undertaking.

Bacillus.—A bacillus peculiar to leprosy has been discovered, and may now be considered as a settled fact, its presence having first been asserted by Hansen as early as 1873, and also identified by other foreign observers, among whom are Koch, Kobner, Neisser, Cornil and Suchard. While its presence has thus been repeatedly demonstrated, its position with relation to the inocubility of leprosy is a matter far more difficult to determine, for the reason that most of the animals commonly employed for the purpose of experiment are too short-lived for use with reference to a disease whose incubative period is of such long or indefinite duration.

Dr. Belfield states: "It is, then, established that a bacillus of specific size and shape is a constant element of the diseased tissues in tubercular leprosy. Yet this fact of association does not, of course, prove that the bacillus causes the morbid process, since it is conceivable that it appears as a sequence rather than a cause of the disease. This latter conception is certainly not entirely satisfactory. It does not plausibly explain why this bacterial variety, and this one only, is found, and always found, in the leprous nodules, but in no other diseased state."

SAN FRANCISCO, CALIFORNIA.

DR. J. L. MEARES, HEALTH OFFICER OF SAN FRANCISCO BOARD OF HEALTH, 1884.

"The isolation of lepers is so important and its necessity so self-evident, that I scarcely think the subject worthy of discussion.

Hitherto the entire expenses of supporting a lazaretto has fallen upon the people of San Francisco, and will continue to do so, unless the State, as it ought to do, takes in hand this important matter.

We probably have more than 100,000 Mongolians on this coast, and even if the Restriction Act should be efficiently enforced, still you have the fact staring you in the face that leprosy will continue to develop, as heretofore among the people.

Those of us familiar with the execution of our sanitary laws, know the fact that leprosy is not imported into San Francisco, unless a case in its incipiency should escape the careful inspection adopted both at Hongkong and the port of San Francisco.

This disease, like consumption, may lie dormant for years, and then develop at any period of life without any apparent exciting cause.

The prejudice of the people against the Chinese has undoubtedly confined this disease almost entirely to that race; but as the Restriction Act will necessarily diminish this population, their labor will be more in demand; and when by their industry and desire to learn,

they acquire a more thorough knowledge of our language and become more assimilated to our manners and customs, will not this prejudice gradually subside? And will it not come to pass, in a few years, in this cosmopolitan city, continually being made more so by immigration from all parts of the world, that marriage between the Chinese and people of other nationalities will become a frequent occurrence? Although this disease may not be contagious, in the ordinary acceptation of that term, we are satisfied that it is communicated by inoculation and by other means not necessary to discuss here."

In the year 1883 action was taken by the Board of Supervisors of the City and County of San Francisco, in answer to the public demand to cause strict search to be made throughout the Chinese quarter and the city, aud all cases of persons found affected with leprosy or elephantiasis removed to the lepers' quarters provided. In addition to the United States and State legislation, the following Order was finally passed and approved on August 14th, 1883, the enforcement of which it was supposed would aid in preventing persons from being landed afflicted with leprosy or elephantiasis, or if in the city and county from being secreted or kept in any place other than in the lepers' quarters—the intention of the Board, as shown by previous deportations, being to send all Mongolian cases back to China at the first opportunity.

The order referred to is as follows:

ORDER NO. 1,738.

Prohibiting the Landing from any Vessel of Persons afflicted with Leprosy or Elephantiasis within the Bay of San Francisco, and Providing for the Removal of Persons so afflicted to the Lazaretto,

[Preamble.]

WHEREAS, The public welfare demands that some action be taken to prevent the landing of persons within the city and county afflicted with the disease known as leprosy or elephantiasis, which diseases are, in the judgment of this Board, contagious under certain circumstances and conditions; and

WHEREAS, In view of the dreadful results of said diseases, every means justifiable for the protection and preservation of life should be taken by this Board to prevent the free and unrestricted coming of persons from foreign ports who are so afflicted; therefore

The People of the City and County of San Francisco do ordain as follows:

[No Leper or person afflicted with Elephantiasis to land from any ship or boat.]

SECTION 1. No person afflicted with the diseases known as leprosy or elephantiasis shall, upon any pretext whatsoever, be permitted to land from any vessel or boat upon the shore or within the limits of the City and County of San Francisco.

[Captains, Officers, Owners, Consignees or Agents of Vessels arriving to prevent the landing of Lepers from such Vessels.]

SECTION 2. No captain or other officer in command of any vessel arriving at the port of San Francisco, nor any owner, consignee, agent, or other person having charge of such vessel, shall land or permit to leave said vessel in this port, any person afflicted with the diseases known as leprosy or elephantiasis.

[Captains or other Persons having control of Vessels arriving, or in the Harbor, having Leprosy, etc., on board, to report the same to Quarantine Officer within twenty-four hours of the arrival.]

SECTION 3. All captains or other officers bringing vessels into the harbor of San Francisco, and all masters, owners, or consignees having vessels in the harbor which have on board any cases of leprosy or elephantiasis, shall, within twenty-four hours after the arrival of said vessels, report the same in writing to the Quarantine Officer, or as soon thereafter as they or either of them become aware of the existence of said disease on board of their vessels; the said report to state the name, place of birth, last residence, age and occupation of all such persons so afflicted.

LEPROSY IN JAPAN.

Dr. K. Yamamoto, a surgeon on board His Imperial Japanese Majesty's ship "Rinjio," has written the following letter at the request of one of the physicians of this city.—*Saturday Press*, 1883:

HONOLULU, June 19, 1883.

DEAR SIR: I can not give you any precise answers about the number of lepers in Japan, as I have not any recent reports of it from the sanitary office in Japan; but I think they are at present very few in number, probably one in twenty thousand—the whole population of Japan being about thirty-five millions.

I have not seen even a single case of leprosy among Japanese sailors since I commenced to study and practice my profession in the naval department of Japan.

In my country, leprosy is considered as an *incurable and highly inheritable* disease (same as you thought, probably), so those who have leprosy, or its tendency, among their families or relatives, are *strongly refused to marry* with other healthy families.

In Japan the leprosy *is not confounded* with any other disease.

In Japan there is no special hospital supplied by government for lepers, but there is one private leper hospital in Tokio. There is no special place to isolate the lepers, as Molokai in this country, but the lepers are confined to their own homes, and are cut off from any social intercourse with others, being strongly refused by all society.

I am sir, yours faithfully,

K. YAMAMOTO, H. I. J. S. "Rinjio."

LEPROSY IN THE SANDWICH ISLANDS.

FROM DR. JOHN S. MC GREW TO GENERAL JAMES M. COMBY. MEDICAL RECORD, N. Y., 1881.

HONOLULU, September 26, 1878.

To His Excellency GENERAL JAMES M. COMBY,
United States Minister Resident.

DEAR SIR: In answering the letter handed to me by you from Dr. Mc Bride of San Francisco, I am compelled to be very brief.

The life of a physician here cannot be said to be a sinecure. If I had the ability I have not the time to devote to the subject to make it interesting, I fear, to your correspondent.

The first question, "When leprosy first made its appearance in the Sandwich Islands," is rather a hard one to answer, as the "oldest inhabitant," who is generally as unreliable as other people, is not satisfied as to the date. From the very best information that has been obtained, it has always existed among the natives of the Islands. The most intelligent natives say that their earliest traditions give an account of this disease; that it was not introduced by the Chinese, as some people want to have it.

Second.—"Are all cases of leprosy excluded from intercourse with society?" Very generally. From political and other influences with officials of the Government, many are permitted to go at large without being questioned—really dangerous cases of leprosy.

Third.—"Do foreigners (other than Chinese) have leprosy in the Islands?" I am credibly informed that there never was a Chinaman landed here with leprosy from China. What few Chinamen have the disease, have contracted it since their arrival here, from association and cohabitation with leprous natives. The Leper Hospital contains several English, German and American lepers; quite as many of either of these nationalities as Chinese.

Fourth.—"Do physicians on the Islands consider leprosy contagious or infectious?" Most of our physicians, I might say all,

have every reason to believe it to be both contagious and infectious.

Fifth.—"Is it a fact that a certain Island is set apart for the care of lepers?" A portion of the Island of Molokai was set apart by an Act of the Legislature in 1866, for this class of unfortunates.

This was considered a necessity, and of the greatest importance to the public health. They are well cared for at the settlement; they have food, clothing and medicine furnished at great expense by the Government, and are more comfortably situated than they could possibly be at their own homes. Still, the mortality is very great at the settlement. It has been in existence abont thirteen years; there have been, in all, about 1, 850 patients admitted; the number of deaths for the same period is 1,140; leaving over 600 still there.

Hoping, my dear sir, that the questions of Dr. McBride are answered, I am, very truly,

JOHN S. MCGREW.

THF QUESTION OF CONTAGION IN LEPROSY.

DR. WHITE IN AMERICAN JOURNAL OF THE MEDICAL SCIENCES, OCTOBER, 1882.

In the earliest times and during the medieval ages leprosy was considered and treated as a contagious disease. But when, by the practice of seclusion, rigidly enforced during many centuries, the disease had nearly died out in Europe, men became ready to accept nearly every positive doctrine concerning its etiology put forth by individual observers or scientific bodies. Thus it has happened that during the present century the opinion has been almost universally adopted by the medical profession that leprosy is not contagious, and that it is endemic mostly because it is hereditary. There have not been wanting, however, observers who have stoutly combatted this exclusive doctrine, and who claim that the facts which point to the contagious character of the disease have been neglected or mis-

interpreted. The many other causes which have been assigned are so diverse and contradictory that they call for no consideration. The theories of heredity and contagion, however, are not incompatible, they support each other. We have an illustration of such an etiological relation in syphilis. The important point to be determined is the proof of the latter, not the disproof of the former. Fortunately for the solution of the question we have in the recent introduction of leprosy into an insular nation (Hawaii) and in several freshly developed foci of the disease upon our own continent (New Brunswick, Cape Breton, North Western States, South Carolina, Louisiana, California and Oregon), that virgin field for observation so essential for the proper study of this subject. The lessons drawn from the data thus supplied seem to be confirmed by the teachings of history—and those lessons, or deductions, appear to justify the following conclusions:

Leprosy has spread under recent observation, when introduced into a previously unaffected stock, in so rapid and general a way as to prove that it may diffuse itself universally through a nation, independently of the action of hereditary tendencies. There is no evidence to support the assumption that this wide and quick extension of the disease has been caused or aided by any peculiarity of soil, climate, diet, or other telluric agency in Hawaii. The history of the affection on the other hand, leads to the strongest conviction (scientific proof is well nigh out of the question) that it is communicated directly from person to person, while the peculiar customs offer a satisfactory explanation of its unparalleled spread. The history of the little centre of disease in Louisiana, watched fortunately from its very beginning, leads to the same conclusion that it affects persons not under any law of heredity, but through the intimacy of personal relationship, the customs and morals determining largely the rapidity and universality of its spread. So too, syphilis abstracted from its venereal relationships, could exist as a disease, and does communicate itself in no inconsiderable measure in various other ways. It is only through the assistance of the loose sexual customs or certain grades of the population everywhere that it has become such a world-wide pestilence. Take away from it its characteristic initial lesion, and give it a greatly prolonged incubative stage, and the difficulty of determining the circumstances of inoculation would be as great as in the disease we are considering.

It is probable that leprosy may like syphilis, be communicated

under all circumstances by which some of the fluids and other products of the infected foci of a diseased person come in contact with abraded or excoriated, possibly with the uninjured surface of a healthy person. It would be necessary that the diseased products should be at the surface of the skin or mucous membrane, and this would generally be accompanied during the process of softening by which the impermeable layers were removed. Thus the nodular form in its ulcerative stage would necessarily be the most dangerous phase of disease, whereas the anæsthetic form might exist for years with little danger of communicating itself to its surroundings. In this sense we may conclude that leprosy is contagious, and in these ways, probably, the disease mostly spreads in a family, a community, a nation. Hereditary transmission need not be excluded as a direct cause in individual cases, although as to how largely the disease originates in this way, and how remotely such influences may extend, our exact knowledge is very deficient.

But if contagious, what is the contagious element in the disease? A constitutional virus peculiar to it, or a foreign organism, an entophyte, which is the sole cause of the local tissue changes, and indirectly of the subsequent systemic changes? The latter theory offers, apparently the most satisfactory explanation of the peculiar features of the affection, while of the actual existence of the so-called *bacillus leprœ* in the various tissues of the disease there can be no doubt and but little as to its nature. A *priori*, there is no reason why the bacterium found may not satisfactorily explain all the local and general pathological process characteristic of the disease, and it has been found in connection with cases from so many parts of the world, and by so many reliable and experienced observers, and has under all circumstances, presented so uniformly identical appearances, that the probability of such specific relationship grows stronger and stronger. The results of inoculation are as yet negative.

If, then, we are prepared to admit the contagious nature of leprosy, what measures should be taken for the exclusion from, and repression within the country? We have at present an unknown number of lepers in the United States, let us say fifty or a hundred; three undoubted centres of contagion, affecting three entirely distinct nationalities, in different climates, and under quite diverse methods of living. It is evident that the disease may make more rapid advance in one part than in another. Any circumstances, for

instance, which tends to soften or abrade nodules, as a hot climate possibly, would of course greatly increase the danger of infection, so that the necessity of interference by compulsory means might be more urgent in the former than in the latter. It is evident, however, that such measures should be undertaken by the national government, and that they should be made applicable to all parts of the country alike. These measures should be the establishment of graded hospitals in possibly insular localities in various parts of the country, to which all access should be prevented, except under restrictions determined by professional rules; the enactment of laws which should make residence compulsory and perpetual, and the concealment of the disease punishable by severe penalties.

These rules should apply to so-called sporadic as well as to endemic and imported cases, but the latter should be given the option of returning to their native land. The immigration of lepers should be prohibited and arrested at ports of arrival by inspection so far as possible, as other contagious diseases now are by quarantine regulations. By the establishment of such national measures, immigration from leprous countries would largely cease, lepers would no longer change their residence within the country to escape the action of local laws against their liberty; marriage with them would become abhorrent when the people had thus become aware of its dangers, and after a generation has passed the disease should be virtually eradicated.

Lepers belong to the dangerous classes of the community which require perpetual confinement, and the sooner this remedy is applied the less seeming cruelty will attach to it.

*THE BACILLUS OF LEPROSY.**

WM. T. BELFIELD, M. D., JOURNAL OF CUTANEOUS AND VENEREAL DISEASES, N. Y. JULY, 1883.

Fourteen years ago, Hansen announced the discovery of bacteria in certain cutaneous nodules removed from patients afflicted with tubercular leprosy. His demonstrations were not, however, entirely satisfactory; for he offered no other proof of the bacterial nature of the bodies in question than their general appearance, size and shape; and the methods which he employed, though the best then devised, failed to give a satisfactory picture. At this time, indeed, (1869) but little attention had been bestowed by pathologists upon the possible pathogenetic relations of bacteria, and had Hansen furnished even an unequivocal demonstration of his assertion, it is scarcely probable that the incident would have attracted much attention.

Within the next decade, however, the role of bacteria in disease became a question of absorbing interest, an object of most extensive and assiduous investigation. Among the fruits of this study were the introduction of accurate and trustworthy methods for the detection and recognition of bacteria—for distinguishing these minute organisms from cell-débris, crystals, organic granules, and other objects of similar appearance. These methods—due chiefly to the ingenuity and industry of Weigert and of Koch, consist, as is well known, in tbe use of the aniline colors for staining, of the Abbé illuminator, and of special methods for the cultivation of bacteria. In 1878, Neisser, then a private docent in Leipzig, now professor of dermatology in Breslau, having thoroughly familiarized himself with these methods, spent some months in Spain for the express purpose of studying the pathology and history of leprosy.† He reported as the result of these investigations, the presence of a bacillus of specific size and shape in every leprous patient, yes in

*Vide Report of Dr. Edward Arning. Appendix I, page xxxvii. Vandyke Carter, "Leprosy in India," page 100.

† Virch, Arch, Bd. 84.

every leprous tissue examined; not only in the cutaneous nodules, but also in the neoplasms of the mucous membranes, mouth, pharynx, and larynx: in the liver, spleen, lymph-glands, nerves, cartilage, and testicle. He was unable to detect the organism in the blood.

Examinations by other observers, prominent among whom may be mentioned Eklund and Kobner, have unanimously confirmed these assertions of Neisser, and have demonstrated the accuracy of the original observations of Hansen. Although leprous tissue is comparatively scarce material, and opportunities for observation therefore somewhat limited, yet there has been such perfect unanimity of results among all observers as to justify generalization. For no one who has sought *intelligently*—i. e., has properly used the aniline colors, etc.,—has failed to find the bacilli in tissues properly preserved and not too old.‡

* * * * * * *

The bacteria are found usually within the characteristic large cells which constitute the mass of the leprous neoplasm; sometimes two or three bacilli may be seen in one of these cells. Occasionally a few stragglers are observed lying in the intercellular spaces also. The individual rods are 1-5000 to 1-6500 inch in length, often somewhat thicker in the middle than at the extremities, exhibiting therefore a spindle shape. Like other bacteria, they are characterized by their affinity for certain (basic) aniline colors—blue, red, and violet especially. In sections of recent tissues the bacilli can be stained with the ordinary two per cent. aqueous solution of the aniline colors; if the tissue has been long exposed to alcohol, the sections should be first treated with a ten per cent. solution of caustic potash, after which they may be stained.¶

The writer's personal knowledge of these bacilli is limited to two cases. A cutaneous nodule was removed intra vitam from a private patient by Prof. v. Frisch, of Vienna, and placed at once in absolute alcohol. Sections made a few days later and stained with aniline showed the bacilli in and among the large cells which constituted the mass of the nodule. During a recent visit the writer

‡ After soaking in alcohol for some years or even months, the bacteria often fail to respond to the staining agent, and may be therefore readily overlooked.

¶ For details see Appendix B. to the author's "Cartwright Lectures," W. T. Keener, Chicago, 1883.

had the pleasure of exhibiting one of the sections to numerous gentlemen in New York and Philadelphia, including several members of the New York Dermatological Society.

The second case was a patient in New York, from whom a piece of skin was excised and presented to me by Dr. H. G. Piffard; sections treated with aniline gave essentially the same appearance as in the first case, except that the bacilli were perhaps less numerous.

But little is known as to the natural history of this fungus. Neisser made cultures from lepra-nodules on blood serum and beef extract; he says that the rods grew into threads; that in these threads there subsequently appeared round glistening bodies which he regards as spores. Yet further observation on this point is needed.

It is then established that a bacterium—a bacillus—of specific size and shape is a constant element of the diseased tissues in tubercular leprosy; yet this fact of association does not of course prove that the bacillus *causes* the morbid process; since it is conceivable that it appears as a sequence rather than as a cause of this disease. This latter conception is certainly not entirely satisfactory; it does not plausibly explain why this bacterial variety, and this one only, is found and *always* found in the leprous nodules—but in no other diseased state. We attribute trichinosis to the trichina spiralis, though we have no other proof of a causal relation than the mere presence of the worm; we ascribe chyluria and lymph-scrotum to the filaria sanguinis hominis, although we know only that this worm is sometimes present in these morbid conditions. Yet the same men who accredit these two worms with morbific influence merely because of their association with diseased states, reject the idea that the bacillus of leprosy is anything more than the *result* of a previously established morbid process.

Yet we are justified in declining to admit the causal relation of the bacillus from mere analogy, if direct demonstration be possible; and in the case of at least one other bacterium such demonstration has been actually furnished. The bacillus anthracis, as is well known, has been cultivated outside of the body on prepared media; has been separated by successive cultures from all ancient tissues; has been in short isolated. And it is an equally familiar fact that these bacilli thus isolated and then introduced into the tissues of a healthy animal, induce a classical anthrax. Until an equivalent demonstration shall be furnished for the bacillus lepræ the proof of

its causal relation to leprosy may be regarded as incomplete. Yet it is evident that the matter cannot be so easily decided for leprosy as for anthrax, since the former discard is peculiar to the human subject—a subject not usually available for experimental purposes of this nature: it seems indeed impossible to furnish the final link in the chain of evidence in leprosy.

Neisser has, it is true, inoculated animals—dogs and rabbits—with the isolated bacilli lepræ, and attests that nodules similar to those of leprosy in the human subject were produced at the site of inoculation. Yet one nodule does not make a leprosy, nor is there in fact satisfactory evidence that Neisser's nodules were of other than simple inflammatory origin.

Such then is the status of the question to-day; the association of a specific bacillus with the morbid changes of tubercular leprosy is established and admitted; while the relation of the parasite to the morbid process is not as yet established by direct demonstration.

*The bacillus has not as yet been detected in the so-called anæsthetic form of leprosy.

REPORT OF THE ROYAL COLLEGE OF PHYSICIANS.

IS LEPROSY CONTAGIOUS? AYE.

GRENADA.—I have seen a few persons amongst those affected where contagion appeared evident.

I consider that contagion will take place when ulcerations exist with copious discharge, and this can only occur in the first or tuberculous leprosy.

I do not think the disease in its incipient stage transmissible by sexual intercourse.—Dr. Aquart.

GUIANA.—I have met with only two cases in which after minute enquiry, I believe the disease to have been communicated by direct contact. My own opinion is in favor of the contagiousness of

*Vide Dr. Arning's Report, page xxxix.

leprosy, and that it may be propagated by the matter of ulcerated tubercules being applied to any raw surface; but I admit that I have met with cases which would seem to preclude the idea that the disease can be considered contagious in the ordinary sense of the term.

I have known instances where black women have cohabited for years with their husbands while laboring under confirmed and ulcerative leprosy, and have children by them, without manifesting the slightest trace of the disease.—Dr. Manguet.

I am clearly of opinion that it is contagious in every stage and form, and especially so after ulceration. I have seen many instances which could only be referred to contagion; the convictions of the parties, and the most rigorous examinations of the history of the cases giving no clue whatever to the pre-existence of any family taint. It is notorious in respect of a white family of distinction in this colony, that, having disregarded the warnings of their medical advisers of the danger of permitting the young members to play in company with a negro boy who exhibited the symptoms of the disease, they one and all became infected, and the majority of them fell victims to the fatal indiscretion.

The liability to the disease in this way (sexual intercourse) is undoubted.—Dr. Pollard.

From what I have seen and heard in Surinam, Dutch Guiana, where more attention is paid to the disease than in British Guiana, I believe it to be contagious. I have known an officer of high rank there contracting it from cohabiting with a woman whose family were affected with it. In Dutch Guiana, people are afraid of shaking hands with any persons who are suspected of the disease, and even of setting on the chair which they have occupied, or of using the same privies.—Dr. Van Holst.

CORFU.—Two instances I have met substantiate the opinion that it is contagious after a lapse of time. In both, the wife became affected some years after the husband had been attacked.—Proto Medico.

MAURITIUS.—I have met with two cases where the disease seemed to be transmissible; in the one instance from the husband to the wife, and in the other from a man to a child of his wife from a former husband.—Dr. Regnaud.

SUMBULPOOR.—On the subject of contagion there appears to be some room for doubt. I have never known or heard of a case in

which simple contact on one occasion has produced the disease, but by prolonged liability to contact with, or close proximity to diseased persons, there is reason to believe that the disease has been reproduced.—Dr. Jackson.

MOZUFFERPORE.—I know of many cases in which there was a clear proof of the contagious nature of the disease. I believe leprosy is also contagious when the ulcerative stage has commenced,and it appears as if the disease took a very long time to affect the system. It is not a matter of days, or even months but of years.

There can be no doubt of it (transmissibility by sexual intercourse).—Dr. Macnamara.

CAWNPORE.—The native doctors say it is contagious in the suppurative stage.—Dr. Jones.

BUDAON.—I have met with instances in which the disease proved to be contagious, after living in close proximity to the diseased persons for a long period of time, say one or two years. The malady was in full vigor, and there were ulcerations with a discharge.—Dr. Harris.

SINGAPORE.—I have met with three cases in which I can with certainty state the disease was contracted by continued and direct contagion.—Mr. Rose.

LABUAN.—I have not met with a case I could satisfy myself had arisen from contagion; but it is the universal belief among the people, whether Chinese, Malay, or Dyak, that it is contagious, and they all alike separate the lepers, and avoid all contact with them.—Dr. McDougall.

IS LEPROSY NON-CONTAGIOUS?

NEW BRUNSWICK.—I am thoroughly convinced that the disease, in Tracadie, is not contagious, and that it is not transmissible by sexual intercourse.—Dr. Bayard.

I have never met with an instance of leprosy being communicated to a healthy person by contagion.—Dr. Nicholson.

Several lepers have cohabited with their wives for years, and no infection was communicated to them.—Dr. Benson.

JAMAICA.—I am certain that it is in no way contagious, and that it is not transmissible by sexual intercourse. The evidence

against the contagion of leprosy, in all its forms, is irrefragable.—Dr. Fiddes.

BARBADOES.—I have not met with any cases of contagion. None of those in attendance, during the last nine years, upon the inmates of the lazaretto have contracted the disease; and I, after receiving a wound from a knife, moistened with the fluids of an inmate, have escaped, although the wound was followed by great constitutional irritation and loss of the finger. From what I have heard I do not believe it communicable by sexual intercourse.—D. Browne.

TRINIDAD.—I have never met with a single instance of it appearing to be so.

The disease has not been transmissible by sexual intercourse in many cases which have been under my care, and which most decidedly confirm my opinion that it is not contagious.—Dr. Saturnin.

CAPE of GOOD HOPE.—I have not seen a single case where it was communicated by contagion. I have known lepers cohabiting with females who remained exempt.—Dr. Ebden.

JERUSALEM.—I have never heard of such instances.—Consul Finn.

DAMASCUS.—It is not contagious and not transmissible by sexual intercourse.

RHODES.—It is entirely exempt from contagion, or transmissible by sexual intercourse.

MYTELENE.—It is demonstrably not contagious.

CRETE.—There are 127 persons who have all lived together healthy among lepers for many years.—Dr. Brunelli.

CORFU.—I have never been able to recognize the contagiousness of leprosy. Women have often lived with leprous husbands without contracting the disease.—Dr. Tygaldos.

TABREEZ.—I have met with no case of dircect contagion.—Dr. Cormick.

SHANGHAIE.—I have never met with an instance of the disease appearing to be contagious.—Dr. Henderson.

VICTORIA.—No instance of apparent contagion has been met with in this country.

CEYLON.—I have no reason to consider it contagious, or transmissible by sexual intercourse.—Dr. Davy.

I have not met with a single case of contagious communication of the disease, although popular belief in this country is strongly in favor of its communicability.—T. A. P.

I have not known a single instance in which a wife whose husband was a leper, was affected by this disease, whereas numerous instances have come under my observation in which the offspring of a diseased person has been affected.—T. G.

BOMBAY PRESIDENCY.—None of the observers appeared to have obtained conclusive proof of leprosy being contagious, or transmissible by sexual intercourse.

MADRAS.—Leprosy does not appear to be contagious.

BENGAL.—It is not a contagious disease in the ordinary sense of the term, nor does it seem communicable by sexual intercourse.—Dr. Jackson.

CALCUTTA.—Never. It is transmissible by sexual intercourse.

ARRAH.—As far as I can ascertain it is not known to be contagious or infectious.—Dr. Hutchinson.

CAWNPORE.—I have met with none.

SEROLIE, JUDPOORE, ULWUR, JEYPORE, HAROWTEE, NAGPORE, and MOULMEIN, also negative.

KYOUK PHYOO.—I have never met with an instance. I do not believe it is transmissible by sexual intercourse.—Dr. Thomas.

AKYAB.—I have seen nothing to induce me to believe that leprosy is contagious, and I do not believe that it is ever communicated in this way, nor ever by sexual intercourse.

IS LEPROSY HEREDITARY?

NEW BRUNSWICK.—It is certainly hereditary. Some members of a family may be attacked and others remain exempt. Dr. Bayard.

JAMAICA.—It is frequently hereditary—particularly in the third generation.—Dr. Fiddes.

DOMINICA.—My belief is that leprosy is hereditary.—Dr. Murray.

BARBADOES,—It does appear to be hereditary, but I cannot say often so.—Dr. Browne,

There can be no doubt of its being hereditary.—Dr. Stevenson.

GUIANA.—It is undoubtedly hereditary. The disease often overleaps an entire generation to re-appear in the next; the immunity may commence in the immediate family of the leper himself. It is possible that many cases presumed to be of hereditary origin are instances either of extraneous contamination, or of the propagation of the disease from one member of a particular family to the others. —Dr. Pollard.

CAPE OF GOOD HOPE.—Most decidedly hereditary.—Dr. Ebden.

SIERRA LEONE.—Invariably, as far as I can ascertain. It generally skips a generation.—Mr. Bradshaw.

DAMASCUS.—Few lepers have children; but when they have, some of the children are diseased and others are not.

SAMOS.—Yes. Certainly.

CONSTANTINOPLE.—Yes. Certainly, yet it often appears spontaneously.

CANTON.—Leprosy is undoubtedly a hereditary disease. It is said to become mild in the third generation and run itself out in the fourth.—Dr. Hobson.

MAURITIUS.—Unequivocally so.—Dr. Regnaud.

CEYLON.—It is often hereditary.—T. A. P.

BOMBAY.—Opinions are divided as to whether it is often hereditary, Dr. Carter thinking it is.

MADRAS.—By statistics, inheritance does not constitute a strong predisposition to the disease.—Day, Porteous, Shortt, Shaw.

BENGAL.—Yes, the disease does often appear to be hereditary.—Durant.

FUNEEDPORE.—Notwithstanding its undoubted power of transmission from parent to offspring, it is also a noted fact that it is often capable of spontaneous origin, and that these idiopathic cases are just as numerous, if not more so, especially in the tropics, as those which can alone be traced to parental influence.

ARRAH.—Hereditariness is the predisposing, and bad food the exciting cause of the disease; the fact of its appearing among the rich and wealthy shows that it must be hereditary.

BENARES.—All but Dr. Dale consider the disease to be hereditary; the natives believe it to be so.—Dr. Dunbar.

SEHARUMPORE.—The belief in its hereditary transmission was

so deeply grounded in the minds of the Punjaubees generally, that they were in the habit of burying alive, not only the leper himself, but also his relations and friends, lest in multiplying their kind, the disease would be communicated to distant generations.

LAHORE.—It is often hereditary but not always so.—Bose.

NIMAR.—The disease in several cases would seem to be hereditary. Cases pass over a generation frequently.—Hunter.

NAGPORE.—Out of 228 cases it was hereditary in 40.

AKYAB.—That leprosy is hereditary is a belief universal in India.—Nisbet.

IS LEPROSY CONNECTED WITH SYPHILIS?

NEW BRUNSWICK.—It is a disease by itself. Syphilis and yaws are unknown in the district where it prevails.—Nicholson.

JAMAICA.—Disease by itself. I have little doubt yaws and leprosy may run their course together as also leprosy and syphilis.—Bowerbank.

DOMINICA.—No. *Imray.* The yaws is a disease different in its nature.

ST. VINCENT.—I think it is connected with scrofula but not with any other disease. I regard leprosy as a form of scrofulous disease.—Checkley.

BARBADOES.—It is a disease *sui generis.*—Goding.

I will not say that syphilis can produce true leprosy; but that it can produce a disease so closely resembling it as to deceive the most careful observer, I fully believe. It is most common in the offspring of syphilitic patients.—Stevenson.

TOBAGO.—I look upon leprosy, syphilis, and yaws as cognate.—Purser.

TRINIDAD.—I have not, but syphilis and yaws may co-exist with it.

GUIANA.—Leprosy is a disease *sui generis*, independent of any other disease.—Reed.

Specifically from any other disease.—Pollard.

I firmly believe leprosy to be connected with syphilis, yea, even to be an offspring of it; imperfectly cured syphilis in parents causes the disease to break out in the progeny of the second, third or fourth generation.—Van Holst.

DAMASCUS.—Leprosy is a separate and independent disease, known in Arabia for many centuries, and mentioned in the Koran by Mohammed under the name of "Jezam;" whereas syphilis was not known here until the French invasion under Napoleon, when his soldiers brought it hither, whence it is called Hal Franji, or the Frank evil.

CRETE.—Although there are certain symptoms in the first stage of the disease resembling those of syphilis, it is not connected in any way either with that or any malady.

TABREEZ.—No. Syphilis is rare in the villages of Persia.

MAURITIUS,—I have not. In two cases the disease declared itself at the same time with a syphilitic eruption. After the disappearance of the latter, the leprosy continued.

CEYLON.—Scrofula and syphilis would lead to leprosy under favorable conditions, but that leprosy is a constitutional form of syphilis, I do not think.—H. D.

Leprosy is often dependent or connected either directly or remotely with syphilitic taint.—T. A. P.

The majority of cases under my observation were connected with syphilis.—T. S.

BOMBAY PRESIDENCY.—Opinion is decidedly against the connection of leprosy with syphilis, yaws or any other disease.

MADRAS.—Syphilis is extremely common among the natives of India, and all the reporters who have come in contact with leprosy mentioned syphilis as no uncommon complication. In none of these reports is connection traced between leprosy and syphilis.

BENGAL.—I have no reason to believe that leprosy is in any degree dependent upon syphilis or any other disease.

MOORSHEDABAD.—Leprosy is very often connected with, if not dependent on syphilis and the abuse of mercury in native practice.—Fleming.

PUBNA.—In connection with syphilis but in some cases with scrofula.—Parker.

SERAMPORE.—In cases of secondary syphilis in which mercury has been administered over and over again the disease has not unfrequently degenerated into leprosy.

BHANGULPORE.—I have very good reasons to know that leprosy is dependent on syphilis, for I have known several cases to have been preceded by syphilis.—Crewe.

ALMORAH.—The natives themselves believe leprosy to depend very often on a syphilitic taint, but I am disposed to think this altogether a mistake. No doubt with a predisposition to leprosy already existing, if a person's constitution becomes tainted with syphilis, this, like any other cause, may develop the disease, but I think the morbific cause of each is quite distinct.—MERTON.

HILL STATES.—No. Yet syphilis is extremely common.—GURDEN.

BHUTTEEANA.—Yes, more than half the cases were sufferers from syphilis in one form or another.

LAHORE.—Is often, not always, dependent on syphilis, which may be considered as one of its most powerful predisposing causes.—BOSE.

JODHPORE.—I believe a person afflicted with secondary syphilis will be more likely to become the subject of leprosy, in consequence of the cachexia the first named disease induces. I believe both diseases may exist and become as it were blended together. I do not think there is any such disease as syphilitic leprosy, that is leprosy arising from syphilis as an exciting cause.—MOORE.

GWALIOR.—It is a distinct disease, but it may have some connection with scrofula.—SUTHERLAND.

NIPAL.—I do not believe that syphilis, except in cases where there is a decided constitutional or inherited tendency to leprosy, has anything to do with its development, although syphilitic eruptions often assume a decidedly leprous character.—OLDFIELD.

AKYAB.—Probably mercurial and syphilitic poisons may induce a cachectic condition of system highly favorable to develop leprosy where the hereditary taint exists.—NISBET.

EXTRACTS FROM NOTES ON "A FEW CASES OF LEPROSY."

BY J. H. BEMISS, M. D., LAHAINA, MAUI, H. I.

NEW ORLEANS MEDICAL AND SURGICAL JOURNAL. APRIL, 1880.

* * * Statistics as to the time and manner of introduction of leprosy into the Hawaiian Islands are wanting. The period between 1825 and 1830 is supposed to approximate to the correct time of importation, though the evidence to that effect is very indefinite. Rev. W. P. Alexander who came here in 1833, says the first case he met with personally was that of a native Hawaiian in about 1838, living in a very isolated locality on this island (Maui), but he had heard several years before that a chiefess in Lahaina—also on Maui—was affected with the disease. The first case on the Islands was said to have been that of a Chinaman on Oahu, the island upon which Honolulu is situated.

Of course the manner of introduction is just as uncertain as the time. The means of importing it, however, have been unlimited. During the height of the whale hunting business, that is, during the first half of the present century, these islands were the great resort for the whaling fleets of the Pacific, as many as a hundred sail often being in the harbors of Honolulu, Oahu; or Lahaina, Maui, at one time. These vessels in addition to bringing sailors from all parts of the world, frequently shipped native crews, who in their cruises were brought in contact with all nations along the Pacific, and afterwards returned here to spread such diseases as they might have contracted. But before whalers ever touched at these islands, the natives are said to have occasionally gone from island to island in the Pacific, exchanging their diseases as well as their commodities, which latter, however, were probably very limited. It may be then that the disease was present here in a dormant state long before it became generally known—at least to foreigners. The old disease, "mai alii"—"chief's disease"—is generally supposed to have been

Elephantiasis Arabum, or else the result of high living, in which the chiefs indulged. Some, however, have thought it not too much to suppose some of the cases to have been leprosy.

The natives call leprosy "mai pake," "Chinese disease," the tradition among them being that the "heathen Chinee" brought it with them. But the first lot of Chinamen did not come here until quite a number of years after leprosy became known, and this charge seems the more unwarrantable when we consider that of the whole population at the leper asylum there are not over six Chinamen.

After its introduction it seems to have spread quite slowly until the latter part of the ten years, 1850—1860. It then became so plentiful that the government took alarm and began to institute measures looking toward the prevention of its spread; one of its acts being the establishment of the Leper Asylum on Molokai, and the forcible transfer of pronounced cases to that place. The census of 1878 (December 21st), showed the number of lepers at the Asylum Kalawao, at that date to have been 806; since then quite a number have been added, though there are still many at large. There have been admitted to Kalawao certainly not less than 2,000 persons from 1866 to date; of which number upwards of 750 are still alive.

The total native population, excluding all foreigners and those born of foreign parents, is 44,088 (census of 1878), quite a small number to furnish so much leprosy. The large majority of these are full blood natives or half breeds, there being two whites,—one American, the other English, and less than a half dozen Chinamen.

There are present here, the two forms, tubercular and anæsthetic. This division is based upon the predominance of one or the other of the two most important symptoms. In actual observation the disease does not always admit of such strict classification, but generally shows the two forms combined in greater or less pathologic preponderance. It may start as purely tubercular or purely anæsthetic, but does not often preserve a single type throughout its course; in the one case anæsthesia, in the other tubercules making their appearance in due time. As to a third variety, macular, my observation does not warrant my stating any such class. True maculæ of one sort or another are common enough, but these cases already present one or the other of the two forms generally recognized. I have seen but one case in which I was not easily able to observe tubercules or anæsthesia well marked.

This man had several large, light and slightly raised maculæ upon his body, as the only main symptom of the disease, but these were anæsthetic, and there was a slight enlargement of the alæ nasi due to infiltration, one of the phenomena of incipient tubercular leprosy.*

The tubercular variety is characterized by infiltration and subsequent hypertrophy of the skin, especially where there is much loose tissue, such as the lobes of the ears, alæ nasi and face generally. Later on there is deposited in the skin of the face, hands, arms, etc., cheesy masses of the size of a pea or a little larger. These tubercles are prone to break down and leave deep indolent sores, which heal, however, after a time, but with strangly marked cicatrices. Mucous membranes, just as the external skin, are liable to the above morbid changes. They may become infiltrated and hypertrophied, or tubercles may appear in their substance and undergo ulceration. When such changes occur in the larynx an alteration of the voice is the result. In breaking down, they produce a most offensive fetor of the breath. The same changes occuring in the mucuous membrane of the intestines are in a certain proportion of cases the cause of the diarrhœa which is so common, and so often fatal. But in many instances diarrhœa is only one of the many intercurrent affections due to a vitiated state of the system. In cases primarily anæsthetic, I have on several occasions first observed tubercles upon the mucous membrane of the posterior part of the tongue and pharynx, as the only localities where they may be seen at that stage.

The anæsthetic form is marked by all those phenomena which are the result of degenerative changes in the nerves. These are anæsthesia, paralysis, contractions and distortion, especially extreme flexion or extension of the fingers and toes, also ectropion, loss of smell and taste, wasting of muscles, vesicles, sloughing of fingers

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*After having prepared this for the mail, I was upon Molokai on professional business, and there saw a case more purely macular than the above. The child a girl ten years old, presented upon her face especially, but also elsewhere upon her body, large black maculæ,slightly raised above the surface and producing a very disastrous effect upon her appearance. She was so young, that it may be she did not understand my questions; at all events, neither by qnestions or close examination could I obtain any evidence of anæsthesia. Scattered from her left eye brow to her hand were not loss than six small tubercules, on her right hand there were about half as many.

and toes, etc. The ulnar and facial nerves are especially frequently affected, but all are liable.

It is with difficulty that any history of a prodromic stage can be obtained from a native. They are by no means observant of such matters, but occasionally one may be found who will complain of a general indisposition extending over a period of several months or even longer.

When anæsthesia plays an important part from the first, the patients very frequently speak of formications, over the entire body sometimes, but especially over the nerves which afterwards become anæsthetic.

* * * * * * *

It will be noted that syphilis or any syphilitic cachexia were in every case diligently sought for, for there are some on these islands, as well as in India and elsewhere, who hold to an intimate connection between syphilis and leprosy. If there is any such relation as they claim, then it is unnecessary to speculate as to the manner of introduction of leprosy into this Kingdom, for though my experience in foreign lands is confined to these Islands, I am not prepared to read of a country where syphilis is so prevalent, so grounded into the whole native population as here. The problem, then, would be, how long the disease—syphilis—left to itself, would require to become elaborated into leprosy. But I am not willing yet to adopt such an hypothesis, for then should leprosy be more general in the families of those affected, as well as more common in other countries, where there is a certain proportion of families thoroughly imbued with syphilis, and from which they have not been exempt for several generations. Again, anti-syphilitic treatment should give some good results, which is not the case, save when syphilis is added to the disease. Moreover, the symptoms of the two diseases do not coincide in a way to warrant such an opinion.

Vaccination was also inquired into. Alarmed by an invasion of small-pox in 1853, a general vaccination of the whole population was ordered, and physicians being at that time very few on the Islands, non-professionals aided in the work. It is charged by some that, as a natural result of the labors of the heterogeneous force so appointed, not only syphilis but also leprosy was greatly increased. In my last circuit trip in my district, I found very few adults who had never been vaccinated.

This involves the question of inoculability, in my opinion the main, if not the only means of propagation, other than inheritance. That is, like syphilis it depends for its propagation upon the direct introduction of its virus into the blood. The general immunity of those coming in constant contact with lepers points to the absence of any direct contagious quality.

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