Leprosy and segregation / by H.P. Wright.

LEPROSY

AND

SEGREGATION.


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LEPROSY

AND

SEGREGATION.

With Photographs.

BY

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"STATUTES OF THE HOLY VIRGIN MARY OF SIENA";
"STORY OF THE 'DOMUS DEI' OF CHICHESTER," ETC.

"Dabit Deus his quoque finem."—VIRGIL.

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1885.

TO

THE RIGHT REV. EDWARD HAROLD, LORD BISHOP OF WINCHESTER, D.D., &c., &c., &c.

MY DEEPLY RESPECTED FATHER

IN GOD,

WHOM TO KNOW IS TO LOVE AND REVERE,

THIS LITTLE VOLUME

IS WITH PRIDE AND PLEASURE

Dedicated.

HENRY PRESS WRIGHT.

PREFACE.

I PUT forth these few pages about Leprosy to inform the public and to invite sympathy. Dr. W. Munro, one of our ablest writers on the disease, told me that during his studies in Edinburgh it was never once mentioned, and I have no reason to suppose that it has received better attention from any school of medicine in England or Ireland. Sometimes, but very rarely, the articles on "Lepers and Leper Hospitals," by Sir James Simpson, in the 'Edinburgh Medical and Surgical Journal,' are quoted, but more to call attention to some quaint custom of days gone by, than to interest the reader in the malady itself, the "*πάθος οὐκ ἰάσιμον*" (Cyril of Alexandria) which renders poor suffering man a "sepulchrum ambulans" (Spencer).

Wellesley C. Bailey, B.C.S., whose long experience in India enables him to speak with authority on leprosy, writes very feelingly and very earnestly when he tells us: *—

"Many people are quite startled when we first

* 'Lepers in India.' Shaw & Co., 1882.

broach the subject of leprosy. "Why," they exclaim, "I thought no such thing existed nowadays. You don't mean to say that you have lepers in India like those we read of in the Bible?"

"It is really extraordinary how many enlightened people are totally ignorant of the fact that there are hundreds of thousands of these sufferers in this poor world of ours, sufferers from the very same awful disease of which we read so much in the Word of God. Just as incurable now as then, and just the same terrible type of sin that ever it was. But it is more strange still, how people can actually live in the midst of such suffering and yet not know of it. I have heard of one man who had been in India for some time, who, when he returned home on leave and found some of his friends interested in lepers, took upon himself to say that there were no such beings in India; that it was all a mistake! Yet stranger far to me it is that people can actually see such affliction and practically be unmoved by it.

"The sufferings which the poor creatures go through are sometimes so awful that one almost shrinks from shocking public feeling by relating such things; but if, for the sake of Him whose delight it always was to relieve the wretched, we are not willing to hear such things, in order that we may relieve them, what is our Christianity worth?

"The hands and feet of the tortured leper drop off

bit by bit, joint by joint; until they have nothing but bare stumps left. As they are unable to work for themselves, they have to make out their living by begging from door to door, and take whatever is thrown to them; and *thrown* to them it is, as if they were *dogs*. When too ill to totter along on their stumps, they sometimes are seen to lie down and die from exhaustion."

And this awful scourge not only prevails in the East Indies, but in all quarters of the world. I do therefore earnestly hope that my humble appeal on behalf of the leper will not go forth in vain; that loving hearts will yearn to stay, if possible, the progress of a disease, which united action on the part of all civilised nations would, I believe, within a century or two, banish from the face of the earth. Prince and people, rulers and ruled, should zealously combine for so great, so holy an end; and they will have this the highest encouragement—their work will be one of mercy, and success *must* of necessity attend it.

It now only remains for me to offer my warmest thanks to Drs. H. Vandyke Carter and Danielssen, veterans indeed in the hard struggle against leprosy; also to Miss Agnes Lambert and Dr. W. Munro, well known for the valuable aid they have rendered to the cause of the helpless leper. The kind and instructive communications I received from those devoted friends of humanity I shall ever gratefully remember; nor can

I forget the attentions I received from my dear and learned friend, Dr. Rost, Librarian of the India House, and from Miss C. E. Pim and Wellesley C. Bailey, the active supporters of the "Mission to Lepers in India." *

HENRY PRESS WRIGHT.

GREATHAM RECTORY, HANTS,
30th April, 1885.

* I earnestly commend this "labour of love" to those who wish to help poor lepers. The asylums at Almorah, Dehra Doon, Subathu, and Ambála are entirely supported by the Mission. There are at this moment more than one hundred lepers well cared for. The Hon. Secretary is Miss C. E. Pim, Alma, Monkstown, Dublin. It costs about 6*l.* a year to support one adult.

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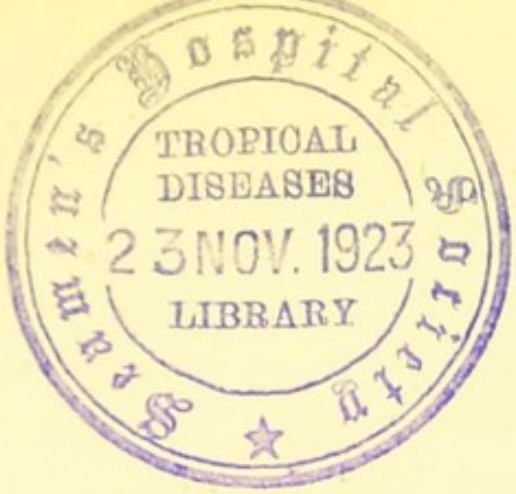

LEPROSY AND SEGREGATION.

CHAPTER I.

Geographical Distribution of Leprosy—Its Prevalence under Opposite Circumstances and Opposite Local Influences.

THE ignorance that prevails with respect to leprosy is perfectly astounding. It is a common opinion that the disease has entirely disappeared from civilised nations, and is rarely to be seen save here and there in India and China. The fact is, taking the world at large, leprosy is just now as prevalent as ever it was, and has not changed either its character or its intensity. This statement may fairly be questioned if based solely on an assertion, but there are official reports collected by the India and Colonial Offices from all parts of the world which give valuable particulars fully confirming it. Those reports were submitted to the Royal College of Physicians, who appointed a Leprosy Committee to examine them, with Dr. Gavin Milroy, F.R.C.P., as Honorary Secretary. The 'Sketch of the Geographical Distribution of Leprosy at the Present Time,' by Dr. Milroy, and some passages from Dr. Munro's work on Leprosy, will make all clear,

and interest and surprise many who scarcely credit the existence of the malady in these enlightened days.

"The chief seats of leprosy in recent times continue to be the same regions of Africa and Asia where it was originally seen and where it is known to have been most common in remote ages. It is still endemic in Egypt, along the valley of the Nile, and on the shores of the Mediterranean and Red Sea. Aubert Roche and other recent visitants of the country confirm the statements of Bruce and Larrey at the end of last century. In Abyssinia it is said to be frequent, not only in the plains but also in the mountainous plateaus. Mungo Park, as well as the earlier traveller Moore,* found it among the inhabitants of Darfur in the interior, and Daniell states † that the slaves brought from Soudan to the west coast of the continent are frequently affected with the disease. It is common along the whole of the north coast of Africa. That it is frequent in many parts of Algeria appears from many recent notices in French periodicals. Morocco and Senegambia have long been known to be infested with it, and there seems to be scarcely a district along the west coast which is entirely exempt.‡ At the Cape of Good Hope it is common among all the native races and tribes; the inhabitants of the great sandy plains are more subject to it than those of the fruitful and cultivated districts. Whether the disease

* 'Travels into the Inland Parts of Africa,' 1738.

† 'Sketch of the Medical Topography of the Gulf of Guinea,' 1842.

‡ Dr. Clark, in vol. i., 'Transactions of the Epidemiological Society,' 1864.

is prevalent along the east coast of Africa we cannot say from want of evidence, but that it exists as an endemic in Madagascar, and in Mauritius and Isle of Bourbon is perfectly well known.

"The Asiatic continent appears to be nearly, if not quite, as much infested with leprosy as the African. In Syria, especially in the southern districts about Beyrout, Jaffa, and other places in Palestine * it is still common; and even some of the lofty districts of the Lebanon are far from being free. In Arabia, too, it continues to be endemic,† and the same may be said of various parts of Persia, where the poor sufferers are compelled to herd together in miserable hovels at some distance from the towns, and are

* "Just outside the town (Ramley, between Jaffa and Jerusalem) sat a group of dirty Arabs in rags. They rose from their stony seats, and advanced holding out little tin cups for alms. Their faces were so disfigured that they scarcely looked human; the eyelids and lips of some were quite destroyed, while the faces of others were swollen into frightful masses. Leprous families intermarry, and sometimes the immediate offspring are free from any appearance of the disease; but it is sure to revive in the succeeding generation. Some of them appear quite healthy till 19 or 20 years of age; but they feel themselves a doomed race, and live quite apart from the rest of the world, subsisting almost entirely on charity; for often their fingers rot off, and their hands are rendered useless."—*Domestic Life in Palestine*, 1862.

† "The list of cutaneous disorders is long and loathsome, from *lupus exedens* to simple *impetigo*. Leprosy abounds; sometimes it assumes the blotchy and not dangerous form called 'baras'; sometimes it is the hideous 'djedūm,' under which the joints first swell, then break out into sluggish, yet corroding, ulcers, and at last drop off piecemeal. However disgusting, it does not render its victims legally impure (as was the case with the Jewish leprosy), nor does any one believe it to be contagious."—*Palgrave's Journey through Central and Eastern Arabia*, vol. ii. p. 3, 1865.

generally left in the greatest wretchedness.* Burnes and other travellers mention the frequency of the disease in Bokhara. It is known there under the names of "mukkow" and "kolee." It is common also in Ladak, Cashmere, &c. In India, one of the most ancient seats of the malady, it is still widely and extensively prevalent. The sea-coast districts, it is generally believed, are more afflicted with it than the inland. In many parts, however, in the interior of the country it is very common, as at Patna, Tirhoot, Ramgur, and various places in the north-western provinces. Some estimate of the prevalence of the disease may be formed from the statements of Dr. Morehead, that in two years, 1851 and 1852, there were received into the Leper Hospital at Madras 212 patients, and that 391 were admitted into the Bombay Hospital from 1848 to 1853.† The statement made

* Herodotus says: "Should any citizen have a leprosy or white eruption he is not allowed to enter into the city, nor to have any intercourse with other Persians; and they say that he suffers because he has sinned against the sun. And should it be a foreigner who is attacked by one of these diseases, in many places they go so far as even to expel him from the country."—*British and Foreign Med. Chirurg. Review, for April* 1864, p. 382.

† Dr. Morehead in his valuable 'Clinical Researches on Disease in India,' 2nd edition, 1860, remarks:—"Leprosy is common in India. The numbers received into the leper establishment at Calcutta are unknown to me; but I visited this institution in 1853, and found the accommodation and arrangements altogether inadequate for the comfort and well-being of those afflicted with this sad disease. . . . The system followed in the Madras Leper Hospital, at the time of my visit, under the judicious management of Dr. Hunter, formed a pleasing contrast to that of Calcutta. The patients were classified according to their previous habits and position in life. Books were provided for the

by some persons that the disease which attracted considerable notice in several of the southern districts of the Madras Presidency had been introduced by negroes from the coast of Africa into Tranquebar, is very questionable.

"Leprosy is very frequent in Ceylon, and especially in the southern parts of the island. It is stated to be much more common along the sea coast than in the interior; in the hilly districts it is believed to be rarely met with. The disease is said to be rare in Burmah; the unhappy sufferers are treated as if they were criminals rather than as the victims of a cruel malady. From the official reports of Drs. Ward and Grant on the Medical Statistics and Topography of Malacca, 1830, it appears that leprosy was so prevalent among the poor, that Government deemed it proper to establish a hospital for the reception of the sufferers. In Java, Sumatra, and other islands in the Indian Ocean* leprosy abounds; and some accounts state that it is by no means confined to the inhabitants of

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educated, and gardening and other light occupations conducive to health and happiness were encouraged. The arrangements for lepers in Bombay, inferior to those at Madras, are superior to those at Calcutta. There is accommodation allotted for them in the Jamsetjee Jejeehboy Dhurmsala; and, under exacerbations of the disease, they are received into a ward of the Jamsetjee Jejeehboy Hospital appropriated for the purpose." Great improvements have been made of late.

* Sir John Bowring remarks, in his 'Visit to the Philippine Islands,' 1859, that "Elephantiasis, leprosy, and St. Anthony's fire are the scourges of the Indians, and the wilder races of the interior suffer from a variety of cutaneous complaints. The biri-biri is common and fatal. Venereal diseases are widely spread, but easily cured."

the sea coast. Several recent writers, as Lockhart, Hobson, Wilson, &c., have noticed the great prevalence of the disease in China, where lazar houses are as numerous and crowded in the present day as they used to be in England and other countries of Europe before the fifteenth century. Whether it extends to the northern provinces of the land we are unable to say.* A Russian writer has recently stated that it is not uncommon in Kamschatka. . . .

"It seems uncertain whether the malady has been recognised among the inhabitants of the Australian continent or of the Australasian archipelago. The endemic disease among the New Zealanders described by Dr. Thomson in 1854 appears to be of a leprous nature.†

"Although leprosy has been but little known in Europe generally since the latter part of the seventeenth century, it nevertheless continued to exist in certain localities in different regions throughout the following century; nor has it even yet disappeared from them as an endemic disease. The southern regions near to the frontiers of Asia are still considerably infested with it.‡ In many of the islands of the

* Dr. Scherer, in the recent 'Voyage of the Novara' round the world, states that "common as leprosy is in Southern China, it is unknown in the north; its area of manifestation seems to be confined within the tropics. Many Chinese in good circumstances when attacked have, it is said, removed to Pekin, where after two years' residence they lost all trace of the disease. It broke out anew, however, soon after their return to the south."—1863-4.

† For an account of Ngere-ngere see Appendix.

‡ Many of the cases of the disease seen in Constantinople are in

Ægean, both Turkish and Greek, it is far from being uncommon at the present time. In Crete it prevails to a very considerable extent, nor is it altogether unknown in the Ionian group (Hennen particularly mentions Cephalonia), and, according to Danielssen and Boeck, in Malta. In Greece, where the disease is regarded as a legal ground for divorce in married persons, the localities said to be most affected with it are certain districts of the Peloponnesus. Attica and Bœotia are not entirely free. In 1840 the number of lepers throughout the kingdom of Greece was stated in an official document to be 161, and in 1851 the number was set down at 350. This apparent increase of the disease was probably due to the inaccuracy of the earlier return.*

"As to what extent it prevails throughout Turkey no information exists. It has been asserted that it is unknown in Wallachia. On the other hand it is notorious that the south-eastern provinces of European Russia are more or less extensively affected along the whole of the vast region extending from the Crimea by the shores of the Sea of Azof and by the Caucasus away to Astracan on the Caspian. It

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persons from different places in Asia Minor, where the disease is probably much more frequent than on the European side of the Bosphorus.

* "In Greece leprosy is endemic; the statistics lately published by Dr. Dekigalla of Syros show to what extent it prevails. According to this author, the lepers are left in a sad condition, some living in solitary huts or caves, and others herded together in lazar houses of the most wretched description."—*London Medical Review*, 1861.

seems to have been endemic for centuries past among different tribes of the Cossacks. In various localities also in the Baltic provinces of the empire, as in Courland, Esthonia, and Finland, it is known to exist; and Meyer states that it is not confined to the population on the coast.

"In Sweden, where the malady was far from being unfrequent at the close of the last century and in the early years of the present one, it has, according to the testimony of Drs. Huss and Berg, of recent years in a great measure disappeared. The localities where it was most common seventy years ago were the districts of Angermanland, Medelpad, Helsingland, Upland, and Bohuslan. Within the last thirty years there were 29 inmates in the Leper Hospital at Hernosand independently of other cases of the disease scattered over the district. Since then no fresh patients have applied for admission. In the district of Medelpad, too, where the malady is believed to have been endemic for centuries, it has become very rare: and in Helsingland, which was formerly one of the chief seats of leprosy in Sweden, the cases are now only solitary and sporadic, where once they were numerous and common.

"The same may be said of the districts of Upland and Bohuslan. The disease has lingered longest along the coasts of Abyfiord, but there, too, it is much less frequent than formerly. In all these different districts the localities chiefly affected seem to have been the deep valleys and the shores of the fiords which are liable to frequent inundations.

"Norway has continued to be very much more

infested with the malady than Sweden. It is still endemic there, under the name of Spedalskhed, along almost the entire coast from Stavanger in the south to Finmark in the north, between the 59th and 72nd parallels of latitude; and within the last twelve or fifteen years it seems to have been extended somewhat more into the interior of the country in certain districts. In 1846 the number of persons known to the public authorities to be affected with leprosy throughout the country was 1122; but the actual number was doubtless much greater, as very many cases of the disease in its early stages, were, it was notorious, studiously concealed by the relatives of the sufferers as well as by the patients themselves.*

"While the malady has, since the end of last century, disappeared from the Shetland and the Faroe

* Professor Daa, at the meeting of the International Statistical Congress held in London in 1860, said:—"The most remarkable affliction in my country is that particular disease, elephantiasis, which has spread all along the fishing districts, and in the damp localities along the coasts, and only there; it does not enter the mountainous parts of the country, nor in general does it penetrate to the interior. The number of persons afflicted with the disease in 1858 was 2798."

Professor Daa added:—"Diseases of the mind are likewise more prevalent in Norway than in many other countries, and several reasons have been assigned for this deplorable fact. It is the same, I believe, both in the islands and the mountains, where the people live very simply, and with very little change of food." Hereditary transmission appears to play an important part in respect both of mental disorders and of elephantiasis among the Norwegian population.—*Report of the Proceedings, &c.*, p. 29; 1861.

Sir W. Wilde, in his valuable 'Status of Disease' in connection with the Irish Census of 1861, enumerates leprosy among the various causes of the great frequency of blindness in Norway, where the proportion of the blind to the population is higher than in any other country in Europe.—p. 38.

Islands, it is still met with in Iceland, although to a much less extent than formerly. A century ago the number of lepers then there was set down at 280, in 1838 the number was estimated at 128; and ten years later Schleisner, who officially visited the whole island, found only 66 persons affected with the disease. A good many, however, of the patients had been, it was believed, cut off by the endemic of measles, which had prevailed and was very fatal the year before, 1847.

"In the south of Europe leprosy is still endemic, although to a very partial extent, in some parts of the coast of North Italy and of the south-east of France. The only place on the east coast of Italy where it is known to exist is Comacchio, situated close to the notoriously unhealthy lagunes of Ferrara, and where the malady has been endemic for ages past. It is confined almost entirely to the town and its immediate neighbourhood, and happily it has of late years diminished in frequency, so that the total number of lepers now in Comacchio is believed not to exceed a dozen or so at most. Along the coast of the Gulf of Genoa from Chiavari to the frontiers of France, it appears to be somewhat more common in certain spots, as at Chiari and Varazze in the district of Genoa, but specially in the province of Nice, as at Monaco, Pigna, Castelfranco, Turbie, &c. In the official report made in 1843, the number of leprous persons in the Sardinian States is stated not to exceed one hundred in all, but if this statement were then correct, the malady would seem to have become more

frequent since; as in 1858 the Government found it necessary to convert a monastery at St. Remo into a lazar house, into which forty patients from the surrounding district alone were at once admitted. The disease appears to be confined to the poor population of the coast. At some points of the French coast too, along the shores of the Mediterranean in Provence, Languedoc, and Roussillon, it is still met with. Formerly it was extremely common there, and even down to the latter half of last century it existed to a considerable extent in some districts. The delta of the Rhone, especially about Martiguez * and Vitrolles, also Berre, Rognes, and other places near Marseilles and Toulon, were the localities which were most affected, and where scattered cases have continued to be observed during the present century. Throughout last century, even down to its close, the disease was by no means uncommon also in Auvergne about the district of Mont d'Or, under the name of the 'Mal S. Main.' In the course of the present century it seems to have entirely disappeared from this part of France, as it had previously done from other parts of the country, as for example from the coast of Brittany and Normandy, where it formerly prevailed to a considerable extent.†

* There are two very interesting papers on the leprosy at Martiguez, on the coast of Provence and not far from Marseilles, in the Memoirs of the Royal Society of Medicine in France, for 1779 and 1787, by Dr. Vidal, a resident physician there. These papers were followed by "Recherches sur état actuel de la Lèpre en Europe, &c.," par MM. Chansereu et Coquereau, in vol. v. of the same work.

† The introduction of the disease into New Brunswick has been

"Spain continues to be more infested with leprosy than most other European countries, but our information as to the extent of its prevalence in different parts is very scanty and imperfect. In the latter part of last century it was common in Andalusia, Asturias, Galicia, &c.; there were many lazar houses in these provinces at that time occupied by numbers of inmates. It still exists to a considerable extent not only in these parts of the peninsula, but also in Grenada * and in Catalonia. Dr. Grasset, writing in

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attributed to emigrants from St. Malo during the present century. The question will be considered in a future chapter.

* "The Leper Hospital at Grenada, founded by Queen Isabella, contained (in 1859) 53 inmates, 39 males and 14 females. Their ages varied from 14 to the grand climacteric. In a few of the inmates, the only symptoms were small dark eruptions on the skin; but in the majority there were tubercular elevations and excrescences on the face, forehead, nose, ears, and frequently also on the neck, arms, and hands. In the advanced cases, the features were much deformed by swelling and ulceration, the mouth and tongue were ulcerated, the voice was low and husky, and occasionally one of the eyes was lost. Several had lost fingers, toes, and even a hand; and in two cases the whole body was one mass of corruption.

"Almost all the patients, it is stated, were inhabitants of the sea coast in the south-eastern provinces of the country, especially in Almeria, Adra, Motril, Malaga, Velez-Malaga, or of Cadiz and its vicinity."

"Señor Mendez Alveiro recently stated to the Royal Academy of Medicine at Madrid that, in 1851, there were ascertained to be 284 lepers in nine provinces of Spain, without reckoning many more about whom no statistical return had been obtained from the districts where they resided. It has been asserted by some writers that the disease has increased since the beginning of the present century. Of the above 284 patients, 188 were males and 96 females. Their ages varied from 15 years to 45; three-fourths of the whole were persons of middle age. 79 had been affected with the disease, at the time they were officially

1820, mentions particularly in the last named province the towns of Reus, Rindoms, Vilaseca, and the mountainous district of Prades, near Tarragona, as localities where many leprous cases were to be seen.

"In Portugal the chief seat of the disease in recent times has been the hilly district of Lafoes, in which the number of leprous persons was about thirty years ago variously estimated at 300 to as many thousands. It is still endemic also in the provinces of Lower Beira and the Algarve. There is a leper hospital in Lisbon. Forty or fifty years ago the number of inmates was said to be about 40; since that time the usual number appears to have been larger. When visited by Dr. Webster in 1861, it contained 69 patients, 49 males and 20 females.* The disease is known in Portugal and in the Brazils under the name of 'Morfe,' or of 'Mal de San Lazaro.'

"With respect to the other countries of Europe hitherto not mentioned, viz. Great Britain, the Netherlands, Denmark, Germany, and Switzerland, cases of the disease have during the present century been of

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enumerated, from one to five years, and 122 from five to ten years. The remainder had been afflicted for much longer periods.

"Both here (Grenada) and elsewhere it is confidently stated that the ordinary attendants at leper houses rarely, if ever, manifest any symptoms of the disease, notwithstanding they have long resided in such establishments; and leprous patients may remain at home for years, without infecting any other member of their family."—*Dr. Webster in the Transactions of the R. Med. Chirurg. Society*, vol. xliii.

* Dr. Webster informs me that these inmates "were labouring under various forms of leprosy, but none appeared examples of pure Arabian elephantiasis; that variety being of rare occurrence throughout this district of Europe."

very rare occurrence among the native residents. Most of the examples that have been met with in England (and the remark applies, we believe, to Holland also) have occurred in persons who either were natives of some of the tropical countries where the malady is still common, as in the West or East Indies, &c., or who have resided there for many years.

"Before passing over from the old to the new world it is to be noticed that leprosy continues to exist in several of the islands off the western coast of Africa. It is still endemic in Madeira, although not now to the extent that it was at the end of last century. There is a leper hospital near Funchal. The number admitted between 1702 and 1803, according to Dr. Adams in his work on morbid poisons, was 890, of whom 526 were males, and 364 females. In 1829 Dr. Kinnis found 17 males and 7 females in the establishment affected with tubercular or articular leprosy, in various degrees of severity. To what extent it exists in the Canary and Cape de Verde Islands, has not been ascertained. Cases have been met with in St. Helena, and the disease is still seen in the Azores.

"In the New World the countries which appear to be chiefly affected are Mexico and other parts of Central America, Brazil, and several of the West India islands. In Mexico it has been long known. It occurs chiefly among the Indian tribes, not only near the coasts and in the plains, but also in many elevated plateaus a thousand feet or more above the sea-level. It is common also in New Grenada, Venezuela, and Ecuador. Ulloa mentions its prevalence in and around

Carthagena, and in a memorial addressed to the first Congress of the Republic of Colombia in 1823, the towns of Bogota, Tunja, Casanare, Socorro, Pampluna, &c., are enumerated as being infested with it. Throughout the whole extent of Guiana, Dutch, French, and British, it is common, and is often known there under the names of "mal rouge," "coco-be," or "boasie." In 1786 a French Royal Commission reported on it as it prevailed in the colony of Cayenne, where it was popularly called "le mal rouge." Forty years later the number of inmates in the leper house in the town of that name averaged 60, but this number was only a small proportion of the lepers in the province. It has been recently stated that the malady has decidedly increased of late years in Dutch Guiana or Surinam.

"It is exceedingly prevalent in different parts of the Brazilian empire, and especially in the inland provinces of Matteo Grosso and Minas Geraes, and in the maritime district of S. Paolo. In some places almost every family is said to be tainted with the "morfea." The Governor of S. Paolo in his report for 1840, remarked:—'It is indeed a sad spectacle on the road from Rio de Janeiro to this town to meet such numbers of persons infected with the leprosy. In the neighbourhood of every village in the district we find a hut or shed which serves as a refuge for these unfortunates, who are excluded from all society.' Notwithstanding the wide prevalence of the disease throughout the entire kingdom,* there are only three

* Mr. Bates, in his recent work, 'The Naturalist on the Amazons,' 1863, mentions the great frequency of leprosy in some parts in the

leper hospitals in Brazil, viz. one at Rio de Janeiro, one at Bahia, and one at Pernambuco.

"In the La Plata States the disease is said to be little known, and only seen in the provinces of Parana and Uruguay in the interior. In the countries on the west side of South America, as in Chili and Peru, it seems to have been scarcely if at all observed until quite recently. Cases have been met with of late years in the city of Quito.

"With respect to the West Indies, the prevalence of leprosy seems to vary a good deal in different islands; for while the disease is common in Cuba, Jamaica, Barbadoes, Guadeloupe,* and St. Bartholomew, it is alleged to be of rare occurrence in Porto Rico, Martinique, and St. Lucie.

"The only parts of North America to the north of Mexico, where the disease has been met with are one or two districts in the province of New Brunswick,

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interior, especially at Santarem, situated at the junction of the Tapajos with the Amazon, and which is known as the "cidade dos lazaros." Some of the best families in the place are tainted with the disease; it falls on all races alike, white, Indian, and negro, but he never heard of a well-authenticated case in a European. The staple food of all classes in most parts of the Lower Amazon country is salted fish.

* Dr. Adam Neale quotes, from the 50th vol. of the 'Philos. Transactions,' the Report of a Commission appointed by the French Government in 1748 to inquire into the prevalence of the disease in Guadeloupe, where it had first attracted notice about 25 or 30 years before. The Commissioners examined 256 suspected persons; of this number, 125 (22 whites, 6 mulattos, and 97 negroes) were affected with the developed disease. As many of the patients resided on elevated situations as in the low marshy plains. The prevalent belief was that the disease had been introduced into the island by negroes brought from Africa, with the disease already upon them when they arrived.

Greenland, and the Aleutian Islands in the Sea of Kamschatka, between the continents of Asia and America."

Dr. Munro, after long experience and close observation, states that "*there is more leprosy in the British West Indies than in any other part of the British dominions in comparison with the amount of population,* and perhaps more than in any part of the world, except the Sandwich Islands. It is now found all over the West Indies, though more severe in some islands than others. Thus it is hardly known in Dominica, while it is more common in St. Vincent and Barbadoes, also in Jamaica and in the Bahamas. It also exists in Antigua, Montserrat and Nevis, although no statistics of the actual number in these islands are attainable. Again, in Grenada, Tobago, St. Lucia, and the Virgin Isles it is said to be rare. Dr. Liveing states that it is less common in St. Kitts and Antigua than in Jamaica, but from statistics this is shown, as far as St. Kitts is concerned, to be in all probability an error. As to islands not under British rule, it is known in Cuba and Porto Rico, in St. Domingo, in St. Thomas, St. Bartholomew, and St. Martin's. In Martinique and Guadaloupe, Dr. Brassac, of Basseterre, Guadaloupe, estimates about 150 cases in each island, or about 1 in 860 of the population, or (if the estimate be correct) less than half the relative number of St. Kitts." *

It will at once be seen from the above wide range, that no particular soil or geological formation, no

* 'Leprosy,' pp. 29 and 30.

special atmosphere, no position by sea or river, desert or rich lands, no diet or habit of life, will repel or produce the disease. Certain combinations may be adduced where leprosy is most prevalent, but point to what you will or where you will, the disease will be found under exactly opposite circumstances or equally opposite local influences. It is said by many that the shores of the sea or the banks of rivers encourage leprosy. Virchow even affirms that apart from them it cannot exist; but such reasoners forget that there are regions far from the sea and arid as the desert, where victims are found; also that leprosy, be it hereditary or contagious, or conveyable from man to man in any way, would for the most part reach a new home by a seaport and so take up its first abode on the coast, where with a settled population it would long remain without extending itself any great distance inland. In support of this view I may again refer with advantage to Dr. Munro, whose reasoning on the point seems to me unassailable.

"The prevalence of leprosy on the high table-lands of Central Asia, in Bokhara, and Samarkand; in the mountains of Samen in Abyssinia; in the mountains of Lebanon, and not on the coast of Syria; in arid Cephalonia; in Sicily where the proportion in the interior, from a late inquiry, appears as 5 lepers to 9000, while on the coast there are only 2 in 9000 of population; in Madagascar, 7000 feet above the sea-level; in the interior of Africa, 100 miles from the Niger, the nearest large river; on the table-land of Mexico; while in Brazil it is seen chiefly in the interior provinces

of Minas Geraes and Matteo Grosso ; in the Rio de la Plata States, chiefly in Parana and Uruguay, inland provinces ; in Bogota and Socorro ; on the Andes and in Quito, while it is unknown in Peru and Chili ; all these facts show that the opinion as to the prevalence of leprosy being in any measure dependent on proximity to the sea or large rivers, except in so far as these are great pathways of human intercourse, are utterly erroneous." *

NOTE.—Very little is known about leprosy in the United States. In the days of slavery the leprous were at once segregated. Such careful separation would gradually banish the disease, while good food and regular exercise would render every generation less liable to be attacked. Cases do yet occur from time to time in Baltimore, and here and there throughout the South, but as far as I can learn leprosy is now endemic in no part of the United States.

It is worthy of notice that in Russia leprosy chiefly prevails along the old lines of commercial travel. The disease came from the East to the Crimea, and then passed up the Volga, and so through the south-eastern provinces, where it has been for centuries. We shall find leprosy and the lines of travel specially noticed by Dr. V. Carter during his examination of the Kattiawar District, Bombay Presidency.

* 'Leprosy,' p. 53.

CHAPTER II.

Where did leprosy first appear?—The violence of the disease and the misery it causes.

IT is often asked, "Where did leprosy first appear, and from what known centre or centres has it at any era spread?" Considering that it is the oldest disease recorded, it is not surprising that no one can possibly say for certain where it first appeared, and opinions vary as to any centre or centres from whence it spread. A theory has lately been maintained by the intelligent medical man just quoted, that leprosy is the result of vegetable diet in countries where salt cannot be easily obtained. India and Africa are given as proofs of this theory and put forth as the disseminators of this fearful disease throughout the world.

Let Dr. Munro speak for himself:—"In Africa (he tells us) salt is so scarce that among the Apingis, an inland equatorial tribe, ten pounds will buy a boy slave, and a cake of it containing 70 cubic inches, in the Niger country, costs usually 2*l.* or more; while at Jenné, a large town, it is attainable by every one, but for the same quantity the charge is 4*l.* Bonnat, lately a prisoner, speaks of the dearness of salt at Selza, in Ashanti, where it is sold at 5*l.* a ton. With respect to India, Dr. Munro, quoting the census

of the North-Western Provinces, tells us that in that district the small farmer eats salt every day or two days, the labourer once in eight days; and Dodd, he adds, says: "It may be confidently declared that the Government that would place within the reach of the poor cultivators of Hindostan an ample supply of salt would receive the blessings of millions." *

No one will deny the importance of salt as regards man's health, but how far the non-use of it by vegetarians will necessarily cause leprosy, I will not presume to say. I prefer leaving that delicate question for the consideration of the medical profession.

When Dr. Munro puts forth that want of salt is the chief cause of leprosy, and shows how, in his opinion, that want acts, he does not imply for a moment that all cases are so caused, for that would be the overthrow of what he previously says. All that he wishes to maintain is that this want of salt fully "accounts for primary cases in India and Africa, such cases becoming centres of contagion for others."

That throughout his valuable pamphlet on leprosy he strives to be strictly fair is certain, for he is ever ready to point out any authority against him, and on the whole his reasoning is vigorous and convincing; but in the matter of Africa as a centre from whence leprosy went to Egypt, and was taken I know not where, I hold that he is carried away by his theory—the continent of Africa, I believe, received the disease from Egypt, not Egypt from Africa.

* 'Leprosy,' pp. 64 and 65. See Appendix for explanation of this theory.

First, let it be remembered that leprosy was in Egypt in the reign of Husapti, the fifth king of that land, who is said to have reigned 3500 years before Christ, when Egypt was a thickly populated country, and that emigrants went from the banks of the Nile and spread along the northern shores of Africa, and also, we may believe, southwards and south-westward. They would carry with them the disease so prevalent in their motherland—

"Morbus qui propter flumina Nili gignitur" *—

and distribute it here and there as circumstances invited. Recent examination of the ethnology of Africa fully supports this view.

It is a curious fact that we find in the east and west of that vast continent two families of men living in the midst of negroes, but of an entirely different stock. I allude to the Kafirs and the Ashantis. The former have beyond all doubt filtered along and it may be also through Abyssinia from Egypt and Ethiopia and Arabia, making way by a combination of prudence and courage along the eastern shores until finally they settled in Kafirland and there so multiplied that they now number 3,000,000, and occupy an area of a million square miles. Their physical conformation is that of a modified negro, but with such difference in height, colour, manners, customs, and character, that they are evidently just that mingling of a superior race with the earlier inhabitants of the soil which would arise

* See Appendix, Prosper Alpinus on Medicine of the Egyptians.

from centuries of movement down the vast continent. The rule is quasi-patriarchal; polygamy prevails; they practise circumcision, never eat swine's flesh, and have peculiar rites of purification, many of them analogous to those prescribed in the Mosaic law. We know how large a part of Judaism is to be found in Christian Abyssinia: we may therefore well suppose that the family of the Kafirs, having much that is Asiatic in their physique, derived their un-African appearance and their Jewish rites and ceremonies from Nubia, Egypt, and so from south-western Asia, the land so long tenanted by the Jews.

It was the same with Ashanti. The aboriginal inhabitants of all the north of Africa were the now Berbers or Kabyles. They entered by Egypt and gradually spread themselves along the country bordering on the Mediterranean, known still by the name of Barbary. In due time foreign nations assailed them. They have been conquered by Phœnicians, Romans, Vandals, and Arabs, and so gradually driven inland, wave following wave, until at last they reached the Kong Mountains and the country southward between that range and the sea. We can easily suppose the Fantis thus occupying for a time the territory now known as Ashanti, while the Ashantis were settled well to the west close to the Kong Mountains. The legend says that the Fantis were then invaded by the Ashantis and driven seaward, their conquerors seizing and inhabiting the wooded country they now possess, into which no marauding horsemen can penetrate. All this is strengthened by the important fact that while

in certain tribes on the Gold Coast the negro element is more or less found, yet, taking the whole region, one race and one language prevail. Many dialects have in course of ages been formed, still philologists tell us that the foundation of all is the same and traceable to the Berber family. Here again, as with the Kafirs so with the Ashantis, Fantis, Denkeras, Akims, and other kindred families, Jewish rites and ceremonies are practised; circumcision, and a quasi-patriarchal government; special customs on betrothal and marriage; and a variety of obligations in domestic life, just as set forth in the Books of Moses. Moreover, at the burial of their dead the earth is thrown into the grave after the manner of the Jews. All this evidently came from the East, in other words from lands in which leprosy has prevailed for thousands of years. Nor must it be forgotten that the Portuguese have mingled for centuries with the Abyssinians and have had possessions on both the eastern and western coast of Africa.

With these facts before us I may safely aver that the view taken by Dr. Munro, as far as Africa is concerned, has little or nothing to support it. It may or may not apply to India, where leprosy, in this our day, is a serious scourge indeed; but that is a question on which I shall not enter. I must leave it also to the great profession so well able to consider it, and for the present shall content myself with showing the antiquity of the disease in that vast peninsula by the following highly interesting facts.*

* 'Asiatic Society of Bengal,' August 1875.

Susruta, who most probably lived about 600 A.D.,* has handed down to us the lectures of his so-called instructor, Dhanvantari, but when writing on leprosy his authority is Charaka (500 A.D.), who was looked to as the great physician of the past. Charaka quotes a re-

* These dates may by some be questioned, but this is certain, that those given by Wise, Vullers, Lassen, and others are thoroughly wrong. The fact is, the Hindoos have but few historical documents deserving the name. The Brahman period is told of in two enormous poems, Mahâbhârata and Râmâyana, but they are devoid of all information as to the time they were written. The absence in Hindoo literature of all chronology, not only of history generally, but as to all literary and scientific tradition, is very remarkable. The only date you can rely on with respect to any writer is that of the transcription of the work to which his name is attached. Wise reasons that Charaka and Susruta must have lived between the third and ninth century B.C., because their names are mentioned in Mahâbhârata, but that poem is made up of various fragments composed at times long apart one from the other.

The fact is we know little or nothing of the story of medical science in the East. We know that the Hindoos did not get their knowledge from the Greeks, for no Eastern medical savant has a name with a foreign sound, and further the weights and measures used were those used in Magadha or in Calinga, i. e. in the Eastern provinces. This is clear, still it gives us no information as to the time when Hindoo medical teachers lived. Under these circumstances we know nothing of Susruta earlier than about the seventh century A.D. That the Hindoos had made an advance in medicine long before that date we may believe, as in the days of Charaka and Susruta they were good in dietetics and on the origin and diagnosis of disease; in surgery (they taught us rhinoplastry); in medicinal properties of minerals (especially precious stones and metals); in knowledge of plants and substances, in chemical analysis and Materia Medica. With all this progress, which none can deny, there was, as I have stated, no chronology, and we cannot after a fair honest scrutiny give Susruta an earlier date than the seventh century A.D. The great Wilson gave the ninth or tenth century A.D.

See Weber 'The History of Indian Literature,' pp. 265–271, and 'Dictionnaire Encyclopédique des Sciences Medicales,' Article "Susruta," par le Dr. Liétard.

nowned Indian savant, Atreya (son of Atri), named in the Vedas. An Atri is also mentioned by Panini, who lived about the third century B.C., and in the Rig Veda Sañhitá, which is as old as the twelfth century before the Christian era. The word Kushtha' (Sanskrit for leprosy) is not found in the Rig Veda (why should it be in a book of hymns?), but Atreya is mentioned, and he, as we have seen, wrote on leprosy. Let me here observe that no writer among the Indian sages ever hints at the disease having come from the west.

Atreya says: "When the seven elements of the body become vitiated through the irritation of bile, flatulency, and phlegm, they affect the skin, the flesh, the saliva, and the other humours of the body. These seven are the causes respectively of the seven varieties of kushtha. Kushthas are of seven, of eleven, or of a larger number of kinds; and these constantly irritating the system become incurable."

After giving an account of the cause of the symptoms of kushtha, &c., a curious and valuable statement is made, showing that the theory of the *bacilli*, thought in the nineteenth century to be the great triumph of modern medical science, was anticipated more than 2000 years ago by an Aryan savant.

"The worms that form in leprous eruption destroy the flesh, skin, veins, muscles, and bones. When affected by them the patient suffers by spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning weakness, disrelish, and indigestion. Then *kushtha* 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." *

What has been said gives no clue whatever as to where leprosy first appeared, but it makes one thing perfectly clear—that the disease has been known in Africa and India for 2000 to 3000 years at least. As the Aryan had no chronology, and leaves the most learned Orientalist in utter darkness as to the movements and migrations of his ancestors, nothing decided can be said as to whether leprosy went westward from India or eastward from Egypt; but inasmuch as ethnologists seem to agree that Egypt was originally peopled by wanderers from Asia, it is allowable to suppose that the former was the course taken by the terrible scourge; and that it found on the banks of the Nile a sustaining home, from which it disseminated its miseries over vast regions of the Dark Continent and from thence over Europe and onward over the New World.

If we know not whence came leprosy, we know, alas, how slowly, yet in time how violently, it devours and disfigures its victims before it sends them to their rest. We are told of a clergyman who, when preaching on the Gospel for the third Sunday after the Epiphany, "rejoiced that the dire evil of leprosy no longer darkened the face of the earth." † Such ignorance carries with it a certain amount of bliss, for that simple priest had in his travels we may presume

* The Charaka Saṁhitá on the "Pathology of Leprosy."

† 'Nineteenth Century,' "Leprosy Present and Past," No. 90, p. 211.

never seen a leper, nor could he have read of Cyprus, Norway, the Sandwich Islands, or New Brunswick, where leprosy rages. Happily with many lepers there is little or no sense of bodily pain, but alas! what torture of mind—what a bitterness—what a loneliness—what a loathing of the flesh! The following picture drawn in Cyprus by an able pen proves the truth of my words :—

"My husband requested that the two worst cases should be pointed out to us. We were brought to a doorway through which we peeped, and were shown a man who lay moaning on a wooden trestle. Two women who were attending on him turned him towards the light. I could only take a single glance and no more. Not a feature of any kind was discernible, and only by inflated movements at regular intervals of the cheeks could we tell a being lay before us. We could only trust that he was unconscious; that the condition was more appalling to an on-looker than the actual suffering to himself. It was even believed that he was quite an idiot; but as he could neither speak, nor see, nor smell, nor taste, nor even hear distinctly, it must have been hard to tell whether the brain was still conscious or not. Food was administered by pouring liquids down his throat; but every day even this was mercifully becoming more impossible. So we could only hope that death would soon relieve him."

Awful state indeed, and that in a land where a man suspected of leprosy is torn from his family, who, as a rule, are his deadliest enemies. His goods are

divided amongst his relatives, and he is banished from their presence for ever. His clothes and a cotton quilt are given him, and a guard of his fellow-citizens conducts him to the Leper Asylum where he is left to live or perish.*

"Notwithstanding the mild climatic influences of India (writes Dr. Carter,† and that very feelingly), the infesting plague of leprosy is not less hurtful and destructive than the same malady elsewhere. Here no sight is more affecting than that of a leper at home. For her or him there is absolutely no aid or attention other than such as ignorance, indifference or prejudice may entail. Not a tithe of the lepers in this province are in reach of medical aid, and not a hundreth part have a suitable dwelling-place. I have had occasion to note all the manifold inconveniences and sufferings which the worst degrees of disease inflict upon its victim, but must refrain from their enumeration. Be it enough to say that leprosy in these parts is a severe and as yet an unmitigated evil; it runs its usual course unassuaged, and the last scene of all is too often witnessed with an impatience not calculated to satisfy or encourage those humane sentiments which it is surely our duty to inculcate."

The description given by Dr. Henderson of the leprous man in China is equally sad. "The disease commences by the formation of one or more dusky reddish shiny patches, and the skin has the appearance of being covered with a coating of fine varnish.

* 'Our Home in Cyprus,' p. 148.

† 'Virulence of Leprosy,' p. 70.

In due time soft, livid, slightly prominent tubercles appear, which spread over different parts of the body, and after a period, which varies very much, the patient presents an almost hideous appearance—face, body, arms ulcerated, the lower eyelids everted, the bridge of the nose broken down, the palate destroyed, fingers and toes drop off, and the whole body appears a mass of disease. All this has to be endured without any kind sympathy of relatives—the leper is hated, despised and evaded—and only obtains by active mendicancy a miserable pittance with which to keep alive his poor sore-stricken frame."

Another picture, by Dr. Hinsom, while watching a case in Bermuda, is equally expressive. "Erythematous patches of a white red colour on the forehead, nose, and ears, gave the person the appearance of being over-heated by exercise, and subsequently they appeared on the hands and feet. These patches continued thickening until they became distinctly tuberculous, while at the same time the sensibility in them, and more especially in the hands and feet, became so acute that the least touch occasioned intense pain. The tubercles went on increasing in numbers and thickness until they were general over the whole of the body, and so distorted the features as to render them scarcely recognisable. On the extremities they vesicated, and bursting, discharged a dark bloody ichor, then slowly and imperfectly healed, leaving an ugly dark scar. At the same time the hair fell off, leaving the head bald, the senses of smelling and hearing became imperfect, the eyes grew

DISFIGURED LEPER (TUBERCULAR LEPROSY).


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dim, and the voice hoarse. The disease extending to the lungs, the patient died of pneumonia. Previously the sensibility which had been so acute at first became completely lost, so that mice and other vermin would nibble and eat away portions of the flesh without the patient being aware of it. The whole duration of the disease was twenty-eight months."

The kind treatment of the leper in an English colony and the comfort offered him through the means of religion, are well set forth by the Hon. Arthur Gordon, Lieut.-Governor of New Brunswick, who thus describes the Lazaretto of Tracadie. They contrast favourably with the heartless neglect generally experienced by the leprous. The despatch to the Duke of Newcastle, then Secretary of State for the Colonies, is dated April 13th, 1863.

"Last summer, during my official tour, I visited the Lazaretto. The outer enclosure consisted of a grass field containing about three or four acres. Within these limits the lepers are now allowed to rove at will. Until lately they had been confined to the much narrower bounds of a smaller enclosure in the centre of the large one, and containing the buildings of the hospital itself.

"Within the inner enclosure are several small wooden buildings detached from each other, and comprising the kitchen, laundry, &c., of the establishment; one nearly completed was furnished with a bath, a great addition to the comfort of the unhappy inmates. The hospital itself is a building containing two large

rooms, the one devoted to the male, the other to the female patients. In the centre of each room is a stove and table with a few benches and stools, while the beds of the patients are ranged along the walls. These rooms are sufficiently light and well ventilated, and at the time of my visit were perfectly clean and neat. In the rear of these rooms is a small chapel, so arranged that a window, obliquely traversing the wall on each side of the partition which divides the two rooms, enables the patients of either sex to witness the celebration of Mass without meeting. Through the same apertures confessions are received and the Holy Communion administered.

"There was one old man whose features were so disfigured as to be barely human, and who appeared in the extremity of dotage. He could hardly be roused from his apathy sufficiently to receive the bishop's blessing, which was eagerly sought on their knees by others.

"I was especially touched by the appearance of three poor boys between the age of eleven and fifteen. To the ordinary observer they were like other lads, bright-eyed and intelligent enough, but the fatal marks which sufficed to separate them from the outer world were upon them, and they were now shut up for ever within the walls of the Lazaretto.

"There is something almost appalling in the thought that from the time of a child's arrival until his death, a period, perhaps, of many long years, he, though endowed with the capacities and passions and desires of others, is condemned to pass from youth to

middle age, and perhaps onwards, with no society but his fellow-sufferers, no employment, no amusement, no resources, nothing to mark his hours but the arrival of some fresh victim, with nothing to do but watch his companions slowly dying around him."

Another example of generous care of the leprous is seen in Cyprus. Before the island came under British rule, lepers were despised and neglected, but now, having the kind and able superintendence of Dr. Heidenstam, they receive every possible attention. During the year 1881 "considerable improvements were effected. As there were no funds available for the erection of a properly built asylum, measures were taken for the improvement of the existing buildings. The roofs were repaired, all the woodwork, where defective, was renewed, a number of new windows were put in, and the whole of the floors were paved with native marble. A wash-house was also provided. I personally inspected the farm at short intervals, and thus ensured the proper periodical whitewashings and cleansings. Of the land attached to the farm, comprising some 120 acres, about 100 acres of practically waste land have been planted with caroub and other trees by the Forest Department, and this, no doubt, when the trees are sufficiently grown, will add very greatly to the salubrity of the situation. The Muktar of the village has been appointed guardian of the plantation. Of the ten acres reserved, about four form an orchard and garden for the use of the asylum, and the remainder is used for growing cereals. The whole of this land is

worked by the lepers themselves, all such as are fit for work being employed upon it.

"I am glad to say that the efforts that have been made for the comfort of the inmates have been fully appreciated, and these unfortunate sufferers feel great gratitude for the interest taken in their welfare." *

* Report of Dr. F. W. Barry, B.Sc., &c., late Sanitary Commissioner, Cyprus. He speaks very highly of Dr. Heidenstam, who succeeded him as Sanitary Commissioner.

CHAPTER III.

The Cause of Leprosy and how it is Conveyed—Heredity and Contagion.

WHEN the tender-hearted Christian reads of the ravages of leprosy, he anxiously inquires, "Has nothing been done to find out the working of the disease; what its causes, and how it is conveyed? for without such knowledge no remedy can be expected."

Of late years something has been done in this direction, and I may justly add, done well. Professional men specially trained to scientific observation, and distinguished for the zeal with which they have pursued their investigation, have been closely engaged watching the structural changes of the leprous body during life, and studying its condition after death, with the hope of discovering causes from effects, and eventually removing those causes by fitting remedies. At present there are three views, each striking and important, and each with its warm supporters.

1. The *Humorialistic*, or that of a primary dyscratia, maintained and elaborated by Danielssen and Boeck. They hold that matters in the leper's body are so morbidly blended, and so specially blended, that leprosy necessarily results; that in the blood there is

an excess of albumen and fibrine, and the blood relieves itself by producing out of its incumbrances patches or nodules of the skin, the patient finding temporary relief just in proportion as the blood is relieved; and new worry as soon as the blood has to deliver its fresh accumulation of faulty matter.

2. The *Solidistic view*, or that of developmental tissue-defect. For a full explanation of this theory, which is maintained by Dr. Vandyke Carter, I must refer the reader to his world-known work on Leprosy, published in 1874, under the sanction of the Secretary of State for India. The learned doctor sums up his clear reasoning with the following words:—"In the absence of other adequate explanation of the phenomena of this disease, I am disposed to attribute much influence to the local nervous affection; and I still hold that there is no primary cachexia in leprosy, and also that the changes of the peripheral nervous system are the essential cause of a large part of the phenomena, which has been erroneously referred to an imaginary cachexia: nor am I aware that in any other theory of the disease, these special lesions and special sequences are sufficiently taken into account.

"Finally, I observe, that so often has incipient leprosy appeared before me in men and women whose health and general condition were otherwise quite good,* that I was disposed to ignore the presence

* Dr. Heidenstam gives a case which fully supports Dr. Carter:—"The only death which occurred during the year was that of an old woman of over 90 years of age, who, although she had lost her four limbs and had been an inmate of the asylum for upwards of 50 years, died from the effects of old age." Very little cachexia there!

of a blood-dyscratia, and to look for an extraneous cause, or a local tissue-defect in explanation of the origin of the malady. Whether both these influences may co-exist; or, in other words, whether the so-called 'predisposition' to leprosy is a tissue-defect, is a question to be considered." *

3. The *Parasitic view*, or that of a systemic infection and secondary dyscratia, the suggestion of Dr. Hansen of Bergen.† He considers that leprosy comes from without, first to the skin, and after a while to the blood, and is an infectious disease; that certain structural elements exist in all parts of the confirmed leper which are the seat of active leprous changes. These rounded gatherings are collections of organisms which carry on the work of more and more diseasing the body, until the poor sufferer, after having gone through many and trying poisonings of the system, finds rest in death.

This view of Dr. Hansen invites us to a patient and careful consideration of a very delicate matter—the cause of leprosy. That it is a study of the utmost importance all interested in the question of leprosy must admit; and those who have given any attention to it will scarcely need to be told that the "bacilli" theory bears directly upon the etiology of the disease. In this part of my subject I confine myself solely to the consideration of the testimony of those scientific specialists who have devoted themselves to the investigation of this most delicate and

* 'Leprosy and Elephantiasis,' pp. 168, 169.

† *Ibid.*, p. 169, note.

intricate question; in order, as far as I can, to show the probative weight of the evidence, as distinguished from mere probability or inference, hitherto produced to the side of heredity.

Taking the population of British India at 180,000,000 —a low census—and the lepers at 120,000, we have only one in 1500 leprous; it at once follows that climate, food, place, modes of life, and other influences have no effect upon millions, yet a certain few are affected. Whatever may be the cause of leprosy, it is evidently wonderfully capricious in selecting its victims; and how are we with the supposition that it is incurable to explain the fact that, be leprosy hereditary, or contagious, or both, it has, after a free run of some 3000 years, only 120,000 subjects scattered over a region 2000 miles long by 1800 broad. Surely heredity, it may be argued, does little and contagion not much, and some go so far as to maintain that neither one nor the other has any influence in extending the oldest and most severe and widespread of the chronic maladies incident to man. Dr. Carter powerfully puts the case thus:—

"Not all members of a family, perhaps not one-half, are affected, whence a doubt as to the prime importance of hereditary influence; and, further, here is a leper who has not been in association with others like himself, and who has no relative affected, whence is excluded (to all appearance) the idea of contagion. If I next add the connecting remark that lepers are no ways distinguished from the healthy but by their

disease, I shall have brought the question of etiology to an issue." *

This large-hearted, learned, painstaking and dispassionate thinker then proceeds to consider "the two casual influences of heredity and contagion." With respect to heredity, I must refer the reader to the Doctor's elaborate tables, accompanied by a long and close discussion, and give in a few words his conclusion in 1867, together with the support rendered him by the aged Norwegian savant, Dr. Danielssen :—

"Leprosy never arises in a spontaneous manner, and this I hold to be quite indispensable to valid research, for if the disease may arise in more ways than one, bewilderment and confusion are the inevitable consequences. It is most probably a complaint which is transmitted from parent to offspring; that is to say, something essential to the complaint is so transmitted. Such essential element may as well be called a latent form of the malady itself.

"Briefly, and with respect to experience in India, I am of opinion that heredity is the common cause of the complaint." †

To this last passage is attached the following note :—

"At the time when my data were being collected, I was not aware of the similar opinions to my own which were already prevalent in Norway :—

"In 213 individuals ‡ attacked with leprosy, now in hospital, the disease was hereditary in 185, and in only

* 'On Leprosy and Elephantiasis,' p. 177, 1874.

† We shall find that further experience led Dr. Carter to modify very much this opinion.

‡ Danielssen and Boeck, p. 336.

24 had it spontaneously arisen; these proportions being about 87 per cent. and 18 per cent. respectively. At a subsequent date Danielssen found a less proportion of hereditary cases; thus, among 1468 known lepers in certain districts, 837 acknowledged some form of heredity, the ratios being 158 and 58; and in India I found much less than 58 per cent. of all lepers had owned to a family taint. I may mention here that Danielssen records a percentage of heredity of 60 in nodular leprosy, of 52 in nerve leprosy, and of 58 in the mixed forms. These are high ratios, which experience elsewhere seldom quite confirms; yet it is to be remembered that in no other country besides Norway are the statistics regarding leprosy collected so carefully and by such competent aids."

In order that the opponents of heredity may have a fair hearing, I will first give at length, and in his own expressive words, a passage from the pamphlet of Dr. Drognat-Landré in which these very statistics from Norway are ably discussed. The reasoning is highly interesting:—*

"Danielssen et Boeck, desquels on peut dire qu'ils ont les premiers fait des études suivies et approfondies sur cette maladie et ont pu acquerir une riche expérience dans d'excellents hôpitaux, declarent l'hérédité comme une des principales causes de la dispersion de la lèpre ou spédalskhed sans qu'une cause occasionelle quelconque ait besoin d'y coopérer.

"Ils tachent de confirmer leur opinion par une statistique redigée sur 213 malades, dans l'Hôpital

* Le Dr. C. L. Drognat-Landré 'De la Contagion Seule Cause de la Propagation de la Lèpre,' pp. 20, 21, 22 and 23.

de Saint-Georges à Bergen. Afin de mieux pouvoir en juger, je reproduis ici cette statistique en entier :

HÉRÉDITÉ CHEZ LES SPÉDALSQUES TUBERCULÉS À L'HÔPITAL DE SAINT-GEORGES.

Nombre total des spédalsques tuberculés.	Dans la ligne directe et descendante.						Dans la ligne collatérale.					
	Nombre des spédalsques du côté paternel.	Nombre des spédalsques du côté maternel.	Série des générations de cette ligne des deux côtés.				Nombre des spédalsques du côté paternel.	Nombre des spédalsques du côté maternel.	Série des générations de cette ligne des deux côtés.			
			1re génération.	2me génération.	3me génération.	4me génération.			1re génération.	2me génération.	3me génération.	4me génération.
145	17	26	13	25	1	4	40	44	28	40	6	10

"Ainsi, sur 145 spédalsques tuberculés, 127 le sont devenus par hérédité.

HÉRÉDITÉ CHEZ LES SPÉDALSQUES ANESTHÉTIQUES À L'HÔPITAL DE SAINT-GEORGES.

Nombre total des spédalsques tuberculés.	Dans la ligne directe et descendante.						Dans la ligne collatérale.					
	Nombre des spédalsques du côté paternel.	Nombre des spédalsques du côté maternel.	Série des générations de cette ligne des deux côtés.				Nombre des spédalsques du côté paternel.	Nombre des spédalsques du côté maternel.	Série des générations de cette ligne des deux côtés.			
			1re génération.	2me génération.	3me génération.	4me génération.			1re génération.	2me génération.	3me génération.	4me génération.
68	12	14	7	15	..	4	12	20	10	18	1	..

"Ainsi, sur 68 spédalsques anesthétiques, 58 le sont devenus par hérédité.

"Chez 185 spédalsques, ils croient donc que l'origine de la maladie était héréditaire, chez 28 spontanée. De plus cette statistique nous démontre que l'hérédité serait plus frequente dans la ligne collatérale que dans la ligne directe ; que la maladie se déclarerait bien plus dans la deuxième et la quatrième génération que dans la première et la troisième. Ils affirment que si la maladie laissait la première génération intacte, elle attaquerait la plupart des membres de la deuxième génération, et celle-ci la propagerait de nouveau par hérédité. Souvent elle sauterait aussi la deuxième et la troisième génération pour dominer plus tard avec plus de vigueur dans la quatrième. Ils accusent ensuites differentes influences météoriques et telluriques, et de mauvaises conditions hygiéniques, parmi lesquelles une alimentation defectueuse, comme causes occasionelles qui favoriseraient le développement de la maladie. Qu'il me soit permit de faire quelques remarques sur leurs assertions.

"Il me semble que dans la ligne collatérale, il ne peut être d'aucune mention d'hérédité; et que par consequent 84 (57 pour 100) des lépreux tuberculeux et 32 (47 pour 100) des lépreux anesthétiques ne prouvent rien pour l'hérédité de la spédalskhed. Les cas de lèpre dans les lignes collatérales (sans parler des lignes directes) plaident au contraire en faveur de la contagion de cette maladie.

"Une propagation qui saute la première ou même les troisième et quatrième générations dans la ligne directe et descendante (en effet, chez 30 [20 pour 100] des lépreux tuberculeux, et 19 [28 pour 100] anesthétiques)

n'est pas non plus encore constatée avec certitudes par ces auteurs. Lorsqu'ils disent : ' Quand la disposition à la spédalskhed est présente, qu'elle soit héréditaire ou acquise, il est evident que tôt ou tard elle se convertit en maladie, sans se comporter ni d'après le climat, ni d'après d'autres relations,' et qu'ils démontrent ceci par des faits nombreux, il s'ensuit très-distinctement que si, par exemple, le grandpère et le petit-fils sont lépreux, et le fils sain, ce dernier selon ces auteurs ne peut avoir aucune disposition à la spèdalskhed : car, selon eux cette disposition aurait du se prononcer.

" Je puis à peine m'imaginer qu'on puisse envisager l'hérédité de cette manière ; si l'on eût presumé la prédisposition chez le fils, mais pas encore tellement dévelloppée qu'elle put se trahir par des symptomes visibles, alors on aurait pu parler avec quelque droit d'une hérédité chez le petit-fils.

" Cette statistique nous démontre ensuite (la possibilité d'hérédité etant acceptée) que l'intensité avec laquelle l'hérédité se développe est très-faible parce que dans la ligne directe descendante on remarque très-peu de lépreux dans la présente génération, la plupart, au contraire dans la deuxième.

" Une hérédité dans les troisième et quatrième générations devrait bien être considérée de plus près, quand on réfléchit que les mariages avec des personnes saines par cette suite de générations, doivent entraver d'une manière évidente l'hérédité de ces mêmes conditions anomales.

" Dans chaque maladie, même quand elle n'est

basée que sur un développement autochthone, on obtiendra, une statistique pareille, et c'est pourquoi il n'est pas permis d'en déduire la dispersion d'une maladie par une transmission héréditaire."

Another equally able and certainly a most determined opponent of heredity is Dr. Munro. A few passages from his long and interesting discussion of the subject will be sufficient to show the line he takes and the conclusion at which he arrives. Having defined "hereditary disease," he proceeds to examine the argument of Danielssen and Boeck, founded on more than one person being affected in a family: the word "family" being used to include all relations to the fourth generation. They have asserted, as already quoted, that of 213 cases, 189 were hereditary. "When we remember (reasons Dr. Munro) that if all relatives within the fourth degree are included, as many as 50 to 100 more persons would be taken in, there is nothing wonderful that in Bergen, where every four-hundredth person is a leper, or in St. Kitts with nearly the same, even apart from contagion, some families should have two or more members affected. Again, as a man has twice as many grandparents as parents, this would account for the greater frequency in the second generation." *

He then asks, "Is the argument founded on collaterals being affected of any value?" and at once answers, "I think not," and upholds his opinion by an apt illustration :—

"In the cases I inquired into at St. Kitts, out of 72

* 'On Leprosy,' p. 72.

cases, in 8 the family history was uncertain, but in 2 of these 8 the uncertainty was only in regard to the grandparents, all others were healthy. Among the remaining 64, the most careful inquiry from the patients' friends and residents on the estates, in regard to relations, could elicit no history of leprosy in the family in 34 cases. The other 30 had leprosy in both lines in 4 cases, in the direct line only in 5, and in the indirect line only in 21 cases ; of these 21, three were in brothers and sisters *living together*, one case only becoming affected four years after her brother, who was attacked in Antigua, but returned and lived in the same house with her. There were 5 in brothers and sisters, and also in uncles and cousins besides, and 13 in uncles, aunts, or cousins (third cousins included). Now of these 13 I found that 8 were in more or less continuous communication with the affected relatives; in one illustrious case the boy having lived with his aunt while she was sick apart from his mother. In 2 cases there was uncertainty as to contact, but in one of those, who had been 20 years sick, his leprous aunt died of cholera three years after his attack, and he had lived all his life in one village beside his family and relations. In 3 instances only was it stated that there had been little or no communication, but of the truth of this statement I am more than doubtful in one case; and in another case, whose half-niece was affected 12 years *before* him, he attributed his illness to *sleeping with a leper;* an example of the danger of concluding that such a case is necessarily hereditary

because there has been no contact with the affected relatives." *

The deduction from these facts is a fair one, but it will be seen to rest entirely upon leprosy being contagious :—"From these figures it is clear that unless the disease were proved to be non-contagious, the fact of its existing in the collateral line is no proof of heredity."

To illustrate more forcibly this deduction, several remarkable cases follow, succeeded by others, by means of which the question is considered, "If in 4 of 72 cases there is leprosy on both sides, would that prove heredity?" the answer arrived at being as follows, "There is nothing in this series of cases to prove heredity, but rather the reverse, so long as the possibility of contagion by close contact is at all admitted." †

Having dealt with heredity on the father's side and on the mother's, a very telling paragraph is presented :—

"Another proof against heredity is the great number of cases in which there is only one leper in a family including relatives. I have already mentioned the number in St. Kitts, which was 34 in 66, and Danielssen and Boeck, Brassac, Milroy, and others mention cases to the same effect. But even *among the other* 32 in St. Kitts, on careful inquiry I found cases such as the following :—An uncle had been, and his niece and nephew were affected, but *that uncle himself* was one of a family of *thirteen* children, *all of*

* 'On Leprosy,' pp. 72, 73. † *Ibid.*, pp. 74, 75.

whom grew to middle age perfectly healthy, as Dr. Boon was able to assure me, he having known them all. And this is only one instance of families of twelve, six, and four, brothers and sisters, in which only one brother or sister was affected, showing of itself that the disease was not hereditary. In no family, including relations, have I ever seen among the blacks more than three members affected, and that of the uncle, nephew, and niece was one of these." *

Non-heredity is further defended by the fact that in China,† where lepers intermarry and are only allowed to marry lepers, the descendants are looked upon as clean in the fourth generation. Also by the statements of Kicrulf and Holmsen, the former holding that in Norway cases arising *de novo*, i. e. according to him not from heredity, always arise in places where the disease is endemic and never where it is unknown ;‡ while the latter states that when a case arises in a new district, *it is always caused by a leprous individual.* §

Dr. Munro sums up the matter as follows:— "Leprosy, I hold, is not always, but only very rarely transmitted from generation to generation ; has never been proved to be transmitted without contact ; is not constantly transmitted, even when both parents are diseased ; seldom affects more than one child in a family, and those only successively, independently of

* 'On Leprosy,' p. 77. † *Ibid.*, p. 78.

‡ Virchow's 'Archiv,' 1853, B. v. p. 13, "Le dévelloppement spontané y a toujours lieu dans des endroits où la maladie est endémique et jamais dans les lieux où elle est inconnue."

§ 'Norsk Magazin,' B. v.

age, sometimes the youngest first after contact, and goes back from child to parent when in contact. From all that I have learned of the disease, I can find no proof of even the hereditary predisposition allowed to exist by Virchow, but feel much inclined to believe with Landré, that contagion is the only cause of its propagation. Even one well-authenticated case of a son or daughter of a leper removed in infancy to a country where the disease is unknown, as from the West Indies to England, and becoming a leper twenty or thirty years afterwards, would do more to establish the possibility of hereditary transmission than hundreds of cases of persons who have been exposed to the possibility of contagion, either from their parents themselves or others. Such proof might also be sought in localities where leprosy is dying out, where the *last* person affected was the grandchild of a leper who had never been in contact with his ancestor; but until such proof is adduced the disease cannot be looked upon as hereditary." *

The following case, reported by the Sanitary Commissioner from Cyprus, is in the direction of Dr. Munro's test requirement:—

"Sixteen years ago, Epistomi, a leper born of leper parents, married in her native village Akathon, a healthy man, and by him had a child, a son, who became a leper. On her husband leaving her she came to the Leper Farm, and after two years had an illegitimate daughter. The daughter was left at the church door to the mercy of the world, and when

* 'Leprosy,' p. 79.

found was kindly adopted by a well-to-do family. She was brought up with all care by those who were strong and well and had no history of leprosy in their family, and at the age of ten showed signs of the disease. At fourteen she was admitted to the Leper Farm a decided leper. In this case, which I have carefully traced, its origin would be considered as hereditary."

Dr. Day has seen leprosy in an infant in arms whose mother was a leper, and Dr. Porteus has treated a child four years old.* Drs. Danielssen and Boeck have seen young children affected with tubercles, and their parents stated that these children had bluish spots on the skin at birth, which subsequently became tuberculous. They have also met with cases of the anæsthetic form at eight years of age, and in these cases, according to the parents, there had been bullæ on the extremities at a very early period of life. On the other side it may be said, and with great force, that *no medical man has ever seen a case of congenital leprosy.*

It can scarcely be expected that the opponents of heredity will at once convince the great body of experienced medical men who are against them of the non-heredity of leprosy. Indeed Dr. Munro himself says, "I do not deny that leprosy may be occasionally hereditary, but only say that it has never been proved to be so." If it may be "occasionally hereditary," then surely it may be, and probably is, frequently so; but of course no one can set forth how frequent, and an opponent always has as a resource the assertion

* Report of Royal College of Physicians, 1867.

that it is much more likely that the child was affected by the leprous father or mother through contact after birth, than by any germ of the disease conveyed before birth.

That, in fact, is the very way that Boeck's proof of nine Norwegians in America is met, a proof which he considers so complete that "natural science surely requireth nothing further." Of eighteen cases seen, nine left Norway lepers, the other nine were attacked two to fourteen years after emigrating; of the first nine, four had leper relatives, five had not; all the second nine had. Certainly this does speak powerfully of heredity, but Dr. Munro resorts to a question which, while it does not prove Dr. Boeck wrong, just so far disturbs his conclusion that it can scarcely be declared unanswerable. "Nothing is stated as to the last cases attacked being related to or in contact with the others; a communication almost, if not quite, certain to happen among foreigners in a strange land, whose community of language would drive them together. It is a pity these points were not inquired into, as without them we must reject the so-called proof, and believe that some of the nine brought the disease with them from Norway; the others either did so or were infected in America." *

Perhaps I cannot do better than close this discussion touching the heredity or non-heredity of leprosy with valuable and highly suggestive passages from Reports by Dr. H. V. Carter. They will be consolatory to either party.

* 'Leprosy,' p. 79.

"I take this opportunity of alluding very briefly to the latest investigations with which I have become acquainted, from their great interest and value. Dr. G. A. Hansen is engaged in a series of inquiries which cannot but throw much light upon the origin and nature of leprosy. These point to the parasitic origin of the disease; and by Dr. Hansen's kindness I have myself seen the minute organisms (a species of *Bacterium*) which are present in living leprous matter taken from the interior of a tubercle. Should these inquiries terminate in demonstration, it would be necessary to reconsider the topics I have just mentioned; for, as Dr. Hansen justly remarks, if leprosy be shown to be a specific disease (like cholera, the exanthemata, &c.), then its propagation by hereditary transmission must be very limited, because no specific disease presents real hereditary characters. Some might admit that proofs of heredity in disease are of the hypothetical order; and as regards leprosy, it is not perhaps impossible to understand most of the signs of supposed heredity on the ground of local infection or personal contagion." *

"As to hereditary transmission of leprosy, inquiries made here (Crete) were negative in result. We saw a young man of 23, a priest, whose father and mother were both lepers. He was nursed by his mother (who is dead), and his father happened to die during his visit to Candia. This young man, their son, is in good health. The old priest asserts that he has known the second generation to be also free from disease, and it

* Report on Leper Asylums in Norway, 1874, p. 27.

is positively stated that amongst the numerous families of lepers (some forty or fifty) living in this place, in only two instances is it known that the children became lepers. The offspring of the diseased have a perfectly healthy aspect. Several healthy wives of leper men were shown to me, and the grandchildren of some older individuals healthy and strong were also produced."

"Dr. Ittar (practising in Crete) undertook a special examination of these people, and he found amongst 90 lepers 42 (including children) not married; 48 are or have been married, and they have 88 children. All these children are not grown up, but several of the oldest ones are near thirty years of age. Only five children are leprous (about 6 per cent.); of these, three were born outside and two in this place. Not a few of the older children have arrived at marriageable age, and some have healthy children of their own. Only 16 of the 90 lepers (17·7 per cent.) had leprous parents, of whom nine were fathers and seven mothers."

"After these emphatic statements which tend to show that heredity is very rare, at least it was rather perplexing to hear of instances showing the reverse. Thus a young man here had a leper father, but was himself born in Athens, and lived there till the age of puberty, when signs of the complaint appeared. He then returned to Crete, and now his feet and one hand are distorted. At Athens leprosy is not endemic."

"Thus to all comprehensive statements on these subjects it is easy to oppose individual exceptions;

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and the facts which would link disconnected data of this kind are yet waiting to be discovered. This is a statement which applies to the whole of my experience." *

Such were the conclusions of Dr. Carter on the heredity of leprosy after his interesting tour through North Italy, the Greek Archipelago, and Palestine in the year 1874. Two years later he made, at the request of native chiefs of Kattiawar (Bombay Presidency), a journey of inquiry through their States in order to visit lepers in their homes and to ascertain all their social and hygienic surroundings, their race, individuality, and prospects. That journey evidently qualified still further some of this great student's earlier views with respect to the heredity of leprosy. The following analysis of data collected by him will be found to fully uphold my assertion.

"*Tubercular Leprosy.*—106 males, 22 females. Taint in the direct or parental line: 19 per cent. of males, 50 per cent. of females: that through the father (most) and paternal grandfather amounting to 15 per cent. of males, 32 per cent. of females; leper men had mother lepers in 4 per cent. of the whole, leper women had leper mothers in 14 per cent.—a striking difference, which is consonant with my earlier researches. Taint in the collateral line of uncles and aunts: 10 per cent. of males showed this, 22 per cent. of

* Report on Leprosy in North Italy, Greek Archipelago, &c., p. 10, by H. Vandyke Carter, M.D. A valuable and instructive paper well worthy careful reading.

females: the father's brother is oftenest the leper relative (8 and 18 per cent. respectively), the mother's brother is proportionately named oftener by women than by men. Co-equal taint—brothers and sisters lepers: 11 per cent. of males named a brother, 1 per cent. a sister leprous: 9 per cent. of the females had a leper brother, none of the 22 had a leper sister.

"*Anæsthetic Leprosy.*—100 males, 33 females. Taint in the direct line 14 per cent. of males, 12 per cent. of females, or about equal: here, too, fathers are oftenest named, and by women the paternal grandfather; whilst men curiously name also their mother and mother's father as being lepers, no women naming either. Collateral taint is given by 10 per cent. of males and 9 per cent. of females: it is chiefly through paternal uncle, but father's sister is also named: one man names his mother's sister as being affected. Brothers and sisters as lepers: 11 per cent. of males, 13 per cent. of females: brothers are much oftener given.

"Altogether about 30 per cent. of all lepers have some direct or collateral taint, and about 70 per cent. have none. 11 per cent. have a brother or sister leprous, but no other evidence of a family taint. Hereditary taint proper is more strongly marked in tubercular leprosy than in anæsthetic leprosy, viz. as 37 : 23·3 per cent.

"Were it possible to negative the idea of contagion in all these instances of family taint—of contagion, that is between parent and child, uncle and nephew, &c., who had many opportunities of coming together—then the series would be emphatically in favour of

ANÆSTHETIC LEPROSY.


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heredity as one means by which leprosy is now being propagated in India. But it is frequently not possible to admit the absence of likely contagion in a family, and even after all allowance of this kind it appears that the majority of lepers had no leprous relatives. No instance of a leprous family impressed me more strongly than that of five leper lads at Gorkhi whose mother was a leper, but it gives no certain sound, for these lads all lived together in one house. They were, however, the only lepers in the village.

"In short, heredity as a mode of transmission of disease is subject to exceptions, no less than is contagion; and as soon as one difficulty is met by a fair assumption, on either view alone, another difficulty will arise, and it seems to me that we are not as yet enough acquainted with any whole series of cases to warrant valid inference. With our present knowledge it may be urged that both heredity and contagion can never concur in the propagation of leprosy, because no disease is known which is certainly capable of this double transmission; and since it is highly likely that leprosy has but one single *vera causa*, the admission of one proximate agency will of necessity exclude the assumption of all others. But while one has no right to insist beyond the limits of ascertained data, it is not beside the mark to suggest that communicability of disease germs may, according to the reasonable doctrine of pangenesis, be essentially of the same nature in both heredity and contagion. Heredity as the exclusive agent in the propagation of this disease hardly having been maintained by observation in Kattiawar

does not seem to be entitled to the position once allotted to it."

It will, I feel sure, be long before the world generally will accept the theory of the non-heredity of leprosy —how it will treat the non-contagiousness of the disease is quite another matter. To that point I will now invite the reader's attention.

As the question of leprosy being contagious or not is one chiefly of facts and fair deductions from those facts, I shall quote freely from the writings of medical men who have long treated the disease, and endeavour to be strictly impartial, giving, where I deem it necessary, my opinion, leaving to all interested in this important subject to judge for themselves where truth lies.

The following very high testimony is against contagion—that of Dr. Boeck:—

"For over a century we have had in Bergen, where leprosy does not exist, a hospital for lepers (St. Jorgens), where more than a hundred patients have been received. The lepers of this hospital have previously been allowed to walk unhindered about the town, and as far as I am aware no one has ever heard of a case proving contagious. In this hospital a certain number of healthy nurses have been employed, and as yet none has been seized with leprosy. In different districts there are several married couples, of which the one has been leprous, but without causing infection to the other."

Dr. H. V. Carter (with Dr. Ittar, practising in Crete) reports:—"The leper village is known as the

'Meskinia,' or resort of 'Meskinos' or lepers. It occupies the western face of two low hills situated about half a mile beyond the fortifications of Candia. Its site is elevated and inclined, and the subjacent soil is the bare limestone. The population is a mixed one; probably 1000 people live here, and of these only 90 are lepers. Most lepers are Greeks (60), yet most inhabitants are Turks; and, in short, this village, once destined as a refuge for the outcast leper, has become the domicile of a large healthy population, who mingle in the freest possible manner with the diseased. It is the custom for the unaffected members of a leper's family to join the expelled individual; and besides, many poor people, especially Turks, resort to this place because of cheapness of house rent and position congenial for work in the adjoining city. As soon as this wholesale intermingling becomes apparent it strikes one with astonishment and even dismay. None of the lepers are allowed to enter Candia, but part of them take turns in begging at the gates of the city, where they may always be seen. The Greeks have a double turn because the more numerous, and lepers comparatively well off *will* take their turn. They like it. Many intelligent lepers assured us that not one instance has there been in this village of leprosy being propagated to a healthy person from a diseased. The people living here must necessarily be in close proximity and members of the same family in the closest intimacy, yet in the only two instances where leprosy has appeared *de novo* the new sufferers had leper parents, and no one of healthy parentage

has caught the complaint, although there are some hundreds of unaffected people living amongst the lepers. This statement refers to a period of fifty years distinctly recollected by old residents here." *

Dr. Joubert, from Burdwan, 27th February, 1877, reporting on leprosy in the Lower Provinces, says :— "Of thirty lepers treated by me, I only found one man who attributed his disease to having lived with lepers and denied hereditary taint. In my opinion I have seen nothing in the cases of leprosy that have come under my observation to support the popular idea that it is contagious ; and the minute pathology of the disease, shown by recent observers to be a disease of the nerve trunks, is strongly against any such theory."

Dr. Milroy writes, October 17th, 1871, from Demerara :—"The almost unanimous conviction of the most experienced observers in different parts of the world is quite opposed to the belief that leprosy is contagious or communicable by proximity or contact with the diseased."

Dr. Browne, in charge of the Barbadoes Lazaretto, reports to Dr. Milroy :—"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 from an inmate, have escaped, although the wound was followed by great constitutional irritation and loss of the finger." †

* Report of Dr. H. V. Carter, Crete, pp. 8, 9, 10.

† Report on Leprosy by Roy. Coll. of Phy., 1867, p. 32, Barbadoes.

Dr. Clarke, one of the ablest and most experienced medical practitioners of the West Indies, speaks without hesitation, "I believe leprosy cannot be communicated by direct contact. I have known instances of man and wife living together for years, the one a leper, the other sound, without the disease being communicated. Leprous persons have always been admitted into the Bridgetown Hospital without difficulty; they occupy a bed in the ward like any other person. They are received into the jail like other prisoners." *

Dr. Saturnin, formerly the Physician of the Leper Asylum in Trinidad, makes the following strong assertion:—"In my long professional residence in Trinidad, during the twenty-two out of the thirty-four years of which I was medical superintendent of the Leper Asylum, I have never met with an instance of leprosy appearing to be contagious; nor have I ever known a case which even made me suspect that it was so." †

Dr. Espinet remarks of the same institution:—"I have never met with a single instance where leprosy appeared to me to be contracted by contagion. None of the staff or servants have ever contracted the malady. The wardsman, who has been employed for upwards of twenty years, and who is in daily contact with the lepers, and frequently drinks out of their cups, is quite free from the trace of it." ‡

The testimony of the other most experienced medical

* Report on Leprosy in the West Indies, by Dr. Milroy, p. 15.

† *Ibid.*, p. 20.

‡ *Ibid.*, p. 20.

men in Port Spain (including Mr. Murray, who has been in leading practice for upwards of forty years; Dr. de Verteueil, distinguished for literary as well as professional attainments; Dr. Mercer, for many years the chief medical officer of the public hospital, and Dr. Crane, Surgeon-General of the colony, is in strict accordance with the above views.*

In the Report of the Committee of the Royal College of Physicians, the following decided opinion is given after a scrutiny covering the working of leprosy over the whole world:—"The all but unanimous conviction of the most experienced observers in different parts of the world is quite opposed to the belief that leprosy is contagious or communicable by proximity or contact with the diseased. The evidence derived from the experience of the attendants in leper asylums is especially conclusive on this point."

"The few instances that have been reported in a contrary sense either rest on imperfect observation or they are recorded with so little attention to the necessary details as not to affect the above conclusion."

This judgment of the College of Physicians is apparently strong testimony on the side of non-contagion; but common honesty bids me assert that it is in reality of little worth, based as it is on a body of reports made, we are told on high authority, not seldom with reckless hurry. To render such returns of real value requires long and careful scrutiny, whereas in India and elsewhere actively occupied medical officers have little or no time for a work which, unless carefully and

* Report on Leprosy in the West Indies, by Dr. Milroy, p. 20.

steadily done, is useless. It must also be remembered that the College of Physicians, when in 1867 they so decidedly opposed segregation, were children as regards leprosy when compared with the experienced specialists of the present day, whose study of the disease during the last fifteen years has resulted in important discoveries which have greatly modified the opinions of eminent non-contagionists, and led some of the leading writers on leprosy almost to declare themselves on the side of contagion.

Here I would observe in justice to all parties that even supposing leprosy to be contagious the action of the virus is so difficult to discern that it escapes the closest attention of the ablest observers in all countries and all climates. This ought to be borne well in mind while examining the following testimony of the upholders of contagion. In a struggle the victor loses nothing by recognising the power of his antagonist.

Throughout the East Indies, and I may say in almost every place and age, the natives have fully believed that leprosy is contagious, and in Syria so strong is the conviction that they express it in a proverb, "Flee from a leper as you would from a snake." It is argued that no great reliance can be placed upon such an opinion, for wherever it is the custom ruthlessly to drive a diseased person from his home because he is loathsome and worrying, the thought soon prevails that expulsion is exercised simply that the whole may not be contaminated by the sick. While saying this, it is only just to state that the millions of India and elsewhere are supported in their judgment

by men of no mean schools of medicine. Avicenna and all Arabian physicians are unanimously of opinion that leprosy is not only contagious but highly so, and Greek and Latin physicians seem to have thought the same. Then again casting out the dearest relatives must have been no hastily formed custom, but only deemed a dire necessity when leprosy after close thought and long experience was declared contagious, when it had been made certain that the suffering of one would secure the peace and comfort of a multitude.

Thus far there are in favour of the contagiousness of leprosy overwhelming numbers ; but reason, not numbers, must decide the question. To reason let us go.

Let the enthusiastic and unflinching champion of the contagion of leprosy be first heard. To all who have studied this subject closely I need scarcely say that I allude to Dr. Munro, who conducts his case with marked ability.

The chief arguments (he says) against contagion have been :*—

1. "That many married couples live together for years, one being diseased without the other being affected.

2. "Hospital dressers, hospital physicians, and in former times queens, who washed the sores of lepers, are said not to be or not to have been attacked.

3. "That even inoculation of the leprous matter has failed to reproduce it, and that medical men engaged making post-mortems of lepers, and have their hands bathed with the fluid of leprous bodies, are not infected.

* 'Leprosy,' pp. 80–87.

4. "Many are exposed to contact with those suffering from the disease, while only a few are affected.

5. "It has never spread in England or other countries now clear of it, from imported cases."

Let us consider these statements seriatim.

No. 1.—It fails, says the Doctor, *in toto*. As regards married couples, the one that is whole is generally too old to receive the disease at the time when the leper is in the most fitting condition to convey it. When such is not the case, the disease is frequently conveyed. This latter statement is supported by an appeal to Tilbury Fox, Planck, Erasmus Wilson, Van Holst of Dutch Guiana, Manget of Demerara, and Nicholson of Antigua, each of whom quotes a case of a European infected after dwelling with a leper woman. Then follow other isolated cases fairly brought forward to strengthen the position.

Here the anti-contagionist steps in, and asserts that when the few examples supplied in favour of contagion are compared with the hundreds of healthy who with impunity reside with the leprous and the thousands in the midst of whom the leprous live day by day, the Doctor's position becomes exceedingly weak, inasmuch as the exceptional cases may have contracted the disease from heredity or some other unknown influence.

The objection is a fair one, but of no great worth. Think of the millions that escape the various contagious and infectious diseases which from time to time are said to *rage*, and those, be it remembered, diseases which seize their victims rapidly and slay them vigor-

ously. The incubation with leprosy is happily a long one; when discerned, the progress of the malady is slow, and its conveyance from one to another, save under special circumstances, by no means easy—there must be a recipient condition which only a few present. The objector brings no argument against contagion, but rather a call and encouragement to struggle manfully against a foul malady which, if it could spread as rapidly as cholera or measles, would soon turn the world into one vast region of pestilence.

The second plea, viz. that hospital dressers, surgeons, and others attending lepers are never attacked, were it even true, is, says Dr. Munro, equally worthless, as the same might be said of such persons in Lock Hospitals. But the case of at least one medical attendant, Dr. Robertson, of the Ile Curieuse Asylum, Seychelles, and those of several hospital dressers, some of whom at least were of clean families, are on record. Similar to these, though not occurring in Leper Asylums, were the cases of Drs. Livingstone and Kirk, threatened with disease after attending a leper, and such cases as that of a Brahmin servant, of healthy family, who was attacked after twelve years' attendance on a leper master, having had to wash and dress his sores. Carter mentions two cases occurring in the children of a sepoy in charge of the Dhurumsala Hospital, who, with his wife, was healthy.

The non-contagionists are not content with such facts, and a hundred others like them. They reason thus:—"Leprosy is so loathsome and sore-covering a disease, that if contagious it must necessarily affect

not one here and one there, but *many* of those who serve in leper homes and leper hospitals." They forget that rarely indeed do nurses or medical men suffer while doing their duty in our largest hospitals or in the crowded fever-laden cellars of our thickly populated towns. Such helpers of the sick are naturally healthy, well clad and well fed, clean in their persons and prudent in their work. It is precisely the same with the attendants upon the leprous; yes, and the loving goodwill which animates the kind doctor or nurse is in itself a cheering protection against taint. Further be it considered, no one claims for leprosy a power to convey itself speedily, but, as we have already seen, quite the reverse.

We are further told that even inoculation of the leprous matter has failed to produce leprosy, and medical men engaged in making post-mortems of lepers and having their hands bathed with the fluids of their bodies, are not infected. This third argument is not of importance either way. A priest was, at his own request, inoculated twice with impunity; a surgeon was cut when dissecting, and suffered not very severely, losing a finger; and many have had their hands bathed in leprous secretions, but no leprosy occurred. These facts may be met by again stating that they were all in rude health and especially steeled against the malady; in other words, not in a recipient condition. But Dr. Munro does more; he meets his opponent with telling examples of contagion. The case of Dr. Livingstone, who was attacked after suffering privation, having scratches on his hand;

one mentioned by Larrey, in which the disease began in the wound on a stump; and that of Hildebrand, in which a European child in Borneo was affected on thrusting a thorn into himself after a leper boy had, in his presence, done so; then, again, the boy on Robben Island, South Africa, with parents and grandparents on both sides English or Scotch, who contracted leprosy through handling the fish-hooks and baiting them for lepers when out fishing, often, we doubt not, pricking his fingers;—all tend to show the erroneousness of such an argument, and that inoculation is the chief if not the only manner by which the disease is propagated. The inoculation would only take place quickly when some special circumstance, such as the person being wounded, made it easy and certain, while more prolonged intercourse is generally necessary to afford opportunities for inoculation under ordinary circumstances.

Argument No. 4 needs no notice, as it has already been met, but the statement made in No. 5 requires attention. It is maintained that leprosy has never spread in England or other countries now clear of it, from imported cases. Up to the present it has not, and for this reason, no sooner is a case discovered than the sufferer, if poor, is taken to some hospital and there isolated; if well-to-do he is confined in one or two rooms, waited on by a special nurse, and kept carefully apart from members of his own family. I am afraid cases of leprosy in England are more numerous than is commonly supposed. I myself knew an officer, a major in the Indian Army, who

died in England after enduring a devouring leprosy, and his cousin, also an officer, died in India a sad victim of the same disease. Sir Erasmus Wilson tells of twenty cases of Elephantiasis Græcorum, which came under his observation, of which nineteen were Europeans. Interesting particulars of each are given in the appendix to the Report on Leprosy, by the Royal College of Physicians. All the sufferers had lived in leprous lands. M. Landré saw several lepers in Holland, and uses skilfully the case of the Scotchman who, born of healthy parents in Scotland, became a leper in New Brunswick.* This last fact in itself bears directly upon the question now under examination; indeed, it seems to me to fully decide the matter, for it shows that once let there be a close and constant intercommunication of all classes between leper countries and Europe, and no precautions taken, the disease may then, as it did of old, become endemic. New Brunswick, generally speaking, is a land of good health. No one can say how leprosy reached its shores; certainly it was not autochthonous. There are three suppositions all telling of contagion. "Eastern leprosy" (says a scrap from an old newspaper) "was introduced into New Brunswick from the Levant in the year 1758 by a French vessel, which had on board a large quantity of infected clothing. The vessel was wrecked and the clothing taken on shore and worn by the inhabitants, who were in due time attacked by the disease, which was so deadly that the survivors fled from the place and

* 'De la Contagion de la Lèpre,' p. 66.

formed three hamlets on the coast of the Gulf of St. Lawrence, one of which is Tracadie. The plague went with them, and no active measures were taken to suppress it until 1844, when a medical board was organised and a lazaretto established. This story may fairly be doubted; from whence it came I know not. I give it for what it is worth. Others hold, with greater probability, that emigrants from St. Malo, in Normandy,* brought leprosy with them; while it is believed by not a few that the contaminator was from Guadeloupe or Martinique. Here let it be noted that the population of New Brunswick is formed of English, Scotch, Irish and French, the last-named living on the banks of the Miramichi, where, on account of their habits and language, they have not married into other nationalities. Leprosy in the province has been confined entirely to the French, with one exception—that of the Scotchman Stewart and his family. "To what cause" (asks M. Landré) "are we to attribute Stewart's leprosy? Certainly not to heredity. If Dr. Vinkhuyzen says to '*spontaneous development*,' how does he explain the apparent immunity of the rest of the population of New Brunswick, who live under precisely the same conditions as the French? The fact is highly interesting: before 1815 leprosy was entirely unknown, but no sooner do lepers come from elsewhere, than a colonist is assailed by the disease, although he is not in the most distant degree related to those who imported it, or to any other leper on the face of the earth."

* Fifty years ago leprosy was not uncommon in Normandy and Brittany.

Landré triumphantly exclaims, "Never was there a more striking proof that leprosy is contagious." *

Drs. Landré and Munro are strongly supported in their conclusions by the Report of the Select Committee of the Cape of Good Hope to the House of Assembly, dated September 5, 1883.

Dr. Ebden, President of the Medical Board, when asked, "Is leprosy contagious or infectious?" replied, "I think that under certain circumstances it is contagious, and the fact of there being at the present moment on the Leper Island (Robben) five Europeans, each one of whom declares he never knew, heard, or saw anything of the disease before coming here, would seem to indicate that it is contagious." †

Dr. Atherstone, F.R.C.S. England, states, "I have formed a very decided opinion as to the nature of the disease, and the manner in which it is transmitted from one to another and spread all over the country. Recent microscopic investigation has established the fact that the diseased tissues and secretions are invaded by numerous parasitical rod-like organisms called *bacilli*, always of the same form and size, no

* Landré, p. 66, "Jamais on ne verra un exemple aussi marquant en faveur de la contagion."

Schilling, the first who wrote on leprosy at Surinam, declares thus: —"Superfluum videri posset de contagio lepræ disputare, de quo nemo fere dubitat." A little further on he says:—"Stat igitur sententia, contagiosum esse lepræ virus atque de parentibus in liberos, de nutricibus in alumnos, de conjuge in conjugem transire; quin etiam persuaseum habeo ex diuturno contubernio absque intima illa corporum miscela per spiritum oris et hircina ulcerum effluvia hanc luem cum aliis communicari."—*G. G. Schillingii De Leprâ Commentationes*, lib. c. p. 31.

† Report of Select Committee, p. 20.

matter from what part of the world the leper comes, or what part of the body is examined, whether the tubercles, lymphatic glands, cartilages, or suppurating sores. This specific *bacillus* of leprosy is no doubt the true cause, and it is spread by inoculation either by direct contact with the secretion or suppurating sores of the leper, or transmitted by the clothes, utensils, pipes, &c., containing these parasitic germs of the disease." *

It would be useless further to multiply quotations upholding the contagion of leprosy, but I could not with justice to my subject leave unnoticed the strong testimony in that direction presented by the Sandwich Islands. Dr. S. Kneeland, of Boston, U.S., observes of leprosy in that once healthy group: "How it is produced is a matter of question. It was not known there till 1848, at which time it was said to have been introduced by Chinese, but it was not noticeable as a disease of the country till ten years afterwards." Once introduced, how speedily it could be carried on Miss Bird makes very clear to us: "The natives themselves have been and still are perfectly reckless about the risk of contagion, and although the family instinct amongst them is singularly weak, the gregarious or social instinct is singularly strong, and it has been found impossible to induce them to give up smoking the pipes, wearing the clothes and sleeping on the mats of lepers, which three things are universally regarded by medical men as undoubted sources of infection." (Contagion?)†

* Report of Select Committee, pp. 38, 39.

† 'Six Months in the Sandwich Islands,' p. 367.

LEPER'S HUT AT METHLA, NEAR DATTA,
KATTIAWAR.

H. V. Carter, M.D. del.

And what has been the result. There was no heredity, no spontaneous disease, but there was contact with the immigrant leper, and then a reckless carelessness which, after that in 1866 segregation was legally demanded, carried some 1500 victims in seventeen years to the miserable loneliness of Molokai banishment.

Before dismissing this highly important question I cannot but again quote from the Kattiawar report of Dr. Carter. I place his testimony last, because it is that of our greatest authority on leprosy; and his now conclusions in favour of contagion have been arrived at after years of anxious and able observation. In his early days of leprosy study, Dr. Carter was an anti-contagionist. The foci and line-run of the disease in Kattiawar seem with other reasons to have convinced him that it is in some as yet mysterious way conveyable from man to man. His reasoning is clear, clever, very striking, and highly interesting.

"All the evidences which I have collected ultimately point to propagation from individual to individual, and this can occur only outwardly by way of contagion, or inwardly by hereditary transmission.

"By contagion is signified the direct or indirect communication of disease outside the body from person to person. Mediate or indirect contact is manifold and includes many possible manners of transmission, as by tainted excretions, tainted clothing or other material, or by aerial or little apparent foul emanations; the efficacy of all such means depending not only upon varied violence of contagion, but upon

favouring or counteracting qualities of the media concerned, and upon similar states of the recipient himself. The direct communication of disease also is hedged round by modifying influences belonging to both giver and taker, and these influences are so powerful and complex that the event in question becomes rare enough to be regarded by many as matter of doubt. Finally, if the inadequate circumstances under which strict medical inquiry has hitherto been conducted be taken into consideration, it is no wonder that the view of contagion as applied to leprosy is still much debated. Individually I am unable to furnish any demonstration of the accuracy of such view, and in the absence of indubitable proof, shall not enter upon a discussion of this vital subject. Only I think that the new collateral evidence of transmission by man, which is furnished by my present analysis of leper localities in Kattiawar deserves particular notice, both in itself and as a datum to be further tested; for regarded broadly the peculiarly close connection and serial sequence of leper villages most obviously points to some method of transmission, and so far as has appeared to me, there is no other agency at work than man and the surroundings he acquires.

"I have noticed for the first time a certain method of dissemination of leprosy which deserves particular attention. Taking the more infested districts, we find that while much of the surface is covered by disease, yet the leper villages are not indiscriminately scattered, and the remark everywhere applies within

fixed areas. Thus the chief town always represents a chief 'focus'; next the villages immediately around are affected, and beyond these pass off as it were lines of leper localities in various directions, which may meet and blend, or become continuous with similar lines in adjoining districts. At present I find hardly a single instance in which a leper village does not form either a focus, or a part of lines or groups such as those now mentioned.

"Next adverting to the less infected areas, a similar methodic distribution of leper villages is found. All display these striking features of 'foci' and lines of infested places, where alone leprosy is to be found; and from the circumstances of their isolation amidst numerous uncontaminated localities, such lines become even more distinct than they are in coast lying and other areas more largely attacked.

"One can hardly help searching for some reasonable explanation of the phenomenon. This is certain: fortuity, or chance, can hardly be held responsible for such marks of method; for even if amongst the several ways in which leper villages might be distributed on one area where they are numerous, it should happen that a focus, group, and line be formed, it is not likely that a precisely similar arrangement should obtain in three or four other like areas adjoining; and still less is it probable that in all other places where leper villages are but few, the latter should still assume an identical disposition. I can no where find such a concurrence of local physical characters as might serve to account for this distribution method; and so

far as I know, neither climatic not telluric conditions —as general elevation, hills and valleys, water-courses and currents, vegetation and cultivation, kinds of soil, and substratum, &c.—are so invariably alike as they should be, upon any hypothesis of this kind which may be proposed as sufficiently applicable to the case. And if we inquire on general population features, no clear light whatever appears.

"Failing thus to perceive the desired clue, I would turn for guidance to such dynamical features as change and movement of local population, degrees of intercourse between adjoining and distant villages, between villages and towns, and towns themselves, and towns with capitals or other towns, &c., belonging to adjoining areas which have not yet come under scrutiny. The circumstances of my inquiry being such as to exclude the possibility of verifying this view in detail, the question must remain for future consideration; nor should I attempt to judge if the leprous plague has followed a particular track in attaining its present distribution. However, I would insist upon the evidence already submitted that disease is now disseminated over the land after a certain fashion only; and as a possible solution of this enigma I repeat that no leper village is found to be isolated; but on the contrary all such villages are connected with others immediately adjoining—the rare unaffected spots intervening being temporary or incidental exceptions. For myself, all these data may be said to point to transmission of the leprous disease by means of human intercourse."

Heredity and contagion have now had a fair share of attention, and however strong may be our convictions with respect to them, all will to the letter agree with Dr. Bateson when in a few but expressive words he says:—"The whole question of heredity is a complicated and difficult one, and requires very delicate handling. The subject of contagion is a still more difficult one, because it is necessary to eliminate, in order to establish it, so many other conditions, most of them obscure, and more especially heredity and common local influences." *

* Dr. Belcher, whose eminence entitles him to give an opinion, amusingly deals with contagion, stating that it is "zealously disputed whether there be such a thing as contagion. The facts and arguments adduced on both sides are apparently so cogent when properly and forcibly set forward, as to lead an impartial auditor to believe both sides, or becoming a medical infidel, to believe neither. To establish the connection between cause and effect is the aim of one side, which argues because one man or a number of men were exposed to certain influences and after that exposure contracted a certain disease, therefore they contracted it from the said exposure. If all men, whenever subject to these conditions, did actually contract the given disease, then indeed there would be a moral probability as to the connection between cause and effect, but of course not an absolute certainty. The non-contagion men taking a logical stand—that an argument from a particular to a universal is invalid—produce perhaps an equal number of cases in which men were in conditions precisely similar to the others but yet did not contract the given disease; which they argue arises from other and unknown causes. Now men look at these things from different points of view, and hence it has been remarked that what we call Liberals in politics are generally non-contagion men, while those termed Conservatives stand by the old paths of orthodox contagion. So also it has been remarked that classical men, as we term them, are contagion upholders, while science men resolutely oppose contagion, and if they believe in it at all, attempt to reduce it within the smallest possible limits."—*The Hebrew, Medieval, and Modern Leprosies Compared*, by T. W. Belcher, M.A., M.D., I.C.D., &c.

CHAPTER IV.

Was the Leprosy of the Hebrews the disease of the Middle Ages, and that now prevailing throughout the World?

AT the present day (observes Dr. V. Carter) there are three kinds of leprosy, varieties of one common morbid state. "They seldom occur separately in cases at all advanced, there being one or other almost always combined at certain stages, e. g. the first with the second, the third with the second (may be the first also), the latter form (anæsthetic leprosy) being the typical and most invariable.

"All varieties occur simultaneously in the same locality, under the same circumstances; and I have known different members of one family to be differently affected with each. A parent too affected with one form will transmit another to the offspring."

There were also three kinds of leprosy (*berat*) in the days of Moses; divided by him into *boak*, or dull white; *boak cecha*, or dark berat; and *berat lebena*, or bright white berat. The first was declared clean, the two others were (*tsorat*) malignant diseases, and deemed contagious. It is equally certain that the Arabians, Greeks, and Latins had three species of the disease.

An interesting question arises, "Was the leprosy of

LEPRA LEPROSA.

H. V. Carter, M.D., ad nat. del.


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Moses the same disease as that which raged violently in Europe during the middle ages, and which is now so terrible a scourge in all quarters of the earth?"

"Most varied opinions (says Dr. Munro) have been expressed in regard to this point. Dunbar thinks that it is now an extinct disease. Balmanno Squire thinks that 'white as snow' meant psoriasis; and Kitto, from differences in the description, concludes that it was not identical with modern leprosy; but Jahn believes that it is identical with the leprosy of Guadeloupe but influenced by change of climate. Danielssen and Boeck say that there can be no doubt that it was the Elephantiasis Græcorum, modern leprosy. Schelingius of Surinam is of the same opinion, and strongly opposed Reill, who held that 'Lepra Judaica' was 'omnino diversa à leprâ Americanâ.' H. V. Carter holds that it is an undecided point, though he seems inclined to identify the eruption of leprosy with Mosaic lepra. Erasmus Wilson, Kaposi, and Tilbury Fox consider that Jewish leprosy, 'tsaraath,' included modern leprosy with psoriasis and other skin diseases. Fox points out that different kinds of 'tsaraath' were differentiated by the Jews, as such cases as that of Naaman were allowed to come in contact with others, not being unclean, as only suffering from lepra vulgaris; while others, as Uzziah, were at once thrust out as being unclean, suffering from true leprosy. Jahn also identifies the white spot 'berat' spoken of in Lev. xiii. as Morphœa, or the eruptive leprosy of the present day. I do not believe with Wilson or Kaposi that all cases of morphœa are really cases of a remnant of

leprosy, but consider that their views as to Jewish leprosy are correct.

"As the first symptom spoken of is a rising (or tubercle), which is the most prominent manifestation of tubercular leprosy, I have no doubt that Elephantiasis Græcorum was one of the forms, and probably the chief form of the leprosy of the Jews.

"Dr. Milroy points out that anæsthesia, the most important but by no means the most prominent symptom of leprosy, is not mentioned by Moses; but this argument is of no value, as anæsthesia is not found in its earliest stages, the only stages Moses required or desired to describe; and besides might, even when present, be easily overlooked, as I found when trying to discover its existence in cases of joint evil or anæsthetic leprosy in St. Kitts, in which I could hardly detect it. It might just as well be said that ἐλεφαντίατις, described by Celsus, was not true leprosy, which would be absurd, yet he says nothing whatever about anæsthesia." *

But there is another mode of dealing with the question which to me is most convincing. I find leprosy existing in the present day as freely as in the days of Moses, and that all over the world there are, as Dr. Carter has already signified, three varieties of the disease actively at work. Further, it has been fully established on the highest authority that throughout Europe and Asia, in the East and West Indies, in Egypt and Africa North and South, in the Western and Eastern Archipelago, in America North and South,

* 'Leprosy,' pp. 13, 14.


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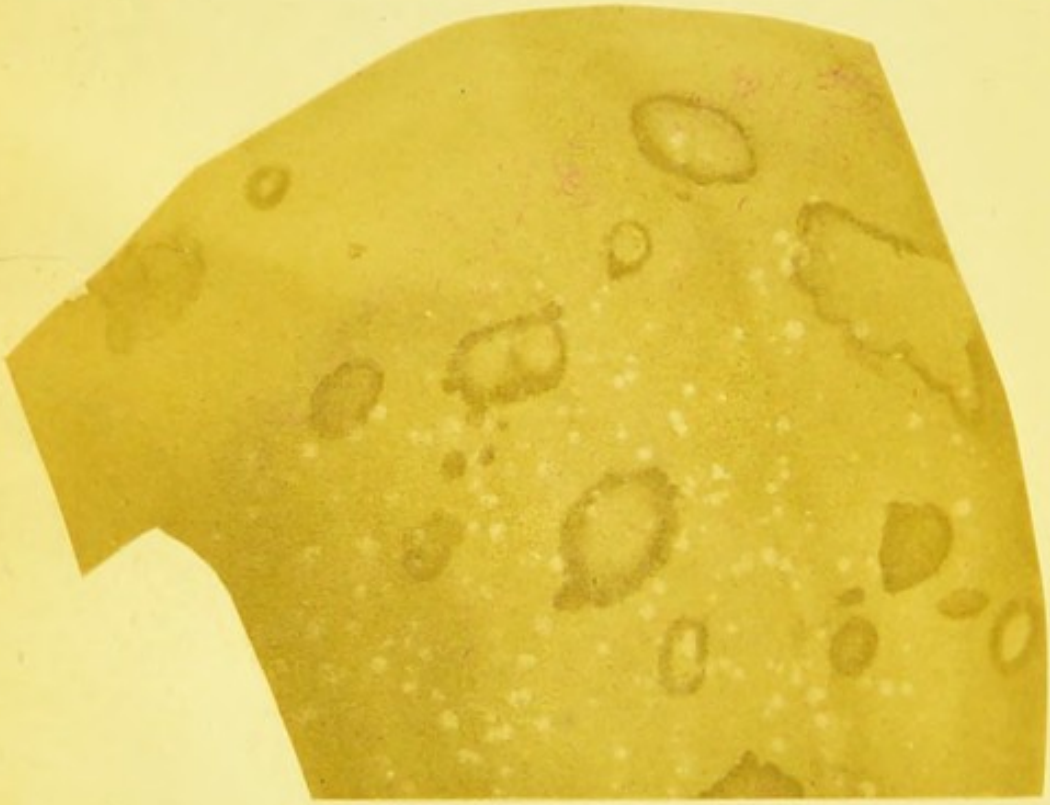

THE ERUPTION IN LEPROSY.

(*From Dr. Danielssen's Memoir on Anæsthetic Leprosy.*)

in Australia and China, leprosy, as now prevailing, is one and the same disease; the conviction therefore at once comes upon me that the Jews of old suffered precisely in the same way that lepers suffer now. They were in a land of bondage, enduring hard fare and the heaviest toil, and were therefore well fitted to receive the malady which so severely tried their cruel masters. That malady has not changed from the days of St. Basil to the present time; why should it have changed during the 2000 years which preceded the birth of that holy man? And if such change did take place, who has recorded it, and what is his testimony? We are told by Tacitus and Strabo, following the Egyptian historian Manetho, that the Egyptians drove the Hebrews from their land to avoid the scourge of leprosy—a falsehood fully disproved by Josephus*—but not one of those writers hints that leprosy was anything less than a severe and torturing disease to be carefully avoided. I cannot, therefore, without much stronger proof than that already supplied, believe that the leprosy of the Hebrews was any other than the disease known by the same name at the present day.

Before leaving this much discussed question I am anxious to strengthen further the reply to those who consider that Hebrew leprosy was not that of the middle ages nor that of the present day, but simply a scaly disease of more or less severity. This simpler form was the disease of Egypt and the Land of Promise according to the judgment of Rhenferdius,

* Antiq., lib. iii. cap. xi. sec. 4.

Cuvelius, Dr. Mead, and Dr. Mason Good, all men whose opinion is worthy of respect, because based on careful thought and firmly maintained. In their day, be it remembered, very little was known of leprosy as compared with the successful study of it during the last fifty years. It was very natural for them to believe that the Book of Leviticus, written at a time when medicine was not a science, and early symptoms in such a disease were the great because the only guide,* referred by its few but delicately accurate words to a kind of leucoderma and certain phases of it of a violent character. Had they possessed our present experience, and found that all over the world where leprosy prevails there is "Elephantiasis Græcorum," they would, I doubt not, have believed with Celsus that leucoderma and the anæsthetic and tubercular leprosy are kindred diseases—constitutional maladies; and knowing that in India, Egypt, Morocco, and elsewhere they are often found working together, they would honestly have said that in all human probability it was precisely the same in the days of Moses.

The Talmud tells us of the leprosy of a Pharaoh who lived before the Exodus. This king "had an accident, and the tender flesh was torn from his body, and his bones, which had grown brittle with the dis-

* Dr. V. Carter found that the natives of India discerned early marks of leprosy where he himself could perceive no sign of the disease. He was particularly struck by their keenness of observation. The Hebrew priest, we may be sure, had from experience the same power of discernment, and knew from the very earliest symptoms what would necessarily follow.

LEPRA LEPROSA (ACUTE FORM).

H. V. Carter, M.D., ad nat. del.


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ease, broke." That was no mere scaly complaint of the skin, but deep-seated leprosy, and as such was conveyed by the Hebrews to Canaan.

Sometimes we are told that leprosy is not now found among the Jews in Syria. Very strange if it were common there; but it certainly is there, and Jews, who are few in number, do not escape. The severe laws which prevailed against it of old and the miseries suffered during the captivities and wars of the Jews, when the victors, we may be sure, had little compassion upon any poor helpless leper, would tend to stamp out the disease, just as it was stamped out in England by public abhorrence and careful segregation. It might with equal reason be argued that as Englishmen suffer not from tubercular leprosy in this nineteenth century, that disease could not have existed in England during the middle ages. The earth is now the same earth that was trod by the Hebrews of old; leprosy was as violent in the days of Atreya (more than 2000 years ago) as it is now; never has the disease ceased, and never has it altered its character. That a gentle form of it was confined to the wanderers in the wilderness and to the few thousand square miles of the land of the Canaanites, I cannot for one moment believe. Leprosy ever has been and ever will be the same disease.*

* The Jews in Damascus, Cairo and Morocco are specially sufferers from leprosy, and generally speaking, receive the disease as readily as others.

CHAPTER V.

Can Leprosy be cured?

THERE is every reason to believe that during the known existence of leprosy (more than 3000 years, some say much longer), no cure of the disease has been discovered. In India Charaka and Susruta bear record of its ravages, but not a hint is given of a remedy; and from their days to the middle of the present century, little or nothing has been recorded of the medical treatment of leprosy. Happily, during the past fifty years exertions have been made to stay the progress of the scourge, and to relieve those tortured by its virulence, but as regards its cure, that seems as far off as ever.

In the year 1868 it was currently reported that Dr. Beauperthuy of Cumana, in the Republic of Venezuela, had at last discovered the long-yearned-for specific, and Dr. Bakewell, of Trinidad, was sent by the Duke of Buckingham, then Secretary of State for the Colonies, to investigate the treatment pursued. Nothing is more difficult than to speak calmly when we are tempted to let our wishes get the better of our reason. Dr. Bakewell was evidently too hasty in his judgment. On July 23, 1868, he writes to Dr. Beauperthuy as follows:—

"The result of the very careful inquiries I have

made, including a personal examination of every case except one (he had been but a very short time in the country) has perfectly satisfied me :—

"1. That the statements made by you respecting the cases you have cured are the exact truth.

"2. That several other cases not yet cured have been greatly ameliorated, and are progressing uninterruptedly toward a cure.

"3. That several other cases, in which, from the severity of the affection, or its long continuance, or from the inability of the person affected to procure the food which you order, it is hopeless to expect a complete cure, have been much improved by your treatment, and the disease has been arrested in its progress. It is possible that some of these cases will further improve."

This favourable report of Dr. Bakewell was placed before the Royal College of Physicians, who were dissatisfied, and begged to suggest to Her Majesty's Government, for the further elucidation of this subject, that more trustworthy and exact evidence of the results of Dr. Beauperthuy's treatment should be obtained by some competent and disinterested person appointed by the Government for that purpose ; and in this case such a course would appear to be more especially necessary, seeing that the alleged cases are said to have been effected by secret remedies, in the employment of which there is notoriously much room for deception.

The suggestion of the College was dated January 28, 1869; on June 1st of that year the wisdom of

their judgment was set forth by the further inquiry by Dr. Bakewell, who was compelled to admit that he found as follows :—

"1. Of the four cases which last year appeared cured, one has relapsed, another presents some doubtful spots, and two remain in the same state as when last seen.

"2. Of the eleven cases left under treatment, four of which were all but well, nine were examined on my recent visit, and every one of these was in a worse condition than when I last saw them.

"3. That the tubercles have in every case reappeared on the parts which were touched by the caustics," &c., &c.

True, Dr. Beauperthuy explains the relapse by saying that none of these patients were in a condition to follow his treatment in its integrity; but such excuses are not worthy attention. Full trial was afterwards given to the medicines and applications, and they, like all others before them, proved failures, and leprosy has continued to this moment without a cure.

In one part of this second Report it is amusing to read a severe repudiation of that which is now deemed an important discovery in connection with this seemingly invincible disease. "The weak point" (writes Dr. Bakewell) "of Dr. Beauperthuy's system is his erroneous theory that the disease is essentially local and parasitic. He accounts for the relapse of the first series of cases by saying that some germs of the disease remained undestroyed, and they rapidly re-

produced the tubercles. All this is pure theory, and unsupported by a single fact. It was quite in vain for me to tell him that I had made scores of microscopical examinations of tubercles taken from different parts of the bodies of seven leprous subjects, and never found a single specimen of the parasites he believes in, or of any other. He was quite confident that they exist, and that if I had not seen them it was my fault. But when a man is perfectly certain that animalculæ exist in and are the cause of cancerous tumours, it is a hopeless task to argue with him." *

This off-hand dealing with a man evidently far his superior, reflects little credit on the taste or skill of Dr. Bakewell. Dr. Beauperthuy was perfectly right, and proved himself *a* thoughtful and discerning practitioner. He seems to have aimed at the destruction of the "bacilli" which Hansen deems so important, and which have lately so closely occupied the attention of Dr. V. Carter. The latter as recently as November 1883, writing on the pathology of leprosy, makes the following valuable remarks:—"I have long regarded leprosy 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

* For full particulars see 'Correspondence relating to the Discovery of an Alleged Cure of Leprosy,' 1871, Blue Book.

† "With the aid of a $\frac{1}{10}$-in. water-immersion lens, eye-piece B, and achromatic condenser of Swift."—Dr. Carter, 'Pathology of Leprosy.'

absent from both healthy and differently diseased structures. In its fresh state I once saw this organism at Bergen, and soon after at Bombay; and quite recently it has been repeatedly studied on the Continent of Europe. In June last I excised a small nodule from the arm of a leper, and after immediately 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 ?), besides there are seen cells and nuclei belonging to the common tissues of the nodule. Here the patient was in fair health, the cutaneous eruption of several month's standing, and quiescent or slowly subsiding. The minute organisms could not possibly have been accidentally introduced; their number is immense, and they seem to be growing actively. . . . 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 person of lepers; and by comparative experiment it is further ascertained that although general disease fail 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) those intervals may be so long as to require a year or more for such outward manifestation. At present proof of the contagiousness of leprosy is mainly inferential; but further

experiments may furnish positive data, like those now being acquired in the instance of tuberculosis, which so nearly resembles leprosis." *

With this high testimony in his favour Dr. Beauperthuy may be considered no pitiable visionary, but rather, with Dr. Hansen, a discoverer of the leading exciter and worker in the awful disease of leprosy; and strange will it be if the discovery of that which renders the disease incurable has been made by one who hoped that he had provided for it a specific. The application of a severe caustic we can well understand would partly stay the active doings of the *bacilli* in the nodule, and so temporary healing might follow; while improved diet and well-directed medicine internally would benefit the general health, and thus here and there some poor leper lose for a time the outward signs of the disease, and be declared cured. It is this so far benefiting from severe use of caustic which convinces me that confirmed leprosy of the violent form never can be cured. Some *bacilli* will be sure to escape—the burning can never reach them all—and what is more, when once the germs are thoroughly established the blood becomes a vehicle thereof (or in some way contaminated thereby) and they are conveyed where nothing can reach them. Do what you will, externally the blood will deposit the nidus from which will proceed fresh tubercles, and possibly the last state

* Dr. H. V. Carter, November 1883, 'On the Pathology of Leprosy.' He evidently feels that "germs given off" and contagion are very closely allied.

of the leper, lately so bright with hope, is worse than the first.

But inasmuch as my judgment may be questioned by some, I must again use the judgment and experience of Dr. Carter who concludes his examination of the general and medical treatment of leprosy thus :—

"1. The general treatment of leprosy is capable of mitigating many horrors of the disease ; it may be the means of checking its progress, or of diminishing the frequency of febrile exacerbations, and so preventing deeper implication of the system ; it may permit of the disease proceeding quietly to its natural termination ; but there is no evidence whatever that leprosy is to be promptly arrested, or in its character essentially modified by any kind of general treatment. I would repeat that the more active symptoms may of themselves subside, and for four, five, or as many more years, the leper may remain, in the natural order of things, seemingly well, and then a fresh outbreak happen in an almost spontaneous manner. Hence the difficulty of estimating the value of treatment.

"2. The internal exhibition of specific drugs has not been followed by any real assuagement of disease. Tonics at one time ; defervescents at another ; or alteratives and the like, have not proved of any permanent or particular value in leprosy ; and some more active drugs have been found to be as injurious as other unfavourable influences. There is no evidence that 'oils' or 'mineral salts' act-upon the leprous neoplasms which are known to exist within the frame ;

but until these deposits are neutralised or destroyed, there may be said to exist a possibility at least of the disease advancing.

"3. The outward employment of penetrating lubricants, which serve as the vehicle conveying agents destructive to life, would promise to be of value upon the supposition that there exists in true leprous growths an organism strictly foreign to the body; and as a matter of fact it is certain that many such applications or even simple oils (which are perhaps also fatal to the life of *bacteria*, &c., are followed by subsidence of leprous tubercles and even seeming annihilation of them. But that the leprous matter in the lymphatic glands (not to mention the deep-seated viscera) is destroyed by such means is unproven; and therefore the permanence of cure is impossible. In short, all the phenomena which are exhibited under the use of medicinal agents may occur from more general causes; and it has yet to be shown that such phenomena whenever due to medicine are specially indicative of permanent good."

CHAPTER VI.

How is Leprosy to be Stayed and made to Disappear?

IT has been already clearly seen that all attempts to explain the cause of leprosy have hitherto not been successful. Climate, place, diet, foul air, habits, &c., however bad and however combined, will not produce leprosy. They may encourage it, but never cause it. Equally true is it that while certain treatment may keep down some of the misery attaching to the disease, no cure has ever been discovered, and, some maintain, never can be. Further, wherever leprosy has been left to work its way in any country unimpeded, there its victims have slowly but steadily increased. This serious question then at once presents itself: Must these horrors go on torturing poor humanity? Can nothing be done to remove them entirely? Surely efforts should be made everywhere to secure so happy a result. Leprosy has ceased to exist in some lands; what was done there with such success can it not be done again? The reasoning seems to be perfectly sound, and ought, it may be said, to be at once acted on. Alas! nations like individuals leave undone many things that ought to be done.

Study of the past points to segregation as the only means of banishing leprosy. It was that which delivered

England of the scourge, and curiously enough was brought about by a combination of State severity and Church tender care. The law at an early period, by its heartless violence, kept the poor victims in poverty and loneliness; and long would they have endured the misery of outcasts had not the Church seen their helpless condition and hastened to their relief. By her decrees she committed them to the kind care of the faithful, who provided them with sustenance for body and soul, and raised for them hospitals in which they were sure of loving protection. We read with horror of the heartless injuries inflicted by rulers on the leper, of the many tyrannies inflicted on him; but under God, good came out of the evil. It ended in a general separation of the healthy from the diseased, and drew towards the latter a loving sympathy from the monastic bodies and led to a happy reaction in favour of the afflicted. Kings and queens began to minister to lepers and the well-to-do gladly provided lazar-houses, each holding a few sufferers on whom devoted men and women tended night and day. In France as early as 1226 Louis VII. left by will donations to 2000 leproseries. So numerous indeed were they in that then comparatively small country that by their means the old roads (les voies antiques) have recently been traced. In England there must have been hundreds of these homes, generally with from five to ten inmates, but here and there (Sherburne, Exeter, Norwich, &c.) large establishments, all very liberally supplied and wisely conducted. It is pleasing to know that special care was taken that the food

should be good and plentiful (so necessary in leprosy) that those who were able had fitting occupation and that certain hours were set apart for comforting worship in the House of God. It is not necessary for me to enter into any further particulars with respect to these hospitals. They are fully set forth in the many stories of our old cities and counties. Sufficient has been said to show that lepers in the middle ages were on the whole duly protected and comforted. And great was the reward, for it was that wise and generous provision for the afflicted which by degrees removed a foul and torturing disease from our own and other lands. It is commonly supposed that leprosy died out, expended itself; that it came no one knew how and went away no one knew why. Better far to say gratefully that our present freedom from the greatest and oldest scourge of man is chiefly due to the Church, especially to its Christ-loving fraternities, which while they carefully supplied bodily and spiritual wants to the leper, kept him strictly within certain limits well apart from the strong and healthy. It was this close segregation that removed leprosy from our midst.

What was done in darker times can surely be done in these bright days of advanced science. And that the experiment should at once be commenced is strongly urged by no ordinary philanthropist, Dr. Carter, who wisely observes :—

"Prevention of the disease is of paramount importance, and to this end the co-operation of the Government and lay element of the community is needful. Whatever were the sanitary shortcomings of our

ancestors the measures publicly adopted and by authority enforced in Great Britain and in most of Europe seems to have been co-efficient, to say the least, in eradicating leprosy. The kingdom of Norway having, however, been deprived of the means indicated, leprosy still prevails in that country as a complaint; showing there as in other countries no natural tendency to subside.

"But the rulers of that still afflicted land have acted nobly. Out of a very small revenue they have devoted 20,000*l.* a year for the erection of suitable asylums and due care of the leprous. To further this noble work they also "undertook a yearly registration of all known lepers in the country dating from the time of establishment of asylums. By this means not only is needful information acquired but public attention and interest are aroused, inquiry excited, example copied, skilled advice followed; in short, the people are educated (as it were) to co-operate with the authorities and the profession."

"Here is a decisive experiment conducted in the eyes of watchful Europe by a nation which, though small in numbers, has yet acquired a high position in the intellectual ranks of the age. No haste or apprehension preceded the establishment of asylums in Norway, but on the contrary the greatest deliberation." The care taken will appear from the following suggestions made by the original committee appointed to advise the authorities. The report of the committee is dated Christiania, 31st of December, 1838.

1. Both kinds of institution (hospital and asylum)

ought as much as possible to be constructed in the same place and with regard to economy and management to be placed in connexion with each other.

2. The buildings should be erected where provisions can be most easily had and the readiest means of communication.

3. The hospital should be constructed after the same plan as an asylum and with ample accommodation.

4. In both institutions the sexes to be separated.

5. Besides large wards there ought to be smaller ones for single patients.

6. Ample bathing accommodation is indispensable.

7. There should be separate work rooms.

8. There should be separate exercise grounds.

9. There should be abundance of light.

10. Plenty of warmth.

11. The food is to be purchased day by day.

These excellent suggestions have been faithfully carried out, and it will naturally be asked with what result. A distinct and convincing answer is given by the following table issued in 1880. Dr. Danielssen informs me that the numbers are now strictly accurate, because "they are made up after a new method—each leper is referred to the year in which he really turned leprous; and not as before to the year in which his leprosy became known."

1856	.. .. ..	2863	
1857	.. .. ..	2794	
1858	.. .. ..	2798	
1859	.. .. ..	2819	
1860	.. .. ..	2781	
1861	.. .. ..	2771	
1862	.. .. ..	2744	
1863	.. .. ..	2728	
1864	.. .. ..	2729	
1865	.. .. ..	2710	

1866	..	..	2704
1867	..	..	2685
1868	..	..	2676
1869	..	..	2619
1870	..	..	2533
1871	..	..	2429
1872	..	..	2336
1873	..	..	2255
1874	..	..	2192
1875	..	..	2093
1876	..	..	2008
1877	..	..	1923
1878	..	..	1855
1879	..	..	1717
1880	..	..	1582

It here appears that in twenty-four years segregation and kind care decreased the number of lepers in Norway by nearly 1300, proving that unless something quite unexpected occur, leprosy will ere long be banished from a land in which it has for ages prevailed—a blessed result from the noble efforts of a noble people.

But, admitting that Norway will in some fifty years thus escape a terrible malady, that malady will still go on with all its virulence in those countries where no efforts are made to allay its progress. The strong and hearty, I fear, bear the sufferings of the leper-stricken with a marvellous fortitude—in good truth thousands know nothing of such sufferings. They believe that leprosy is a disease of the past, whereas it tortures poor man as severely as ever.

Were the insatiable violence of the disease and the tight hold it has on humanity generally known, loud cries would go forth for its amelioration and eradication. When the finance of Egypt is out of order and the purses of Europe suffer, a Conference is summoned. When the rights of free commerce on the Congo are in danger and great monetary interests threatened, a Conference is invited. Well, so let it be, and God

defend the right! But is there to be no thought for the thousands and tens of thousands whose bodies and minds are enduring a living death? Are no fitting steps to be taken to keep down and at length to destroy the monster that so relentlessly devours? It would be a noble sight indeed to see an active and combined exertion among the nations, in order gradually to remove leprosy from the face of the earth. A conference for such a purpose would be high honour to an age that proudly boasts of its philanthropy—yes, and it would bring blessings from above upon a disease-afflicted world.

I am afraid that any such combination is far, very far beyond the ken of hope; but happily there is this consolation, the attention of England has been long and loudly called to the great home of leprosy. Our Indian Empire has at least 120,000 victims, and the number is I fear constantly increasing. Their faithful friend Dr. V. Carter has for years pleaded in their behalf. His words so far back as 1873 are very telling:—

"Having shown what plans have been executed in Norway for checking this scourge, and having also pointed out the good results which already appear from those wise and benevolent means, it may be fitly suggested that the example thus set is worthy of being followed wherever occasion demands. Now the condition of India is, I submit, precisely one which calls for efforts on the part of its rulers similar to those just referred to.

"It may be sufficient to state amongst other valid

reasons for the interposition of Government, that leprosy is a peculiar malady in severity and extent, and claims special consideration. That British rule in India would benefit itself and subjects by an intervention to be recommended on grounds of both policy and humanity; that delay is to be deprecated; and that the present time is well suited for enlisting the co-operation of the people, who are tolerant only from an ignorance which it is our duty to dispel by open, deliberate, and rationally founded action."

Such was the urgent appeal of this eminent authority in 1873. It was equally pressing in the Reports made by him in 1876 of leprosy in North Italy, the Greek Archipelago, Palestine, and parts of the Bombay Presidency of India. With special reference to the west of India (there are fully 12,000 lepers in the Bombay Presidency) he thus dwells on the importance of asylums and segregation:—

"No provision here exists for mitigating the sufferings of lepers and for checking the spread of their disease. It is true that the people are very ignorant and prejudiced, but still they have confidence in their present rulers, and I feel assured they would regard measures of relief as a blessing. The suitable segregation of pauper lepers in one or two asylums or villages of refuge, and the dissemination through the land of right ideas upon the subject of home treatment of lepers, represent the earliest of such measures; and if it be said these cost time, effort, and money, one may reply the investment is so humane a work, and these expensive agencies may be recommended

as likely to prove highly remunerative from even a material point of view; and surely the responsibilities and duty of authorities everywhere, in whose hands rests the welfare of a poor and industrious multitude, become more strikingly obvious when viewed in a higher aspect than a material one."

One must see leprosy in its virulence to know how this heroic labourer in its midst feels every word he writes; and of this we may be assured, the Indian Government appreciate his worth and the high value of his judgment. Unhappily, rulers cannot always do what they feel to be just. The Governor of Bombay examined for himself. He and his Council would fain carry out, and that with all energy, the suggestions of Dr. Carter, but they are under restraint; they can only act as far as the already oppressed revenue shall permit. Thankful, therefore, must every true philanthropist be for the following generous decision, dated Bombay Castle, 7th December, 1882:—

"His Excellency the Governor in Council fully recognises the desirability of establishing leper asylums in this Presidency, especially in the city of Bombay itself, for the segregation and care of the numerous sufferers, but it is evident that provision cannot be made for all the lepers in the Presidency except at a very great cost—so great that, however much His Excellency the Governor in Council may wish to alleviate the sufferings of lepers, he cannot undertake to meet the whole of the expenditure with due regard to other claims on the public revenues. The alleviation of the common sufferings of humanity

is, however, a work in which the State and the public may alike participate ; indeed, what the State cannot, with its limited means and the large calls upon its resources for the effective maintenance of the administration, undertake to do in this direction, may well be performed by benevolent persons possessing large means. With this view, His Excellency the Governor in Council is pleased to direct that the leper returns now before Government for the Northern, Central, and Southern Divisions of this Presidency and the Province of Sind should be published with this Resolution in the Bombay Government Gazette, in the hope that they will attract the attention of wealthy philanthropists both in this Presidency and elsewhere. In the words of Dr. Carter, leper asylums would rank among the fittest of charities, and if sufficiently large donations for their foundation and maintenance are offered or subscribed by the benevolent, His Excellency the Governor in Council will have great pleasure in granting such further aid from the public revenues as the finances will permit."

CHAPTER VII.

Are Europeans liable to Leprosy?—Is England in danger?

I ANSWER, yes. Europeans and their descendants freely exposed to the disease take the malady just as readily as others. Such at least seems to be the testimony from various quarters. In the East Indies white men are comparatively few. They go to the country when grown up, and the greater number (especially our soldiers, who are kept apart in barracks) return to England after a few years' stay in the East. Still there are many cases of European lepers. Dr. Carter reports that amongst the thirty or forty patients in the Jamsetjee Jejeehboy Hospital, there are usually two, three, or four Europeans. Besides those publicly treated, others are known to be scattered about the city living in their own homes. "I have myself seen lately (1876) three well-marked instances, viz. of a boy at school, a young woman, and an adult military man. Bombay still harbours in a crowded locality a leper colony of most wretched subjects—men, women, and children; and it is at least curious that the above three cases reside not far from this focus of loathsome disease."

The Sanitary Commissioner of Madras tells of three European lepers met with by him in private

practice who had every comfort at home, and another medical officer mentions three other cases.

If these sufferers are to be seen, there are, we may be sure, not a few concealed. Dr. Drognat-Landré in Surinam, Governor Longden in British Guiana (1875), the Report on Leprosy by the London College of Physicians (1867), all give particulars of leprosy among Europeans. Dr. Munro also supplies his list and valuable comments, and notice has been already taken of the twenty cases treated by Sir Erasmus Wilson ; nor must we leave unnoticed the fact that in our London hospitals sufferers from real leprosy are not nearly so rare as is commonly imagined.

All this is very significant and full of warning when we remember that in parts of Europe leprosy is literally raging. In Italy, France, Greece, Russia, and Turkey the disease is met with, while in Norway and the Greek islands it slays its thousands. Add to these that in healthy New Brunswick a few immigrants have introduced leprosy so effectually that Tracadie has already become world-known for its large gathering of loathsome disease, and we in England surely have more reason to dread a re-introduction of the malady than to boast of its complete departure from us. Ere we are aware of it the fearful scourge may again be actively in our midst ; and England, who thought herself so safe, be with her closely packed population again in the field of its cruel ravages. Ominous words are those with which Dr. Carter ends his Report on Leprosy in Europe and Bombay (1876). Speaking of India, he says :—

"Commonly European lepers in India cannot give any consistent account of the origin of their disease; yet the bare facts of the whole case are sufficient to point to a special cause. Whether or not this cause be a specific one operating by direct communication from the leprous to the healthy I need not here inquire, and I will only observe that the sources of contagion absolutely abound among us. The real difficulty is to understand why so few European residents are now attacked; but present immunity (or comparative immunity) may not continue under circumstances so much changing as those we live in, in these days of increasing social contact with the native born. From some considerations which have presented themselves to me, I am disposed to infer that should the colonisation of India by Englishmen be ever attempted on a large scale, there would be a decided risk of the new population becoming tainted with leprosy; nay, this risk might be converted into a positive infliction, were not means taken to prevent a possible communication of the disease, and therefore strict regulations would have to be enforced. Mr. Wilson (Sir Erasmus), indeed, has suggested that England herself needs or may need protection from the constant, even if small importation of lepers from abroad;* much more then would prudence dictate

* Holmsen thinks that leprosy once departed never returns:—"La spédalskhed montrerait quand elle est dans son état naturel et libre (?) un penchant à former des foyers séparés. Elle augmenterait dans un tel foyer par une propagation héréditaire et un développement spontané, pour se montrer brusquement, après un certain temps, dans un lieu fort éloigné du premier foyer, cependant toujours transportée par un individu

that Europeans permanently living in India should be careful of their surroundings."

Dr. Carter wisely urges that in the general inquiry into the leprous plague of India this topic of leprosy among Europeans and the danger to England herself should be carefully considered. The whole matter, he holds, will in no long time have to be undertaken if the full duty of government be resolutely faced. For the present he asks for the immediate erection of a suitable asylum in Bombay not only for indigenous leper-poor, but also for the suffering European leper, who has special hardships and therefore special claim on the country's attention.

But surely something more ought to be done. In every quarter of the globe the flag of England floats proudly over large possessions, and these possessions have been wedded to her to have and to hold, for better for worse, in sickness and in health, and she is bound to love and cherish them, for thereto she hath pledged them her troth. How can she better show forth her love, how can she more tenderly cherish her charge, than by using every effort to banish a disease which eats into the nerve-tissues of her people, and

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lépreux ; tandis que la maladie s'étendrait insensiblement dans le lieu primitif. C'est seulement dans ces foyers que Holmsen observa un développement spontané. Jamais il n'a vu un foyer une fois éteint se former de nouveau ; aussi ne croît-il pas que cela puisse avoir lieu ; il remarquait toujours dans un tel foyer une augmentation ou une diminution graduelle. Quand dans un de ces endroits la maladie se trouvait dans la période de déclin, alors la disposition héréditaire elle-même n'était pas en état de la reproduire."—'Norsk Magasin,' B. v. p. 433 ; Landré, p. 29.

pours a death-laden blood through their veins? Millions have been spent, wisely or unwisely, I do not presume to say, to defend our territorial rights, to extend our rule and our commerce, to maintain our honour, and, with all this delicate care of our interests and our renown, shall no heed be paid to the loud piteous wail of the leper heard from every corner of the earth? Shall nothing be done to help the bitterly afflicted, not in the hours, but in the years of their bodily and mental torture? No pen however powerful, no tongue however eloquent, can picture the misery of the despised and helpless leper. Let then, I say, finances public and private combine, that relief may be rendered, and that speedily. We have societies of all kinds for various holy ends, and of this we may be certain, God blesses our every labour of love; but in one important direction we have not done our duty—nay, we have been wilfully neglectful—the leper has been sadly and cruelly forgotten.

Shall this continue, or shall it not? That is a question which concerns England more than any other nation, for she holds sway over regions and islands teeming with leprosy. From every quarter of the globe the leper's cry goes forth—"Help us! comfort us in our extremity; from out the depths of our misery we call upon you to stand between poor humanity and a devouring malady, which, if Christian nations would but combine, might be banished from this earth." Warning words again when Dr. Carter only eight years ago made his touching appeal to the Indian Government—they apply to every

quarter of the globe :—"Nothing has been attempted for alleviating the public, family and individual sufferings which are entailed by the passive endurance of the leprous pest. An evil of this kind, when once recognised, cannot be allowed to fester unchecked without there ensuing the greatest moral as well as physical degradation. This I take to be a political and professional dictum, the truth of which is indisputable." Deeply impressed with the danger of such degradation, he puts practically before the authorities the only sure remedy :—"The two main objects must be protection of the community and the care of the sick—objects which in practice become unique. I would suggest first, that a convenient refuge be offered to all vagrant lepers whose further wanderings should then be interdicted ; next, that a similar asylum be open to the poorer classes of peasantry, whose compliance with the wishes of the State is to be insisted upon ; and, thirdly, that those persons who are willing to provide separate maintenance for their leprous sick should be permitted to do so only upon the condition that the isolation proposed be practically an efficient one. Segregation of the sick becomes an inevitable resultant, because it would be impossible to furnish individual separation for all ; and hence a common home for the large majority would be required."

"Liberavi animam meam." In Norway, New Brunswick, and the Sandwich Islands the system of segregation has proved successful. It would, I doubt not, be equally so wherever applied. In India,

the great home of the leper, at first the restraint of the liberty of lepers would be trying to them, but after a short season the advantages of segregation would be recognised by the community at large, and the comfort and relief secured thereby admitted by none more readily than by the poor afflicted lepers themselves. Is there no one in England who will move, and that at once, in a great and noble labour of love? In good truth, it is a matter well worthy the support of the highest personages of the realm.

If these few pages help to draw attention to the oldest and severest of the many maladies that try humanity, glad shall I be. Would that I could see actively at work a "Society for the Segregation and Comfort of Lepers," with the sacred motto:—"A new commandment I give unto you, that ye love one another." Let each do his best and take courage. The call is not to cultivate close intimacy with the mighty ones of the earth. That would soon be found a vain thing:

> "Dulcis inexpertis cultura potentis amici,
> Expertus metuit."

No, it is the beseeching cry of the "Lazar in his rags." The poor despised and rejected one from the midst of his bitter affliction invites us to hasten and help him. Let us gladly heed the sad and solemn appeal, and our holy joy shall be that, inasmuch as we do it unto one of the least of these our brethren, we do it unto Christ.

APPENDIX.

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I.

New Zealand Leprosy.

Dr. Thomson, in his 'Story of New Zealand,' gives the following account of Ngere-ngere, commonly called "New Zealand leprosy."

"Lepra gangrenosa, a strange species of leprosy, occasionally occurs among the New Zealanders. It is called Ngere-ngere or Tu Whenua, and commences with a scabby eruption over the skin; imperceptibly the eyelashes and beard fall off, not the hair on other parts; the skin assumes a pale colour, the eyeballs become prominent, the voice alters its tone, and the face swells. Although the sufferer eats and sleeps well, his friends soon detect the nature of the malady which afflicts him, from the horrid expression the face assumes. In about a year from the appearance of the eruption, a dry crack appears on the flexure of the last joint of some of the fingers or toes, the soft parts ulcerate by a dry process, the joint falls off and the part heals. Each revolving year carries off by a similar process one or more joints. Nature conducts her amputation without pain, as if anxious to avoid aggravating the mental agony such a disease must produce; and death, the poor man's friend, comes to the sufferer's relief before all the fingers and toes have fallen off. It may be supposed that men, beholding themselves, not figuratively but literally, dying by

inches, would be miserable ; but all the sufferers I have seen were cheerful and happy. The gift of a pipe or a fig of tobacco diffused a horrid expression of joy and thankfulness over their idiotic and satyr-like faces."

Whether this is really the specific disease no one seems able to prove, but most assuredly it is extremely like it. Call it if you please a kind of dry gangrene, or of scrofula, or any other name, it has pathognomonically quite enough of the symptoms of leprosy to claim a very close alliance with that trying disease, and Dr. Thomson very wisely and very safely terms it "lepra gangrenosa." Liveing maintains that with Dr. Thomson's description before him "no one can possibly doubt its identity with Elephantiasis Græcorum." A lady from New Zealand only lately told me the Ngere-ngere is now very rare and is fast disappearing. Whence the disease came no one knows, probably it came with the Maories from the Eastern Archipelago.

II.

The Pellagra of Lombardy.

"Near Milan," says Canturini, "the rough and unskilled labourers are scarcely better than mere beasts of burden. The 'pellagra,' that terrible scourge, which is the consequence of slow starvation, is increasing every year." The accuracy of this passage is fully supported by a recent State paper published by the Italian Minister of Agriculture and Commerce :—"If

a visitor should enter the habitation of one of our labourers, even of the salaried class, he would see in the midst of the richest fields of Italy, in the midst of a cultivation which may be compared with the best English or Flemish agriculture, a population reduced to the condition of brutes, and physically ruined by the inhuman severity of its labour, by its infamous food, and by the shameful condition of its dwellings." The result is vividly set forth by a writer in the 'Edinburgh Review' for April 1881, who thus describes the character and progress of pellagra :—

"The disease begins with an itching and redness in the hands and feet. This is followed by the disappearance of all subcutaneous adipose matter. The whole body shrinks ; the bones stick out ; the skin becomes thin, wrinkled, yellow, and sometimes black. The atrophy and the wasting soon extends to the muscles. The pulse becomes more and more rapid and thready. The temperature declines ; sensibility is diminished, sometimes to such a degree as to allow of the introduction of a needle without its being perceived by the patient. Finally the patient, dried up, inert, apathetic, insentient, with sunken eyes and deadened look, becomes a mere mummy, unconsciously awaiting the opening of the grave." This disease has often been pronounced a species of "elephantiasis Græcorum," but it is not, for true leprosy knows nothing of such a cachexia, its victim is often bodily inconvenienced by nothing save the working of the sad malady.

III.

Want of Salt with Vegetable Diet induces Leprosy.—Dr. W. Munro.

"The chief action of salt in the body is, as is well known, to dissolve albumenoids. If the system is deprived of it, would we not expect that the albumenoids kept in solution by it would become deposited? Now this is what exactly takes place in leprosy, in which, in the tubercular form, there is a deposit of albumenoids under the skin,—in the non-tubercular, between the tubules of the affected nerves. All other changes follow from this, which is the primary one."

"The increase in albumen and fibrine in the blood described by Danielssen and Boeck as existing previous to deposits or exudations taking place (the value of the analysis proving this is, however, denied by Kjerulf) is probably due to the deranged state of the liver interfering with the proper excretion of urea."

"And as chloride of sodium is, like chloride of ammonium, a liver stimulant, although not perhaps so active as the latter, which is perhaps the most active liver stimulant we possess, and is, in fact, *the* liver stimulant supplied by nature so abundantly, the entire deprivation of it would tend to produce functional derangement, and with that derangement the feeling of intense languor, which is so marked a symptom in the earlier stages of leprosy, probably caused by the detention of albumenoids in the blood. Thus the

deprivation of salt would in another manner assist in producing the primary phenomena of leprosy."

"As showing where the disease seems to begin, I may mention that these exudations or infiltrations are first noticed in tuberculated leprosy around the blood-vessels of the corium, where are seen elongated spaces occupied by round, nucleated (sometimes fusiform) cells. In non-tuberculated leprosy these changes take place in the interfibrillar spaces of the nerves. The cell proliferation is looked upon as a neoplastic, not an exudative formation by Virchow; but the later researches of Carter (1876) do not agree with this, the cells being, according to him, formed, at least primarily, from the exudation round the blood-vessels, and in the line of the lymphatics. Possibly both views may be reconciled, there being firstly exudation, and neoplastic formation of cells in it afterwards by cell division. The brown pigment granules already mentioned Carter looks on as new formations; but they are, as I have already said, found in non-leprous skin diseases."

IV.

The Waters of the Nile and Leprosy.

That the waters of the Nile excite leprosy is an opinion which prevailed very commonly at the close of the sixteenth century — indeed we may fairly consider that such was the conviction more or less long before the time of Lucretius, and has had its supporters even up to the present moment. The

language of Prosper Alpinus on the point (A.D. 1591) is very decided:—

"Aqua (Nili) finito augmento fluminis, in alveo Caleg remanet, pauloque post stagnans facta, putrescit, viridisque primo cernitur et mox nigra, admodumque fœtida apparet. Cujus putredo contracta in ipsâ (quando fluminis augmentum terminetur mense Octobri, vel ad summum Novembri, et Junio rursum mense augeri incipiat) adveniente primâ æstatis parte, adhuc magis augetur, intenseque putris reddita, halitus in aërem exhalat corruptos valdeque veneficos, à quibus aër infectus, pueros omnes partem rivo proximam habitantes in pestilentes eos morbos incidere est causa. Quam ob causam omnes civitatis habitatores illam rivi partem habitare timentes ne ipsorum filii ab illo venefico aëre moriantur, aliò confugiunt. Hæcque sunt mala, quæ Cayri epidemice grassari solent. Multa alia existunt, quæ sparsim multos offendunt, quales sunt lepræ, elephantiasis, &c. Lepra atque *Græcorum elephantiasis in multis pauperibus semper cernitur.* Qui inopia aquam cœnosam, semiputridamque epotant, atque pro victu carnem bubulam, camelorumque et pisces salitos semiputres, in stagnisque et lacubus captos, caseumque quendam immodicè salitum et semiputrem (est enim is omnium ciborum pauperibus familiarissimus, tum etiam, quia ibi vilissimo pretio venditur. Hunc Gibnehalon appellant). Ex quo victu ipsorum corpora multum sanguinis fæculenti, perustæque flavæ bilis, et pituitæ crassæ, viscidæ, salsuginosæ generare ac coacervare, necessarium est. A quibus humoribus ad cutem protrusis

eos excitari morbos cuilibet nostrum manifestum est. Vagatur et altera elephantiasis, ut nuper etiam dictum est, quâ correpti pedes multis magnis duris tumoribus, tumidos, magnos, atque deformes habent, elephantium maximè similes, cruribus tumefactis etiam conjunctos ; quibus tamen æger nihil doloris sentit, sed ad ambulandum ineptus redditur. Multos vidi ipsorum qui ipsi, pedibus calceorum loco ligneis capsulis indutis, incidebant passu lentissimo ac difficillimo. Hoc morbo correpti multi Cayri cernuntur ex malo victu, quem affectant, scilicet ex piscium Nili, ac multorum lacuum stagnantium, semiputridarumque aquarum et colocassiæ radicum, bammiæ, melochiæ olerum usu, quo multam pituitam crassam, lentamque gignunt, quæ ad pedes defluxa illos scirrhosos œdæmatososque tumores pedibus creat." *

V.

Dr. Hjorth on the Etiology of Leprosy in Crete.

Dr. Hjorth, who considers that bad diet is the principal if not the main element in the development and aggravation of leprosy, remarks :—"In consequence of the numerous fasts of the Eastern Church, coupled with the neglect of agricultural pursuits, the Cretan peasant seldom or never uses fresh meat, butter, or fresh vegetables, with the ex-

* 'Prosperi Alpini de Medicinâ Ægyptiorum,' lib. i. pp. 55, 56.

ception of some inferior kind. Their food consists of a large quantity of bad salt fish, barley bread, and of an enormous quantity of olive oil, often rancid, which they will drink like water. In many places there is a want of good water; it is often brackish, and in the mountain districts from which a large number of the lepers come, it is derived from the melting of the snow." He points to the analogy in the diet used by the inhabitants on the coast of Norway, where leprosy is so prevalent, with that of the Cretan peasant, with this difference only—that the rancid oil so largely used is in the one case *animal*, in the other *vegetable*.

VI.

Leprosy in Ireland.

Gerard Boate, a Doctor of Physick to the State in Ireland, in his 'Natural History of Ireland' has a quaint Section on Leprosy. His hostility to the Irish is not only violent—it is virulent and vulgar.

"The rickets are of late very rife in Ireland, where few years ago unknown; so, on the contrary, it hath been almost quite freed from another disease, one of the very worst and miserablest in the world—viz. the leprosy, which in former times used to be very common there, especially in the province of Munster; the which therefore was filled with hospitals, expressly built for to receive and keep the leprous persons. But many years since Ireland hath been almost quite freed

from this horrible and loathsome disease, and as few leprous persons are now found there, as in any other country in the world ; so that the hospitals erected for their use, having stood empty a long time, at length are quite decayed and come to nothing.

"The cause of this change is not so obscure and unknown, as it is in most other changes of that nature. For that this sickness was so general in Ireland did not come by any particular defect in the land or in the air, but merely through the fault and foul gluttony of the inhabitants in the successive devourings of unwholsome salmons. The common report in Ireland is, that boiled salmons eaten hot out of the kettle in great quantity bring this disease, and used to be the cause why it was so common ; and some famous authors have not stuck to relate as much for a truth. But that is a fable, and salmons have not that evil quality, which way soever they be eaten and prepared ; but when they are out of season, which is in the latter end of the year, after they have cast their spawn : upon which they do not only grow very weak and flaggy, but so unwholesome, that over their whole body they break out in very filthy spots, just like a scald man's head, so as it would loathe any man to see them. Nevertheless, the Irish, a nation extremely barbarous in all the parts of their life, did use to take them in that very season, as well as at any other time of the year, and to eat them in very great abundance, as easily they might, every river and rivulet in most parts being very full of them, and by that means that horrible disease came to be so amongst them.

"But the English, having once gotten the command of the whole country into their hands, made very severe laws against the taking of salmons in that unwholesome season, and saw them carefully observed; whereby hindering those barbarians against their will to feed on that poisonous meat, they were the cause that that woful sickness, which used so mightily to reign amongst them, hath in time been almost quite abolished. Which great benefit, with so many others, that hateful people hath rewarded with seeking utterly to exterminate their benefactors." *

VII.

Leprosy in Madagascar.†

"It certainly deserves notice that while the laws of Madagascar excluded leprous persons from society, the disease was kept within bounds; but after this law was permitted to fall into disuse it has spread to an almost incredible extent. There is no doubt that this result is partly owing to lepers being allowed to marry without any hindrance, but the natives also are strongly impressed with the conviction that the disease is also inoculable.

"In Madagascar there are a number of different races of all shades of colour, from the pure negro to the

* Chap. xxiv. sect. 4, p. 101. Dr. Boate implies that leper-houses soon went to decay and disappeared. We may fairly suppose that hundreds existed of which nothing whatever is now known.

† Edin. Med. Journal, July 1884.

Hovah, whose complexion is not darker than that of a native of Spain. These occupy widely varying climates. The central provinces, from their great elevation, have a temperate climate similar to that of the South of France. The climate of the plains, on the other hand, is tropical, and towards the north excessively warm. The circumstances and modes of life of these races are as varied as their origins and the nature of the localities in which they reside, yet leprosy affects all alike. The Hovah who lives in European fashion and in a temperate climate, is not less exempt from this scourge than the African slave. It is found amongst the Betammerahs, who abhor it. It occurs where fish is an article of food, but it is also to be seen where no fish is to be had, and where rice and vegetables satisfy the simple wants of the population. It exists in town and country; at the elevation of 7000 feet above the sea-level, along the coast-line, and through all intermediate elevations. Probably the dirty habits so prevalent in half-civilised nations must tend to aggravate it; eating from a common dish with the fingers; the custom, very common to Madagascar, of interchanging garments, and of all lying huddled promiscuously together at night, cannot fail to render it more inveterate, even if they do nothing in the way of originating it."

VIII.

The Gaga Cure in the Fiji Islands.*

Another tree the contact with which is avoided by the Fijians is the sinu gaga (*Exœcaria Agallocha*) or poison sinu, a littoral plant. The sinu gaga is found in mangrove swamps or on dry ground just above high water mark. It is 60 feet high, has a glossy foliage, oblong leaves, and minute green flowers arranged in catkins. It is difficult to exterminate unless the stumps are taken up, innumerable young shoots springing up the moment the main stem is felled. When the tree is wounded abundance of white milky juice flows, which causes a burning effect on coming in contact with the skin. Some natives, however, can handle this poisonous juice with perfect impunity. None, save those who have been sufferers from the effect of these poisons, can form any adequate conception of the agonies endured and the courage displayed by a Figian, who voluntarily submits himself to be cured of leprosy by the smoke of the sinu gaga wood.

The Rev. W. Moore gives a vivid picture of the cure of a Fijian, who is taken to a small house, and there suspended by the feet over a fire on which has been laid a few pieces of sinu gaga. When sufficiently smoked, the daring sufferer is taken down, deep gashes are cut in the skin, the blood flows freely, and if the patient survives he is thoroughly cured. This

* Dr. Seeman's Mission to Viti. Report of W. S. Mercer, Acting-Governor, to His Grace the Duke of Newcastle, K.G.

was neither tubercular nor anæsthetic leprosy we may be sure, but some severe skin disease, which might, we can well suppose, be cured by this torturing process.

IX.

Leprosy in the Shetland Islands.*

Case of lepers in Papa Island as drawn up by Mr. Andrew Fisken about the year 1736 or 1737. After a most careful description of five women lepers he says :—

"The disease is found by experiment to be very infectious and seems also to run in the blood, most people that have taken it without infection from another having been related to three families in the island. . . . The persons in this direful case are, as soon as it is observed, obliged to retire to a solitary little hut built on purpose for them at a distance from all houses, and are not allowed any converse with their husbands, wives, or nearest relatives ; but have their necessaries of life furnished them by a contribution from all the inhabitants of the island. The food is brought to their hut, and taken in when the person who brought it has retired some distance to the windward of their habitation."

* Edinb. Med. Jour., vol. lvii.

X.

The Lepers of Tracadie, New Brunswick.*

"Miramichi is a little town in North-eastern New Brunswick, about half-way between New York and Greenland. Over a century ago, one Gardner, a Scotchman, and a resident of the town, saw a fawn-coloured spot on his wife's forehead. Anon there were ominous swellings at the corners of her eyes. Then the tendons of her fingers began to stiffen and contract until her hands resembled bird's-claws. The fawn-coloured spots were doubled and quadrupled. The husband sought the advice of Dr. Mackey, a young medical graduate, who made a careful study of the disease. It baffled his skill. He could give it no name. It seemed beyond the reach of remedies. So engrossed was he in its study that he grew thin and pale. Sleepless nights were passed. To add to his distraction his attention was directed to a second case. The victim was a Mrs. Landry, living seventy-five miles from Miramichi. Of French extraction, she was in no way related to Mrs. Gardner. Fawn-coloured spots appeared upon her body. Her skin became as transparent and as scaly as isinglass. The contraction of the fingers and the ominous swelling of the eyes were there. To ascertain the true character of the disease the anxious doctor sold his little property and went to Europe. He travelled

* 'The Orient,' Bombay, March 1883.


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THE NERVE-AFFECTION IN LEPROSY.

H. V. Carter, M.D., ad nat. del.

through England, France, and Germany, and gleaned no information. Acting from a hint he received in Paris, he passed through Denmark into Norway. Near the coast, where the main staple of food was dried fish and salt meats, he visited a lazaretto. Its inmates were immured for life. There was no mistaking the symptoms. They were suffering from the same disease as Mrs. Gardner and Mrs. Landry. It was leprosy, and incurable.

"On his return to Miramichi, Dr. Mackey found the scourge eating into the little community like a cancer. Prompt action was necessary. Mrs. Gardner's fingers had dropped off at the joints, while Mrs. Landry was in a worse condition. Her eyesight was gone, and she exhibited unmistakable symptoms of leprosy. The alarm was at once sounded. The interest of the oldest practitioners was aroused. One or two scoffed at the idea of leprosy, and asserted that the disease would yield to remedies employed in scrofulous and similar complaints. Their experiments, however, verified the younger practioner's discovery, and the community was thoroughly startled. Within twelve months there were 78 cases in one section.

"The Provincial Parliament was spurred to action under the personal appeals of the Members from Miramichi. A Bill establishing a lazaretto was passed. Shelldrake Island, dotting a bay on the north-east coast of the province, was the spot selected. It was an isolated island, off all lines of travel. Here buildings were erected with barred windows. . . . This lazaretto was virtually a prison for life, and the

horror of the adjacent parishes. It was removed to Tracadie, on the bay of that name, about 1849. . . .

"All have separate beds. The men are kept on the main floor, and the women on the floor above. Rarely do they see each other. As we entered the male ward ten of the unfortunates were arising from dinner. It was a plain board table, destitute of cloth and napkins, and furnished with tin plates, cups, and spoons. On an iron cot ten feet from the table sat a pitiful object. His flesh looked like flakes of sulphur moulded into the shape of a man. He had been in bed over a year. Although but 15 years old, he looked like a man of 70. As we passed along the apartment a heavy black-bearded man, clad in a blue woollen shirt, turned his face from us, picked up a short black clay pipe, and moved into the sunlight through the open door. Poor fellow! his misfortunes were his own, and he sought no sympathy from the outer world. His name was Michael Duaron, who had lived by himself in the forest, a lone fisherman, and curiously enough expressed great fear of being lonesome when taken to the lazaretto. The windows were open, and a cool breeze from the sea was felt.

"There were ten males in the ward. They ranged themselves in line with bowed heads and dejected countenances. Two were mere boys, 11 and 12 years old. On the face of one was a fungus outgrowth. Only one of these men spoke English. He was Peter M. Noel, of Tracadie, a man of magnificent physique: beyond slight swellings above the cheek-

bones he showed no signs of the disease. He had a clear blue eye, a rugged complexion, and an honest face. He was a man of deep feeling, and of more than ordinary intelligence. Confident of sympathy, he told his story in a straightforward way. He was 23 years old, a woodchopper and raftsman.

"'You seem surprised to see me here,' he said, 'because you see no marks of the disease. Look at my hands,' showing his palms. All the lines of his hands appeared to have been frosted with silver. 'Look at the whites of my eyes,' he continued. They were of a light orange colour. He pointed to the slight swellings below his temples, and then said: 'All your doubts would be removed if you were to see my body. This spring I was logging up the north-west branch of the Miramichi. One night I saw a yellow spot on my leg. I paid no attention to it, supposing that it came from wading so much in the cold water. Two or three days afterwards another spot appeared near the first one. I began to have strange pains in my legs, and could not get enough sleep. Within a week I noticed a spot on my breast. The pains increased, and I thought that I had rheumatism. I took some medicine for it, and it did me no good. At last I came over here, by the advice of a comrade, to see the Sisters, and to find out what was the matter with me. They told me that I had the disease, and here I am for life.'

"Noel told his sad story with an erect head. He had not been in the lazaretto long enough to acquire the dejected look of his fellow-sufferers, but the

shadow on his face indicated that it was surely coming. He is a fair violinist, and undoubtedly vents much of his sadness through his instrument. With tears in his eyes he spoke of the kindness of the Sisters, but he complained of a lack of books and newspapers. His countenance grew bright when promised a file of Parisian newspapers.

"We were next conducted upstairs to the female ward. Fourteen women and girls, in all stages of emaciation, stood in line with clasped hands and eyes cast down. Sisters and cousins were among them. All were in some way related to the men below. They were not disposed to be communicative. One woman, nearly 80 years old, overheard attention being called to the fact that she was concealing her hands under her apron, and at once flung up her apron with spiteful energy, and extended two withered stumps, accompanying the action with bitter words. She had no hands. Her heart was touched by our expressions of sympathy. She had been released from Sheldrake Island, forty years ago, under the supposition that she had been cured. She called to her side her daughter, a pleasant-faced woman, 24 years old. Her fingers were talons in appearance, and her hands were withering, losing the joints one by one, as her mother's had done. In the dormitory we saw a female dwarf only 28 years old. She looked to be 90. Her eyes were sightless, and her face misshapen, and totally unlike that of a human being. It was the face of a person suffering from the worst form of leprosy. Despite our remonstrances, she arose to receive us. Sad at

heart she turned away. The affected woman in low tones bade us good-bye as we went downstairs.

"Once more in God's free air, we cast our eyes toward Mr. Young's mansion. Poor Noel and his four companions stood in the yard awaiting us. 'Gentlemen,' said Noel, approaching us, hat in hand, 'I beg your pardon, but my companions can't speak English. This poor man,' pointing to the heavy bearded man who had left the dinner-table on our entrance, 'is bleeding at the lungs. He thought that one of you might be a doctor, and that you could tell him what to do for it. He has been on the sea, but he cannot stand the sea air any longer, because his lungs are so weak.' We could give him no encouragement. Our faces forestalled Noel's translation of what was said. The bearded man walked back to the fence, and turned his face to the sea. Noel accompanied us to the end of the lane leading to the highway. It was the boundary of the lepers' world. The two leprous boys walked by our side. One said, 'Please, sir, give me a penny.' He got a half-dollar, and the other boy was not forgotten. If a bag of gold had dropped from the skies they could not have been more surprised. They shot off towards the lazaretto with the speed of the wind. Nor was Noel forgotten. We had already gained his confidence. He accepted a Canadian bank-note with even more astonishment and far more thankfulness than the boys had shown. It was a small sum to create so much happiness in so wretched a being. I involuntarily compared him with William H. Vanderbilt, at that moment pro-

bably speeding Maud S. at Saratoga; and with Jay Gould lolling on the silken cushions of his princely home on the Hudson. A day's interest on Vanderbilt's fortune would strew this agonising life with humble luxuries; and a trifling part of Jay Gould's fortune make it immeasurably happy. If honesty and industry are any gauge of fortune, what had honest hard-handed Noel done that his fate should be so different from theirs?

"Noel saw that we were about to part with him. All his longings, fears, and wishes gushed to his lips. 'My God,' said he, 'why can't I get well? I have worked hard. I have never dissipated. I bathe every day. I am clean. I don't see why I can't get well. Sometimes I think that it is not the leprosy [it was the first and only time that he used the word] spoken of in the Bible. I have heard of a man who had the same disease, and was cured by a doctor who said it was the black scurvy. If I was doctored for the black scurvy, I believe I'd get well. They say there is a doctor in Chatham who can cure me. I've lain awake at night studying up a plan to get to him, so that I might ask him to cure me. I have no money, but I could work hard to pay him if he would only cure me. Do you know that at times I can't help thinking that we are not cured because some one is making money by keeping us here? I know that it is not so bad as it used to be when they had a fence with sharp spikes at the top surrounding the yard. Some of the men have told me how they used to treat them then. The Sisters have changed all that.

I have no word of complaint against them. God bless them, they do all they can for us. It is not their fault, nor is it our own fault, that we are here.'

"We were standing at the end of a lane. Church was out, and a cloud of dust indicated the march of the churchgoers homeward. The sun had passed the meridian. A dinner-bell rang. Noel started as though awakened from sleep. 'I beg your pardon, gentlemen,' said he, removing his hat, 'for detaining you from dinner. I see so few who understand my situation that I forget myself when I meet them.' Tears were in his eyes. 'Come again and see me, if you ever revisit the country. God help me, but it will be many a long day and many a long night before I forget your faces.' He turned and walked slowly down the lane, the hot sun casting his shadow before him, and I saw him no more."

XI.

Sandwich Islands.

Island of Molokai Leper Settlement.*

"The place chosen for the segregation of lepers is a most singular plain of about 20,000 acres, hemmed in between the sea and a precipice 2000 feet high, passable by a bridle-path. The settlement is accessible also by a very difficult landing at Kalaupapa on the windward side of Molokai.

"As our party stepped on shore we found the lepers

* Bird's 'Sandwich Islands.'

assembled to the number of two or three hundred, for they had heard in advance of our coming, and our ears were greeted with the sound of lively music. This proceeded from the 'band,' consisting of a drum, fife, and two flutes, rather skilfully played upon by four young lads, whose visages were horribly marked and disfigured with leprosy. The sprightly airs with which the poor creatures welcomed the arrival of the party, sounded strangely incongruous and out of place, and grated harshly upon our feelings. And then as we proceeded up the beach, and the crowd gathered about us, eager and anxious for a recognition or a kind word of greeting—oh, the repulsive and sickening libels and distorted caricatures of the human face divine upon which we looked!

"Three miles inland from Kalaupapa is the leper village of Kalawao, which may safely be pronounced one of the most horrible spots on all the earth; a home of hideous disease and slow coming death, with which science in despair has ceased to grapple; a community of doomed beings socially dead, 'whose only business is to perish;' wifeless husbands, husbandless wives, children without parents, and parents without children; men and women who have 'no more a portion for ever in anything that is done under the sun,' condemned to watch the repulsive steps by which each of their doomed fellows passes down to a loathsome death, knowing that by the same they too must pass. . . .

"If our sensibilities were shocked at the sight of the crowd of lepers we had met at the beach, walking

about in physical strength and activity, how shall we describe our sensations in looking upon these loathsome creatures in the hospital, in whom it was indeed hard to recognise anything human? The rooms were cleanly kept and well ventilated, but the atmosphere within was pervaded with the sickening odour of the grave. At each end, squatted or lying prone on their respective mats or mattresses, were the yet breathing corpses of lepers in the last stages of various forms of the disease, who glanced inquisitively at us for a moment out of their ghoul-like eyes —those who were not already beyond seeing—and then withdrew within their dreadful selves. Was there ever a more pitiful sight?

"In one room we saw a sight that will ever remain fixed indelibly on the tablets of memory. A little blue-eyed flaxen-haired child, apparently three or four years old, a half-caste that looked up at us with an expression of timorous longing to be caressed and loved; but alas, in its glassy eyes and transparent cheeks were the unmistakable signs of the curse—the sin of the parents visited upon the child!

"In another room was one—a mass of diseased flesh, with but little semblance of humanity remaining—who was dying and whose breath came hurried and obstructed. A few hours at most, and his troubles would be over, and his happy release arrive. There had been 14 deaths in the settlement during the previous fortnight. On the day of our visit there were 58 inmates of the hospital.

"Though the lifting up of the veil of mystery which

hangs over the death valley of Molokai discloses some of the most woeful features of the curse, it is a relief to know the worst, and that the poor leprous outcasts, in their "living grave," are not outside the pale of humanity and a judicious philanthropy. All that can be done for them is to encourage their remaining capacities for industry, and to smooth as far as possible the journey of death. The Hawaiian Government is doing its best to stamp out the disease, and to provide for the comfort of those who are isolated; and, with the limited means at its disposal, has acted with an efficiency and humanity worthy of the foremost of civilised countries."

XII.

LEPROSY AND SUICIDE — DROWNING AND BURYING ALIVE.

About thirty-five years ago, the then political agent informed the Government that a practice obtained in Kattiawar of lepers drowning themselves in the sea. Colonel Lang wrote: "I found that this practice is much more common than I had any idea of, and although the lepers in most cases voluntarily consent to the self-sacrifice, it is much to be feared that cases occasionally occur when they are very strongly urged, if not actually compelled, to submit to it, partly from the trouble and annoyance their relatives have in attending on them when the disease is in its last stage,

and still more from a superstitious notion, which appears to be very prevalent among the lower classes in this province, that any one assisting in burning or burying the corpse of the leper is very liable to get the disease himself.

"Parenthetically, it may be remarked that lepers were regarded as just sufferers: e. g. in a formal engagement against female infanticide passed in 1808 between various chiefs in Kattiawar and the East India Company, it is urged as evidence of the sin of infanticide that the Shastras teach punishment for this is equal to that of other great offences, entailing long detention in hell and afterwards, on second birth, the offender will become "korees" (leprous), &c.

"The result of Colonel Lang's representations was the erection in 1850 at Rajkot, the political capital, of an asylum for lepers which still exists. Its maintenance is defrayed out of yearly subscriptions amounting to Rs. 5278, which are paid by the Talookdars of the province, monthly bills being passed by their representative committee at Rajkot. The number of its inmates for the last five years was about 50, but for the last two years 37·33 and 31·83. There are no fixed regulations whatever; each inmate gets a ration of flour, wheat, dall, rice, &c. No animal food is allowed, but some extras are given when needed. The institution is superintended by a pensioned hospital assistant, and it now serves only as a more or less resting-place of the wandering sick. As an asylum proper, this institution does not seem to have been intended.

"Such, then, was the outcome of a sad and somewhat sensational revelation, not apparently the result of deliberate inquiry, but incidentally brought to light. After a later and fuller research, I have no such startling facts as this of suicide to reveal, for doubtless the practice does not now prevail; yet I beg it to be remembered that the suffering entailed by disease is always the same, and not even suicide could appear more appalling, than do the misery and hardships which are endured at the present hour, by very many poverty-stricken lepers in our Indian Empire."*

Burying lepers alive was long a custom in India. The appeal of the leper to Lord Lawrence that his friends might be allowed to bury him alive is a touching incident in the story of that great man.

XIII.

On the Prevention of Leprosy by Segregation of the Affected.

By H. Vandyke Carter, M.D., President of the Medical and Physical Society of Bombay, Nov. 1883.

By the kindness of Dr. G. A. Hansen, the able Superintendent 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

* Dr. H. V. Carter's 'Tour in Kattiawar,' p. 81.

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 interest 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. A 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 twenty-five 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. Recognising 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 additions" brought to light year by year only $\frac{1}{6}$ are "new cases" of quite recent origin, whilst $\frac{5}{6}$ are entered as "overlooked" cases dating back two, three, or several years to the beginning of illness. As to the possible number of such latent *residua*, Dr. Löberg, in 1870, liberally estimated them at 300; 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 2050 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. 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 enumeration 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 asserted duration of illness, must for varying periods have been all along living unregistered in the country districts.

Such numbers are still considerable—eg. 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, 18 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.	Discharged.	Cured.	At home.	In Asylums.		
1	2	3	4	5	6	7	8	9	10
1856	..	..	..	..	..	2628	235	2863	2113
1857	2863	242	293	16	2	2367	427	2794	2060
1858	2794	235	225	4	2	2323	475	2798	2082
1859	2798	249	213	8	7	2296	523	2819	2095
1860	2819	226	253	9	2	2242	539	2781	2068
1861	2781	246	238	14	4	2060	711	2771	2096
1862	2771	201	212	12	4	2046	698	2744	2119
1863	2744	189	195	6	4	1979	749	2728	2162
1864	2728	213	202	9	1	1948	781	2729	2182
1865	2729	200	205	9	5	1938	772	2710	2136
1866	2710	220	213	10	3	1909	795	2704	2126
1867	2704	185	182	7	5	1898	787	2685	2137
1868	2685	215	211	7	6	1888	788	2676	2119
1869	2676	167	200	16	8	1832	787	2619	2104
1870	2619	160	230	13	3	1769	764	2533	2055
1871	2533	153	238	16	3	1682	747	2429	1987
1872	2429	126	205	9	5	1628	708	2336	1943
1873	2336	122	177	18	8	1583	672	2255	1874
1874	2255	135	183	10	5	1549	643	2192	1832
1875	2192	123	203	14	5	1470	623	2093	1771
1876	2093	110	187	6	2	1395	613	2008	1731
1877	2008	90	165	7	3	1294	629	1923	1704
1878	1923	90	139	10	9	1237	618	1855	1681
1879	1855	39	162	11	4	1115	602	1717	1642
1880	1717	29	150	7	7	965	617	1582	1606

Remarks on the above Table.—The headings of the several columns mostly explain 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 some slight 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 2113 lepers, and in 1880 only 1606, showing a diminution of 507 in the course of 25 years. But if (as in the adjusted lists) all overlooked cases whose duration dated two or more years back be added in their due place, there must have been at least 2863 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 1281; 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 methods of registration. Probably the diminution has amounted to near 1000, 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 3965, while the total outgoings (columns 4, 5, and 6) have amounted to 5246, leaving a deficieney of 1281, 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 it is 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

9–14 per cent. per annum, whilst among the 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 somewhat 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 ten 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 recognised 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 four or five cases reported from both districts and Asylums; equal to 1·63 per cent. of grand total of lepers 6918, 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 the Reports that most recommended remedies have been fairly tried, yet without any uniformly successful results; 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. As successive decennial periods the number in column 7 were as follows:—1860, at home 2242 or about 80 per cent. of total lepers then known; in 1870, at home 1769 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 deaths. In fact, the 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 available means of isolation; capacity equal to lodgment of 800 sick: total population of country about 2,000,000, total lepers still near 2000. 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 contem-

plated 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 effected is evident :—thus, at first in 1856, only about 8 per cent. of sick were immured ; in 1860 the figures were 539 in 2781, or 19 per cent. ; and in 1870 they had risen to 764 in 2533, equal to 30 per cent. In 1880 the figures were 617 in 1582, 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 Asylum during the past twenty years, has varied from 173 to 112 : during the last quinquennium it has been about 125, a minute proportion of these being due to transfers, and readmissions. The outgoing by disease amongst the immured also varies, there occasionally happening brief epidemics of erysipelas, pneumonia, or diarrhœa ; though such signs of "hospitalism" are not, I think, commoner in leper asylums than in any 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 F. to 298 M. in 1880) ; whilst outside, men are most numerous—843 M. to 763 F. 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 considerations:—Supposing no reproduction 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 2863 cases alive in 1856 would in the course of seven 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. 17–18), 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. Generalised statements, therefore, not sufficing to uphold the view suggested, it ought to be shown when and where hygienic improvements have had an exclusive 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 most irregularly distributed : thus, amidst healthy spots in Norway there are adjoining ecclesiastical areas with about 2000 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 noticeable 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 five 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 tuberculosis, &c.

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 observations 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 summarised 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, pro-

portionately 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 versâ*. 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

* 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 excluding 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 main, very near 1 to 10. This implies the yearly advent of one new case to every ten 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 2371, of new cases 239; 1994 and 204; 1859 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 thus 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 leprous.

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 unfavourable 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 asylums:—"Indeed, except in 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."

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 worst 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 satisfactorily 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 only remains to add that the transmission of personal ailment is necessarily effected either promptly or by contagion, or slowly through communication to offspring—the intimate mode of transmission being essentially the same in either instance; and here Norwegian 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, or consequence; and this consideration at once disposes of preconceivable 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 further 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 and 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 analogous, special institutions already exist for the permanently disabled, the blind and the insane also, in most civilised countries, for those incurably affected with cancer and consumption. At one time, indeed, asylums for lepers were common all over Europe, where now the disease 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.

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 reagents its presence is easily demonstrated. . . . In June last I excised a small "nodule" from the arm of a leper; and after im-

mediate 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 no doubt correspond to the "brown cells" figured as characteristic in my large work on Leprosy (London, 1874): besides, there are seen cells and nuclei belonging to the common tissues of the nodule. 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 accidentally 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 lepræ* 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 tuberculosis, &c., 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 fail 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 the contagiousness of leprosy is mainly inferential: but further experiments may furnish 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 figures of the *bacillus tuberculosus* on the same scale as those of the lepra-growths. 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 1-16000th or 1-6000th 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 are shown in

the drawings, made as accurately as possible with the aid of a 1-10th in. water-immersion lens, eye-piece B, and achromatic condenser of Swift.

BOMBAY, *November* 1883.

XIV.

HEREDITY AND SEGREGATION.

REPORT OF DRS. LEWIS AND CUNNINGHAM.

Almorah Asylum.—"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 inference that hereditary taint exercises a most important influence in the transmission of the pest." *

"Nevertheless, when we take into consideration the comparatively small families that lepers have and the high rate of mortality among their children, it is not probable that the contributions to the leprous community will, in the present instance, do more than replace the number of the present generation.

"Taking all the information attainable from the figures we have given, there appears to be no great

* Lewis and Cunningham's Report, 1876, pp. 71, 72.

risk of increase to the leper population of Kumaon as far as the disease is dependent on heredity for its multiplication." *

It seems to be quite clear from the reasoning of Drs. Lewis and Cunningham that, if heredity only just keeps up the number of lepers from year to year, and contagion is a mere fancy, there can be scarcely a case of spontaneous leprosy in Kumaon—in other words, there is nothing in the climate, habits of the people, food, &c., which produces the disease. It, therefore, at once follows that if segregation were adopted, the increase by heredity would to a very great extent disappear; leprosy would, therefore, within a certain number of years be entirely stamped out. Yet, strange to say, those energetic special assistants to the Sanitary Commissioner declare that segregation of leprous people would be wholly impracticable and highly tyrannous, "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 circumstances alone being required for the development of the disease." †

* Lewis and Cunningham's Report, 1876, p. 66.

† Ibid., p. 72.

It is not necessary to answer at length an argument so palpably weak. Sufficient to say that segregation in Norway, New Brunswick, and the Sandwich Islands, is slowly but surely diminishing the number of lepers, so that in due time the malady must disappear. By segregation I, of course, mean the isolation of all lepers, and the entire separation of the sexes.

How far the system could be carried out generally in India is quite another question. It could be applied, and I speak on the highest authority, that of Dr. H. V. Carter, to a limited district, and if successful be gradually extended. More than eight years have passed since Drs. Lewis and Cunningham reported against segregation, repudiating altogether that leprosy is contagious. I can only trust that the discoveries since made by Hansen, Carter, and others have greatly modified their early conclusions.

Sir Henry Ramsay—The Sanitary Commission in 1874 and Dr. Milroy—Their Suggestions relating to Leprosy in India.

General Sir Henry Ramsay writes in May 1875 to the Lieutenant-Governor of the North-western Provinces as follows: "It would be impossible to find anywhere in India so suitable a locality as Kumaun for pursuing a thorough and complete investigation into the whole subject of leprosy. At Almora we have an asylum, containing on an average 100 lepers, labouring under every form and stage of the disease, whose family history can be ascertained to the

minutest detail. In the district there are many hundreds either wandering alone as beggars or residing at their homes, whose history could be gathered with perfect accuracy. Such a record would give a mass of statistics, which would admit of some reliable deductions being drawn, as to whether it is possible to deal with this loathsome disease. In my opinion, it is necessary something should be attempted. If, on inquiry, it is found that nothing can be done, then it will be so far satisfactory to have ascertained that as a fact; but, in the absence of that knowledge, it appears to me wrong that this fearful disease should be allowed to continue to spread itself among the population, if any measures can be taken to prevent it."

In this, the Lieutenant-Governor, Sir John Strachey, coincides, and adds that "the field of inquiry, while sufficiently large, will not be unmanageable in extent."

The Army Sanitary Commission in 1874, writing to the India Office, in reiterating its suggestion that the whole subject of leprosy should be examined in India, says: "The first step towards this examination is to obtain accurate statistics of the disease, such as can show not only the usual numerical data, but the precise localities where leprosy exists in India."

Dr. Milroy suggests as follows :—

"Commencing, therefore, as if the subject were a *tabula rasa*, Drs. Lewis and Cunningham will first make themselves acquainted with the natural history of the disease as it occurs in Hindustan; its essential and pathognomonic outward and physical symptoms;

the circumstances and conditions which influence its organisation and spread; the factors which seem to affect or modify its progress, whether beneficially or otherwise, apart from direct medication or the action of drugs, internal or external—in short, all its characteristic features and attributes. They will thus determine the general nosological nature of the malady and whether Cullen has rightly classed it as a '*cachexia totius vel magnæ corporis habitus depravatus sine pyrexia primaria vel neurosis*'; and the College of Physicians ranged it among the 'General Diseases' between Lupus and Scrofula."*

I am afraid that these instructions were more easily given than carried out. Further, Messrs. Lewis and Cunningham, comparatively young men, could scarcely be expected to make in a short time any advance upon the information already acquired by the giants of the medical profession, who have so long and so ably studied leprosy, Drs. Danielssen, Boeck, Carter, Hansen, Munro, Drognat-Landré, &c., &c. Any one reading the Report of Drs. Lewis and Cunningham must be struck with its general feebleness, arising, not from want of ability in the observers, but from the very limited experience on which their conclusions rested. Their unqualified denunciation of segregation is, I fear, closely akin to presumption.

* Lewis and Cunningham's Report, pp. 14, 15.

XV.

LEPROSY AND THE COUNCIL OF ANCYRA, A.D. 375.*

"Pauca de hâc voce, Canon xvii. Ancyranus sic habet :—Τοὺς ἀλογεσαμένους καὶ λεπροὺς ὄντας, ἤτοι λεπρώσαντας, τούτους προσέταξεν ἡ ἁγία σύνοδος εἰς τοὺς χειμαζομένους εὔχεσθαι. Eos qui irrationabiliter versati sunt, et qui leprosi sunt, vel fuerunt, præcipit sancta Synodus inter eos orare, qui spiritu periclitantur immundo. Canone præcedente cum brutis commixtio damnata fuerit longissimâ et durâ pœnitentiâ, quæque juxta reorum ætatem producta fuerat. Eorum autem nullus ad fletum, vel auditionem pulsus fuerat, non misericordiæ caussâ, sed severitatis. Quod enim tempus alias in Fletu et Auditione ; Græci *πρόσκλαυσιν* vocant et *ἀκρόασιν* ; transigere debuerunt ; illud omne in substratione transigunt, quæ stationum durissima est ; imò in qua sola opera durissima imperantur.

"Hoc igitur decimo septimo Canone addunt, si ejusmodi homines leprosi fuerint : ad hiemantes, id est extra omnem Ecclesiæ ambitum *εἰς ὑπαίθριον καὶ τὰ τοῦ ναοῦ προσαύλια* esse submovendos, ne scilicet sui corporis contagio cæteros inficerent, ut ibi pœnitentiam, quæ Canone præcedenti definita fuerat, peragant.

"Mosaicâ lege ; Levit. xiii. 46, Numer. v. 2, leprosi à reliquo cœtu prohibentur, qui mos in Europâ viget, non religionis, sed sanitatis causâ. Testatur Balsamon

* J. C. Suiceri Thesaur. Eccl., p. 226.

Commentario in Epist. Athanasii ad Ammun. pag. 920 in oriente hoc non observari. Οἱ λέπραν νοσήσαντες, inquit, παρὰ μὲν τῷ παλαιῷ νόμῳ, ὡς ἀκάθαρτοι ἀπεπέμποντο; μεθ' ἡμῶν οτὲ καὶ ἐκκλησιάζουσι καὶ συνεύχονται, ἀπὸ τοῦ νοσοῦ μηδὲν ἐμποδιζόμενοι αλλὰ μᾶλλον καὶ οἰκειούμενοι. Sed alia fuit in Ancyranâ provinciâ consuetudo; ubi tamen per λεπρούς alii intelligunt eos, qui κτηνοβατείας vitio cæteros infecerunt: alii simpliciter pollutos, vitiis inquinatos. Sed hæ sententiæ à vero alienæ."

XVI.

I.—Leper Hospitals in Great Britain.

Town and County.	Name or Locality.	When Founded.
1. Aberdeen	St. Anna's.	
2. Aldcampus, Berwickshire.	.. ..	Before 1214.
3. Aldnestun, Berwickshire.	.. ..	,, 1177.
4. Appleby, Westmoreland.	St. Nicholas.	
5. Athelington, Dorsetshire.	St. Mary Magdalene's.	
6. Aylesbury, Buckinghamshire.	St. John's and St. Leonard's.	Henry I., before 1135.
7. Banbury, Oxfordshire	St. John's	John, before 1216.
8. Bawtry (Haworth) ..	St. Mary Magdalene's.	
9. Broughton	St. Mary's.	
10. Beccles, Suffolk ..	St. Mary Magdalene's	About 1327.
11. Berkhamsted, Herts	St. John the Evang'.	
12. Bolton, Northumberland.	Holy Trinity	Before 1225.
13. Bristol, Somersetshire.	St. Lawrence	,, 1135.
14. Brooksheet (Southweald, Essex).	St. John	,, 1292.
15. Burton, Leicestershire.	Blessed Virgin and St. Lazarus's, Burton Lazars.	King Stephen.
16. Bury St. Edmunds, Suffolk.	St. Peter's	About 1327.
17. Colchester, Essex ..	St. Mary Magdalene.	
18. Cambridge	Hospital of Lazars ..	Before 1397.
19. Canterbury, Kent ..	St. Nicholas's.	
20. Chichester, Sussex ..	St. James and St. Mary Magdalene's.	Before 1199.

LEPER HOSPITALS IN GREAT BRITAIN—*continued.*

Town and County.	Name or Locality.	When Founded.
21. BERWICK-UPON-TWEED	.. ..	Before 1283.
22. BLYTHE, Nottinghamshire.	St. John the Evang'.	Pope Honorius.
23. BRISTOL, Somersetshire	St. Mary Magdalene.	
24. CHATHAM, Kent ..	St. Bartholomew's..	William II., before 1100.
25. CHESTERFIELD, Derbyshire.	St. Leonard's	Before 1208.
26. CROWMARSH, Oxfordshire.	.. ..	About 1248.
27. DARTFORD, Kent ..	Trinity.	
28. ,, ,, ..	St. Mary Magdalene	About 1330.
29. DEVIZES, Wilts	.. ..	Before 1207.
30. DONCASTER, Yorkshire	St. James	Henry III., before 1272.
31. DUNWICH, Suffolk ..	,, ...	Before 1199.
32. EDINBURGH	Greenside	1591, probably a previous hospital.
33. EXETER, Devonshire..	St. Mary Magdalene	Before 1163.
34. EYE, Suffolk	,, ,,	About 1330.
35. GLASGOW, Lanarkshire	St. Nunan's	In 1350.
36. GLOUCESTER, St. Margaret's.	St. Margaret's ..	Before 1320.
37. GORLESTON, Suffolk ..	.. ..	Mentioned in 1372.
38. HARDWICK, Norfolk..	St. Lawrence's ..	Edward II., before 1327.
39. HEDON, Yorkshire ..	St. Sepulchre	Before 1216.
40. HEREFORD	St. Giles.	
41. HASTINGS, Sussex ..	St. John the Baptist	,, 1199.
42. HEXHAM, Northumberland.	.. ..	About 1210.
43. HYTHE, Kent	St. Andrew's	Before 1336.
44. HUNTINGDON	St. Margaret's ..	Malcolm IV. Scotland, who died 1165.
45. ILFORD	St. Stephen's.	
46. IPSWICH, Suffolk ..	St. Mary Magdalene.	
47. ,, ,, ..	St. James.	
48. KINGEASE, Ayrshire ..	St. Nunan's	Before Robt. Bruce.
49. KIRBY, Westmoreland	St. Leonard's.	
50. LANCASTER..	,, ,, ...	About 1190.
51. LANGPORT, Somersetshire.	St. Mary Magdalene's	,, 1310.
52. LERWICK, Shetland.		

LEPER HOSPITALS IN GREAT BRITAIN—*continued.*

Town and County.	Name or Locality.	When Founded.
53. LEICESTER	St. Leonard's.	
54. LINLITHGOW	St. Magdalen	Before Alex. II.
55. LITTLE MALDON, Essex	St. Giles.	
56. LINCOLN	Holy Innocents.	
57. LONDON AND VICINITY	St. Giles	1101.
58. ,, ,,	Between Mile End and Stratford, Bow.	1472.
59. ,, ,,	Highgate.	
60. ,, ,,	At Kingsland.	
61. ,, ,,	At Shoreditch.	
62. ,, ,,	Lock, Kent St. Without, Southwark.	
63. ,, ,,	St. James's, Westminster.	Very early.
64. LONG BLANDFORD, Dorsetshire.		
65. LOWCROSSE, Yorkshire	St. Leonard's.	
66. LYNNE, Dorsetshire ..	St. Mary Magdalene's	Before 1336.
67. LYNNE, Norfolk ..	,, ,,	In 1154.
68. ,, ,, ..	St. John's.	
69. ,, ,, ..	West Lynne.	
70. ,, ,, ..	Cowgate.	
71. ,, ,, ..	Letch Hithe.	
72. MAYDEN BRADLEY, Wilts.	Virgin Mary	Before 1135.
73. NORWICH	St. Mary Magdalene's	,, 1119.
74. ,, ...	St. Mary's.	
75. ,, ...	Without St. Magdalene's Gate.	
76. ,, ...	Without St. Bennet's Gate.	
77. ,, ...	Without St. Giles'.	
78. ,, ...	,, St. Stephen's.	
79. NORTHAMPTON	St. Leonard's	Eleventh century.
80. ONGAR	St. Oliver.	
81. OTTEFORD, Kent ..	.. ..	Henry III., before 1272.
82. OTTELY, Yorkshire ..	.. ..	Edward II., before 1327.
83. OXFORD	St. Bartholomew.	
84. PAPA STOUR	Shetland.	
85. PETERBOROUGH, Northamptonshire.	St. Leonard's	Before 1154.
86. PILTON, Devonshire ..	St. Margaret's ..	,, 1197.

LEPER HOSPITALS IN GREAT BRITAIN—*continued.*

Town and County.	Name or Locality.	When Founded.
87. PLYMOUTH, Devon ..	St. Mary Magdalene's.	
88. PLYMPTON ,,		
89. PONTEFRACT, Yorkshire.	St. Mary Magdalene's.	
90. RACHENESS, Southacre, Norfolk.	St. Bartholomew's ..	Before 1216.
91. RIPON, Yorkshire ..	St. Mary Magdalene's.	Early 12th century.
92. ROCHESTER, Kent ..	St. Katharine's ..	About 1316.
93. ROMENDALE (Romney), Kent.	St. Stephen and St. Thomas.	Baldwin of Canterbury.
94. ROTHFAN, Elginshire	.. ..	Before 1249.
95. SELWOOD, Somerset ..	.. ..	About 1212.
96. SHERBURN, Durham ..	The Virgin's, Lazarus	Before 1181.
97. SHREWSBURY	St. Giles	,, 1189.
98. SOUTHAMPTON, Hants	St. Mary Magdalene's.	
99. ST. ALBANS, Herts ..	St. Julian's	Between 1100 and 1135.
100. STAMFORD, Lincolnshire.		
101. STURBRIDGE, Cambridgeshire.	St. Mary Magdalene's	Very early.
102. TANNINGTON, Kent ..	St. James's.	
103. TAVISTOCK, Devon ..	St. Mary Magdalene's.	
104. TAUNTON, Somerset.		
105. TENBY, Pembrokeshire.	St. Mary Magdalene's.	
106. TEWKESBURY, Gloucestershire.		
107. THETFORD, Norfolk ..	St. John's	Edward I.
108. ,, ,, ..	St. Margaret's ..	About 1390.
109. TOWCESTER, Northamptonshire.	St. Leonard's	,, 1200.
110. WALSINGHAM, Norfolk.		
111. WARWICK	St. Michael's	Hen. I. or Stephen.
112. WYCOMBE, Buckinghamshire.	St. Margaret and St. Giles.	
113. YARMOUTH, Norfolk ..	Outside North Gate	Before 1314.
114. YORK	St. Nicholas	About 1110.
115. LANGWADE, Norfolk.		

2.—List of Leper Hospitals recently supplied by kind friends.

Abbegmahon (Co. Cork).	
Babington.	
Badminster.	
Baldock.	
Bawtry	St. Mary Magdalen.
Bodmin	SS. George and Anthony.
Boughton.	
Bridgenorth..	St. James.
Bridgewater..	St. Giles.
Brighton	St. Mary's.
Cambridge (2)	SS. Anthony and Eloy ; St. Anne.
Clattercote in Cleydon ..	St. Leonard.
Congleton (Cheshire).	
Cotes.	
Derby	St. Leonard.
Dover	St. Bartholomew.
Dunstaple.	
Eastbridge	St. Lawrence (for monks).
Gild Martin..	St Leonard.
Ilchester	Holy Trinity (Lepers and Poor Travellers).
Ilford	St. Stephen's.
Launceston (2)	St. Leonard ; St. Thos. Newport.
Liskeard	St. M. Mag.
Lochée	St. M. Mag.
Mere in Dunston.	
Newbridge	SS. Mary and Lawrence.
Reading	St. M. Mag.
Rhuddlan (Swansea).	
Snoring Parva.	
Sponne	St. M. Mag.
Sprowston, Norfolk.	
St. Albans	St. Mary de Pratis.
Tickhill	Now a Coffee House.
Wilton	St. Giles.
Windsor	St. Peter.

There were hundreds more, and I shall be thankful for information about any not mentioned in this list.

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SUPPLEMENT.

AFTER the Appendix had been printed, the Report of the Hawaiian Board of Health for 1884 was received from the Bishop of Honolulu, and the extract from the Louisiana Board of Health for 1880 from Dr. W. Munro. The information they supply is too valuable to be neglected.

DR. ARNING'S EXAMINATION OF LEPROSY IN THE SANDWICH ISLANDS.

By a letter dated Montreux, Switzerland, Dec. 16th, 1882, Dr. Hildebrand, who formerly resided in the Sandwich Islands and was very highly esteemed there, urged the Hawaiian Government, through Mr. Gibson, President of the Board of Health, to secure the services of Dr. Arning, a physician of very high repute, to investigate the disease of leprosy. The following extracts from the letter supply valuable and interesting statements.

"That in consideration of the important results for the benefit of the Hawaiian people, which are likely to be derived from the intended investigation of the contagion of leprosy, the Hawaiian Government declares itself ready to assist Dr. Arning, either by

direct vote or otherwise. The sum in question is very moderate, simply large enough to cover the expense of living on the islands for the space of nine months. I imagine that you will be justified to set aside a small portion of the money appropriated by the Legislature for sanitary purposes. If not, you can appoint him physician to the Leper Settlement, where Dr. Arning will be obliged to spend the greater part of his time.

"In order to impress you with the importance of the results which may flow from an investigation of this kind, I shall have to say a few words of its character and range. It will not be confined to inoculation of animals, but will extend over all the possible bearings of the contagion. The germ will be propagated outside of the human body, cultivated in breeding stores of particular construction, and in liquids of different chemical constitution. If inoculation succeeds in the first instance, it will be repeated with the germs modified by these measures; to learn if they lose or increase in power—for, as it may be taken for granted that simple contact with the leprous tissue of the living body does not communicate the disease, it is to be presumed that under certain unknown conditions, probably outside of the human body, the germs acquire an unusual energy, under which they develop their contagious quality. For this purpose the soil of the leper graves will have to be examined; houses which have been inhabited by lepers, or in which the disease is known to have taken its commencement, will have to be searched for extra-corporeal breeding places. I

will only refer here to a popular belief prevalent in southern China, that the disease spreads from the decomposing urine of lepers. The history of individual cases will have to be followed up, with a view to all the possibilities which modern research of other disease-germs has revealed.

"Some startling discoveries, which at the same time open valuable views, have of late years been made with regard to the bacteria germs of that most deadly disease called malignant carbuncle. These are now proved to be identical with the innocuous bacteria which stick to dried grass or hay, and are present abundantly in the lower strata of the atmosphere in all countries covered with vegetation. These latter have been converted into deadly poison by successive breeding of generation after generation in solutions with gradually increasing proportions of albumen, and *vice versâ*, the former have been converted into innocuous hay-bacteria by breeding in solutions with gradually diminishing albumen. A similar relation is supposed to exist between the germs of variola and vaccine, although the perfect proof has not been furnished yet.

"That from researches of this kind finally must result a true knowledge of the natural history of that vegetable organism which originated the disease called lepra, is self-evident. The only question is, after how many years? At the same time, it is evident that the knowledge of its natural history—and only this—will point out with certainty the sanitary measures which are to be adopted toward warding off the

disease, preventing its spread, and, I do not hesitate to say, finally effecting its cure.

"Probably you have read in the papers of the discovery, by Dr. Koch in Berlin, of the bacteria which cause tuberculosis of the lungs—consumption; well, he has demonstrated by conclusive experiments, not that the disease is inoculable—for that discovery had been made before him—but that the bacteria are the sole carriers of the disease, and that they are present only in the tubercular deposit, not in the blood. In no sputum of a tubercular lung are they wanting, and from the dried sputum they pass into the atmosphere of confined rooms, where they may, but need not necessarily, become propagators of the disease, for they require a temperature of at least 40° C. in order to live and propagate. You will see at a glance, what a hopeful field this knowledge opens to preventive measures against the spread of this dreadful disease.

"On the other hand, the germs being confined to the lungs, at all events in the earlier stages of the disease, this has to be attacked by local means, inhalation and inflations. And, as we know already an organicide which kills the micrococcus-cell, in the case of malaria, without damaging the blood-cell or globule, the source of human life, why should one despair of finding a corresponding remedy in the case of tuberculosis or lepra?

"The foregoing remarks will convey to you, my dear sir, a due appreciation of the importance of the work, and also of the difficult and complicated nature of the investigations. Only men in possession of all

the specific knowledge obtained thus far, experienced in the use of the microscope, and practically trained to the different methods of experimental research, are competent to undertake it. Such a man offers himself to you, commissioned by one of the highest scientific bodies, from no motives of gain, but prompted by the simple enthusiasm of science and philanthropy. I am sure that you will not grudge him the small contribution which is needed—1500 to 2000 dollars will cover the whole expense, I should think. The French Government has assisted M. Pasteur to the extent of over 100,000 francs, during the last two years, to enable him to carry on experiments tending to impart to sheep immunity against a contagious disease. How much more cogent reason to assist experiments tending to the salvation of a nation of men ?"

To this earnest and intelligent appeal Mr. Gibson returned the following wise and generous reply :—

OFFICE OF THE BOARD OF HEALTH,
HONOLULU, *February* 1, 1883.

"Dear Sir,—I have received and read with the greatest interest your letter of 16th Dec. ult., in which you inform me of the mission Dr. Arning desires to undertake to this country, of the aid he may require, and of the nature and importance to this country and to science, of the work he will undertake.

"It gives me great pleasure to be able to assure you at once that, if Dr. Arning comes here for the purpose of studying the natural history of the con-

tagion of leprosy, he will receive from the Board of Health every assistance they are in a position to give him, in the way of premises and facilities for carrying on his investigations, together with a salary as a physician under the Board, during the time he is thus occupied, of say 150 dollars per month. For the purpose of giving him full opportunity for research, he may, at his choice, find a place on the medical staff either at the Branch Hospital at Kakaako or at the Leper Settlement.

"An investigation, by a competent person, of a nature such as Dr. Arning desires to engage in, is a matter that I have long desired to see taken in hand, and the Board has been anxiously considering how so desirable a work could be carried out. Dr. Arning may therefore feel assured that, if he comes here for this purpose, he will receive the cordial and earnest co-operation of the Board.

"Accept my thanks for the interest you have taken in this matter, and for the instructive letter you have favoured me with. It gives me personally the greatest pleasure to be able to respond to your suggestions with a prompt compliance.

I remain, dear sir, yours sincerely,

WALTER M. GIBSON,
President of the Board of Health."

In due season Dr. Arning reached Honolulu, and at once began a close and vigorous study of leprosy, and, on April 10, 1884, sent in the following remarkable Report :—

To His Excellency W. M. Gibson,

President of the Board of Health.

Honolulu, *April* 10, 1884.

"Sir,—I have the honour to submit to Your Excellency a Report on my work in connection with leprosy, carried on during my stay on these islands.

"After my arrival, about the middle of November last year, and pending the selection by the Government of a suitable locality for carrying on my work, I endeavoured to inform myself on the different views held here, in regard to the disease and the modes of dealing with it.

"Several things at once struck me very forcibly. Firstly, that I had either been misinformed by an excellent authority on an exceptional degree of malignancy which leprosy showed on these islands, or that this malignant type and quicker course of the disease had, with the more general spread, gradually given place to the eminently chronic character which it exhibits in its older and established domains. My informant was Dr. Hildebrand, and he wrote to me from his experience, gathered more than fifteen years ago, that on these islands, and at his time, leprosy killed its victims within three to five years; whereas I now find the average run of a case of leprosy is between ten and fifteen years. It will, of course, be extremely difficult to get at exact numbers in this respect, as leprosy is not a disease where we are able to fix a well-defined time of commencement; but we

shall have to attach value to such a statement by an intelligent observer, even without its being based on statistics, and infer therefrom that leprosy actually exists in a milder form than it did during the first decades of its spread on these islands.

"In the beginning of December I began my microscopic work. I was then able to prove the presence of the same micro-organism which Hansen and Neisser first demonstrated in leprous tissue, and which has received the name of *Bacillus leprœ*. I have now examined leprous tissue from Norway, Spain, Syria, Surinam, and these islands, and find the same changes due to the invasion of the same germ. At first I was baffled in my attempts to find the bacillus here. The delicate manipulations you have to apply to the tissues, in order to show its presence, seemed to work differently here than at home, but by varying the methods I have succeeded. Following up the spread of the bacillus in the various tissues gained from three post-mortem examinations —(two at Kakaako * and one at Kalawao)—and by excisions of tubercles from the living, is at present the chief work I am occupied with. The aims are manifold: firstly, to gain knowledge of the paths the germ follows in the organism, and the changes it brings about in the tissues of the body; then to gather information as to the life-history of the germ itself; and last, but not least, to see to what extent

* Kakaako, a branch hospital not far from Honolulu, was opened December 12th, 1881.

the presence of the bacillus can be used as a practical test for leprosy.

"With regard to this latter proposition, I am able to say distinctly, that I have found the bacillus in every case of tuberculous leprosy I have examined, and that it cannot be found in any other disease. As yet, I have not been able to prove its presence in the blood or in the spots and sores of anæsthetic cases. In these cases, I believe, I shall find the bacillus in the nerves supplying these parts with vitality, and, I have good reason to hope, that I shall soon be able to publish proofs of this opinion.

"I have further extended my microscopic examinations to other diseases, which have of late been attributed to the invasion of a healthy organism by parasitic germs. In three cases of consumption occurring amongst natives, I have found Koch's bacillus tuberculosis; likewise in gonorrhœa and pneumonia the same germs that have been proved to cause these diseases in Europe. Nor have I failed in detecting in various skin diseases—the itch, the white *kane* spot, and the *puupuu*, which are so prevalent amongst the natives—the same closely allied animal and vegetable parasites, which are known to produce corresponding diseases in other countries.

"A current belief, that leprosy has been extensively propagated by careless and indiscriminate vaccination, induced me to try and vaccinate lepers with a view of possibly finding the germ in the pustule. Unluckily, although I tried to procure the best lymph, the vaccination did not take in any one of the cases. The

experiments will be repeated with new lymph I have ordered.

"Inoculation of leprosy on all sorts of animals—dogs, cats, rabbits, guinea-pigs, birds, and fish—has of late been perseveringly tried by quite a number of authorities, so far without result as regards general infection. I have procured a monkey for carrying on these experiments.

"With a view to ascertain what becomes of the milliards of germs a leper harbours after his death, and whether there is a possibility of their infecting the soil, I have, on a visit to Molokai, caused a grave to be opened in which a leper had been buried a year ago. A portion of the crumbling dust was removed, and will be examined in due course.

"My time, during the next six months, will be chiefly devoted to cultivation experiments, i. e. to try and grow the bacillus lepræ on specially prepared substances outside of the human body. This work is of the most tedious and delicate nature, and always associated with many discouraging failures; but, nevertheless, it has to be undertaken, forming an essential part of the modern methods of investigating disease.

"As regards treatment of the disease, I consider it altogether unwarrantable to call leprosy incurable, and simply to remove the afflicted out of sight. This is a remnant of mediæval barbarism which every professional man ought to oppose, more especially so in our relation to a race which has had our civilisation forced upon it, and which is accustomed to look up to us for help and support. Is it not fostering their

innate sense of indifference to hygienic principles, instead of setting them a fair example, when we gather together very nearly a thousand suffering people in a lonely spot, and let them have only a flying visit of a doctor once a month? We medical men consider it one of the foremost principles of our work to grapple with disease to the very last; and if, even in acute cases, where we see death imminent, we think it right not to give in, but to try and stay the fast ebbing current of life, then much less should we leave fellow-creatures, suffering from an eminently chronic disease, to succumb gradually, without even an effort to help them.

"And for the nonce, even accepting the oft-repeated assertion, that both history and personal experience show us that we have to deal with a disease which we are not able to arrest by general treatment; there will be work enough in store for us to help these outcasts through other troubles, not in direct relation to leprosy. But we ought never, for a moment, to accept the saying of the incurability of leprosy as true; but ought to go on fighting against it. Perhaps we have been on the wrong track of treatment, and there is yet a solution of the problem to be found. The recent experiences concerning the germ nature of disease may be the means of showing us the path of rational treatment; and they must and do give a new impulse and new encouragement to us to persevere in trying and experimenting. But then we must not expect to find an arcanum, an oil or extract with very nearly supernatural qualities, as has only too long

been done in connection with this most intractable disease; but must act systematically on a rational basis, individualising the cases and trying to benefit them by saving what can be saved of their vitality. And then there is a vast field for local surgical treatment, apart from general medication. What should we think of the surgeon who would leave large ulcerating surfaces and sores without attempting to heal them, or would not timely remove a bone which is mortified by violent disease, and keeping up painful and detrimental irritation? Should it be otherwise in leprosy? Why are we entitled to leave scores of leprous eyes to decay and waste away, while there is a chance of saving, if not all, at least a large part of them, by skilful surgical interference? One of the most common operations in ophthalmic surgery is for an inflammation of the inner eye due to disease. By such care hundreds of eyes are saved. And for a similar inflammation occurring in leprosy, are we to do nothing but stand and watch blindness slowly but surely coming on?

"I find there is no foundation in saying that lepers will not stand surgical interference. Excisions of tubercles and excision and stretching of nerves have been performed by me, and the wounds heal as readily as in other individuals.

"Besides this, there is another potent agent which ought to be extensively applied in treating this disease, viz. electricity. I have, in two cases, by a three months' course of electrical treatment, been able to restore, in a marked degree, the muscular

power of withered leprous hands; and I know of other cases where this treatment has been similarly efficacious.

"I think it is self-evident that any bacterial disease is more likely to be successfully combated in its initial stages, before the organism has lost its power of resistance and recovery, and we ought, therefore, to look out for cases presenting the very first symptoms, especially in children and young people.

"That there are very many such cases amongst the rising generation, no one, who has paid any attention to the question, can deny. I had, before the official examinations of the school children were ordained, examined two of the schools in this city; and found, in one of them, amongst ninety-five scholars, five; in the other, amongst fifteen scholars, three cases of initial leprosy; which would be at a ratio of 7·27 per cent. I then and there advised these patients to be removed from the schools; since then a few more cases have been removed by the examining physicians. What strikes me as particularly necessary, at the present moment, is to provide suitable accommodation for these children. It seems to me to be perfectly unjustifiable to take these children out of the schools, on account of the danger of their communicating the disease to their schoolmates, and to cast them back on their families. The danger to the community is not lessened in the least. These are not such cases as have hitherto been segregated as confirmed lepers; indeed, some of them appear to be, otherwise, in splendid bodily health. And surely it would be more

conducive to their maintaining this general good health, if they could be kept in their regular training with its beneficial influence on mind and body, instead of idling away their time at home. We require a home for these children where the regular school training is kept up as far as possible; where there is a reliable person to look after them and see that the orders of the attending physician are carefully carried out. This home ought to be as cheerful a retreat as possible, in a healthy location, where the inmates can roam about within certain limits, and where there is plenty of good food and air. Decidedly advanced and bad cases ought to be kept entirely out of the sight of these children.

"I will not dwell, in this report, on the merits and drawbacks of the Molokai Settlement and the Branch Hospital at Kakaako, as they present themselves to my mind, but I believe that instead of enhancing, these two institutions detract from each other's value, and that this condition will last as long as Kakaako is kept up as an over-crowded leper settlement.

"It will be seen, from the foregoing, that I advocate segregation; and I may be asked to first prove the actual power of contagion in leprosy. To this I reply: that, from what we already know of the nature of the disease, we are entitled to enforce segregation; even without the question of actual contagion being definitely settled. We know that leprosy is dependent on the invasion of the human body by a microscopic germ, which has the power to increase indefinitely in

the tissues. Therefore we must look upon every single leper as a hot-bed of disease, quite independently of the exact condition under which he can transmit it to others. He, at any rate, breeds and multiplies a poisonous germ, and is, on this account, dangerous. A similarly infested locality we would hasten to quit, as we are not able to remove it from us. But in the case of leprosy, which is bound to individuals and not to localities, it is more expeditious to remove the infected individuals from the unaffected members of the community.

"Hoping that Your Excellency will favourably consider this Report, and the views and suggestions therein contained,

I remain, yours most respectfully,

EDWARD ARNING, M.D."

LEPROSY IN THE UNITED STATES.

It is very difficult to get accurate information with respect to leprosy in the United States. It is evident from the facts set forth in the Louisiana Report that it is much more prevalent there than is commonly supposed. These facts tell of a state of things terrible indeed to contemplate. We can only trust that within the last five years steps have been taken to render some relief to the poor miserable creatures who have, we fear, long had to endure a torturing and devouring disease under most trying circumstances.

"The annual report of the Louisiana Board of Health for 1880, carefully drawn up, contains a detailed statement of the progress of the Asiatic leprosy in that State during the last century. It was brought in 1680 to the West Indies by the negro slaves, and thence to Louisiana. In 1778 this disease was so prevalent among the blacks, together with the African elephantiasis, and another disease equally horrible, named yaws, peculiar to Guinea negroes, that a hospital for lepers was established in New Orleans. At the present time the majority of lepers in that city are found to be whites, of French, German, and Russian extraction. The disease seems to be hereditary, and certain families are known to be infected by it, and are shunned as corpses would be. The mother of one of these families, when the disease showed itself, was deserted by husband and children, and nursed until her death by a young girl, who is now a victim of it. An Italian Catholic priest, who attended cases of leprosy in the Charity Hospital, is now dying of it in the same house. New Orleans, it appears, has now no separate asylum for these incurable patients, and they are received into the Charity Hospital, and placed in the crowded wards to scatter death. The President of the Board of Health has made a personal investigation into the extent of this disease, even venturing into the deathly swamps of the lower Bayou Lafourche. This whole district, he states, is several feet lower than the turbid Bayou, sloping back into cypress swamps, liable to constant overflow from crevasses. The poor Creole inhabitants live in low huts sur-

rounded by wet rice-fields, living upon fish and fish-eating birds. They are separated from the rest of the world and have intermarried for generations. So impregnated with disease is this remote region that some of the exploring party were struck down on reaching it with violent hemorrhages and fever. Of all foul corners of the world it is the fittest for the disease most dreaded by man since the beginning of the world to hide away its prey. Below Harang's Canal, President Jones found Asiatic leprosy existing in different generations of six families. Some of these wretched creatures have been driven out from human habitation, and are living apart in the swamps, dying of decay. In some instances their flesh had become as insensible as bone, and they were able to handle fire with impunity. It was impossible to make a correct estimate of their numbers, as a rumour spread among them that the searching party had come to carry them off to an uninhabited island of the sea, and they hid themselves, their friends, too, refusing to tell their names or number."

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