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THOMPSON.

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LONDON:
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CONTENTS.

PAGE

A Contribution to the History of Leprosy in Australia. By J. Ashburton Thompson, M.D., D.P.H. 1

Report on the Conditions under which Leprosy occurs in China, Indo-China, Malaya, the Archipelago, and Oceania. Compiled chiefly during 1894. By James Cantlie, M.A., M.B., F.R.C.S. . 239

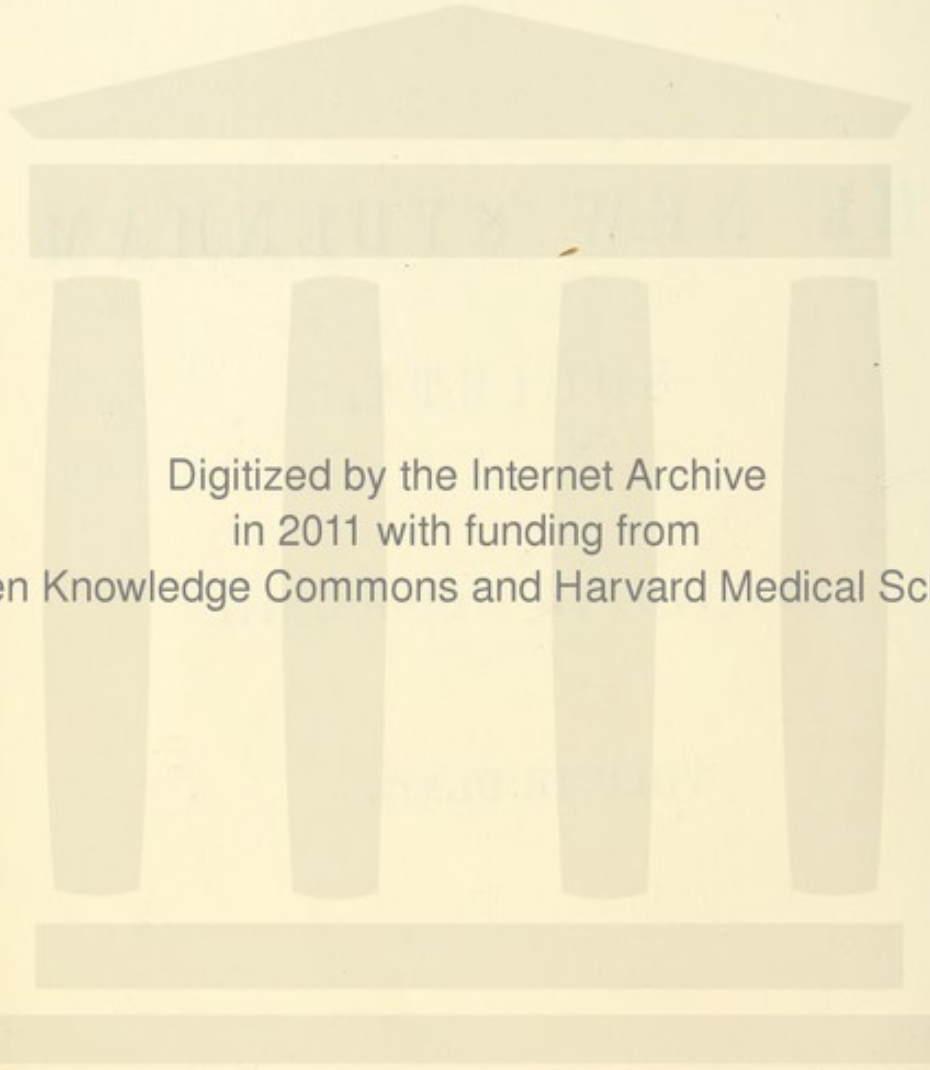
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THE NEW SYDENHAM SOCIETY.

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A CONTRIBUTION

TO

THE HISTORY OF LEPROSY IN AUSTRALIA.

BY

J. ASHBURTON THOMPSON, M.D., D.P.H.,

FELLOW OF THE BRITISH INSTITUTE OF PUBLIC HEALTH; EXAMINER IN PUBLIC HEALTH, UNIVERSITY OF SYDNEY.

LONDON:

THE NEW SYDENHAM SOCIETY

1897.

"The disease is still widely spread, and productive of an immense amount of human misery. The discovery of the truth as to its nature and cause is the only means by which that misery can be mitigated or prevented. All misstatements, all errors of observation, all garbling of facts can have but one result, the delayal of that discovery and of its beneficent results. It is most desirable, therefore, that we should one and all who engage in the inquiry, endeavour to be, in all that we write upon it, both careful and candid in our statements."—From a communication to the 'Journal of the Leprosy Investigation Committee,' i, p. 68, August, 1890, by Mr. Jonathan Hutchinson.

PREFACE.

In January, 1894, the sub-committee of the National Leprosy Fund, which had been appointed to conduct such farther investigations into the nature and causes of leprosy as might seem desirable to them, announced their readiness to receive reports on several subjects; among others, on "the reputed recent increase of leprosy on the Australian continent, its extent and possible causes." Thereupon I determined to arrange such notes on this topic as I had made during a few preceding years, and to expand them as much as opportunity should allow.

The subject thus set connoted two questions:—First, had leprosy recently increased on the Australian continent? And secondly, if so, to what might that increase be due? Evidently the former question could be answered only after collecting all the recognised cases of which either some record existed, or of which some account could still be given by those who had witnessed them. Perusal of a list so compiled would show whether the reply should be in the affirmative; and if in the affirmative, whether the second question could be answered by reference to some simple circumstance (such as the importation of lepers), or whether a more recondite cause must be sought out.

An object of the following paper, therefore, is to record the cases which have been recognised in Australia from the beginning. The attempt is made now for the first time. The committee which was appointed by the Royal College of Physicians in 1862 to collate, digest, and report upon information concerning leprosy which the Right Hon. the Secretary of State for the Colonies proposed to gather from different parts of the world, framed a series of ques-

tions designed to guide contributors. Copies were circulated in Australia, and replies were returned from six of the seven territories hereafter dealt with—from all, that is to say, which were then existent. It appeared that up to a date between 1862 and 1867 (when the report of the committee was published) leprosy was believed by the respondents to have occurred nowhere but in Victoria. The fact was otherwise, as presently appears in its place ; and, in short, there is no evidence that any systematic effort to ascertain the beginning and progress of leprosy in Australia was then or ever has been made on the spot.

The collection just referred to contains the data for the main subject of these pages. This consists of an epidemiological study of the conditions under which leprosy appeared in Australia, of the course subsequently followed by the disease, and of the circumstances under which emigrants from recognised leprosy areas entered the country, and of the relation in which they afterwards stood to the aboriginal race and the whites who superseded it. It will be seen that the design thus indicated has been but imperfectly carried out, for the data are (and probably must ever remain) defective. Nevertheless they suffice to establish certain broad conclusions firmly enough. These do not accord with the generally current hypothesis that the virus of leprosy is always derived from pre-existent lepers ; and consequently it became apparent, as the search progressed, that the strict limits of the subject must be somewhat exceeded in two respects. First of all it seemed necessary to remind the reader of certain pathological and epidemiological facts and experiences which are either not generally known, or, if known, are often slighted ; and then to set out the circumstances under which individual whites were attacked at a length which might appear gratuitous without this explanation.

Hence it is to be feared that both subject and Appendix will make but dull reading. In describing the result of an inquiry into the history and the earliest recognised appearance of a disease not generally familiar in a quarter of the world where printed medical records not long ago were wanting, it is surely essential (though rarely done) to

establish each incident as securely as possible, by adducing the best evidence available in its favour. Under this necessity I believe it would be difficult to avoid tediousness, even for a writer who possessed the literary art; but an increased measure of accuracy should compensate.

For much of the material I am indebted to very numerous private correspondents, who, it will be noticed in several cases, have taken great interest in this matter, and much trouble to forward it. Perhaps I may be allowed to add, therefore, that if my co-labourers choose to continue me in the editorial position which I have ventured to assume, I shall be glad to receive farther contributions from them, concerning both the old and the current history of leprosy in Australia.

J. A. T.

SYDNEY; *November*, 1894.

CONTENTS.

THE EPIDEMIOLOGY OF LEPROSY IN AUSTRALIA.

SECTION				PAGE
I.—The Fundamental Problem				9
II.—Concerning the Primæval Autochthons				12
III.—Of the Numbers of the Aboriginal Population				22
IV.—No Record of Lepra among the Primæval Autochthons				23
V.—The Aboriginals are susceptible of Lepra				28
VI.—The White Occupation of Australia				35
VII.—Origin of the Chinese met with in Australia				40
VIII.—The Number, Occupations, and Distribution of the Chinese in Tasmania				42
IX.—Do.	do.	do.	in Western Australia	43
X.—Do.	do.	do.	in South Australia	44
XI.—Do.	do.	do.	in Victoria	45
XII.—Do.	do.	do.	in New South Wales	50
XIII.—Do.	do.	do.	in Queensland	56
XIV.—Do.	do.	do.	in the Northern Territory	60
XV.—As to some Ætiological Details				62
XVI.—Duration of the Latent Period				68
XVII.—General Remarks on Communicability				72
XVIII.—Was Australia Leprosy-free in its Primæval Autochthons?				93
XIX.—Recorded Incidence of Lepra on the Chinese in New South Wales and Victoria				96
XX.—Recorded Incidence of Lepra on the Whites in New South Wales and Victoria				101
XXI.—Provisional Conclusions				108

APPENDIX: CONTAINING THE DATA.

SECTION		PAGE
I.	—Preliminary	111
II.	—Tasmania	115
III.	—Leprosy in Western Australia	116
IV.	—South Australia	118
V.	—Leprosy in Victoria	120
VI.	—Leprosy in New South Wales	136
VII.	—Leprosy in Queensland	207
VIII.	—Leprosy in the Northern Territory	225
IX.	—General Remarks on the Several Laws enacted against the Liberty of Lepers	229
X.	—Chronological Summary of all Cases of Leprosy recorded in Australia to the end of 1893:—Has Leprosy recently increased on the continent of Australia?	231


NEW GUINEA
TORRES STRAIT
Cape York
TIMOR
ARAFURA SEA
Cape Wilberforce
PALMERSTON
GULF OF CARPENTARIA
SOUTH PACIFIC OCEAN
Cape Melville
COOKTOWN
MAYTOWN
PORT DOUGLAS
CAIRNS
Cape Grafton
Mulgrave River
HERBERTON
GERALDTON
BURKETOWN
NORTHERN TERRITORY
CARDWELL
GEORGETOWN
INDIAN
TOWNSVILLE
CHARTERS TOWERS
MACKAY
TROPIC OF CAPRICORN
QUEENSLAND
ROCKHAMPTON
GLADSTONE
Port Curtis
BUNDABERG
MARYBOROUGH
WEST AUSTRALIA
SOUTH AUSTRALIA
BRISBANE
CUNNAMULLA
STRADBROKE Isd
SOUTHPORT
STANTHORPE
TENTERFIELD
Tweed Riv
LISMORE
WALGETT
MOREE
EMMAVILLE
TINGHA
ARMIDALE
WILCANNIA
NARRABRI
GUNNEDAH
NEW SOUTH WALES
MUNGLE
PORT AUGUSTA
WELLINGTON
DUBBO
NEWCASTLE
FORBES
CANOWINDRA
SYDNEY
YOUNG
ADELAIDE
OCEAN
FREMANTLE
PERTH
NARRANDERA
WAGGA
ALBURY
TUMUT
GOULBURN
COOMA
BEECHWORTH
BENDIGO
HORSHAM
BRAIDWOOD
BATEMANS BAY
BERMAGUI
BROULEE
ARARAT
BUCKLAND
PAMBULA
BOMBALA
VICTORIA
MELBOURNE
GEELONG
SOUTHERN OCEAN
TASMAN SEA
BASS STRAIT
TASMANIA
RINGAROOMA
LAUNCESTON
HOBART
DIAGRAM OF
AUSTRALIA
NOTE
Names which have been mentioned in the text are alone noted on this diagram
J. Alderston Thompson
9.X.99.

THE EPIDEMIOLOGY OF LEPROSY IN AUSTRALIA.

Sect. I.—THE FUNDAMENTAL PROBLEM.

A special interest attaches to the circumstances under which lepra made appearance in Australia.

Attempts to ascertain the manner in which this disease is maintained on recognised leprosy areas have always failed in the past; and but one hope of solving this question by epidemiological methods therefore remains. If an area isolated from the world could be found; if it could be ascertained to be leprosy-free; if, then, the advent of lepers to it were observed; if, lastly, the state of that virgin population were watched during a sufficiently long subsequent period, some weighty evidence might be got. But in order to attain to a positive conclusion these conditions must be scrupulously fulfilled. The indigenous population must be ascertained to be leprosy-free beyond a doubt; the arrival of the earliest immigrant lepers and their subsequent movements must be watched and recorded; and either the continued freedom of the population must be established by the most thorough inquiry, or else the date at which cases of lepra began to appear among it must be learned with similar exactitude. This must be impossible, I suppose, except in a deliberately planned experiment; but there is a chance that the requirements may have been met by one of the unplanned experiments of life, with accuracy sufficient to warrant a very probable conclusion.

The need of evidence of the kind thus indicated having

become obvious, certain authors of repute have sought for it either in the history of times which may properly be called ancient, in view of the improvements of method, or else in parts of the world so remote and so imperfectly examined (for all that appears[1]) that they fall very nearly into the same category; and one author[2] at least, relying on such evidence, has asserted that lepra never has made appearance among a virgin population except in consequence of the importation of lepers. The exacerbation of lepra in Europe during the Middle Ages attributed to returned Crusaders—not its appearance then,[3]—and its alleged appearance in America consequent on the Spanish conquest, are examples of one class of instances commonly adduced in support of that opinion; and the exacerbation of lepra in Hawaii during the fifth decade of the present century—not its appearance then,[4]—and its alleged appearance in other groups of Pacific islands consequent on immigration of Chinese lepers, are examples of another class. But such evidence as alone is forthcoming in those cases cannot be relied upon to establish the only point which can be regarded as crucial in relation to the alleged possibility of importing lepra,—or, in other words, to the debated question whether lepra can be maintained and spread by contagion. Nor to those who reflect upon the times, or are at all acquainted with the localities, does it seem reasonable to expect that anything of decisive value should stand on record concerning them: for it is not mere recognition of the disease, nor observation of its rapid increase, which is important; but a virgin population, and its beginning among them.

The case of Australia differs from others known to me in

[1] *Ex. gra.* Hillebrand's letter of February, 1866 (in Mr. C. N. Macnamara's work)—with which compare Dr. Arning, 'Journal L. I. C.,' No. 2, p. 131; with which last compare Dr. Mouritz (*ubi cit. infra*). See also Dr. Davidson with reference to Madagascar, &c. &c.

[2] Professor H. Leloir, 'Traité de la Lèpre,' Paris, 1886.

[3] Simpson; Sir John Simon, K.C.B., 'English Sanitary Institutions;' Dr. Charles Creighton, 'A History of Epidemics in Britain.'

[4] Report of the President (H.E. Walter M. Gibson) of the Board of Health on Leprosy to the Legislative Assembly of 1886, Honolulu. See also Appendix K, *ibid.*, by Dr. Arthur Mouritz, pp. lxxiii, lxxiv.

important respects. In the first place, the continent constituted an isolated area; all writers seem to be agreed that although its extensive coast-line had rarely been touched at different points, yet its inhabitants had always lived free from intrusion, and from admixture of blood, until the beginning of its present occupation by the English. Thus it was peopled only by the autochthons. Secondly, it was first occupied by the whites almost within living memory,—that is to say, but little more than a hundred years ago. Thirdly, the whites arrived, not as a casual band of adventurers, but in an expedition under military control which was provided with the minor requisites of organised government, responsible to the Colonial Office, and under the usual obligation of recording and reporting all considerable events as they occurred. To this organisation men of scientific attainments were not wanting; the medical, botanical, geographical, and geological branches of knowledge were sufficiently, and in some cases well represented. Fourthly, while the autochthons were of little importance either in numbers or in effective power, the hostility of natural conditions was most formidable. And this—difficult as it now is to realise that hostility for all but those who have ventured, in Central Australia, off the known tracks by which even that part is traversed—was a distinct advantage. The insignificance of the aboriginals and their isolation from the world were directly due to it; and then, as regards the whites, it caused the work of exploration and settlement to proceed slowly at first. Expeditions of discovery were undertaken, relinquished, resumed, and at last were carried to success; and accounts of most of them remain which were recorded while the event yet hung uncertain for guidance of those who might renew attempts in which the pioneers had failed. The earlier settlements which were effected by sea were therefore localised, and progressed deliberately; the organisation usual in colonies established under the Crown had time to develop at each point, and was not impeded by hasty diffusion of the people over too large an area at once. To mention one result of these conditions which is of importance in the present connection, enumerations of the people were early undertaken and frequently repeated; of which

the recorded results, largely in manuscript, have been before me.[1]

Thus it seems likely that in Australia the earliest appearance of lepra should be discoverable with some certainty, if that be possible in any country at all; and, conversely, if it be impossible in the case of Australia, then the history of no other country in which the circumstances were really less favourable to the search can be relied upon to establish the possibility of importing lepra.

And therefore, if the inquiry herein begun could be completed, an important result should be attained, whatever answer were yielded by it at last. A positive answer is desired; but if the problem turned out insoluble, at all events one of those faults so common in epidemiological writings on this disease would have been pointed out—namely, arguments based on insufficient or uncertain premises. For unless these views of the conditions under which Australia was settled, and of the information at present available concerning other places and other times, be greatly mistaken, that which her case is insufficient to establish cannot be more securely based upon the data which alone exist concerning Europe in the Middle Ages, or South America at its conquest, or insignificant and consequently seldom visited groups of islands in the South Seas.

Sect. II.—CONCERNING THE PRIMÆVAL AUTOCHTHONS.

Although there are records which show that the Australian coast was touched by European navigators at different points, and at long intervals of time, from about the beginning of the seventeenth century, no settlement was ever attempted until 1788, eighteen years after Cook had taken formal possession of the continent at Botany Bay.

Such accounts as have been left by the earlier navigators of their passing visits lay stress on the infertility of the country and the hostility of the aboriginals.

[1] By favour of Mr. T. A. Coghlan, Assoc. M.I.C.E., Government Statistician, New South Wales.

I have summarised the following details from the late Mr. Edward M. Curr's work.[1] His accounts agree, as far as I use them, with those of other writers. In the first place, it should be noted that the Australians are a homogeneous race, notwithstanding the very great size of the country they inhabit. Thus:

> The tribes throughout Australia are so much alike in physical and mental development, customs, manufactures, songs, dances, and language, that all late writers with one exception have attributed them to one stock.—Vol. i, p. 153.

And then as to the general conditions under which they exist in all parts of the continent, he wrote to the following effect:

> Owing to the scarcity of water the tribes are confined as a rule to the river banks during a great portion of the year, and leave the water-frontages only after rains. As the rivers are generally small a tribe usually occupies both banks, but for short distances. Dialects vary every fifty miles or so; each is understood only by the tribe using it, and is a foreign language to its neighbours; only the philologist perceives that they are merely variations of the same language, as nearly allied to each other in most cases as are Spanish and Portuguese.[2]

Then, as is well known, agriculture and the art of building, even in the narrowest sense, are unknown to the Australian. The aboriginal is therefore a nomad. His wanderings are the result of a never-ending search for food, which is nowhere plentiful; and as all live in similar scarcity, each tribe is confined by the economic jealousy of its neighbours to its own small territory. Curr pointed out another cause of the division of the autochthons into separate communities, and of the strict preservation of the latter from intrusion:

> What has led to the interruption of communication over the continent has lain in physical obstacles primarily—waterless wastes, impenetrable scrubs, and mountain ranges in which no food is procurable.

So also Mr. Ernest Favenc, an explorer and historian of

[1] 'The Australian Race; its Origin, Languages, &c.,' by Edward M. Curr; John Ferres, Government printer, Melbourne, v. Trubner and Co., London, 1890.

[2] To similar effect as regards language is 'A Journal of Two Expeditions of Discovery to North-west and Western Australia in the Years 1837-8-9,' by George Grey, Governor of South Australia. 2 vols., 8vo., London, 1842.

exploration to whom I shall have occasion to refer again, remarks that—

> One great obstacle to exploration was the native's want of knowledge of all but his immediate surroundings, never venturing beyond tribal limits. To this there were infrequent exceptions (*ubi cit. infra*).

These physical conditions, which were less unfavourable only on the sea-coast, and there chiefly on the eastern and northern shores, gave origin (as it seems to me) to customs which had for their chief effect preservation of the territory belonging to each tribe from intrusion, and consequent economy of the scanty food resources of which, at the best, it could alone boast :

> By temperament they are light-hearted and inclined to kindness ; but a belief in sorcery makes them hate and fear every man not belonging to their own tribe. They believe that every great evil is caused by sorcery ; and every death, no matter from what cause except old age, is attributed by them to the black arts of their neighbours. This belief tends to keep them in small communities, and is at the root of the crass ignorance which makes every tribe think its territory the centre of the earth which they believe does not extend more than one or two hundred miles beyond their own borders.

These general characteristics belong to the aboriginals wherever they are encountered, and constitute one proof of their racial homogeneity. And for want of agricultural art their economic state is everywhere identical, since it depends on the natural features of a country which offers no strong contrasts. But the scarcity of food becomes greater, of course, the farther west the country ; for rain comes from the east, and is largely precipitated by the coast range, which runs north and south one or two hundred miles back from the sea, and parallel with the eastern shore. The natives who live near the sea on the east and north coasts, as well as some tribes found at a few other points of the coast country, are well grown ; but they become habitual fighters, and really formidable to small bands of whites, only in North Queensland and on the north coast as far west as it is known.

These conditions can easily be placed in a practical light. For instance, they are such as to encourage a belief that even an easily communicable disease if it appeared among a

tribe would not spread beyond the territory inhabited by it; or if, by some accident, it did reach their nearest neighbours, that most probably it would not extend beyond them. Curr, however, was at great pains to trace an epidemic of smallpox which began in 1789, and probably at Port Jackson (Sydney). He believed that it overran the continent south of the tropic of Capricorn from east to west, and that it swept backwards and forwards at least twice before it finally died out in 1849. On the other hand, he thought there was no evidence that it ever gained a footing north of the tropic nor east of the 134th parallel of longitude; although it had been introduced to the north coast, "probably by Malays" (no ground being stated) since the year last named (and before it—see Wilson, quoted below). Apart from any uncertainty which may attach to this opinion, and which would arise in the means by which alone the necessary inquiry could be made, it may be thought possible that smallpox is the only disease which could so travel under the described circumstances, even among all the easily communicable diseases.

It is believed that Australia as a whole has always remained secluded from the world and free from intrusion of alien races except on the north coast. The general opinion is that the parcelling out of the country in small areas among many tribes, which held at the date of discovery, must have long before become permanent. To that strict seclusion two exceptions have been named. Communication between Cape York and Papua is said by Peschel to be maintained; and, on authority of Jardine, he adds that the "practised eye can easily discern among the Australians of Cape York (to be distinguished from Cape York Peninsula or North Queensland) the huge figures of individual emigrants from New Guinea."[1] He gives no reference to his authority's writing, nor any quotation, but after search I believe the following to be the original sentence:

Of the aboriginals of Cape York I can say little more than has been so often repeated in descriptions of natives of other parts of the Australian continent. The only distinction I can perceive is that they appear to be in

[1] Peschel, 'The Races of Man and their Geographical Distribution,' H. S. King and Co., London, 1876.

a lower state of degradation mentally and physically than any of the Australian tribes which I have seen. Tall, well-made men are occasionally seen, but these almost invariably show decided traces of a Papuan or New Guinea origin, being easily distinguished by the thrum-like appearance of the hair.[1]

While the aboriginals of the Cape are generally spoken of as well grown, or at all events often tall, the natives of the opposite shore of Papua are not characteristically described by the epithet "huge" which Peschel employs. But McGillivray's account[2] is more particular and very different. He expressly states that he found the Cape natives exactly resemblant with those he had seen in Southern Australia; and then adds that he saw two or three Australians of Papuan appearance among them, who, he thought, had come across—not from Papua, for they were not Papuans, but from islands nearest to the Cape in Torres Straits. Then he explains that while the Australians of the Cape are typical Australians, he did observe such strong evidence of intermarriage with Papuans on Prince of Wales Island among the Kowraregas who inhabit there, that although their language was Australian, he thought it very difficult to decide whether they should be classed with the aborigines of New Guinea or of Australia. Peschel concludes that Australia must have been peopled by way of and immediately from New Guinea, with which theory we are at present not concerned; and he distinguished between it and the prehistoric times to which it relates, and the supposed recent or present communication which bears immediately on our subject. The latter notion he supported by reference to the presence of outrigged canoes and other articles found among the Cape aboriginals, which are used in Papua, but not met with among the Australians anywhere else. That such articles are found among the Cape natives is undisputed. But, while a distinction between transmission of objects and ethnic intercommunication must always be

[1] Report to H. E. Sir George Bowen, Governor of Queensland, made by John Jardine, Police Magistrate, Port Albany, Somerset Island, March 1st, 1865. Appended to 'A Narrative of the Overland Expedition of the Messrs. F. and R. Jardine from Rockhampton to Cape York,' compiled by F. J. Byerley, Brisbane, 1867.

[2] 'Narrative of a Voyage of H.M.S. Rattlesnake, 1846–50,' 2 vols., London, 1852. See I, pp. 124–6, and II, pp. 1, 2.

kept in mind, it is easy to surmise the channel by which they reached the Cape after hearing what McGillivray has said. The evidence seems to show that the Papuans were friendly with the Kowraregas, and the latter with the Cape natives; not either that the Papuans reached the Cape, or that the Kowraregas had sufficiently influenced the Australians by admixture of blood for the characteristics of the latter to have become at all modified.

A discussion of this topic would lead too far, nor am I able to support one. My object in referring to it even briefly is to draw attention to the element of uncertainty introduced by it. Whether the Kowraregas, or other islanders of the Straits, have ever been found to have lepra among them I do not know; but the presence of that disease among the Papuans has been established, though only within ten years past, by his Honour the present Administrator of British New Guinea, Sir William McGregor, K.C.M.G., M.D.,[1] who has had long experience with the disease, first in the Seychelles and afterwards in the Fijis. But he thought it not very common in New Guinea, and observed it in the mild form so often seen in the South Seas—that is to say, as a slowly progressing form of L. nervorum, often for long, at all events, unaccompanied with mutilations; such a form as, I suspect, caused the so-called "macular leprosy" to be first raised to a separate category.

The other exception to absolute isolation of the aboriginals from the outer world occurs on the northern coast-line from about Coburg Peninsula eastward to the Gulph of Carpentaria. It is said that at some points the natives show physical evidences of admixture with Malay blood, and have even some Malay words incorporated in their dialect. But I do not think anything particular is known as to the date at which that admixture began, or its extent; and I suspect it was recent. As to these points the following quotations contain, I believe, all that is well established. Flinders, while issuing from the Gulph near Cape Wilberforce, observed a small number of prahus, and had a good deal of friendly communication with Pobassoo, a Malay in command

[1] Intercolonial Medical Congress, Report of the second meeting, 1889.

of the little fleet; the conversations were carried on through the Malay cook of Flinders' ship:

According to Pobassoo, 60 prows belonging to the Rajah of Boni, and carrying 1000 men, had left Macassar with the north-west monsoon two months before on an expedition to the coast, and the fleet was then lying in different places to the westward, Pobassoo's division being the foremost.

It (that is the tripang they came down to fish for) is carried to Timor and sold to the Chinese who meet them there; and when all the prows are assembled they return to Macassar. By Timor seemed to be meant Timor-laoet. . . . .

Pobassoo had made six or seven voyages from Macassar to this coast during the preceding twenty years, and he was one of the first who came. . . . They sometimes had skirmishes with the native inhabitants of the coast; . . . they cautioned me much to beware of the natives. . . . . I inquired if they knew of any rivers or openings leading far inland, if they made charts of what they saw, if they used any charts; to all which Pobassoo answered in the negative.[1]

From these early Malay visitors having had skirmishes with the aboriginals it seems likely they landed, even if they penetrated no farther than the beach; and from their fear of the former, and from their knowing little of the coast-line, it seems tolerably certain that nothing that could be called intercourse had then occurred—to say nothing of Pobassoo's statement as to his having been among the first on the coast twenty years before,—that is to say, about 1783. And accordingly Flinders, after inquiring in a foot-note whether it could be that the natives of the west coast of the Gulph had learned their custom of circumcision from these Malays, concludes that, from the short time the latter had been in the neighbourhood and the nature of their intercourse with the natives, it was "very little probable."

To the same effect as Flinders' account is that given by Captain Philip P. King. While surveying the northern coast-line he took his vessel to Coepang, Timor, for refreshment; and while lying there conversed with a Malay named Dramah, who had often visited New Holland in command of the fishing fleet which, he was told, annually repaired there. King said:[2]

[1] 'Narrative of a Voyage to Terra Australis,' by Matthew Flinders, 4to, London, 1814.

[2] 'Narrative of a Survey of the Intertropical and Western Coasts of Australia, performed between the Years 1818 and 1822,' by Captain Philip P. King, R.N., F.R.S., F.L.S., 2 vols., London, 1825; pp. 135 *et seq.* vol. i.

The coast is called by them Marega, and has been known to them for many years; a fleet to the number of 200 proas (this number is perhaps much exaggerated) annually leaves Macassar; it sails in January during the westerly monsoon, and coasts from island to island until it reaches the north-east end of Timor, when it steers south-east and south-south-east, which courses carry them to the coast of New Holland; the body of the fleet then steer eastward, leaving here and there a division of 15 or 16 proas. . . . . After having fished along the coast to the eastward until the westerly monsoon breaks up, they return . . . . without waiting to collect in one body; . . . they steer north-west, which brings them to some part of the coast of Timor, when they easily retrace their steps to Macassar, where the Chinese meet them and purchase their cargoes. . . . . Dramah informed us that in procuring water they are usually attacked by the Maregas, whom they describe as treacherous and hostile, and by whom they are frequently defeated; . . . . a perpetual warfare exists between them.

Dr. T. B. Wilson,[1] after having been wrecked near Cape York, arrived at Raffles Bay from Timor in 1828. He mentioned finding Assistant Surgeon R. M. Davis, of the 39th Regiment, in charge of the settlement, and gave the latter's annual medical report for the year ending June, 1829, in which the only sentence of present interest was that "nothing in the form of epidemic or contagious diseases has been met with;" in which, however, he referred only to members of the settlement. He also gave a report by Captain Laws, R.N., in which the latter stated that Port Essington was the annual rendezvous of the Malays of Macassar and Aroë Islands, and that the natives "are particularly hostile to the Malays." Of the aboriginals, of whom he seems to have seen a good deal, Dr. Wilson says, "In personal appearance they bear some resemblance to the natives about Port Jackson (Sydney). They are, however, better made, and possess more intelligent, and perhaps more savage countenances." The only sentence in which their diseases were mentioned by him spoke of a party of them who were all suffering from acute bronchitis, of ophthalmia, and of "deep circular impressions, especially on the face," as though they had had smallpox, which, after some inquiry, he concluded was the disease to which the scars were due, the more that one native had lost an eye during the illness to which he ascribed them. At page 30 he said:

[1] 'Narrative of a Voyage round the World,' by T. B. Wilson, M.D., London, 1829.

I also learned that a considerable number of Malay proas, chiefly from Macassar, had visited the settlement last season, and that while they remained their crews had conducted themselves with great propriety. They were highly gratified by their reception, and much pleased with the prospect of being able to carry on their operations without fear of molestation from the natives, with whom they are always at variance, and whom they represented as very bad characters, . . . stating that they were in the habit of stealing their canoes and spearing their men whenever an opportunity offered. They spoke well of the natives on the coast of the Gulf of Carpentaria, four of whom were accompanying them to Macassar. . . . They proceed, according to their own report, as far east as Cape York (pp. 30—32).

From something said in another place I suppose these four natives did not go to Macassar, but it seems unlikely they could expect to reach their own country alive again if they left the Malay party with whom they were travelling so far away from it as Raffles Bay. Raffles Bay was settled from Sydney (but temporarily, as it turned out) in an expedition of three vessels led by Captain Stirling; they arrived June 17th, 1827.

Curr,[1] on authority of Mr. Paul Foelsche, Commissioner of Police, Northern Territory, says that during quite recent years there has been friendly intercourse between the natives about Port Essington and the Malay fishermen; but at the time referred to the aboriginal tribe he mentioned had dwindled to a very small number indeed, so that Mr. Foelsche was able to name all the remaining members.

Prahus still come down, and now penetrate, I believe, as far as the head of the Gulph. The Report of the Government Resident of the Northern Territory for the year 1892, published 1894, which is the only report in type I have been able to see, is a considerable document (but entirely wanting in population statistics). It appears therefrom that the Malays have regularly visited some parts of the coastline down to the present, as they are said to have yielded a revenue of £4757 in licence fees since 1884, when this impost was first declared, and to have taken away produce to the value of £52,272.

I have no definite information as to the exact region from

[1] Op. cit., vol. i., p. 270.

which the Malays came, nor as to the prevalence of lepra either in Macassar or Timor.

So that in respect of the importation of lepers to the northern coast, or more exactly to parts of the coast-line eastward from Port Essington and (more recently) as far up the Gulph as its head, there is perhaps a general likelihood but also uncertainty. However, while it may be true that the landing of a few Malays on the beaches alone occurred in the earlier times, matters doubtless altered with repetition of their visits, so that some sort of friendly intercourse with the natives was brought about later. This must have been the case if the physical and lingual modifications and additions already referred to have taken place; and unless other tribes in that region possess the amiable characteristics observed by Leichhardt in the neighbourhood of the East Alligator River,[1] it may plausibly be suggested that close relations between the aboriginals and the Malays first began in that country and round Port Essington and Bowen Straits. Hence, although we can usually make sure of the primæval state of the autochthons discovered by whites in Australia, we cannot be sure of the primæval state of the north-coast natives at any particular part of the coast-line at and to the east of Port Essington when the whites first began to become familiar with them. We know what Flinders found, and may well accept his account as it stands; and we know what has happened at points of the coast more recently, in as far as the whites are concerned; but we have no knowledge of the interval worth speaking of, as far as I know.

Thus the question whether lepers were imported to the north coast must ever remain unanswered; for, of course, *that* is the question—not whether Malays, but whether lepers were imported. All that has been said is by way of raising a presumption merely, and it is a very doubtful one: (*a*) for want of knowledge of the state of the district whence the Malays came; (*b*) from the small proportion of the number with the fleets compared to that of the total inhabitants of their native district. And, as to aboriginal lepers first

[1] 'Journal of an Overland Expedition in Australia from Moreton Bay to Port Essington during the years 1844–5,' by Dr. Ludwig Leichhardt, London, 1847, p. 507.

observed in this district during a very few years past, there is no evidence at all as to the date at which lepers first appeared among them. It may have preceded the arrival of the Malays, or it may not (see Sects. V and XIV, below). I hesitate to say that ethnological treatises could furnish nothing further of importance in connection with this part of the Australian coast, of which indeed a great deal remains practically undiscovered; but at the end of a long, if imperfect search, I feel confident from the general features of the case that the requisite ætiological certainty is not likely ever to be reached.

Sect. III.—OF THE NUMBERS OF THE ABORIGINALS.

On this topic I find the remarks made by Mr. T. A. Coghlan, Government Statistician, N.S.W., more satisfactory than any other statement of the kind I have met with.[1]

> At the census of 1891 only 38,879 aboriginals were enumerated, of whom 8280 were in New South Wales, 565 in Victoria, 23,789 in South Australia, and 6245 in Western Australia. The figures relating to New South Wales and Victoria include all aborigines now living in those provinces, but the returns from the other colonies are very imperfect. The aborigines of Tasmania are extinct, but the Tasmanian census of 1891 enumerates 139 half-castes, which are included in the general population. It has been asserted that there are some 70,000 aborigines in Queensland. This is, however, a very crude estimate, and may be far wide of the truth. In the case of South Australia a large number of the aborigines in the Northern Territory are entirely outside the bounds of settlement, and it seems probable that they are as numerous in that colony as in Queensland. The census of Western Australia includes only those aboriginals in the employment of colonists, and as large portions of this, the greatest in area of all the Australian colonies, are as yet unexplored, it may be assumed that the number of aborigines enumerated at the census is very far short of the total in the colony. The aboriginal population of the entire continent may be set down at something like 200,000.

But in truth nothing at all can be said on this topic, except that originally the population was decidedly sparse.

[1] 'The Seven Colonies of Australasia,' 1893, by T. A. Coghlan, Government Statistician of New South Wales. Sydney: Charles Potter, Government printer, 1893.

Tribes varied in number, and natives are spoken of as being more numerous here or there than elsewhere by the early explorers; but compared with the size of the country they were but few altogether. Even if the 200,000 mentioned as a possible figure for the present total population of the continent were all actually present in Queensland, the density would be but one to between three and four square miles. They were early exterminated in Tasmania, where the last died in 1867, and they died off rapidly wherever they were forced into close contact with whites; thus they are nearly extinct in Victoria, but survive in greater number in the larger territory of New South Wales, though still steadily and rapidly diminishing there. The point to note, however, is that during this century aboriginals have everywhere existed, at first in large, later in lessened number, and consequently have afforded a sufficient opportunity for study of their diseases. Whether that opportunity was ever fully used, or used sufficiently to cast light on the subject under discussion, I shall now endeavour to judge.

Sect. IV.—OF LEPRA AMONG THE PRIMÆVAL AUTOCHTHONS.

Having reviewed the general conditions under which the myall[1] aboriginals lived with reference to the probabilities of communication of disease from one tribe to another, and so over the continent; and having examined the probability of the importation of lepers to the myall aboriginals sufficiently to show that the fact is, and most likely will ever remain, doubtful; I proceed to inquire whether there is any evidence of the existence of this disease among the blacks at the date of their discovery, and before either the whites or the coloured aliens who followed the latter could possibly have influenced them. It will be remembered that in so large a country the date of discovery must have varied with the progress of exploration; and while the tribes about Port Jackson (Sydney) were "discovered" in 1788,

[1] "Myall" = savage, or unsophisticated by intercourse with foreigners.

there are still tribes which await "discovery," since there are enormous areas of country in the north-west which as yet are unknown. On this point I have been obliged to rely largely on the assistance of gentlemen who are more intimately acquainted with the voluminous records than I can hope to become.

Mr. F. M. Bladen has been engaged for some years past in editing Historical Records for the Government. He has been good enough to make the following general statement, but before giving it the reader may be reminded that Sydney was the seat of government for all Australia, and the depository of official documents concerning every occupied or explored part for very many years :

Mr. Bladen was able to say positively that there was no mention of leprosy among either aboriginals or whites during the first fifteen years (1788—1803) ; and he felt sure that there was none during the first thirty-six years—but not quite so certain as in the former case because the documents had not been completely classified, and consequently he had not become quite so familiar with them. But, he added, there was but little information contained in the records concerning medical topics ; almost all with which he had met being confined to administrative details, such as the number of patients under treatment in hospital, stores, &c. And the exceptions consisted of brief references to scurvy, from which the earlier immigrants generally suffered much on board ship, and Governor Phillip's well-known description of an outbreak of smallpox.

Here may be interpolated another note made by Curr, whose work already quoted shows that he was particularly interested in the diseases of aboriginals, and constant in his inquiries concerning them. He said :

It is a matter for regret "that the subject of the diseases generally of our aborigines, and the peculiarities of their constitutions have heretofore failed to attract the attention of the gentlemen of the medical profession in these colonies ; that some competent persons have not made the whole matter a study."

The Surgeon-General of the first expeditionary fleet made no allusion to any such disease as leprosy among such aboriginals as he had had opportunity of seeing during the first two years.[1]

Mr. Bladen farther said :

[1] 'History of a Voyage to New South Wales,' by John White, 1798.

I have failed to find any allusions in the descriptions of the natives of N.S.W., which Phillips and his contemporaries wrote, to anything that could answer to leprosy. Had there been any such disease among the aboriginals who visited the camps at Sydney or Parramatta, I am quite sure that Phillip (who was a most minute and careful observer of the manners and customs of the aboriginals) would have noticed and mentioned it.

The kind of remarks which, alone, are occasionally met with in the works now referred to are exemplified in the following extracts:

Kittle, in his history of New South Wales,[1] says at page 212, "Colds and fevers are among their (the aboriginals of Port Jackson) ordinary complaints, and some of them are troubled with a disorder greatly resembling the itch. They call it Djee-ball. It is sometimes very virulent, and renders those afflicted with it extremely loathsome."

And in Captain Watkin Tench's 'Complete Account,' &c., it is similarly noted of the same tribe, "They are sadly tormented by a cutaneous eruption, but we never found it contagious."

Mr. Ernest Favenc, to whom I have already had occasion to refer, and who is the author of an important account of Australian exploration,[2] has been good enough to write to me as follows:

I am almost certain that there is no mention made in any of the explorers' journals of anything amongst the natives which could be construed into a form of leprosy, except in Sturt's account[3] of his trip down the Murray. At p. 148 of vol. ii he says, "It would disgust my readers were I to describe the miserable state of disease and infirmity to which these tribes were reduced. Leprosy of the most loathsome description, the most violent cutaneous eruptions and glandular affections, absolutely raged through the whole of them."

The place where this tribe was encountered was presumably 150 or 200 miles from the mouth of the Murray, and Sturt mentioned having met a healthy tribe lower down. It is, of course, doubtful in what sense the word leprosy was used by him, and in default of a more particular statement I suppose the probability is that the writer had *lepra vul-*

[1] 'A Concise History of the Colony and Natives of New South Wales,' by Samuel Kittle, Edinburgh, 1815.

[2] 'A History of Australian Exploration from 1788 to 1888,' compiled from State documents, private papers, and the most authentic sources of information. Issued under the auspices of the Governments of the Australian colonies. Sydney: Turner and Henderson, 1888.

[3] 'Two Expeditions into the Interior of Southern Australia, 1828–31,' by Captain Charles Sturt, 1833.

garis, or merely some repulsive disease of the skin in mind. And Mr. Favenc pointed out in his letter that as the district referred to was one of the earliest settled (or taken up for pastoral purposes) it would be singular, if lepra had really been met with, that no mention of it at all should have been made by the numerous whites who subsequently dwelt there.

Mr. Favenc, himself an explorer of distinction, went on to say :

So far as my personal experience goes I have seen no indication of the leprous signs you indicate amongst myall natives in any part of Australia. I have noticed a scaly appearance among the tribes, but this, I think, is due to poverty of living, as I have generally noticed it among the semi-starved aborigines of the desert country, and not amongst the comparatively well-fed natives of the eastern coast.

The signs on which I had laid stress in making inquiry of Mr. Favenc were the mutilations of L. nervorum ; for I consider that these alone are certain to rivet attention when they are advanced, and, if spoken of, are almost indisputable evidence of lepra, though reported by a layman of no experience with the disease. We shall see presently that descriptions of advanced or well-marked cases of L. nervorum, such as are quite convincing, have sometimes been given by lay observers. But experience shows that L. tuberosa might very likely remain hidden under some reference to syphilis at the hands of medical men without clinical experience, as well as of laymen.

The explorations of Mr. Ernest Giles, F.R.G.S. (gold medallist),[1] are well known. He spoke to me as follows, after having made five exploratory journeys between the years 1872 and 1876, starting from Central South Australia and working west :

He first examined a considerable collection of photographs of lepers of various races. He then strongly affirmed that the myall black never suffered from " constitutional diseases," but that these appeared only after their communication with whites ; and he mentioned especially syphilis and consumption. He was quite certain he had never seen any such destructive or deforming disease among them as, from the photographs, he perceived lepra was.

[1] ' Australia Thrice Traversed,' 2 vols., maps. Sampson Low, London, 1889.

But as to the opportunity enjoyed by explorers of making the kind of observation now referred to, I scarcely think it was often extensive. No doubt they rather frequently saw small numbers of aboriginals at sufficiently close quarters and during a sufficiently long time; and occasionally they became more or less well acquainted with larger bodies; but always the myalls seem to have been either hostile or extremely timid. However, opportunity probably varied much in different parts of the country.

And if opportunity varied, so also did qualification in the observers. The latter were most often laymen; but in important instances either the leader was himself a medical man or else one accompanied the expedition. Thus:

Dr. Ludwig Leichhardt led a party (1844) from Moreton Bay to Port Essington, and he accomplished it by travelling north, crossing the base of Cape York Peninsula, and skirting the head of the Gulph, &c. &c.

With Sir Thomas Mitchell on his journey through the Barcoo country was Mr. Stevenson as surgeon and collector.

With Burke and Wills on their successful transcontinental journey from north to south was Dr. Herman Beckler as surgeon and naturalist (1861).

Baron Sir Ferdinand von Mueller, K.C.M.G., M.D., F.R.S., was himself engaged in 1847 in exploring unknown regions in the south-east quarter of the continent which then were still unknown. In 1855 he was with the Hon. A. C. Gregory, C.M.G., on an exploratory expedition to Northern Australia: they went by sea to the mouth of the Victoria River, and explored its head waters, descending southerly as far as the 20th parallel, and returned; then they started again from about Queen's Channel, travelled south-easterly, skirted the Gulph, crossed the base of the Peninsula, and arrived at last at Port Curtis. With them, also, was Mr. Elsey as surgeon and naturalist.

Thus Baron v. Mueller acquired an explorer's acquaintance with at least two widely separated and extensive tracts of Australia, at a date when all the blacks encountered were myall; and, while I believe that leprosy is unmentioned in any of the records of the expeditions referred to above, and that it is not specifically mentioned in any other, except Sturt's account already quoted, Baron v. Mueller has, at my request, been good enough to make the following explicit statement:

During my exploratory travels through wide tracts of Australia I have never noticed a case of lepra in any form among the primæval autochthons, nor have I heard of the occurrence of leprosy among the aborigines from the early explorers or their published works. The original freedom of

Australia from lepra seems also indirectly furthermore attested by the reports from West Australia and Tasmania, the two colonies eldest next to New South Wales. Both, like the latter, had Government medical officers from the commencement, who would have been sure to have recorded such a patent and dangerous disease had it existed among the original natives of their districts.

At the early dates referred to perhaps little was thought of lepra as a danger; and its patency, it must always be borne in mind, is relative for the most part to the clinical knowledge or experience of it which observers have.[1] Nevertheless it may be thought that lepra could not have been prevalent or common in any part of the country in which, from close settlement, the aboriginals became really well known without having been recorded.

Without pursuing a tedious search any farther, I think it may be confidently asserted that no record of lepra among the aboriginals in any explored part of the continent has ever been made; and (though less confidently) that no records exist which contain such vague descriptions or such cursory remarks as would give rise to strong suspicion that leprosy lay concealed in them. The well-established character of lepra as a disease which adheres to (or possibly inheres in) localities must not be forgotten, however, and the probability that in consequence it would not be met with—if met with at all—in every part of the continent. Speaking generally, the aboriginals of the southern half have been better known from the first than those of other parts of Australia.

Sect. V.—THE ABORIGINALS ARE SUSCEPTIBLE OF LEPRA.

That the aboriginals are susceptible has already been demonstrated by the particulars and photographs of Case No. 15, Queensland, given in the Appendix. The Northern

[1] This matter of competency to diagnose leprosy is a very much more important factor in forming an estimate of the value of epidemiological writings than is commonly recognised; and from experience I see that this criticism should be borne in mind, even when the testimony of practitioners resident on leprosy-areas is being considered.

Territory case, also, was attested by Dr. O'Flaherty in charge of the Port Darwin lazaret (of this, however, a farther account is given below); and perhaps the Townsville case, No. 28, Queensland, may be reckoned, which was attested by the two medical men who reported it to the Queensland Government, although no particulars were mentioned in the report, or have since come to hand.

But there is farther evidence which seems to me trustworthy. I have mentioned in the Appendix, Queensland, a police report in which pearl fishers at Barrow Point, Cape York Peninsula, were said to have requested the police to remove aboriginals from the neighbourhood of their camp, who were described (at least as regards one of them) as being mutilated in a way scarcely attributable to any disease but lepra. This example, however, cannot be quoted with reference to *myall* blacks any more than the three former. The coast between Cape Grafton and Cape Melville has been frequented by pearlers for some years past, though not for very many; some fisheries, at some points or other of the indicated part of the coast-line, began to acquire importance about 1888, or shortly before then. Probably, therefore, the aboriginals referred to were not myalls; and, at all events, attention was drawn to their illness by pearlers whose acquaintance with lepra was due, no doubt, to its prevalence in their native islands or country.

The following particulars of the Northern Territory case are both interesting and important. I am indebted for them, as well as for the contribution which follows, and which has not yet been published, to the interest taken in this inquiry by Dr. Percy Moore Wood. On referring to the Appendix, Northern Territory, it will be seen that the Government Medical Officer at Port Darwin said the aboriginal leper was received by him in an advanced stage of L. tuberosa. He was officially ascribed to Elsey (pastoral) station; but this was doubtless done merely by way of indicating the country in which he lived, for from the following letter it seems that he was better known at Springvale (pastoral) station. Both were held by Mr. Alfred Giles; the latter is 220 miles almost due south of Port Darwin, and near the Katherine River (telegraph) station;

the former is 80 miles farther south, and on Elsey Creek. The tribal territory to which this leper belonged probably included all these stations. Mr. Giles wrote as follows:

I knew the black fellow ever since I came here in 1879. He was not an old man, but, I should say, about thirty-five. When I first knew him, as far as I could see, there was nothing wrong with him; but about four years afterwards his toes rotted off both feet; in fact, half the instep was gone, and then his fingers came off, all but the thumb on each hand—and I think one finger was left. . . . . I had a good idea he was a leper from the time his toes began to drop off; . . . . as he could not get about much I used to feed him; . . . . he never complained of any pain, nor do I think he felt any; he was a jolly fellow, rather. . . . . He undoubtedly belonged to this country (the Katherine River), and had never been to the north coast. . . . . I have seen no other so advanced; but if there are any signs by which a layman could identify the disease, and you let me know, I will pay more attention to toeless blacks.

The duration of this case seems to have been about ten years; but Mr. Giles surmised that his speedy death after his removal to Leper Island, Port Darwin, was due to fright and banishment. Dr. Wood was confident that this aboriginal, said by Mr. Giles never to have been to the north coast, in reality could not possibly have reached it, considering the many different tribes which intervened between the Katherine and the coast.[1] Yet it is not certain that a Chinese leper could not have reached him; but if a Chinese wandered so far south he must have been known at one or other of the two stations, a point on which Mr. Giles was silent.[2]

Other evidence refers to quite a different part of the territory. It was collected by Mr. Reginald Stow, a solicitor, and reached me through Dr. Wood. Mr. Stow's notice of the peculiar physiognomy occasionally presented by the sufferers, as well as his remarks in general, stamp him an acute observer:

I was on the East Alligator River in June, 1893, and stayed with the buffalo hunters three days.[3] Among the aboriginals camped beside us was

[1] But compare Mr. Mayhew's letter below.

[2] Unless he first died or was murdered in the bush. Such are the doubts which attach to this kind of inquiry.

[3] One of the earliest attempts to effect a settlement hereabouts was made in an expedition to which part of a native regiment from India was attached. The buffaloes referred to are wild descendants of stock then

a man of the average height, about twenty years of age, and of apparently good physique. He had lost every vestige of his toes and fingers, and all that remained of his hands and feet looked very like little black clubs. Another noticeable feature was his very effeminate appearance, not a sign of whisker on his face,[1] judging from which alone he might easily have been mistaken for a lubra; and his expression generally was what one would expect to find in Tennyson's melancholy, mild-eyed lotus-eater. Indeed, so pronounced is this melancholy, apathetic, effeminate expression, that I could undertake to say from a look at an aboriginal's face whether he had his fingers and toes intact or not. However, I found an exception in a man who appeared to have developed the disease at between forty and fifty years of age. This man had, when I saw him, developed the disease about three years, and had then lost the big toe from one foot. He had not the expression peculiar to the other six or seven cases I have seen, and he at times suffered pain in the affected foot. I particularly ascertained the truth of this, for I had the idea that no pain was attached to leprosy. The first case I mentioned was of four or five years' duration; and I have heard to-day from ——, who has just returned from the district, that the man is at death's door. When I say four or five years old, I mean as far as can be gathered from the natives; but you know how unreliable they are as regards time, and, moreover, they would not probably think of the disease until it was developed.

As far as I could learn from the aboriginals, the disease, whatever it is, was with them before the coming of the white man; they have no dread of it. A native affected lives with his tribe, shares their blankets, pipe, and everything else, and is fed by the others when the disease has gone far enough to prevent the use of his hands.

I have only seen six or seven natives suffering from this disease, but I am told by the buffalo hunters that there are a great many a little way back, and one hunter assured me that he would have no difficulty in rounding up twenty in a day. I can quite credit this, for one day I struck a camp with three out of six affected. I forgot to mention that in two or three cases I noticed white patches on the hands and wrists. Whatever the disease may be, the natives say that it always takes the one form, and the hands and feet disappear from the fingers and toes downwards, joint by joint, and that its termination is always death.

This important letter leaves no doubt, I believe, that leprosy is diffused to a considerable extent among some of the tribes living in the Alligator River district.

The following, contributed by Mr. G. N. Mayhew, of Palmerston, is suggestive on certain points. I had inquired of Mr. Mayhew concerning communication between the coast

imported, now being hunted for their hides and horns by Australian stockmen, assisted by a few Malays.

[1] The aboriginal is hairy.

tribes and those of the interior with special reference to the case related above by Mr. Giles:

The aboriginal who died in the lazaret came from the Katherine River district, about 200 miles south of Port Darwin. But there is some reason to believe that the district named is connected by the intercourse of the natives with the coast at Bowen Straits (comprehending the three Alligator Rivers). It is well known that the Alligator blacks travel as far south as the Eveleen silver mine, because they have committed outrages there, and the Eveleen silver mine would be only a couple of days' travel from the Katherine. The two lots of natives might not meet frequently; but it is a reasonable assumption that they do sometimes congregate together for the purpose of holding what they call "big corroborees." Again there is another custom which all the natives here (as far as I know) follow out, which might assist in the spread of the disease, and that is the habit of stealing women for wives from any tribe that doesn't keep its weather eye open for such acts of larceny.

I do not, of course, pretend to know just how much time or how many opportunities a leper must have before he can pass his disease along; but this I do know—that friends of mine have at various times expressed the opinion that leprosy existed among the Eveleen[1] blacks, and if that could be proved, there is nothing more reasonable than to assume that the Katherine black was attacked through the disease spreading from the coast.

The origin of the disease, according to the coast blacks, dates back to a time when only the Malays were visiting the Port Essington and Bowen Straits localities;[2] from which it may be inferred that unless leprosy is a natural gift to them they must have acquired it from the foreigners. But in that case the memory of the aboriginals must extend back to about 1824 and some immediately subsequent years, to which extent it could not be limited, I believe. Besides, the advent of the Malays was a noteworthy event in their simple calendar; suppose they used it as, for instance, eclipses of the sun have commonly been used—merely to fix the time? The blacks have always[3] been as friendly with the Malays as they have with anyone else living among them. The Malays brought trade which they wanted, and the blacks in turn collected tortoiseshell, pearl-shell, and trepang to exchange with them. Rows, of course, happened at times between them, but on the whole the Malays got on well with the blacks, and were intimately associated with them during the half-century or more[4] that the Malays have been visiting the coast.

The buffalo hunters are some half-dozen whites and Malays mixed, who have been shooting buffalo for their hides only for the last ten or twelve

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[1] This seems to be a slip of the pen; 'Alligator,' probably, should have been written.

[2] Compare Mr. Stow's account above.

[3] Compare Flinders' account quoted above, and Mr. Foelsche, quoted by Curr, above.

[4] Compare Flinders above.

years. Their field of operations has always been around Port Essington or about the Alligator rivers. In their occupation they use the natives as carriers of skins and helps generally. It was from them particularly that we have heard most talk of leprosy amongst the Alligator natives. It may be that they are confounding leprosy with the severer forms of venereal disease; yet the nature of their complaints so resembles leprosy that I, for one, see nothing at all unreasonable in granting it to be leprosy.

A valued correspondent of ours once wrote of the existence (as he presumed) of leprosy among the Macarthur River blacks, another coast tribe.

I have extracted from this letter more than was strictly necessary, because the writer is the editor of the 'Northern Territory Times,' and, as his paper testifies, had had his attention turned to this subject since the beginning of 1893 at all events. It will not be supposed that I disparage a communication which contains useful hints if I point out that, considered in relation to the writer's interest and excellent opportunities, it strongly points to the need and probable profit of a special investigation of the matter in this part of the continent. Indeed, Mr. Mayhew concluded by saying that such an inquiry had often been urged upon the South Australian Government; but "the official mind had been found slow to recognise the need to do anything in the matter."[1]

The correspondent referred to by Mr. Mayhew was Captain W. G. Stretton, Chief Warden of the Goldfields, and for many years past a Resident Magistrate of the Northern Territory. He obligingly communicated the following to me, first of all corroborating the accounts already given concerning tribes in the Alligator River district. He wrote:

"I was on the East and South Alligator Rivers during October, 1894. I visited that neighbourhood, the head of Van Diemen's Gulph, in company with the Government Resident, and on the East Alligator saw several natives (that is, aboriginals) suffering from the loss of top joints of fingers and toes, the ears lengthened and flabby; in some cases the feet and hands were much swollen."

He then proceeded to speak of occurrences of a disease

[1] Early in 1895 a male aboriginal was brought into Palmerston from one of the Alligator rivers. Dr. O'Flaherty examined him, and has informed me he considered he was suffering from nerve leprosy. No farther information. The man escaped from confinement.

which he thought was, and which appears to have been, leprosy among the aboriginals in quite another and distant part of the same country. This was the neighbourhood of the MacArthur River, which debouches on the west coast of the Gulph ; Captain Stretton was Resident Magistrate at Borroloola, a post on the west bank of the MacArthur, and southward from the coast about fifty miles, from August, 1888, to August, 1894. He wrote :

"During this time I had plenty of leisure to study the manners and customs of the immediate tribes of natives . . . . the disease does not appear to have so strong a hold (as on the Alligator Rivers) or is dying out. I saw a native woman, about twenty-eight years of age, whose ears were hanging down like a piece of dough ; her hands and feet were covered with white patches and a dry scaly look. She died soon after my arrival on the MacArthur. A young man, about twenty years of age, had lost all his toes, otherwise he was apparently in robust health. When I asked him how he lost his toes he replied 'him tumble down himself.'"

The case of the woman is the first in a female aboriginal (if the description should be thought sufficient, under the circumstances, to identify the disease with leprosy) of which there is any record ; all other reported cases have occurred in males.

To sum up with regard to the aboriginals :—(*a*) No case of lepra among them has been recorded in Australia south of the latitude of Maryborough, Queensland ; (*b*) no case of lepra was recorded among them in any part of Australia before the year 1892 ; consequently (*c*) no case has been recorded among them under circumstances which demonstrate the existence of the disease in Australia among the aboriginals while still in their primæval state ; (*d*) nor any until after the known advent of immigrants from recognised leprosy areas ; (*e*) nor any, even, except at places where (as far as I have been able to learn) they might have come in contact with such immigrants. On the other hand, the information is defective. All that is known of lepra among them has been recorded so lately as three years ago at the most,—that is to say, only after the general attention of the public had become aroused to leprosy. There is at present nothing which can be classed as evidence to warrant the tracing of lepra among the aboriginals in the Northern Territory to the Malays in older times, or

to Chinese in quite recent times, nor anything evidential which connects it with either race; especially no Malay leper has been seen, or has been recorded, in Australia. But the presence of whites is necessary to our knowledge of leprosy. Now, as regards the Chinese, they have always followed the whites in Australia; the attention of the whites was first attracted to the disease by its occurrence among those immigrants—first among them because they were usefully employed and individually known; and it was most probable *à priori* that it would be observed among the insignificant aboriginals, who were rather in the way than otherwise, only after it had been noticed among the useful servants. I think the late date at which alone attack of the aboriginals has begun to be recorded is by itself fatal to any ætiological argument which it might be attempted to base on the information here collected, and now for the first time made known. The very late discovery of cases at three, or perhaps four, very widely separated parts of the country is a sufficient ground for surmising that after all the truth is far from having been revealed, at least in the entire absence of anything like an epidemic or sudden and wide-spread increase among any race. In short, it is clear that effective observation and inquiry have only lately begun.

The part of this review which tells for importation necessarily appears the stronger. I need scarcely point out that it is so only in appearance. The area concerned appears to me one which would probably repay exploration by a competent observer, from the (apparent) simplicity of the conditions.

Sect. VI.—THE OCCUPATION OF AUSTRALIA BY THE WHITES.

From the foregoing imperfect and, in the present view, often vague details concerning the autochthons, we can turn to the better-ascertained facts concerning occupation of the country by the whites. It is necessary to mention a few dates, areas, and numbers, in order that some notion may be formed of the general condition of the country as regards

distribution of the white population at different times; but these I shall reduce to what seems to me barely necessary. A reference to the circumstances which influenced the composition of the population will complete all that need be said separately on this topic.

The approximate area of Australia is 2,944,628 square miles. It was formally taken possession of by Cook in 1770, at Botany Bay. In 1788 the first immigrants landed at Sydney, Cove, on the landlocked waters of Port Jackson; they numbered 1030. Here the Government was seated, and it was of the Crown-colony type. By offshoots from this settlement the continent and the island of Tasmania were gradually settled. Thus Tasmania, which has an area of 26,216 square miles, was settled in 1803; it acquired a separate government, and was erected into a Crown colony in 1824; it was granted responsible government in 1854; its population [1] was then (1851) 70,130, and in 1891 it was 147,667. The area of Western Australia is 1,060,000 square miles; it was settled at Freemantle in 1826; became a Crown colony in 1829, and was granted constitutional government in 1890; its population was 49,782 in 1891. South Australia, which has an area of 903,690 square miles (including the Northern Territory), was colonised from England direct in 1836, at instigation of certain of the colonists of New South Wales who were dissatisfied with social conditions there; it was a Crown colony from the first, and was granted constitutional government in 1856; in 1855 its population was 85,821, and in 1891 it was 320,431. The Northern Territory (area 523,620 square miles) was added to South Australia, and thereafter was governed with it in 1862, but it had no population until several years later. With New South Wales at first was included all that country which is now known as Victoria and Queensland; it was divided into three districts called the Middle, the Southern, and the Northern. A settlement was first effected in the Northern district on the Brisbane River in 1824, and the colony of Queensland was delimited, separated from New South Wales, and granted constitutional government in 1859; it has an area of 678,600 square miles; in 1861 it had a population of 30,059, and in 1891 of 393,718. The Southern or Port Phillip district was delimited, separated from New South Wales, and, as the colony of Victoria, was granted constitutional government in 1851; it has an area of 87,884 square miles; in 1851 its population was 77,345, and in 1891 1,140,405. Lastly, New South Wales has an area of 310,700 square miles; constitutional government was granted in 1851, when the population numbered 187,243; its population in 1891 was 1,132,234.

In every case the earliest settlement was made by sea. From the point first chosen exploration started; the land was then taken up for pastoral purposes, villages sprang up at convenient centres, and thus the country gradually be-

[1] All population figures here and elsewhere are exclusive of aboriginals unless the contrary is stated, but include coloured aliens.

came occupied. If the total population be compared with the total area its density is extremely low. But the actual distribution is probably three fourths among the towns, large and small together, while the remaining fourth is very widely sprinkled over the occupied areas.

The earlier settlers were all immigrants from Europe, and almost exclusively from Great Britain. They continued to be English in the main until 1851, but the proportion of native-born became larger and larger as time went on; and is now equal to two thirds of the total at all ages (1891).

In 1851 gold was discovered in New South Wales and Victoria; soon afterwards this led to an influx of people from every part of the world.

The census of 1861, and every subsequent census, revealed the presence of some natives of every recognised leprosy area in the world; without taking the trouble to enumerate them, it may be briefly said that this statement is all but literally true. If coloured races be excepted, their total number was very small in proportion to those whose birthplace was a leprosy-free area—among which I reckon all parts of Australia for the present. None appear in the Appendix, however, as having suffered from leprosy; no Norwegian, Syrian, Cypriote, Mexican, Russian, &c. &c.

The discovery of gold brought the Chinese—that is to say, in numbers; for it will be seen presently that the date of arrival of the first individuals is not ascertainable. They came in numbers then, first to Victoria, soon after to New South Wales. Discovery of gold in South Queensland caused their appearance in number there about 1867; further discoveries about 1873 made in the country back from Cooktown (15° S. lat.) caused them to arrive there in numbers, and direct; for Cooktown lies on the course of vessels approaching Australia from China. Those who had gradually spread over South Queensland after 1851 had, I think, for the most part travelled there from the south, where they had originally arrived. The discovery of payable gold in the Northern Territory, which was made during the laying of the transcontinental telegraph line in 1870–1, caused a moderate number to appear there afterwards. In 1881 nearly 3000 were enumerated. About 1883–6 the con-

struction of a railway was the occasion of importing Chinese coolies in considerable numbers.

The cultivation of cotton had been profitably carried on in Queensland by the whites as long as the civil war in the United States lasted; but at its close the planters found they could not continue unless they had cheaper labour. Chinese were imported in small numbers, and were not found useful. About 1867 sugar began to take the place of cotton; and kanakas,[1] who had already been found serviceable in the declining cotton-fields, were imported to the sugar plantations, and in such numbers that the first Act of the Queensland Parliament to regulate the traffic was passed so early as 1868. From that time forward their importation was regularly continued, but has lessened a little of late years. Cultivation of sugar, then, controls the distribution of the kanakas in Queensland. They were first employed near Brisbane, and afterwards on the plantations which gradually became established near the mouths of all the rivers as far north as Cooktown; a few also went to the northern rivers of New South Wales, where sugar is grown—the Clarence, Richmond, and Tweed. They came first from the New Hebrides and the Solomon Islands; but gradually they were gathered more widely, and eventually from nearly every group south of the line or on it.

Pearl fishing during later times has caused the inflow to the North Queensland coast and the northern part of the West Coast of Western Australia of small numbers of Japanese, Malays, and a few Cingalese; but they are almost confined to the remote localities in which the fisheries exist.

Lastly, as the general population has increased, numbers of coloured aliens of various nationalities have arrived in the course of ordinary and gradual immigration. Afghans, for instance, have more recently come with camels which are now largely used in the interior; as well as many natives of India, Ceylon, and Syria, who are hawkers, cooks, fruit sellers, &c. &c.

But all these coloured aliens together are not yet so numerous as to strike the casual observer as he walks about,

[1] A generic term, borrowed from the Hawaiian language, for South Sea Islanders of both the Melanesian (or Papuan) and Mahori types.

at least in the towns; the case is different in districts where there are many sugar plantations, or where there are alluvial gold-fields. However, one cannot walk much about any town without seeing one or two Chinese at least.

The Chinese either work for themselves, or are imported by Chinese proprietors; they are free to roam about the country looking for suitable places in which to establish themselves. They collect in mineral country, seeking for stream tin and alluvial gold; or else in the neighbourhood of towns. Their various occupations are mentioned below.

The kanakas are engaged for terms of three years. They can re-engage, but after some years' stay they like to strike out for themselves, and as "time-expired boys" are to be met with wide-spread over Queensland. There are but few in New South Wales, and practically none elsewhere.

Experience has shown that leprosy occurs most frequently among the Chinese and the kanakas, who are the coloured aliens present in largest number. The Chinese preceded the kanakas by many years; they are found in numbers, moreover, in colonies where kanakas have always been very few or altogether absent. It is only in Queensland that the relative importance of these two races as regards importation of lepers need be considered, and the recorded facts are there meagre and uncertain. The parts in which lepers have been observed where the Chinese alone have been of importance, as forming to all intents the only source of (known) imported lepers, are New South Wales, Victoria, and Western Australia.

Chinese are significant in this connection only when they have leprosy, of course, and many Chinese lepers have been noted. But as every Chinese leper (no doubt) has not been recorded the distribution of Chinese in general must be examined, and such inference regarding their importance as may be warranted must be drawn from knowledge of the state of the part of China in which they lived as to prevalence of lepra.

And then, secondly, the distribution of the Chinese is of consequence chiefly in relation to the occurrence of lepra among the whites (or the resident population in general). Judged by that criterion their apparent importance has

varied very much. The broad fact disclosed in Table V, Appendix, is that there has been practically no lepra among whites in Victoria, but a good deal in New South Wales. And therefore, after briefly considering the distribution of the Chinese in other parts, and only as far as seems indispensable, it will be necessary to go into more detail regarding their number, occupation, and distribution in the two colonies just named.

Sect. VII.—ORIGIN OF THE CHINESE MET WITH IN AUSTRALIA.

To all the numerous inquiries I have made on this topic from time to time the same reply has been made: the Chinese met with in Australia come from the provinces of Kwang-tung and Fuh-kien—those in which Canton and Amoy are situated. The Rev. Soo Hoo Ten, of Sydney, has informed me that a larger proportion arrived from the neighbourhood of Amoy in former years; more recently the majority have come from Canton and Macao. To similar effect was a private communication obligingly made to me by Mr. H. E. Hobson, H.I.M.'s Commissioner of Customs, Kowloon; he said, "I imagine that nearly all the Chinese in Australia will be found to have travelled *viâ* Hong Kong or Macao, though it is possible that a few may have gone down from Singapore and Penang, and to be natives of Canton province."

From Surgeon-General Gordon's work[1] it appears that Dr. Wong furnished a note on lepra in China to the Report for the half-year ending September, 1873; from this the following particulars have been taken:

> The disease is very prevalent in the Canton province; it is endemic there, and prevails equally among the population on shore and in the boats. In the whole empire leprosy is most common in the provinces of Canton and Fuh-kien. It is but little seen in Kwang-si and the north of China. In the province of Canton it is most prevalent around the city of Canton, in the districts of San-ni, San-ning, Sun-tak, Hiang-san, and Tung-kun; also in the districts south of Canton, and in the island of Hainan.

It was reported in 1871 that lepra prevailed extensively

[1] 'Epitome of the Reports of the Medical Officers to the Imperial Chinese Customs Service,' London, 1884.

in Amoy, and that 7 per cent. of persons who applied for treatment at the native hospital were suffering from it. Dr. Patrick Manson wrote in 1881 :

> Leprosy has laid a firm hold on the people. Large numbers of lepers are attracted as beggars to Amoy, but this does not explain the extent of its prevalence, and in the population of the neighbouring villages one leper is considered to exist for every 450 of the population, or thereabouts.

And again it was said :

> At Canton in 1871 leprosy, both anæsthetic and tubercular, is common among the natives.

Lastly, it was noted in 1873 that lepra had increased compared with what it had been ten years ago.

The medical reports from which these statements have been taken began only in 1871 ; consequently they do not deal with the beginning of the period of most interest. But I believe that the two provinces named have always been known seats of lepra in China, and that immigration to Australia has always been from them alone.

The following table shows the number of Chinese cleared from Hong Kong to Australia during the twenty years 1869 to 1888. In the latter year immigration was almost brought to a close by the Chinese Immigration Restriction Act, which was then adopted by the Governments of all the colonies except Western Australia, and except South Australia as regards the Northern Territory only.

TABLE I.—*Showing the total number of Chinese cleared from Hong Kong to ports lying in each of the colonies mentioned.*

New South Wales . . .	16,926
Victoria	7,848
South Australia . . .	71
Northern Territory . . .	11,153
Queensland	29,558
Tasmania	7
Total . .	65,563

(From the ' Hong Kong Government Gazette,' by favour of Mr. Commissioner Hobson.)

But this table only gives the destination declared at the port of departure, and has little bearing on distribution of the immigrants within Australia.

Sect. VIII.—THE CHINESE IN TASMANIA.

In 1863 Mr. E. Swarbreck Hall wrote, "Chinese, or other Northern Asiatics, Polynesians, negroes, are scarcely known in this colony."[1]

Mr. Robert M. Johnston, Registrar-General, wrote to me:

> I have no definite word of the first arrival of Chinese, but am inclined to believe it took place at the time of the first discovery of tin at Ringarooma about the year 1875. The discovery of gold a few years earlier also inclined a few to our shores.

I think it very possible that Chinese may have gone to Tasmania before 1875 as occasional visitors from the mainland; but it seems clear enough that they were then rare at the most.

The following table shows the progress of population in the island, several earlier returns having been omitted as of small importance:

Table II.—*Tasmania.*

Census.	Persons.	Chinese.
1841	50,216	—
1847	70,160	—
1851	70,130	(Gold discovered in N.S.W. and V.)
1857	81,492	—
1861	89,977	—
1870	99,328	—
1881	115,705	844
1891	146,667	943

Thus Chinese were not distinguished in the abstracts until 1881. Their occupations were not returned until 1891; and, not to give the whole list, 889 were then classed under the following heads:

[1] Report R. C. P., p. 224.

TABLE III.—(*Chinese*) *Tasmania*, 1891.

Butchers, fishermen, fish-curers	4
Fruiterers, market gardeners	125
Cooks	6
General store-keepers	34
General merchants	4
Lodging-house keepers	8
Hawkers	9
Domestic servants	2
Miners (alluvial gold, tin)	697
	889

(Total number, 943.)

Their distribution in 1891 was given as follows:—In Hobart, the capital, there were 36, and in Launceston, the only other large town, 39; in two mining districts there were 586 and 184, and the remainder were scattered in very small groups over the rest of the island.

No leper has ever been observed in this colony.

SECT. IX.—THE CHINESE IN WESTERN AUSTRALIA.

There were returns of population in this colony before the first date given below, but the numbers were very small.

TABLE IV.—*Western Australia.*

Census.	Persons.	Chinese.	Malays.	Japanese.
1848	4,622	—	—	—
1854	11,976	—	—	—
1859	14,837	—	—	—
1870	24,785	—	—	—
1881	29,708	145	—	—
1891	53,285	917	806	260

I have no information either as to the first appearance of Chinese in Western Australia, or as to the cause of the large increase shown since the census of 1881; but there is every probability that some were there before 1881, when, however, they were distinguished in the abstracts for the first time.

Their occupations were first distinguished in 1891, and about two thirds of them were then returned under the following headings, the remainder being distributed among a number of other occupations.

TABLE V.—(*Chinese*) *Western Australia*, 1891.

Performing personal offices for man	89
Cooks	225
Dealing in articles of food	22
Market gardeners	102
Labourers, sandal-wood cutters, &c.	162
	600

(Total number, 917.)

At both censuses their distribution seems to have been general; in 1891 the principal townships, twenty in number, held 341 of the total.

Two lepers, both Chinese, have been observed in this colony (see Appendix, Table V).

SECT. X.—THE CHINESE IN SOUTH AUSTRALIA.

In the case of all other colonies the census figures exclude aboriginals, which include every alien. In South Australia they include aboriginals "in settled districts only;" and that practically means the known aboriginals—those who hang about stations and townships, and are partly employed. Their numbers were small, and they may be neglected.

TABLE VI.—*South Australia.*

Census.	Persons.	Chinese.
1844	17,366	—
1846	22,390	—
1851	63,700	—
1855	85,821	—
1861	126,830	—
1866	163,452	—
1871	185,626	—
1876	213,271	—
1881	279,865	321
1891	320,431	288

As to the date at which Chinese arrived in this colony Dr. Whittell has been good enough to write:

> Some thirty-five years ago (1860) a Chinese was a curiosity in Adelaide. About this time three or four opened shops for the sale of curiosities. They made a little money and went home. Others came, and their numbers have gradually increased; but most of them appear to be birds of passage, here for a time and then away.

Their occupations were not distinguished at any census;

on this point Dr. Whittell remarked that they were "engaged in gardening, hawking, and a few trades."

Their distribution at the censuses of 1881 and 1891 was general over the colony. Thus in 1881 there were 114 in the city of Adelaide, 65 in other municipal districts, and 134 in other (rural) local government districts; in 1891 the corresponding figures were 97, 70, and 106. The remainder were doubtless found outside the defined areas.

No leper has ever been observed in this colony (but see Appendix, S.A.).

Sect. XI.—THE CHINESE IN VICTORIA.

Chinese are said to have first begun to arrive in Victoria in 1853,[1] and at the 1854 census 2373[2] were enumerated. In 1855 an Act was passed to limit the number entering, by restricting the number any ship might carry, and by imposing a poll-tax; nevertheless 25,524 were enumerated in 1857. At the end of 1859 they were estimated to number about 42,000. In 1860 an exodus[3] of an estimated number of 11,000 took place; and, at all events, they were found to be reduced to 24,732 in 1861, when also they constituted 53 per cent. of all foreigners in the colony, and were 1 in 22 of the general population.[4] At the census of 1871 they numbered 17,935, and at that of 1881 they had fallen to 12,128. In that year another restrictive Act was passed; it was repealed by the more stringent Chinese Immigration Restriction Act, 1888, which has already been alluded to. In 1891 the Chinese numbered 9377.

The following table shows the number of the total population including the Chinese, and of the Chinese, at several censuses:

[1] But cf. The Chinese in New South Wales, below.

[2] General Report on the Victorian Census, 1891, by Henry Heylyn Hayter, C.M.G., Government Statist.

[3] Ibidem.

[4] Gen. Rep. Census, 1861.

TABLE VII.—*Victoria.*

Census.	Persons.	Chinese.
1846	32,879	—
1851	77,345	—
1854	236,798	2,373
1857	410,766	25,424
1861	540,322	24,732
1871	731,528	17,935
1881	862,346	12,128
1891	1,130,463	9,377

The occupations followed by the Chinese in Victoria are sufficiently exemplified by the following excerpt from the abstracts, in which the whole number were accounted for. But I do not know whether those who were then classed as "miners" were all miners in reality, or exclusively: it may be so, but possibly in a case of considerable difficulty the enumerators may have classed as miners Chinese who were merely found living on mining fields. Here it may be remarked conveniently that everywhere in Australia except the Northern Territory the Chinese are merely alluvial diggers; placer diggings, or, in the case of tin, deposits of stream-tin attract them. They follow the white alluvial digger and go over abandoned claims again, and when the latter turns his attention to deep leads, or attacks the reefs from which the alluvial gold was shed, the Chinese usually depart or take to other callings. But in the Northern Territory all the important reefing, or nearly all, is in the hands of Chinese.

Of the 24,732 Chinese enumerated in 1861, 21,161 were classed as miners; 3,571 were ascertained to be following other occupations, which are sufficiently exemplified in the following table:

TABLE VIII.—(*Chinese*) *Victoria*, 1861.

Engaged in professional work	80
Trading	1,046
Performing personal offices for man	360
Manufactures	150
Agricultural operations	564
Connected with food and drink	310
Maintained at the public expense	184
Miscellaneous	115
Unspecified	694
(Total, 24,732.)	3,503

Of the 17,935 enumerated in 1871, 12,000 were set down as gold diggers, and the higher numbers of those engaged in other pursuits were as follows :

TABLE IX.—(*Chinese*) *Victoria*, 1871.

Farmers, gardeners, agricultural labourers	1,446
Shopkeepers	542
Hawkers and pedlars	274
Gamblers, lottery-ticket sellers	244
Opium dealers	146
Butchers	114
Prisoners	123
	2,889

(Total, 17,935.)

I have varied the headings selected for example, partly in accordance with the higher numbers classed under them, but also arbitrarily, in order to give a general idea of the varied character of the occupations followed by the Chinese. And here it may be noted that though the numbers employed vary in different parts of Australia, the kinds of occupation followed by them are everywhere the same. The year 1881 may be passed over, therefore, with the remark that the numbers classed under mining decreased, and the numbers otherwise employed increased ; and some different exemplificatory headings may be selected from the occupation abstracts, 1891 :

TABLE X.—(*Chinese*) *Victoria*, 1891.

Hotel, eating-house (masters and servants)	526
Butchers, poulterers, vegetable hawkers	197
Dry grocers, tea hawkers	129
Farmers and market gardeners	2,905
Labourers, fishermen, tobacco growers, &c.	420
Miners	2,185
	6,362

(Total males 9,772, half-castes included.)

In 1881 the males had numbered 11,869, and the reduction during the decade had occurred chiefly among those classed as miners. On the other hand, there occurred during the same decade an increase among those employed at other businesses ; servants, laundry hands, farmers,

market gardeners, carpenters, and furniture makers were among them.

The occupation of cook has been prominently represented in tables relating to other colonies, and, as is well known, wherever Chinese are found there are many cooks among them. Yet in the Victorian abstracts that occupation is not named. Its absence is merely a matter of tabulation of course; nevertheless it seemed to me important to establish this beyond doubt. Accordingly I referred the matter to the Government Statist (Mr. Henry Heylyn Hayter, C.M.G.), and he replied as follows:

> There are numbers of Chinese cooks in Victoria, but only a few were returned as such at the census, the bulk having been set down as domestic, hotel, or ship servants, under which the whole were tabulated.

The distribution of the Chinese in Victoria was governed primarily by the occurrence of gold, but this did not separate them from the white population; on the contrary, the distribution of the latter also was largely governed by the same circumstance.

There were, and are, six principal gold-fields in Victoria: Ballarat, Castlemaine, Maryborough, Ararat, Bendigo, and Beechworth. These names represent large areas, and apply also to the principal town in each. There are, of course, many other places where gold is found, but they are overshadowed by these; and the more is this true the earlier the date referred to.

To these fields the Chinese were confined or nearly confined in the earliest years; the majority had been attracted by the prospect of gold-seeking and the chances of profitable occupation of other kinds which a rush holds out; like the whites moved by similar hopes, they concentrated themselves where gold was known to be, and where a great part of the general population was to be found. A comparatively small proportion lived in the municipal district (or town) central to the field; most of them were scattered among the ranges of the surrounding country. There were always some distributed among other rural districts and towns, and in the capital; but to mention the numbers of the latter would introduce a tedious and unprofitable complication: the following table will therefore put the

reader in possession of as much of the facts as is necessary :

TABLE XI.—*Estimated number of persons and of Chinese on the principal gold-fields of Victoria.*

	1858.		1860.		Census, 1861.		Census, 1871.	
Ballarat . .	48,000	6,400	57,665	5,752	55,246	5,973	—	—
Castlemaine .	29,222	9,727	24,407	6,183	37,020	6,585	—	—
Maryborough .	29,171	4,474	61,170	3,364	44,879	3,219	—	—
Ararat . . .	23,105	4,525	12,160	1,400	9,169	1,312	—	—
Bendigo. . .	18,000	3,000	22,620	2,740	38,833	2,578	—	—
Beechworth .	24,149	5,547	22,069	5,447	18,819	4,542	—	—
Totals . .	171,647	33,673	200,091	24,886	203,966	24,209	270,428	15,669
Chinese . .	19·6 %		12·4 %		11·8 %		5·7 %	

Those figures were furnished to the Department of Mines by the Wardens of the several fields. The census report for 1861 gave the total Chinese as 24,732, and the Chinese diggers as 21,161 ; others, 3571 : and it was stated that 7666 of the total Chinese were living in municipal districts —chiefly in those of the gold-fields named, and in Melbourne and Geelong.[1]

It is important to note also, on the same authority, that the total gold-fields population was 42 per cent. of that of the whole colony in 1861.

The number of Chinese who lived in the municipal districts on the gold-fields in 1861 and 1871 is shown in the following table :

TABLE XII.—(*Chinese*) *Victoria*, 1861, 1871.

	1861.	1871.
Ballarat	1,282	741
Castlemaine . . .	1,120	354
Maryborough . . .	465	190
Ararat	102	88
Bendigo	1,037	751
Beechworth . . .	389	47
Total . . .	4,405	2,171
(Total Chinese .	24,732	17,935)

To speak of a later date, and of the colony as a whole,

[1] Gen. Rep. Census, 1861, p. 15.

9377 Chinese were enumerated in 1891 (when their proportionate number to the total population had also become much less). Considerably more than half of them lived in four counties—among them Bourke, in which the capital lies; but there were none at all in only two counties. So also there were but two among all the cities, towns, and boroughs in which there were no Chinese; most were enumerated in Melbourne (1563), Ballarat (433), and Bendigo (368). In other such places there were only moderate or small numbers in each, so that the remaining Chinese (7013) were very widely distributed.

These facts sufficiently establish the presence of Chinese in Victoria in considerable proportion (during many years) to the total population, and in certain localities in a still larger proportion; their dissemination over the colony, and always in those places where most whites were to be found; their occupation, in numbers and at trades which would be likely to bring them into association with the whites, or, at least, casual business contact, and their connection with the food supply.

In the Appendix the presence of leprosy among them at several towns is established; and the facts permit the inference that the disease occurred among them more frequently than has been actually recorded, especially during the years 1858—1880.

It is also shown in the Appendix that the lepers were never isolated, and were never systematically cared for; so that the destitution into which some of them fell was the subject of public as well as official reproach, and their presence in public places at advanced stages of illness was the subject of a motion for adjournment in the Legislative Assembly.

Sect. XII.—THE CHINESE IN NEW SOUTH WALES.

A statement is on record that in 1836 the colonists found themselves in need of labour; and their applications to the Colonial Office having been met by the despatch of an unsuitable class of emigrants, they felt obliged to import

Chinese and kanakas for themselves.[1] I have been unable to learn whether any such importation then took place; but a single ship-load of 64 kanakas was landed at Sydney in 1846, after which I believe no more were imported to this colony.

In the Statistical Register, of which the first volume was dated 1822, and which was kept in manuscript for several subsequent years, there was no reference at all to foreigners of any country until 1833. There was no mention even then of the birthplaces of the people, but in the brief table which classified them under religions 56 were entered as "Pagans." In 1836 a corresponding table described 100 persons in the same way, and 207 were described as "Mahommedans and Pagans" in 1841. In 1846 the latter heading was again used, but the number under it had fallen to 162; and in this year their distribution was for the first time referred to. In the Middle District (see p. 35) there were 113, in the Northern or Moreton Bay District 22; and there were 27 in the Southern or Port Phillip District.

In 1851 the Southern or Port Phillip District having been erected into the separate colony of Victoria, a census was taken in the Middle and Northern Districts, and 852 persons were classified under "Religions" as Mahommedans and Pagans. There was no indication of the nationality of the persons thus described at any of the dates mentioned, only they were not aboriginals.

On searching the admission books of Brisbane Hospital, which have been preserved from 1830, I noticed that Chinese began to be admitted there in 1853, and from that time forward they were rather frequently admitted. In 1855 one Ram Lal was under treatment, and soon afterwards one who was described as an Indian Coolie. I think it is probable that these persons reached Moreton Bay from Sydney, and not direct.

These facts suggest that under the heading "Mahommedans and Pagans," Indians, kanakas, and Chinese may

[1] 'The Story of the Nations: the Australian Commonwealth,' by Greville Tregarthen (T. Fisher Unwin, London, 1893).

have been included. However, the first direct mention of Chinese in New South Wales occurred in the census abstracts of 1856, when 1806 were enumerated. Gold had been discovered in 1851, and probably the advent of Chinese in considerable number began soon afterwards.

The following table shows the progress of population in New South Wales, the number of Mahommedans and Pagans, and the number of Chinese at successive censuses:

TABLE XIII.—*New South Wales.*

	Census.	Persons.	Mahommedans and Pagans.	Chinese.
New South Wales, Victoria, and Queensland	1822	24,188	—	—
	1823	28,333	—	—
	1825	36,336	—	—
	1833	60,794	56	—
	1836	77,096	100	—
	1841	130,856	207	—
	1846	189,609	162	—
New South Wales and Queensland	1851	187,243	852	—
	1856	266,189	—	1,806
New South Wales	1861	350,860	—	12,988
	1871	503,981	—	7,220
	1881	778,690	—	10,205
	1891	1,132,234	—	13,517

The Government Statistician (Mr. T. A. Coghlan) has remarked that the numerical decrease in the number of Chinese between the years 1861 and 1881 was probably due to new discoveries of rich gold-fields in other colonies (in Queensland chiefly). But the years 1878—1881 were marked by so large an increase that legislative interference was thought necessary, and a restrictive Act was for the first time[1] passed; but as the number of Chinese had increased in 1887 by no less than 4439, it appeared that the law was inefficient, and the severer restrictive Act of 1888, already alluded to, was placed on the statute book. This limited immigration, not merely by imposing a heavy poll-tax and in other similar ways, but also by forbidding entering Chinese to engage in gold-digging without special permission, and by forbidding their naturalisation under any circumstances.

[1] The letter of a correspondent published in the Appendix to the Report R. C. P., p. 82, speaks of an Act passed in 1855. This is an error; he must have had Victoria in mind.

The effect of this law has been to stop immigration of Chinese almost entirely.

In the abstracts relating to occupations of the people the Chinese were not distinguished at any census until 1891. Since they follow the same kinds of occupation everywhere in Australia, this is not a matter of great importance; yet it prevents a comparison between the numbers engaged in mining in New South Wales and in other colonies. The following selection from the abstracts for 1891 shows that their occupations resembled those followed by them in Victoria:

TABLE XIV.—(*Chinese*) *New South Wales*, 1891.

Hotel and eating-house, masters and servants	128
„ „ cooks . .	291
Cooks (additional)	792
Provisions, fruit, fish, greengrocery, dry grocery, poultry . . .	835
Butchers	28
Farmers	49
Labourers	325
Market gardeners	3,843
Other gardeners	405
Tobacco growers	379
Oyster-fisher	1
Miners (tin and gold chiefly) . .	2,019
	9,095

(Total Chinese, 1891, 13,555; specified, 13,504.)

198 of the cooks not engaged in hotels or eating-houses were enumerated in the metropolitan district, as well as 1154 of the market gardeners. Those not mentioned in the table were classed under shopkeeping and the lower mercantile and less important manufacturing pursuits in great variety, and they were not without the usual sprinkling of professional, literary, and ecclesiastical persons.

The following tables show the distribution of the Chinese at the censuses of 1861-71-91. The returns for 1881 were lost by fire before more than a few of the abstracts had been printed. First of all I give the numbers enumerated in the city of Sydney and in the suburbs of Sydney at the three censuses:

TABLE XV.—(*Chinese*) *New South Wales*, 1861-71-91.

		1861.	1871.	1891.
Sydney	City	169	296	1736
	Suburbs	21	40	1729
	Total	190	336	3465

And while the population of the city alone (area 4·31 square miles) stood at these three censuses as follows—56,394, 77,680, and 109,090,—that of the city and suburbs together was at the same periods 95,596, 136,483, and 399,270.

The following table shows the number of the total population and of the Chinese in those *census districts* in which most Chinese were enumerated at the censuses of 1861 and 1871 :

TABLE XVI.—(*Chinese*) *New South Wales*, 1861-71.

Census District.[1]	1861. Total.	1861. Chinese.	1871. Total.	1871. Chinese.
Armidale	6,630	267	9,706	204
Bathurst	12,616	956	16,860	410
Binalong	13,510	517	3,865	16
Bombala	2,054	76	2,854	230
Braidwood	8,149	1,351	11,422	639
Broulee	1,983	—	3,739	183
Campbelltown	2,609	2	1,870	3
Carcoar	4,995	1,592	6,411	376
Forbes	—	—	6,799	103
Maitland	14,573	27	13,670	15
Mudgee	6,578	1,534	11,901	802
Nundle	—	—	2,068	355
Newcastle	7,922	5	18,667	13
Richmond	5,179	30	4,528	98
Sofala	4,460	1,877	2,821	507
Tambaroora	2,911	1,641	3,265	405
Tenterfield	1,365	116	2,349	145
Tumut	3,410	1,172	3,321	183
Wagga-Wagga	2,647	49	5,993	124
Wellington	1,799	157	3,354	173
Young	(See Binalong)	—	5,924	373
Total	103,390	11,369	141,377	5,375
Whole colony	350,860	12,988	503,981	7,220

[1] The names of the districts correspond with the names of towns central to them, by which their position is sufficiently indicated (see Map).

In the next table are shown those *counties* in which most Chinese were enumerated at the census of 1891, and the total population in each; there were none at all in five counties only, which had altogether a very small total population, and the remaining five or six thousand Chinese were so equally distributed in small groups among the remaining counties as to make it useless to speak more particularly of them:

TABLE XVII.—(*Chinese*) *New South Wales*, 1891.

County.[1]	Persons.	Chinese.	
Bathurst . .	30,143	346	(Bathurst).
Cooper . . .	3,553	230	(Narrandera).
Cumberland . .	447,179	4,234	(Sydney).
Gough . . .	13,052	834	(Emmaville).
Hardinge . .	4,243	536	(Tingha).
Northumberland .	86,661	478	(Newcastle).
Roxburgh . .	9,496	273	(Sofala).
Wellington . .	16,485	536	(Wellington).
Wynyard . .	12,530	546	(Dutton).
Total . . .	623,342	8,013	
Whole colony . . .	1,132,234	13,157	

The above figures relating to distribution show that in 1861 77 per cent. of the Chinese were distributed among 54 per cent. of the total population; in 1871, 78 per cent. among 55 per cent. of the total population; in 1891, 59 per cent. among 55 per cent. of the total population. And the object of setting them out is merely to show that the Chinese were scattered over the colony; it is not worth while to go farther into detail, therefore, after this point has been established. It must not be forgotten either that their bearing as regards occurrences of lepra among the whites is inferential merely; one Chinese leper, known to have lived in a village containing a thousand whites, would be an important fact if it were known, while a thousand healthy Chinese living among a thousand whites would have no significance at all. More than this, a Chinese leper might easily have lived and died in a village during an

[1] The districts correspond with the appended names of towns within them, by which their position is sufficiently indicated (see Map).

intercensal period, where at a census no Chinese at all were enumerated.

The facts are sufficient to show that the Chinese were from the first broadcast over New South Wales, and were engaged there in multifarious occupations.

In the Appendix it is shown that lepra among the Chinese remained unrecorded (with a single exception) until shortly before 1883; on the other hand, that it was recorded among the whites rather frequently from the year 1868.

Sect. XIII.—THE CHINESE AND KANAKAS IN QUEENSLAND.

Under New South Wales the presence of "Pagans" in the Moreton Bay district (that is, about Brisbane) has been remarked upon; and I have also said that in searching the admission book of Brisbane Hospital I observed that Chinese began to appear among the persons under treatment in 1853, and thenceforward continued to be admitted rather frequently. Probably this date may be taken as that at which Chinese first appeared in considerable number. There were no kanakas, or, at all events, no considerable number of them, until their regular importation for labour purposes began long afterwards (1863).

It should be borne in mind that the colonisation of Queensland began later than elsewhere. As already noted, a settlement existed at Brisbane from 1824; but it was a penal settlement or camp, supplementary to that in which New South Wales began, and the process of colonisation was so far slow that Queensland came into being as a self-governing territory only in 1859. It has already been pointed out how small its population still is as compared with its area; and this circumstance renders it desirable for the present purpose to consider each district by itself, and as an independent community, if a useful practical view is to be taken. But this is impossible; and a very general statement must suffice, although discoveries of gold, the growth of sugar, and pastoral pursuits, have caused settlements to spring up at very numerous and widely distant points.

The table below shows the progress of population, and

the number of Chinese, Japanese, kanakas, and members of other coloured races enumerated at each census. Chinese and Japanese were not distinguished until 1881: a slight reduction should be made in all the figures in the sixth column for persons born in India, &c., but of white parents; and in 1886, 1092 persons were entered as being natives of Malaysia:

TABLE XVIII.[1]—*Queensland.*

Census.	Persons.	Chinese and Japan.	Japan.	Kanakas.	India, Africa, &c.
1861	30,059	538	—	—	290
1864	61,467	628	—	—	361
1868	99,901	2,629	—	1,543	624
1871	120,104	3,305	—	2,336	375
1876	173,283	10,418	—	5,108	457
1881	213,525	11,229	246	6,348	64
1886	322,853	10,463	73	10,037	1,901
1891	393,718	8,522	49	9,243	651

The occupations of the Chinese were distinguished for the first time in 1881:

TABLE XIX.—(*Chinese*) *Queensland*, 1881.

Professional	33	(divinity, literature, medicine).
Domestic	647	("attendance" 540).
Commercial	751	(general dealers 394, carriers 140).
Market gardeners	1,145	
Station hands	540	
Gardeners	336	
Agricultural labourers	298	
Other agricultural	134	
Gold-diggers	5,525	
Tin-miners	497	
Coal-miners	9	
Other industrial	473	
Labourers	248	
Unspecified	492	
Other indefinite	99	
	11,227	(Total 11,229).

At the census of 1886, while the total number of Chinese was nearly the same, the numbers engaged in mining had fallen to 1643; but in relation to this matter it

[1] For coloured aliens possibly present before 1861 see also 'The Chinese in New South Wales,' above.

must be again pointed out that the task of ascertaining the occupations of the Chinese is often not an easy one, and that the temptation to enumerators to set them down as miners merely because they were found living on a gold or tin field must have been sometimes felt. In 1891 the occupations of Chinese were given as follows:

TABLE XX.—(*Chinese*) *Queensland*, 1891.

Professional	35
Innkeeper, inn servant, &c. &c.	211
Attendance (cooks, 571)	704
Dealing in food and drink	325
Storekeepers, hawkers, &c.	670
Manufacturing food and drink	43
Labourers (undefined)	488
Farmer, farm servant	1,024
Market gardener	2,564
Fruit producers	377
Sugar plantation labourers	126
Fishermen	157
Mining (gold, silver, tin, copper)	879
	7,603 (Total, 8522).

The occupations of the kanakas were as follows in 1881, when they were first distinguished:

TABLE XXI.—(*Kanakas*) *Queensland*, 1881.

Professional	2	(divinity 1, billiards 1).
Domestic	425	(attendance 413).
Commercial	274	(carriers 262, of whom 236 were pearling at Somerset Island).
Agricultural	5,545	(sugar plantations chiefly).

And in 1891 8,559 kanakas out of 9,243 were classed under the headings "agricultural, pastoral, mineral;" nearly all of them were engaged on sugar plantations.

The distribution of the kanakas is on the whole governed by that of the plantations, therefore, and it is enough to say that they are found on the rivers from the Mary to the Endeavour: most are to be found on these plantations, but there are small numbers on a few round Brisbane. A small number also are very widely scattered over Queensland, as "time-expired boys" chiefly.

The distribution of the Chinese was largely governed by that of the gold-fields, as usual; the following table shows the larger numbers found in certain of such districts in 1881:

TABLE XXII.—(*Chinese*) *Queensland*, 1881.[1]

Etheridge . .	362	(Etheridge R.).
Cook . . .	328	(Mulgrave R., Normanby R.).
Kennedy . .	705	(Charters Towers, Burdekin R.).
Palmer . .	5,133	(Maytown, &c., Palmer R.).
Woothakata . .	566	(Hodgkinson R.).
	7,094	(Total Chinese, 11,229).

And the total Chinese in all such districts was 7272 to 23,801 total persons therein.

The following table may be useful as giving an idea of the wide distribution of Chinese and kanakas at the census of 1891:

TABLE XXIII.—(*Chinese and Kanakas*) *Queensland*, 1891.[2]

District.	Chinese.	Kanakas.
Cook . . .	573	53
Etheridge . .	197	7
Kennedy . .	734	8
Palmer . .	551	2
Woothakata . .	206	3
Brisbane . .	245	84
Cairns . .	1,592	891
Cardwell . .	very few	1,126
Bundaberg . .	,,	2,525
Mackay . .	,,	2,442
	4,098	7,068

(Total, 1891: Chinese, 8522; Kanakas, 9243.)

These figures suffice, as in the corresponding case of the colonies already examined, to establish the intimate local admixture of Chinese and kanakas among the rest of the population. I find it possible to add the following details regarding the capital:—In 1876, 150 Chinese were enumerated in the city and suburbs of Brisbane; in 1891 there were

[1] The appended names of rivers or towns sufficiently indicate the locality of the districts (see Map).

[2] The names of rivers or towns sufficiently indicate the locality of the districts; see also Table XXII.

258 (inns, cooks, attendants, 39; dealing in food and drink, 49; storekeepers, hawkers, 44; market gardeners, 28=160); and the total population of Brisbane and suburbs was 31,109 in 1881, and 56,075 in 1891.

In Queensland leprosy was first observed in a Chinese as far back as 1855, and was subsequently recorded among whites rarely, among coloured aliens rather frequently, and under circumstances which warrant the inference that it actually occurred among both much more often than it was either noted, or even recognised.

Sect. XIV.—THE CHINESE IN THE NORTHERN TERRITORY.

I am not able to say much on this subject. The country indicated by the term Northern Territory has a very large area, which is defined by the coast on the north and by geographical boundaries on the east and west; to the south it is continuous with South Australia (of which it forms part); but as to settlement is separated from the occupied part of South Australia by uninhabited country, which extends through many degrees of latitude.

In 1824 Captain Bremer in H.M.S. Tamar, and accompanied by two transports, examined and left Port Essington, and founded a settlement on Melville Island; it was relinquished in March, 1829 (Dr. Wilson, *ubi cit. supra*).

In 1827 Fort Wellington was established at Raffles Bay. It was given up in 1829.

Another settlement was effected at Port Essington in 1848, which also had little success.

Native troops from India accompanied one or other of these expeditions. Cattle were landed for their use; from these the country became stocked, and during a few past years the hunting of these cattle for their hides and horns has formed a business steadily pursued.

The explorer Stewart having crossed the continent, the Territory was added to South Australia in 1863. A serious attempt to settle it was made in 1864, but it failed. In 1869 at another attempt the town of Palmerston on Port Darwin was founded, and has since continued.

A transcontinental telegraph line was completed during 1872; as far as I can ascertain, gold was discovered during erection of the posts in the country more or less near Port Darwin.

Chinese began to appear soon afterwards, and at the census of 1881, 2722 were enumerated.

In 1883 the northern half of a projected transcontinental railway line was designed; by 1889 a length of 146 miles had been completed. The contractors imported Chinese coolies to construct it. At the census of 1891 3447 were enumerated, and there was (in addition) the unusually large proportion of 60 Chinese females.

As to the white population, the Registrar-General stated in his Report for the year 1892 that there were 1428 Europeans (1155 males) on January 1st.

Gold-mining seemed to be in the hands of the Chinese in 1892; 900 were engaged at it against 50 Europeans, and here the Chinese are found reefing as well as placer-digging.[1]

In the Appendix it is noted that no official record of occurrences of lepra in the Northern Territory has ever been kept, although this will probably be altered for the future; and I think that such account as I have there given is most likely very defective. One white, one aboriginal, and several Chinese lepers have become officially known, and several aboriginal lepers have been (in my opinion) observed, under circumstances which are suggestive of a wide spread of the disease among them in certain districts.

In Section V above, I have remarked (*a*) upon the want of knowledge of the fact as to importation of Malay lepers (if any) to the country at any time; (*b*) on the doubt which attaches to the date at which the Malays first began to be tolerated by the aboriginals; (*c*) on the absence of all proof for the present that lepra began among the aboriginals after arrival of Malays on the coast; (*d*) on the want of proof that it has been discovered only among aboriginals in contact with Chinese, or (*e*) that the affected aboriginals had been in contact with Chinese lepers; (*f*) on the doubt which

[1] Report of the Government Resident for 1892; Adelaide, 1894.

arises in the known customs of the aboriginals whether, if any among a coast tribe became lepers, the disease could be communicated by them (supposing it to be communicable) to inland tribes, where, nevertheless, it has been observed in one case at least.

As I shall not again speak in detail of lepra in this part of Australia, I conclude these notes by repeating that the Northern Territory and North-west Australia seem to offer a promising field for farther inquiry; and, speaking as one who has a vivid idea of the conditions of life there, by remarking that the information at present at hand is entirely insufficient in my opinion to warrant even the most cautious, tentative ætiological inference from it.

Sect. XV.—AS TO SOME ÆTIOLOGICAL DETAILS.

Such studies as this are possible only on two conditions: that the diagnosis of every case said to have been an example of the disease under investigation shall be established beyond reasonable doubt; and that the available record shall be shown to have fulness enough to furnish a correct outline (at least) of the course followed by the disease in the country, and among the people affected by it. Other matters have importance, but these are essentials. They are in the nature of data. If in any case it should be found impossible to fix them, none but romanticists would proceed, unless, indeed, the intention were to prevent ill-founded inferences.

Nevertheless nothing has yet been said of these data, except in relation to aboriginals; nothing of them in relation to native-born whites, for instance, though most is accurately known of their history, and though, consequently, in their infection interest for the present centres. The reason lies in the reader's convenience. The detail from which alone he can estimate their value for himself is necessarily prolix and even tedious: to introduce it here would interrupt this broad survey too much; accordingly it has

been relegated to the Appendix, where it can be examined at leisure.

And therefore, before proceeding to weigh the evidence which has been gathered as to the leprosy-free character of Australia in its primæval autochthons, and before inquiring more closely into the course of the disease among the native-born whites, it only remains now to consider the local aspect of some of those circumstances which elsewhere have been thought to stand in more or less direct relation to occurrences of lepra.

As to the influence of food in Australia I find very little to remark upon. During the last forty or fifty years, at all events, it has been plentiful, varied, and wholesome. In the bush lightly salted beef in good condition is a common, and perhaps the commonest form of meat. But the proportion of the population which is nearly confined to it is extremely small; it consists only of those who live permanently in the extreme back country, or whose occupations cause them to travel on long journeys by road in the remoter parts. However, their proportion to those who live on fresh victuals —to all those who live in or near townships, for instance— is very small; and, as a matter of fact, very few of those natives who have acquired leprosy could possibly have been ill-fed or exclusively confined for rather long periods to a diet of corned beef, bread, and tea, with a deficiency of vegetables, which is the bush diet referred to. Fish, in one form or other, is generally available, either from the sea or from rivers and lakes, or else canned—very rarely is it smoked; and the manner of preparing and eating fish in Australia is in every respect the same as in England. The uninformed traveller would not suspect that his food had often been dressed by Chinese at the inns he had visited; in other words, the Chinese in Australia do not introduce either new articles of diet or new ways of cooking. To be quite accurate, perhaps bêche-de-mer, or tripang, forms an exception; but at all events that is met with only in the best clubs in the form of soup, and seldom, if ever, in hotels.[1]

[1] The following table from 'The Seven Colonies of Australasia' (by T. A. Coghlan, Government Statistician, Sydney, 1893), with its prefatory

As to nearness to the sea and to rivers, nothing at all can be inferred concerning its influence from the distribution of such cases of leprosy as have arisen within Australia. In a new country the places of settlement are in large measure governed by the distribution of the rivers, and by that of harbours on the coast-line; and possibly this has been especially the case in Australia, where sources of water other than rivers are not as commonly met with as could be wished. This, it will be noticed, is a merely logical criticism. I am prepared to learn that the presence of water—that is to say the shores of it, from ponds to estuaries—is related to endemic prevalences of lepra.

The occurrence of cases of lepra in towns may be noticed, which, contrary to usual experience elsewhere, appears to be proportionately common in Australia. But even the largest towns have tracts of unoccupied country not far from their centres; they cover a larger proportionate area, and are more freely intermingled with lots which never have been

remarks, will be useful:—"Considering the comparatively high rate of wages which prevails, food of all kinds is fairly cheap, and articles of diet which in other countries are almost within the category of luxuries are largely used, even by the poorer classes. The average quantities of the principal articles of common diet annually consumed in the various colonies of Australasia are given below:

Article.	New South Wales.	Victoria.	Queensland.	South Australia	Western Australia	Tasmania.	New Zealand.	Australasia.
Grain—								
Wheat . . lb.	390	300	246	390	390	362	454	334
Rice . . . lb.	11·8	7·1	19·0	12·3	25·2	8·2	8·6	10·7
Oatmeal . lb.	4·2	6·0	4·3	4·3	4·9	...	...	4·9
Potatoes . . lb.	206·5	353·0	281·0	205·0	99·7	550·0	461·0	305·0
Sugar . . . lb.	93·5	90·75	80·0	96·3	106·2	87·0	86·8	91·2
Tea . . . lb.	7·8	7·7	8·4	6·5	10·6	6·7	6·2	7·3
Coffee . . . oz.	11·5	17·4	10·4	21·9	24·2	10·2	9·2	13·4
Cheese . . lb.	5·2	2·8	...	...	...	...	...	4·0
Butter . . lb.	16·7	10·8	...	...	...	...	...	13·8
Salt . . . lb.	43·8	21·0	51·5	10·6	19·4	22·2	33·9	34·2
Meat—								
Beef . . . lb.	176·8	155·0	280·0	...	...	60·0	90·0	161·1
Mutton . . lb.	104·8	98·0	90·0	...	...	150·0	110·0	103·7
Pork & Bacon lb.	9·5	12·0	...	...	...	...	...	10·8."

cultivated or built upon than towns in older countries. In short, the contrast between "town" and "country" is very much less marked everywhere in Australia than in those parts of the world where the comparative immunity of town dwellers has been noticed.

Until lately the death-rate due to the filth diseases has been high in every centre of population. But, speaking very generally, the state of the towns, though in the eyes of the sanitarian below what it should be, has never, I believe, approached that which could be supposed to have a determining influence in respect of leprosy. It is not necessary to reflect long on the state even of the cities twenty or thirty years ago in order to perceive that they were then suburban in character for the most part, and, if whole municipal areas be regarded, really rural in great measure. These conditions very largely persist still. If to this estimate a reference to the ordinarily dry climate, and the tropical character of the occasional rains, be added; to a municipal *régime* which may fairly be described as orderly; to an absence of malaria, except in the sparsely inhabited north; to ample and good food, to nearly continuous sunshine, and to outdoor habits of life, I think it will be apparent that nothing likely to deteriorate the public health can exist such as might be thought of possible importance in connection with leprosy.[1]

Mention may be made here of the kind of communication usual between Chinese and whites, and an illustration will show most concisely what it is. The small proportion of whites who acquire leprosy during a residence on a leprosy area—in India, for instance—is usually explained by reference to the casual character of such communication as there was between them and the natives. The association or contact between the Chinese and the whites in Australia is

[1] The following tables (which give uncorrected rates) furnish all the known facts of importance in connection with the present subject concerning New South Wales. They are taken from 'A Record of the Present Sanitary State of New South Wales, 1894;' contributed by the present writer, first to the third meeting of the Intercolonial Medical Congress, Melbourne, 1889; and secondly to the fifth meeting of the Australasian Association for the Advancement of Science, Brisbane, 1895:—

NEW SOUTH WALES.—METROPOLITAN DISTRICT. *Recorded Rates.*

Year.	Population estimated at middle of year.*	Density.	Natural increase per cent.	Birth-rate.	Death-rate.	Deaths under 1 to 1000 births.	Death-rate from principal zymotic diseases per 10,000.								Zymotic death-rate per 10,000.	Death-rate from typhoid and diarrhœal diseases per 10,000.	Percentage of deaths from diarrhœal diseases and enteric fever to total deaths.
							Small-pox.	Measles.	Scarlet fever.	Diph-theria and Croup.	Whoop-ing-cough.	Enteric fever.	Diar-rhœal diseases. ‡	In-fluenza.			
1875	161,126	See foot-note †	1·09	37·67	26·80	176·93	...	16·32	13·65	6·14	0·12	7·19	26·06	...	69·51	32·25	12·43
1876	167,294		1·31	38·06	24·96	169·91	...	0·06	27·67	6·33	0·12	7·65	18·91	...	59·71	26·06	10·44
1877	176,419		1·88	37·66	18·32	156·20	0·236	...	0·45	6·17	1·02	5·66	18·59	...	32·32	24·43	12·97
1878	187,635		1·69	38·14	21·16	173·37	...	...	0·21	6·76	9·00	9·06	20·30	...	45·35	29·36	13·87
1879	200,609		1·97	39·18	19·46	153·41	...	0·05	0·10	5·38	0·45	5·73	19·88	...	32·50	25·62	13·16
1880	219,221		1·60	38·99	22·96	192·24	...	0·98	1·02	3·92	4·57	4·15	18·70	...	42·38	22·87	9·95
1881	227,731		2·00	39·14	19·11	162·02	0·75	0·61	0·39	1·97	2·10	4·08	15·63	...	25·55	19·71	10·31
1882	241,761		1·90	39·83	20·77	183·28	0·95	1·12	0·21	2·56	0·74	6·90	21·17	...	32·72	28·80	13·52
1883	258,514		2·10	39·80	18·75	143·26	...	0·89	0·37	5·02	0·31	6·57	16·24	..	29·43	22·82	12·16
1884	278,999		2·13	42·62	21·24	171·90	0·11	0·25	2·11	3·29	3·98	7·49	17·52	...	34·78	25·01	16·36
1885	285,090		2·02	43·02	22·77	186·86	0·03	0·07	2·17	4·31	0·34	7·32	20·34	0·70	37·60	28·66	12·58
1886	300,410		2·28	43·70	20·87	173·28	..	0·10	2·06	2·70	3·93	9·95	15·61	0·17	37·45	25·56	12·25
1887	316,550		2·49	42·39	17·52	140·83	0·41	1·39	1·39	3·47	1·36	6·00	4·18	...	26·53	17·21	9·33
1888	333,555		2·22	41·09	18·76	152·04	0·06	3·69	2·13	6·95	0·12	5·46	12·86	...	31·54	18·32	9·76
1889	351,475		1·99	37·97	18·03	172·44	...	0·11	0·6	7·80	5·97	5·95	13·23	0·06	34·17	19·18	9·63
1890	370,355		2·14	36·53	15·10	134·75	...	0·05	0·92	5·16	2·29	3·86	8·45	0·51	22·14	12·31	8·16
1891	369,655		1·95	35·95	16·48	148·13	...	...	0·51	5·83	2·50	2·80	8·47	6·21	27·13	11·27	6·84
1892	405,490		2·11	34·70	13·59	130·21	0·02	0·05	1·06	3·40	2·54	1·97	7·32	0·99	19·21	9·27	6·84
1893	416,370		1·79	33·52	15·57	146·75	...	9·10	3·58	3·63	0·93	1·78	8·12	0·43	30·28	9·40	6·35

* Being the mean between the population at the end of the year and of the preceding year, as estimated by the Government Statistician in his volume on 'The Wealth and Progress of New South Wales,' published annually. † According to the census population of 1891, the most densely populated of the metropolitan municipalities had a density of 62, 47, 43, 37 (the city area 4·31 sq. m.), and four others of 25 to the acre; the minimum was exemplified by four others which had about three acres to the individual. The whole metropolitan district has an area of about 142 sq. m., or 90,988 acres, and in 1891 carried 34·41 per cent. of the total population. ‡ Diarrhœa, dysentery, cholera.

NEW SOUTH WALES.—Country Districts. *Recorded Rates.*

Year.	Population estimated at middle of year.*	Density.	Natural increase per cent.	Birth-rate.	Death-rate.	Deaths under 1 to 1000 births.	Death-rate from principal zymotic diseases per 10,000.								Zymotic death-rate per 10,000.	Death-rate from diarrhœal diseases and enteric fever per 10,000.	Percentage of deaths from diarrhœal diseases and enteric fever to total deaths.
							Small-pox.	Measles.	Scarlet fever.	Diph-theria and Croup.	Whoop-ing-cough.	Enteric fever.	Diar-rhœal diseases. ‡	In-fluenza.			
1875	423,493	See foot-note †	2·36	38·36	15·23	98·49	...	11·57	1·93	4·55	2·40	4·29	10·38	...	35·13	14·68	9·64
1876	436,944		2·25	38·74	16·05	91·37	...	0·78	19·73	5·99	0·34	6·29	8·37	...	36·48	14·62	9·10
1877	452,524		2·35	38·02	14·46	101·53	...	0·04	1·90	6·98	0·29	6·07	10·93	...	26·23	17·01	11·75
1878	470,162		2·42	38·64	14·44	103·74	...	0·02	0·40	8·03	4·21	5·74	11·69	...	30·13	17·46	12·00
1879	490,064		2·60	38·91	12·32	88·08	...	0·04	0·22	7·81	2·44	3·06	7·15	..	20·77	10·24	7·98
1880	511,454		2·63	36·72	13·33	80·47	..	1·09	0·55	4·00	0·66	2·91	6·43	...	15·68	9·36	12·70
1881	532,560		2·42	37·70	13·48	94·51	...	1·38	0·49	3·98	2·02	3·24	8·75	...	19·38	11·99	9·89
1882	553,000		2·22	36·29	13·09	106·21	...	0·13	0·61	5·17	1·64	5·11	10·16	...	22·83	15·28	10·84
1883	575,774		2·37	36·45	12·68	90·90	...	0·42	0·62	5·80	0·76	3·91	7·46	...	19·19	11·41	15·62
1884	601,647		2·28	36·67	13·73	101·65	...	0·65	0·28	3·87	1·49	5·10	8·24	...	22·16	13·34	9·68
1885	642,185		2·18	33·47	13·69	101·15	...	0·12	1·01	6·93	1·40	4·36	7·01	1·15	20·40	11·37	8·31
1886	669,045		2·22	34·61	12·43	101 92	...	0·04	0·39	2·81	1·38	4·36	7·31	0·36	17·79	11·67	9·39
1887	638,285		2·30	34·60	11·43	86·29	...	0·10	0·44	4·55	2·35	3·43	6·03	0·25	16·53	9·46	8·24
1888	602,150		2·37	35·35	11·61	12·88	...	1·35	0·57	3·10	0·44	3·59	6·31	0·20	15·54	9·90	8·53
1889	714,975		2·17	33·33	11·33	98·62	...	0·12	0·56	3·08	0·43	4·76	8·67	0·20	10·13	13·43	11·35
1890	731,485		2·30	34·77	11·79	88·44	...	0·04	0·45	6·36	2·31	2·23	4·46	1·45	16·43	6·69	5·61
1891	753,925		2·07	33·76	13·09	102·79	...	0·13	0·27	5·65	2·16	2·12	5·37	9·39	24·67	7·49	5·73
1892	775,985		2·20	33·47	11·47	92·91	...	...	0·34	4·12	1·55	3·19	5·21	1·79	16·02	8·40	7·33
1893	794,140		2·12	33·23	12·01	98·28	...	4·34	0·40	5·30	1·74	1·83	5·91	0·96	20·37	7·80	6·49

* Being the mean between the population at the end of the year and at the end of the preceding year, as estimated by the Government Statistician in his volume on 'The Wealth and Progress of New South Wales,' published annually. † Nearly 66 per cent. of the total population live in the country; but on reference to the last census it will be found that of the urban population there were (besides the 383,283 then residing in the metropolitan district) 353,660 living in various centres, while 381,307, or a little more than a third of the total, lived under strictly rural conditions. ‡ Diarrhœa, dysentery, cholera.

infinitely less intimate than that between the natives of India and the whites ; because the servant class of Chinese are very rarely to be met with except in the limited capacity of cooks, and because the number of Chinese women is excessively small. The degree of direct contact in Australia is slight; it is temporary, casual, or loosely speaking instantaneous, and rare.

The Chinese bring very few women indeed with them. There is a limited amount of close association between Chinese men and white women. The latter are usually among the lowest members of an abandoned class ; but this is not invariably the case, and at the census of 1891 Chinese half-castes were enumerated to a total number for Australia and Tasmania of about 2000. No case of leprosy has ever been recorded either among such white women or their half-caste offspring.

Sect. XVI.—DURATION OF THE LATENT PERIOD.

Since the question under consideration is why lepra attacked the native-born Australians, and since leprosy is a disease observed to be often endemic and attached to particular localities, it must not be assumed that every immigrant from a leprosy area who became a leper after landing acquired the disease before emigrating, nor that some of those who became leprous after arriving received the virus from others who had acquired it in their native leprosy area. It is desirable to distinguish the imported leper.

But the acquisition of leprosy abroad and at home can be discriminated with certainty only in two cases. If a person arrive already suffering, it is certain he acquired it abroad ; if a person who has never been abroad begin to suffer, it is certain he acquired it at home.

A third class of lepers consists of those who fall ill some time after their arrival ; they could be distributed among the two former classes if the latent period of leprosy were known, but this cannot be even approximately fixed.

The cases which are relied upon to illustrate various terms of latency are those in which the native of a leprosy-free area has visited a leprosy area, and has developed the disease either during his stay or after returning to his native and leprosy-free country. In the former case it is assumed with probability that the latent period may have dated from his arrival at the longest ; in the latter that it must have lasted from the date of his departure at least. It may have been much shorter in the one case than the facts reveal, or much longer in the other.

The more or less doubtful inferences thus drawn are made still more uncertain by the difficulty there is in recognising the earliest signs of the disease, so that often the opportunity even of observing them is wanting,—the difficulty of fixing, that is to say, the end of the latent period. Its beginning is unknown in every case ; probably its end has never been fixed.

Under these circumstances an opinion is generally entertained that the latent period of lepra may be very long—that it may extend over many years. Yet cases are related which go to prove that it may be short. The minimum remains unconjectured.

Now the third class mentioned above is by far the most numerous, I mean in the present instance, and among those recorded cases of which the general details are sufficiently known. But the particular detail in point is so difficult to examine, partly owing to lapse of time before inquiry can be made, and partly owing to the nationalities of most of the immigrant lepers, that I have been forced to conclude that the elementary data of time and place are very often untrustworthy. The following table shows the result of an inquiry begun among the coloured lepers in the New South Wales lazaret two or three years ago with assistance of competent interpreters ; it has been abstracted from the histories given in the Appendix.

TABLE XXIV.

Case No.	Nationality.	Alleged date of arrival.	Assigned date of attack.	Interval. Years.
21	China	1878	1882	4?
22	„	1880	China	—
29	„	1885	China	—
31	Java	1872–4	1885?	12–14
33	China	1881	1886	5
35	„	1885	1886?	1?
36	„	1887	1887–8	1 or less.
37	„	1878	?	?
44	„	1884	1890?	6?
46	„	1879	1891	12
47	„	1882	1889	7
48	„	1875	1885–6	10–11
49	Tanna	1882	1887	5
52	China	1886	1891	5–6
55	„	1886	?	?
57	„	1870	?	?
59	„	1879–80	1892	11–12
60	„	1872	China	—
61	„	1886	China	—
62	„	1887	1888	1
63	„	1842	?	?
64	„	1886	1892	6
66	„	1891	1891	5 or less.

I found that the date of arrival was generally given readily, and on checking it off by requiring the length of stay at various places in Australia to be mentioned that the total usually tallied with the first statement. I consider the alleged dates of arrival to be the true dates as a rule. In four cases China was assigned as the place of attack (22, 29, 60, 61); I saw no reason to doubt that. In cases 35 and 36 attack occurred either in China or shortly after landing, for the men were admitted to the lazaret within a year of their arrival. In cases 44 and 62 the alleged attack about a year after arrival seemed likely enough to be accepted, although No. 62 must have remained at large and undetected for about four years; however, that is quite possible. Of the remaining fifteen, queries are attached to six; in four of these (37, 55, 57, 63) no answer that could be fixed upon was given; in two others (21, 31) the answer seemed to be quite untrustworthy. The statements given in the remaining nine cases (33, 48, 47, 46, 49, 52, 59, 64, 66) appear as

accepted; but they do not deserve the appearance of ascertained fact which they bear from the manner in which they are necessarily set down. The intervals alleged by the nine were—5 or less, 5, 5, 5–6, 6, 7, 10–11, 11–12, and 12 years; and, while I place little confidence in them as they stand, it must also be remembered that they are not clinical intervals at all, but are arbitrarily fixed by the date at which the subjects happened to leave China.

The latent term may in each case have been nearly as much longer as the patient's age allowed. But the important point is that each of these intervals was long enough to permit a surmise that the disease might as well have been acquired in Australia as before emigration; nor can it be asserted that so long a time as five years must or need have elapsed before the disease could be acquired, supposing it were due to some influence locally operative.

In relation to Victoria, the question whether certain white lepers were imported is of special consequence. Three have been recorded in that colony, and three only. No doubt will be felt, I presume, about the first (or Mr. Hutchinson's) case; although details are wanting, the statement made was perfectly clear: the patient was said to have contracted the disease while resident in India.[1] And I presume, also, that it will be thought much more likely in the third case that the disease was acquired under influences which operated while the patient was travelling in India or Burma, &c., rather than in Victoria, where fresh occurrences of lepra had nearly ceased to be recorded at the date of his arrival, and where only one case in a native (of N.S.W.) ever has been noted; and this notwithstanding the assigned interval of four and a half years which is said to have elapsed between arrival and observation of the first signs. And as to the single case in a native (of N.S.W.)—that, namely, which was reported by Dr. Peipers,—nothing definite can be said as to the area on which the disease was acquired except this, that the subject was born and for eight years lived in Sydney, where other cases among natives have been recorded both before and after the date of his birth; that he then went to New Zealand, where lepra is met with among the

[1] Report R.C.P., p. 81.

aboriginals at all events, and lived there seven years ; and that thence he went to Melbourne, where the first signs were observed after a residence of five years. However, if the disease were really acquired in Melbourne, it would surely be singular that the only case recorded there in a native should, nevertheless, happen to be noticed in one who had previously spent many years on areas where lepra was known to be present.

Sect. XVII.—GENERAL REMARKS ON COMMUNICABILITY.

Hirsch pointed out that discovery of the bacillus of leprosy did not by itself warrant the conclusion that the disease was communicable,[1] and attention has just been drawn to this point once again.[2] His critique of Dr. G. Armauer Hansen's discovery and of the subsequent research by which Professor Albert Neisser proved[3] the invariable presence of a bacillus in leprous tissues still holds good ; namely, that "it is only an *a priori* proof of the conveyance of leprosy by contagion," and that the malady "is contagious not only directly but indirectly," for no sufficient experimental proof of its communicability has yet been given.[4]

Very many attempts have been made (I reckon that 85 to 90 is a number about the mark) by trustworthy and competent observers to transmit leprosy from lepers—(*a*) to the healthy ; (*b*) to those suffering from other maladies ; (*c*) to apparently unaffected parts of the bodies of those already suffering from leprosy.[5] All of the attempts under (*a*) and (*b*), which numbered more than fifty, and which

[1] 'Hist. and Geog. Pathology,' p. 44, ed. N.S.S.

[2] 'Rep. Leprosy Commission in India,' p. 259.

[3] 'Virchow's Archiv,' 1881.

[4] Dr. Max. Wolters, 'Cent. für Bacter. u. Parasit.,' Bd. xiii, Hefte 14, 15, 1893.

[5] See Dr. Wolters, loc. cit. ; see also Professor H. Leloir, 'Traité,' &c., pp. 237, 238 ; Bargigli (Bargilli, of Mytilene), cited by Hirsch ; Dr. Arning, 'Journ. of the L.I.C.,' ii, p. 132 ; and for two cases in which a local manifestation was produced by Dr. Jules Goldschmidt, of Madeira, by injecting the juice of a tuberosity into the apparently healthy skin of the forearms of two tuberous lepers, see that writer's work, 'La Lèpre,' Paris, 1894.

alone have importance, uniformly failed, save Dr. Arning's, in which there was apparent success, but under circumstances fatal to its evidential value.[1]

All of the many attempts made to inoculate the inferior animals, both warm and cold blooded, are considered by the best authorities to have failed. Some doubtful successes have been recorded; but Dr. Wolters' account of them, and especially the results got by MM. H. Leloir,[2] Campana, and Wesener from implanting portions of dead leprous tissue (preserved in alcohol by Professor H. Leloir for three years, and then in addition heated to 48° during an hour) should be studied.

All attempts to cultivate the bacillus outside the body are likewise considered to have failed. Consequently all those statements which speak of it as persisting in efficient form for long after it has left the human body, all those which speak of it as living for howsoever short a time after it has been discharged or removed therefrom, and all those which definitely class it either with the endogens or the exogens, must for the present be regarded merely as more or less probable suggestions.

For the same reason, the analogies often drawn between lepra and tuberculosis must not be mistaken. If the life-history of the *B. lepræ* were known, and were known to resemble that of the *B. tuberculosis*, it would be a reasonable assumption that lepra and tuberculosis were maintained and diffused in the same way. But this is not known; and the established facts are that tuberculosis is communicable, that in many parts of the world it is the most widely spread and the most important of all the causes of premature death, and that it is inoculable in its morbid products, while the communicability of leprosy remains doubtful, its diffusibility is certainly very slight, and inoculability in its morbid products remains undemonstrated.

Some of those who think that lepra is diffused and maintained only by direct or indirect communication with the

[1] Keanu was inoculated September, 1884. His nephew David *died* of leprosy, July 19th, 1890; his mother-in-law Pulu *died* July 2nd, 1891; and his own son Josepa was consigned to the Settlement long before he himself became a leper, and *died* December 13th, 1893.—'Settlement Record,' Molokai, H.I.

[2] Op. cit., p. 237, foot-note.

sick attempt to explain its obscure and silent march on the assumption that most of those who keep company with lepers are insusceptible, and escape in virtue of their powers of natural resistance. Had this mode of maintenance and diffusion been demonstrated, this suggestion would be reasonable and probable; but, as the very matter under discussion is the communicability of leprosy, it begs the question.

Again, if those who keep company with lepers are thereby really exposed to the virus of this disease, it is still possible that the majority, who escape attack, do not necessarily do so in virtue of natural resistance; perhaps the conditions of successful implantation of the virus cannot be so simply fulfilled.

But if this point be dropped, it is at all events indisputable that the fact of infection can be ascertained only in the laboratory. Hence there is no way of judging whether failure of the majority to acquire leprosy, which is a constant phenomenon, be due to their insusceptibility or to the simpler circumstance that, notwithstanding appearances and probabilities, they were never in danger. In short, for all that is known, it may be that the sick are not the common source of the virus; it may be that man's resistance to it is but small, and that when it is suitably introduced into the body from its proper habitat he usually succumbs.

Thus, while the probability as deduced from pathological analogies is generally thought to be in favour of the maintenance of lepra by direct or indirect communication with lepers, this opinion remains for the present unsupported by any direct proof.[1]

The evidence for communicability is not widely different, in my opinion, on the clinical or circumstantial side. There

[1] Here the phrase "direct or indirect" is used for fear it should be supposed that the possibilities which attach to the suggestion that the mode of communication may be indirect have been overlooked. This is not so; but I incline to regard the suggestion as premature. The all-important question is not how the virus is communicated, but where it resides and whence it proceeds—whether in and from the bodies of existent lepers, or in and from the surroundings of man, be it from his food, the soil, or some other of them.

is, in fact, but one instance in which communication seems to have been established; that is to say, one only in which the circumstances were such as seemed to exclude every other source of infection than an imported leper. This is Dr. Hawtrey Benson's case; but it is unique.[1] There is one other which raises a strong suspicion, namely, Dr. Robert Liveing's Guernsey case.[2] Foreign writers, so far as I am acquainted with their works, do not cite any instance as strong even as the latter. There are three or four other well-known cases, which, I think, are not so recorded as to impress the doubtful.

The greater number, or perhaps even all, of those who think that lepra is communicable explicitly or implicitly postulate intimate or prolonged contact. The cases adduced in proof (and their name is legion) have an alluring aspect from afar, but on close examination this turns out to be lent them by the *post hoc* glamour. Almost all of them may be expressed by the following simple formula:—On a recognised leprosy area, A, being healthy, enters into more or less intimate association with B, who either is or shortly becomes manifestly leprous; after some months, or a year or two, of continued intimacy, A also becomes manifestly leprous. Small account is taken of those persons who are attacked, although they have never been in conscious contact with any leper.

Such experiences seem to satisfy a majority, in accordance with the known rarity of exiguous reasoning faculties. But if reference be made to the writings of the more distinguished among those who see no objection to the view now under examination, it turns out to be very difficult to form a good idea of the length, or degree, or kind of association which is considered necessary. For although prolonged and intimate contact are mentioned by some of the most authoritative writers, yet those conditions are admitted to have been wanting in some cases, and consequently cannot be spoken of by them as essential.

Thus, for example, Professor H. Leloir, who, as has just

[1] Professor H. Leloir regarded the conditions as experimentally perfect, op. cit., p. 308, foot-note.

[2] 'Handbook on the Diagnosis of Skin Diseases,' London, 1882, p. 289.

been seen, relies on the Irish case, accepts also Dr. Edmund Atkinson's Baltimore case.[1] In the former the patient had been the bedfellow of the imported case during eighteen months; in the latter, though the families of the patient and of the primary leper became acquainted (having lived in the same street for two years, next door to each other for one of them), the patient herself denied that she had even so much as touched the leper (had never even shaken hands with him).

Hereupon it seems expedient, by way of farther illustrating the uncertain way in which the degree of intimacy necessary to effect communication is regarded, to remark that if the mere neighbourhood of a leper were enough, then those cases which Professor H. Leloir has gathered and impartially discussed [2] as being possibly indigenous would necessarily cease to have peculiar interest. In the absence of bacteriological proof the author judiciously refrained from declaring them to be cases of leprosy without reserve: but suppose that proof had been given; how could they be spoken of as possibly autochthonous if any leprous soldier or returned colonist who happened to live in the same street with the patients might have been the source of their infection?

And, in fact, this point was taken by Dr. Ehlers at the end of his report on leprosy in Iceland,[3] *à propos* of Dr. Zambaco Pacha's showing that there were lepers in Bretagne. He said plainly "On ne peut jamais dire qu'une personne n'a jamais été en contact avec des éléphantiasiques." As to Bretagne and the cases there, he accepted Dr. Zambaco's diagnosis (whose clinical competency in this matter is well known) although it was unsupported by bacteriological proof.[4] In Dr. Ehlers' view, as a convinced contagionist, that proof seemed scarcely required, for he was able to point out that about 4000 Bretons sailed every

[1] Op. cit., p. 309.

[2] Existe-t-il dans les pays reputés non-lépreux en France des vestiges de l'ancienne lèpre?" 'Journ. des Mal. Cut. et Syph.,' April, 1893.

[3] 'La Sem. méd.,' November 17th, 1894.

[4] 'Ann. de Dermatologie,' 1892, p. 1279; MM. Besnier et Widal, quoted by Professor Leloir, *ubi citato supra*.

year to fish on the west coast of Iceland, where, therefore, they could easily, and doubtless did, come into contact with lepers.

Thus it appears that the Breton fishermen do what on all hands is admitted to be dangerous; they resort to "an endemic seat of leprosy."[1]

And with regard to the sentence quoted from Dr. Ehlers' paper it must be pointed out that if it is to be taken literally (and nothing to the contrary appears) farther discussion is impossible. Yet it may be inquired what value that expression of opinion has in the face of acknowledged facts. Now, the acknowledged facts are that when lepers return to leprosy-free areas in Europe, and when from leprosy areas in Europe they emigrate to leprosy-free areas in another quarter of the world (Iowa, Minnesota, Dakota, Wisconsin), and even when from rural leprosy areas lepers resort to old towns which stand on or in close relation to those endemic seats (Bergen, for instance), the suggested sequence of events is not observed. I give two or three examples additional to those more generally known, but the second I consider is of doubtful validity. H. Vandyke Carter made the following statement in his brilliant report of 1873:

"This town (Bergen) is free from the disease, and as a rule, populous localities do not seem to be foci of the affection."[2]

Then, in the 4th Annual Report of the State Board of Health, Massachusetts, this sentence appeared:

"A leper hospital has been established at San Francisco, and fifty-two cases have been admitted in ten years (1874–83), all of whom with a single exception were Chinese; and no case has been reported of a native citizen of California acquiring leprosy."[3]

And this valuable, because fully and scientifically reported example is to be found in Dr. Zambaco's not less witty and

[1] Hirsch, op. cit.

[2] 'Report on Leprosy and Leper Asylums in Norway, with reference to India,' presented to the Secretary of State for India in Council, 1873, London, 1874, p. 10.

[3] See 'Report of B. of H. to the Legislative Assembly of Hawaii on Leprosy,' Honolulu, 1886, p. 208.

entertaining than important account of his 'Voyages chez les Lépreux'[1] concerning Scutari; it concludes thus:

"J'ai dû entrer dans tous ces détails pour prouver que l'isolement des lépreux de Scutari est absolument illusoire et que la population de la capitale, de Scutari surtout, se trouve en communication quotidienne, permanente, avec les lépreux, d'une manière directe et indirecte. Hé bien! Il n'y a point de lépreux dans la ville de Scutari. De mémoire de l'homme il n'en a point eu."

Certainly leprosy is not as easily communicated as Dr. Ehlers suggests, and as Professor H. Leloir among other authoritative writers seems to think sometimes possible,—that is, I venture to add, at all events *by lepers*.

The last-named author, however, whose authority in this matter rests on the best grounds and is undisputed, speaks most commonly of intimate contact, direct or indirect, and of inoculation.[2] And if, from his teaching, we turn to the opinions held by Dr. Hansen, we find the latter sharing the same views but expressing them more clearly and still more confidently. At p. 102 of the English translation of his too concise work[3] he gives two cases by way of example in which young men became affected after wearing in the one case drawers, in the other stockings, which had been cast off by lepers. Thus close and prolonged contact, direct or indirect, seems required by Dr. Hansen; and that this really is his general opinion is made plain by his explanation of the failure of the 170 to communicate their disease to their neighbours in the American States already mentioned. He attributes this harmlessness (constant in the States, non-existent in his view in Norway) to more prosperous circumstances in their new home, and to larger and better houses which allow lepers to have "usually their own room, *or at least their own bed*" (p. 94). In view of many broad facts this scarcely can be the true explanation of the matter; and I venture to remind the reader that all these theories to account for attack or escape, as the case may be, start from the assumption that the virus is derived from the bodies of lepers. In reality, therefore, they are divagations; their

[1] Paris, 1891, chap. xxv.

[2] 'Traité,' &c., chap. x, and p. 289, foot-note.

[3] 'Leprosy,' Hansen and Looft; translated by N. Walker, Bristol.

interest (and in a strictly provisional sense their usefulness) must not be allowed to obscure the true question at issue.[1]

And close, intimate, or prolonged contact are on the whole most commonly demanded even by the more trustworthy among the authors who consider that leprosy is maintained by communication with the sick.[2] Yet it was noted above that many cases were known in which these conditions did not exist; now, therefore, I refer additionally to my own experience under this head. This has been small, but carefully observed under circumstances which render it likely that the data are complete. I say, then, that it is as certain as anything of the kind can be that in the Cases 34, 36, 40, 43, 51, 53, 54, and 70 at the least (see

[1] In order not unduly to interrupt the course of these remarks, I place in this foot-note the following observation, which seems to me to have importance in itself, and in its conclusion. In the graphic work of M. Zambaco, from which I have already quoted, may be found at pp. 220–22 an account of the monks of Mount Athos. It was chiefly furnished by Dr. Phanarioudi, who had for long attended the many convents there. Fifty years ago the monks first erected a refuge for the accommodation of lepers who having been driven from their villages in the Peloponnesus—from Metelin, Volo, the islands of Thassos and Calimnos, &c.—took refuge in the forests with which the mountain is clothed, and perforce led there the lives of wild beasts. Among the monks were many who thought it would be a sign of special grace if they were stricken with leprosy, and who consequently made every effort to contract the disease; they associated with the lepers in their lodging, shared their food, and even wore their flannels and underclothing while still saturated with discharges from their leprous sores. But although these attempts had for years been systematically and perseveringly made, not a single monk had ever suffered in the least; and that although their food and filthiness of body and dwelling were such in every respect as are commonly thought favourable to development of this disease. And M. Zambaco concluded by remarking that "un seul fait de transmission observé dans cette localité isolée où toute contagion peut être suivie avec rigueur et précision, et où la lèpre n'est point endémique, aurait été certes de la plus haute importance. Mais un tel fait ne s'est jamais montré." And thus it appears that the different results which followed in Norway and in Greece on procedures apparently so closely parallel are not, after all, inexplicable; for in reality the conditions differed in an important particular. Norway is, but Mount Athos is not, an endemic seat of the disease.

[2] Except the members of the Leprosy Commission in India who relied on indirect communication; with reference to which I have made a remark above. But the case of the 170 in the States (as well as others) tells as much against indirect communication as the commissioners themselves thought it told against direct communication.

Appendix, N.S.W., and Table XXVI), there never was at any time conscious contact with any leper. This conclusion rests on almost minute inquiries made among relatives, friends, and the neighbours of a lifetime (often in distant parts of the country whither I went to interrogate them) at the moment of discovery, when from shock, personal fears, and general interest it seemed probable that every known fact or suspicion would be revealed consciously or unconsciously to a watchful inquirer. And the patients referred to, though repeatedly interrogated while under detention, have never seriously varied the information thus gathered at first; but had deceit nevertheless been successfully practised in any case, or had any important matter nevertheless escaped notice, it would still be gratuitous to suppose that this could have happened in all.

The difficulty which appears to me to be thus raised is not due merely to the want of opportunity for intimate contact which these cases demonstrate: it is due to the basic assumption that the virus is got from the bodies of the sick. However, on that assumption they would still require some special explanation; and probably for that reason inoculation, which does not require either direct or prolonged contact, is a mode of communication much favoured by many writers who think lepra communicable.[1] But for my own part I think it clear that this is pure imagination. On this point I am entirely at one with *Un Missionaire*, who, and who alone among contagionists, as far as I am aware, denies that there is any evidence for inoculation.[2] The well-known and not numerous cases usually cited in proof are of the most frankly *post hoc* character.[3] But in this matter it is

[1] Cf. 'Leprosy in British Guiana,' by J. D. Hillis, London, 1881, p. 174, *et seq.*, where there is a good summary.

[2] 'La lèpre est contagieuse,' par Un Missionaire attaché aux léproseries, Paris, 1879, p. 71. As a contagionist, this writer does not deny the possibility, of course; but, more cautious than some contagionists, he remarks on the lack of evidence that communication by inoculation ever had occurred.

[3] See, for instance, Dr. Hillebrand's pin-or-penknife case, given in his letter printed in 'Leprosy, a Communicable Disease,' by C. N. MacNamara, London, 1889, p. 65; the Robben Island fish-hook case, Dr. Ross, 'Rep. L.I.C.,' ii, p. 83; Dr. Blanc's razor case (when a wardsman fell ill after an incubation of one week—or rather directly from the alleged inoculation),

not necessary to refer to clinical experience; for the question of inoculability is precisely that one which has been most thoroughly put to the test of practical experiment, as has been shown above. The numerous attempts made by several different, and for the most part thoroughly competent observers, yielded results which spoke strongly against the inoculability of this disease *from man to man*.

In 1881 Dr. Hillis (op. cit.) remarked that if lepra were acquired by inoculation, then the primary sign should be a localised erythematous spot; and later Professor H. Leloir expressed himself to the same effect. There are two cases, and I think no more, which give colour to this reasonable surmise. One has been recorded by Dr. Arning: a young lady showed, after three months' residence at Honolulu, a small, red, slightly elevated spot on her left upper arm, in which on excision Dr. Arning discovered lepra bacilli; he has not stated that the disease subsequently became generalised, but to Dr. Arning's mind it was quite indubitable that this was a clear case of primary localisation of the virus in the skin.[1] The other case is my own, No. 51 (Appendix, N.S.W.).

But while such observations should be frequent if this were really the way in which lepra was acquired, I find other objections to the proposed view on which the narrowness of my practical experience and my consequent ineptness in this matter alone prevent me from laying great stress. The account of Dr. Arning's case is seriously defective, in as far as it is strictly confined to the apparently local manifestation he describes; in my own case, though the history of the "ringworm," as the patient called it, on her right forearm was perfectly clear, and the lesion itself prominent during several years of her detention, yet she did not fall under my observation (nor under any more competent observation) until the disease had become systematised. I am therefore

ibid., p. 100; the case of the Dominican Sister, who pricked her finger with a needle while mending the clothes of lepers before sending them to the laundry, to which I have mislaid the reference; Dr. Taché's New Brunswick coffin case, 'Leprosy in India,' Honolulu, H.I., published by authority, 1886, p. 143; and there are a few others.

[1] 'Rep. L.I.C.,' ii, p. 129.

obliged to say that I have never seen a purely local leprous sore (and this is Professor H. Leloir's experience), nor a case of pure lepra of the skin; but in every tuberous case which has come under my observation, and at whatever stage, there has always been evidence of affection of the greater accessible nerve-trunks (and this is Dr. Hansen's experience).

I conclude, then, that the theory of the inoculability of leprosy in its morbid products will not hold water; and that it fails for want of evidence, experimental or clinical, sufficient even to raise a presumption. But then, the fact that leprosy can be acquired by persons who have never been in conscious contact with any leper becomes of the greatest importance with reference to the question of the true provenance of the virus.

To be fair, let the converse aspect of the matter now be examined; what has been the result in households which comprised a leper as to spread of the disease in New South Wales? The following are the available facts (see Table XXV). The time which has elapsed since the patient was removed will be thought insufficient in some cases; only it is to be remembered that when the task is to prove communication as the result of intimate contact, the term within which it is said the disease manifested itself is usually alleged to have been quite short—three months, one week, at most a year or two years.

TABLE XXV.—*Showing the Cases of all Whites, N.S.W., in which the particulars are sufficiently known to base a judgment on the Relation in which they stood to Subsequent Cases* (a) *in the same Household, and* (b) *in the same Neighbourhood.*

Case No.	Initials.	Sex.	Married.	Form.	Probable year of attack.	Age at isolation.	Date of isolation.	Years elapsed between attack and isolation or death.	Subsequent case in same household.	Other case outside the household, but in the same village or locality.	Years elapsed since attack.	Remarks.
15	G. R.	M.	Not	T.	1872	—	Not	17	Sister	Yes	22	Sister followed. (See Case 45.)
65	M. M.	F.	Not	T.	1881	24	1893	12	None	None	13	
11	P. S.	M.	Yes	T.	1876	—	Not	10	None	Yes	10	
45	M. R.	F.	Not	T.	1884	33	1891	7	None	None	10	
68	A. M.	F.	Yes	T.	1885–6	35	1893	7	None	None	8	Mother (L. T.) died 1881. (Case 12.)
34	F. G.	M.	Not	T.	1881	27	1887	6	None	None	13	
53	C. D.	M.	Not	T.	1887	24	1892	5	None	Yes	7	See Case 42.
36	H. B.	M.	Not	T.	1885	17	1889	4	None	None	9	
56	M. E. K.	F.	Not	T.	1888	43	1892	4	Sister	None	6	A sister (L. T.) followed.
43	H. S.	M.	Yes	T.	1878	41	1891	13	None	None	16	
39	H. R.	M.	Yes	T.	1888	28	1890	2	None	None	6	
40	A. G.	M.	Not	N.	1888	14	1890	2	None	None	6	
42	E. U.	M.	Not	T.	1889	23	1891	2	None	None	5	
54	S. P.	M.	Yes	T.	1890	49	1892	2	None	None	4	
58	W. W.	M.	Not	N.	1895	13	1892	2	None	None	4	
70	E. R.	F.	Not	T.	1892	16	1893	2	None	None	3	
51	I. L.	F.	Yes	T.	1890	53	1891	1½	None	None	4	

It appears, first, that out of seventeen cases in which the particulars are sufficiently known, there was extension of the disease to persons known to have been in household contact with the sick in three, namely, 15 and 45, 68 and one unnumbered, and 56 and one unnumbered; and secondly, in other three (which include one of the foregoing), namely, 15, 39, and 42, there occurred one or more cases in the same district as, or in the country more immediately surrounding the residence of, the first known case. These three require the addition of some particulars to those in the table. In relation to Case 15, the first known case (Case 4, N.S.W.) was attacked in 1862, and may perhaps have lived until 1872–5; he belonged to the village of Campbelltown, where his father was established as a publican, but whether he lived there during the whole of his illness is unknown; the second case belonging to this group was that of a little boy (Case 15, N.S.W.) who lived at the same village, and who was attacked in 1871–2; his parents were well-to-do people of some little property; the third (Case 25, N.S.W.) lived as a domestic servant in the household of my informant at Camden, a village six miles from Campbelltown; she left service to get married in 1872, was attacked in 1873, and resided in her own cottage half a mile out of Camden until the end of 1878, when she died. The actual relation in which these three stood to each other (if any) is unknown; but every probability points to their having been no more than casual acquaintances at the most. Case 53 was the first known of another group; with him the second, Case 42, had but a nodding acquaintance—a statement consistently adhered to by the two men during their detention and without doubt strictly correct; moreover, the second patient was employed at a station fourteen miles away, and but seldom went into the town where Case 53 lived. Case 11 was the first known of the third group; he lived in the same small cottage with his wife, child, father, mother, aunt, and one brother (who specially attended to him) during all the years of his illness, and they escaped; the second case in the locality (Case 39) occurred to a man who was no relative, and who very rarely visited the hut according to accounts which leave no room for doubt.

The interpretation which this limited but carefully recorded experience best bears is now left to the reader's judgment. I disclaim the position of advocate; but I may well express my opinion, which is that in New South Wales close contact with tuberous lepers is a matter of very slight moment, and that little contact or no contact at all does not avoid danger.

It has been sought to smooth away the difficulty, now once more exemplified, which is raised by the presumption that the virus is derived from the bodies of the sick, by reference to natural resistance in combination with indirect communication. As to the latter I have already pointed out that it cannot be discriminated from surroundings infective in themselves on any leprosy area; the proof must be sought among a virgin population to which lepers have been imported, and is still to seek,—unless, indeed, the case of the 170 in the States may be accepted as conclusive. But as to natural resistance, it should be remembered that this phrase indicates no new thing.

All that has been experimentally demonstrated of natural resistance during recent years is precisely what has long been clinically inferred. It has been made a matter of demonstration that this function can be suspended or interfered with by lowering the bodily temperature, by fatigue, by introducing chemical substances into the body, and by unsuitable feeding; and it has long been a truism of clinical teaching that cold, fatigue, inhalation of foul gases, and starvation expose to disease those who in normal physiological circumstances usually escape. The relation of the abnormal circumstances just mentioned to occurrences of disease has always been thought to be indirect; and this, too, is the teaching of experiment: they have always been thought, and now are proved, to give a free opportunity to diverse infections which otherwise would have been successfully fought. Nor has it ever been suggested that susceptibility to leprosy is a special susceptibility; it has always been considered to stand on a footing with susceptibility to every other infective process. Hence it should be fostered by filth, foul odours, and starvation, just as susceptibility to other infective processes is fostered by them. And these

conditions, generally unfavourable to health, have usually been relied upon, by those who think leprosy directly or indirectly communicable, to explain prevalences of this disease.

But there is not a shred of evidence for this, any more than there is for inoculability. The evidence is that overwork, filth, foul odours, and starvation stand in no appreciable relation to prevalences of leprosy. I have already pointed out that these conditions do not exist, are not to be found, among the whites in Australia; and for a closely parallel example Bates' account of leprosy at Santarem, quoted by Dr. Robert Liveing, may be consulted.[1] Vandyke Carter's more general opinion may also be quoted; he said, "Experience in Norway, so far as I could learn, does not countenance the view that the greater or less prevalence of leprosy is due to the varying hygienic condition of the people. I am assured that at the present time no such general improvement in the manners, habits, diet, &c., of the people has taken place as could in any measure serve to explain the actual subsidence of the disease."[2] So also Dr. Hansen, in his report for the year 1875, quoted by the last-named author,[3] definitely denied any importance to improved hygienic conditions in the diminishing prevalence of leprosy in Norway, though many years later he assigned very great importance to them in relation to the failure of the 170 to maintain their disease in the States, as has been remarked already above. I propose, however, to cite but one well-observed instance which seems to me conclusive by itself; it is that of the island of Madeira, and is taken from the account written by Dr. Jules Goldschmidt,[4] whose personal researches were "poursuivies d'une façon ininterrompue dans cette île depuis 1866."[5]

On the island of Madeira all lepers were never isolated, though about the year 1500 a lazaret was established to which poor lepers only[6] were

[1] 'Elephantiasis Græcorum,' by Robert Liveing, London, 1873.
[2] Loc. cit., p. 20.
[3] 'Memoir on Leprosy,' Bombay Castle, March 5th, 1884.
[4] 'La Lèpre,' Paris, 1894.
[5] 'Le Bulletin Médicale,' No. 101, p. 1156.
[6] Always, and everywhere, only the poor!

forcibly removed from all parts of the island down to 1860, and since 1860 all lepers have been entirely unrestrained. The people themselves do not regard lepra as a communicable disease; they ascribe its occurrence to use of a certain vegetable, and in consequence regard it with perfect indifference, and live in quite ordinary contact with the sufferers. The area of the island is about 780 square kilometres, and its population about 130,000, so that density is uncommonly high. It may be taken that about two thirds of the close-packed population, or about 80,000 of them, live in *la misère*, and their state has for long past been steadily going from bad to worse. The author reckoned the total number of lepers present on the island at 70 in 1894.

By all experience, by every analogy, were prevalences of lepra ruled by diminished natural resistance consequent on continued overwork, inadequate food, and the filth which is the constant concomitant of those conditions of life, Madeira should be ravaged; and yet there are but about 5·5 lepers per 10,000 inhabitants. This case seems to me incompatible with the assumption that natural resistance to leprosy can be broken down by the usual agents alone, that the virus is derived from lepers, and that it is communicated either directly or indirectly from the latter to the healthy. But if the virus resided in the surroundings of man the case could be easily explained: ripe for leprosy, as for any other infective process, the islanders are; leprous in any but small proportion they are not—it might be said because they are not exposed to the virus, though they are exposed to the sick at close quarters. And, moreover, it always is the case that the total lepers on any leprosy area bear but a small proportion to the total poverty-stricken population among whom they live and move uncontrolled.

Lastly, if eager clinicians have fallen into *post hoc* pits, epidemiologists have often wandered in the maze of Ogygian legends.[1] Yet nothing special need be said now on this

[1] The oft-quoted cases need not literally deserve this epithet in order to fall into the class it indicates. Thus the case of Hawaii is not, scientifically speaking, a whit more valuable than the case of Peru. Leprosy has increased there during the latter half of this century, just as it increased in Norway during the former half; but of the course it followed in spreading nothing whatever is known, though the group consists of eight inhabited islands, and thus was well suited to elucidate some important points. Or to mention another modern case which falls into that class, the alleged course of the epidemic at Parcent; one scarcely knows whether he should

point, for an attempt is here being made to ascertain in a practical way whether the beginnings of leprosy in a newly settled country can be learned even when the circumstances seem to be rather more than usually favourable.

In an epidemiological view it seems to me that there are thus far but two noteworthy cases on record: one valuable for the manner in which it has been observed, which is that of Norway; and one very little known, but remarkably distinguished by physical circumstances, which is that of Madeira. The latter really affords the soundest support to the hypothesis of communicability of any case yet described; it is consequently surprising that extended and special use should not have been made of it long since, and I have a proportionate pleasure in now pointing out its peculiar merits. My authority is Dr. Goldschmidt's work already quoted.

Madeira was uninhabited until it was occupied by the Portuguese in 1419. Emigrants from Portugal were introduced, many criminals and persons of the outcast class among them. Leprosy was then present in Portugal, as it was over the rest of Christendom; there is every probability, therefore, that lepers were to be found among the older settlers and later immigrants. Towards the end of the 15th century a lazaret was established at the capital, which still exists; and from that time, at all events, down to the present day there have always been more or fewer lepers among the population.

Here the circumstances preclude error, and are matters of indubitable historical record. Unless the virus reside in the surroundings of man, this case apparently proves that it does reside in the bodies of lepers.

In order to show that the views I now seek to express are not singular, and that there is reason to be dissatisfied with the hypothesis of communicability, and to look for the true habitat of the virus in the surroundings of man and not in the diseased body, I need merely mention, among modern writers, Hirsch, Mr. Jonathan Hutchinson,[1] and Beavan

be more astonished at the deadly certainty with which the disease attacked precisely those who were known to have come into close contact with the sick, and apparently no others, or at acceptance by the historian of the all-important early data at the hands of the mayor of that obscure village, avowedly deposing to facts which began to be encountered nearly forty years before the attempt to gather them was made.

[1] 'Journ. L.I.C.,' i, p. 67.

Rake ;[1] to whom probably may be added M. Leroy de Méricourt ;[2] and I do this just here because I now propose to suggest an explanation of the diminished prevalence of leprosy in Norway which is other than that advanced and generally accepted.

In Dr. Hansen's latest publication already referred to, there is, at page 145 of the English translation, a table which has the form of the summary table printed in the official reports on leprosy quinquennially issued by the Government. These latter not being commonly at command, it must be mentioned that the table at page 145 is erroneous. In every line it is internally or arithmetically incorrect; and, further, the number of lepers represented as being present at the end of the latest year dealt with is larger by 145 than, on a correct calculation with the figures therein given, it should be. These figures, however, do not agree with those in the official table, which last is internally correct, of course. It is the official table, therefore, to which I refer below.

Judging from the diminished annual number of new cases latterly brought to light, there is no doubt that leprosy has steadily diminished in Norway during a longish series of years.

I admit at once that nothing has been done since 1856 which could have effectually contributed to diminish the prevalence of leprosy, unless it be the imperfect control to which known cases have been subjected. And nothing of a more general character has happened, such as radical change in habits and customs, or in prosperity, which could have caused, or materially contributed to, the observed diminution.

Now that is an important part of Dr. Hansen's argument, which shows that leprosy was increasing in Norway during some years prior to 1856, and even rapidly increasing. The available evidence that this was the case sufficed to satisfy Carter, and I have not become aware of anything which can be taken to throw doubt upon it.

This fact has a significance which I shall point out

[1] Ibid., i, p. 47.

[2] 'B. de l'Acad. de Méd.,' tome xix, 1888, p. 647.

presently. That it is the corner-stone of Dr. Hansen's views becomes apparent when it is noticed that he infers from it[1] that the disease would have gone on increasing but for the (imperfect) control to which known lepers began to be subjected in 1856, to which alone they continued subject down to 1885, and to which alone the home-dwellers are still subject, notwithstanding the law of 1885.

He supports this inference by an indirect argument. He asserts that the number of new cases annually occurring in the various districts is proportionate to the number of home-dwellers remaining therein. In other words, the smaller is the proportion of known lepers removed to asylums to the total known lepers, the larger is the number of new cases annually brought to light. He quotes the figures for three districts between the years 1856 and 1865.

The statement is strongly in favour of the notion that the virus of leprosy is derived from lepers, and that the disease is maintained by direct or indirect communication with the sick; but it could not be fully criticised by any person not thoroughly acquainted with all the local circumstances.

Yet it can be sufficiently examined with aid of the numbers given in the official Table;[2] it is unnecessary, and might be misleading, to compare the figures for a few individual districts. For although neglect of isolation in a few districts might well prevent the total annual number of new cases (in the whole of the infected part of the country) from falling as rapidly as it otherwise would, yet the proportion borne by the total home-dwellers to the annual number of new cases could not be materially altered in that way if the former were really "so many sources of infection." The statement is that they were. Dr. Hansen infers this from the constant proportion he thinks he sees between them and the annual number of new cases; and it is clear, of course, that unless such proportionateness can be demonstrated, causativeness cannot be confidently attri-

[1] See Carter, op. cit., 1873; see also Hansen and Looft, op. cit., p. 101, lines 1 to 4.

[2] 'Norges Officielle Statistik: Beretning om de Spedalske i Norge i femaaret 1881–5,' Baekke iii, Tabel 2; Christiania, 1888.

buted to the home-dwellers. The proportion borne by the new cases in the whole of the infected part of the country in each year to the total home-dwellers at the close of the last preceding year from 1857 to 1885 was as follows; the figures for years subsequent to 1885 being still subject to some slight adjustment in the usual course:

1857 . . 9·1	1864 . . 10·5	1871 . . 9·6	1878 . . 7·8
1858 . . 8·8	1865 . . 10·4	1872 . . 7·6	1879 . . 6·6
1859 . . 10·4	1866 . . 10·7	1873 . . 7·8	1880 . . 5·1
1860 . . 9·8	1867 . . 10·7	1874 . . 8·6	1881 . . 4·2
1861 . . 10·0	1868 . . 11·2	1875 . . 8·6	1882 . . 4·4
1862 . . 10·1	1869 . . 9·8	1876 . . 6·5	1883 . . 6·1
1863 . . 9·8	1870 . . 10·1	1877 . . 7·2	1884 . . 2·1
			1885 . . 2·2

For about half this term, then, the proportion of new cases to home-dwellers remained steady enough. So far the figures do not negate proportionateness, though by themselves they could scarcely be taken to demonstrate it; but those for the remaining half do negate proportionateness. The year 1872 was marked by a decrease in the proportion between new cases and home-dwellers; and that proportion thereafter continued to fall at least as steadily as it had been maintained before.

Dr. Hansen's main argument of this kind is unmistakable, although I have to admit that as yet I have not succeeded in following the reasoning he bases on such details as he refers to, rather than gives with the fulness which his long experience would readily permit, and which the importance of his statement requires. After making every reasonable allowance, I conclude that the evidence of communication from the sick which he thus adduces is not as convincing as it may appear, perhaps, at first sight. The figures bear the interpretation, as it seems to me, that some general cause inimical to the infection came into operation in the course of nature, at a date somewhat before the year 1870, and better bear it.

So, also, though there is no doubt that leprosy was increasing during a few years prior to 1856, it cannot be asserted plausibly that it would have continued to increase but for the practice of control. For, in the first place, such an assertion would run counter to our knowledge of the

natural history of communicable diseases, and especially to all that is known of the natural history of leprosy. Leprosy has been present on the very areas now referred to from time immemorial (I believe the first record is usually ascribed to the thirteenth century) ; and thus, were a disease which, once introduced, steadily went on to attack more and more people, it should have been difficult at the beginning of this century to find a sound person in the whole country. But, of course, this was not the case ; on the contrary, an increase in the amount of disease began to be perceptible during the third and fourth decades.

Clearly the inference to be drawn from the facts, that is to say, the inference which is most in accord with general knowledge of the behaviour of communicable diseases, is that on this ancient endemic seat of leprosy there was an exacerbation of the essential conditions (whatever they may be) during the earlier half of the century, in consequence of which cases of leprosy began to become more common ; and that being so it seems probable, and, again, in accordance with knowledge, that at some date after 1856 a remission in those essential conditions occurred, in consequence of which the disease gradually became less common again, and began to show signs of reverting to the slighter degree of prevalence which alone is believed to have obtained during the first two decades of the century.[1]

On this view the case of Norway would fall into line with the case of Great Britain, for example, and would no longer present that crux with it which, on the view of maintenance by communication with the sick, at present it does.

Proof of the manner in which leprosy is diffused remains wanting ; but whereas acknowledged facts which are inconsistent with the notion that the virus is derived from the bodies of existent lepers, and that the disease is maintained by direct or indirect communication with the sick, are met with at every turn by those who entertain that view,

[1] As I have already hinted above, I think it probable that the Hawaiian Islands present a similar or perhaps even a parallel example, but the records are so defective that a local inquiry would be necessary to supply missing details (if now possible) before speaking with any great confidence in the indicated sense.

nothing is certainly known which runs counter to the hypothesis that the virus resides, not in man, but in his surroundings.

Sect. XVIII.—WAS AUSTRALIA LEPROSY-FREE IN ITS PRIMÆVAL AUTOCHTHONS?

There is, I repeat, but one way of demonstrating contagiousness by epidemiological methods. It lies in discovering a country in which the autochthons, or at least the inhabitants settled there for centuries, had always lived leprosy-free; where, at a known date, alien lepers had been introduced, and where the inhabitants had afterwards begun to suffer from leprosy. If such a country could be found, the question of maintenance by contagion could be seriously discussed; if not, no means of certainly distinguishing between direct or indirect contagion and infectivity of the environment exist.

With this object in view the history of Australia has been examined. The result of the inquiry, for as far as it has been possible to carry it at this time, has been to leave the leprosy-free character of Australia (that is, in its primæval autochthons) not established. But, as the continent has an extremely large area, it would be only in accordance with what is known of lepra in all other countries if on close examination some part were found to be leprosy-free, and some other part or parts not so. And while, in my opinion, nothing conclusive has been discovered herein, but only tolerably good indications of the direction which might hopefully be given to exploratory investigations in the future, those indications are themselves furnished by a more or less well-grounded suspicion that while the southern part of the continent may have been lepra-free, portions of the northern coast-line within the tropics may not have been so. It is true, however, that the portions referred to are those which have been exposed to visits from members of an alien and lepra-infected race during about a hundred years past.

Strongly as this evidence seems to tell for importation

under some limited aspects, its defects are many and serious. Especially the most important point—whether leprosy began among the autochthons of the tropical Australian coast-line only after arrival of lepra-infected Malays among them, and whether it exists among coast or other tribes to the west and south of Port Essington who probably have never received such visitors, has thus far remained altogether unexamined; and the secondary point whether any actual leper ever were landed (except long after arrival of the whites) not only is, but clearly must ever remain unsettled. A mere presumption is the most that can be raised, and that will appear more or less strong according to the extent of the intercourse, and the ascertained degree of prevalence of lepra among the people who were parties to it. But those defects have now been sufficiently dwelt upon, and it is only necessary to say in conclusion that nothing certain regarding the fundamental datum (freedom of the primæval autochthons from lepra) has resulted from this inquiry. This point remaining unascertained, the case for importation falls to the ground as regards those parts of Australia.

This is misfortune, but not without mitigation. Discovery of the mode in which lepra is maintained has been delayed in great measure by the advocacy of special pleaders, and by too easy acceptance of merely plausible assertions. Conspicuous examples are the allegations that lepra actually has been imported, and actually has been disseminated over the world in consequence of such importation, which have been made again and again on the faith of records of events which happened in the Middle Ages or a little later, or else in remote and seldom visited corners of the earth. If the fact really accorded with those representations of it little occasion for discussion would be felt; it would be thereby settled that lepra could be maintained by contagion, and whether the mode were direct or indirect would become a secondary and, for the practical purposes of prevention, no very important matter. But proof is still wanting, and they who most strenuously repeat those assertions almost seem to perceive this; for confident as their language is they never rely upon them, but always introduce

quite other and weak arguments along with them. Now I submit that if the question whether Australia were leprosy-free in its primæval autochthons remain unanswered notwithstanding the favourable circumstance of contemporaneous times, the loose accounts of casual adventurers several centuries ago cannot be longer adduced in discussing this crucial point; and if those who are in the habit of adducing them should take broader ground, and should say that lepra has always followed the streams of travel, it is easy to reply that our knowledge, such as it is, depends upon those streams and flows from them.

But the case of Australia is not thus entirely exhausted. On the tropical northern coast-line leprosy exists among the aboriginals at the present day; and if this disease can be maintained and diffused by lepers, then, certainly, it may have been imported to them from Timor, Celebes, and perhaps other parts of Malaysia. In reality, however, there is nothing which shows that it has not always been present among them (nor even if it were imported, that it was brought by the older Malay visitors rather than by Chinese during quite recent years). In the south no leper among the aboriginals has ever been recorded, nor any among the early native-born whites (1788 to 1862);[1] but whether this is a fact, or merely a matter of record, remains doubtful. Thus as regards historical evidence the north and the south are so far on a footing. But from about the middle of this century a tolerably good medico-historical account of the south is available, and this shows that soon after the introduction of alien lepers from China leprosy was recognised among the whites. There are many who will see cause and effect in this sequence of events, and who will accept it in justification of a surmise that a similar sequence really did occur in the unstoried north. But so far as we have seen

[1] It will be noticed that mention of the very earliest case of leprosy in a native (1856, see Appendix) has been omitted. The reason is that it was observed by myself after these remarks had been written. It thus emphasises the difference there is between record and fact; and since the patient had been attended at different times by all the practitioners of any importance who ever lived in Sydney (including, as I was informed, Dr. George Bennett, see Appendix), it illustrates that other point already mentioned, namely, failure to recognise the disease.

at present there is here only a coincidence; whether there is more remains an open question. How can it be answered? Perhaps not at all decisively; but the south now referred to has a very large area indeed, and it may be that a closer examination of the incidence of lepra on its different parts may yield at least some indication of importance. A comparison in this respect must therefore now be drawn between Victoria and New South Wales.

Sect. XIX.—INCIDENCE OF LEPROSY ON THE CHINESE IN NEW SOUTH WALES AND VICTORIA.

As the remarks already made touching the latent period of lepra have shown, it is impossible to separate the Chinese lepers into those who acquired their disease in China, and those (if any) who acquired it after arriving. All that can be done is to regard all recorded Chinese lepers as having been first infected at home.

If lepra be directly or indirectly communicable, it should have spread among the Chinese, for everywhere and always in Australia they have lived at very close quarters with each other. Yet no considerable prevalence of the disease among them has ever been recorded; at all events, therefore, no evidence of such spread exists. But I am satisfied that the recorded number of cases among them is far from representing the true number; I believe that many Chinese have returned to China on recognising the first signs, and most likely other Chinese lepers have been overlooked, or, if observed, have not been recorded. The number of unrecorded cases cannot be estimated, of course; and if it be thought most probable that the disease did not appear among the Chinese sufficiently often to warrant a suspicion of "spread," of which I have myself no doubt, the following explanation might be suggested: that the Chinese being familiar with the signs of leprosy were in a position to effectually separate the sick from the healthy at an early stage, and thus, though living under circumstances of apparent close contact, would enjoy an advantage over the whites, although the latter habitually lived in appa-

rent separation from them. The weight of this suggestion depends on the view of lepra practically taken by Chinese of the class met with in Australia—the coolie class, or one very little above that for the most part. My own recent observations lead me to agree with the opinion expressed by Dr. McCrea, of Victoria, five-and-twenty years ago. I doubt much whether the Chinese in Australia practically fear leprosy as a communicable disease. From actual occurrences I know that they will continue to harbour and to associate with lepers, provided the latter are either still able to work or have money. Practically they show anxiety to get rid of lepers only after the existence of cases has become known to the whites, and then only because they know the fear with which the whites regard the disease, and because they desire to avoid aggravating the common prejudices against their nation which the whites entertain; and they voluntarily expel lepers or report them to the police, only when the sick are destitute and unable to keep themselves. Thus if lepra be directly or indirectly communicable, it should have spread among the Chinese, who lived in contact with the lepers among them, and who possessed whatever racial predisposition to the disease the southern Chinese may be thought by some to have; but there is no reason to think it did so or, in view of the remarks made under Sect. XVI, it can have done so only in very few cases at most.

It has already been shown, and with certainty, that the Chinese in Australia have all arrived from the same part of China; and that a part in which lepra is prevalent.

The recorded facts as to the occurrence of lepra among the Chinese in New South Wales and Victoria are given as follows in the Appendix:—In Victoria there were Chinese lepers (number unstated) from and after the year 1858; apparently the total number was never accurately ascertained, and even when an official enumeration was attempted in order to furnish the report to the Colonial Office the result was rendered doubtful by that of another official enumeration which seems to have been held shortly afterwards, and which yielded quite a different and very

much larger result. But, however, the general history of Victoria makes it certain that from the date mentioned down to about 1885 there was a succession of Chinese lepers, which was steadily kept up. Down to that date these lepers, though sometimes informally provided with refuges, were in one or two towns admitted to and maintained in the general hospital, and otherwise were perfectly free, and quite unrestrained in their going and coming; their presence in public places at advanced stages of their illness among the whites was complained of in the Legislative Assembly and the newspapers. In 1885 two Chinese lepers were received into a refuge established for them at a maritime quarantine station, and subsequently others were admitted there; they came in voluntarily, being helpless. Power to detain those already discovered, and others who might happen to come to notice afterwards, was granted by the Legislature in 1888. Five years later, in 1893, the reporting of recognised cases of leprosy was made compulsory under penalties, and in that year two more Chinese were detected, but none at all during 1894.

So that as regards the Chinese, leprosy in Victoria remained entirely unchecked by measures of isolation, or any sort of restriction on intercourse with either whites or their own countrymen; and yet it had so far died out by 1889 that no farther case was heard of during the next three years, at the end of which compulsory notification came into force, and during two years of compulsory notification only two more cases came to light.

The matter went very differently in New South Wales. One Chinese leper was recorded at Sydney in 1861, and no other until an unascertained date shortly before 1883, or say 1880. In 1883 five Chinese were under informal detention or official care, and then, during the ten years 1884–93, twenty-five more were recorded. Ten of these were recorded before notification of recognised cases[1] was made compulsory

[1] It should be noticed that stringent as the New South Wales Leprosy Act apparently is, only recognised cases need be reported; obviously, therefore, the record compiled under it cannot be relied upon for completeness, even after the usual allowances for inevitable oversight have been made.

in 1890 (November), the other fifteen afterwards, and two of them during 1893. It will be remembered that immigration of fresh Chinese was almost entirely stopped from 1888 by the Chinese Immigration Restriction Act, both on this area and in Victoria.

That is a remarkable and striking difference in the record of lepra among the Chinese on these two areas which is thus disclosed ; I cannot find a satisfactory explanation, but there are circumstances which probably have some bearing upon it.

In the first place, the contrast drawn is a contrast between records ; it is real so far as the records go. That the records are probably, almost certainly, incomplete may be admitted at once ; but it still remains to be asked whether, notwithstanding incompleteness, they are full enough to furnish a correct outline of the course of lepra among the Chinese. I do not see how this is to be answered. All that seems possible is to suggest that it would surely be remarkable if leprosy were entirely overlooked in New South Wales during the twenty-five years 1856–80, if it had occurred among the Chinese, either with the frequency which was observed in Victoria or even with the frequency observed in New South Wales after 1880 ; and the more that cases in whites were recorded rather often on the latter area from 1868 onwards.

Suppose the record to suffice for a fair indication. Can the absence of Chinese lepers in New South Wales be accounted for ? There is this point : it was only at the census of 1881 that the enumerated Chinese were found present in nearly equal numbers on both areas ; before that date Victoria had had twice as many Chinese as New South Wales, and earlier still seems to have had nearly all there were in Australia. This would account for a vastly larger number of lepers having been discovered in Victoria, but not for an entire lack of them in New South Wales.

If the Chinese, attracted to the gold-fields, had arrived in Victoria from China, either in a body or in quickly succeeding bodies, so that the largest number mentioned above in connection with that colony (42,000) very speedily

accumulated ; and if on decline of placer-digging they had thence departed to spread over New South Wales, and afterwards over the rest of Australia, it might be possible to suggest that a kind of filtration occurred : that the lepers were arrested in Victoria by onset of their disease, and generally remained where they had established themselves rather than undertake fresh adventures in unknown parts of the country while in ill-health. That the very large numbers who were present in Victoria before 1860 diminished in great part by emigration to other parts of Australia, and at first chiefly to New South Wales, is no doubt the case ; and very probably some lepers were filtered out in the manner suggested. But besides this mode of decrease on one area, and besides diminution by death, there was also a loss on both areas which was always steadily going on, and which was due to return to China of the successful. This decrease was supplied by a steady annual stream of fresh immigrants from China. So that any filtration that may have taken place could not be brought to account for an entire absence of Chinese lepers in New South Wales before 1880, since it is certain a large proportion of those enumerated at the later censuses had arrived therein direct from China. Still, if lepers really existed among them, how did they come to escape notice ?

There is another point which regards the distribution of the Chinese on the two areas. It cannot be doubted that early observation of lepra among the Chinese in Victoria was due in great measure to concentration of nearly all the Chinese at first on the six principal gold-fields, where also a large proportion of the miscellaneous white population was to be found. They were mixed with and under observation of the whites ; and among the latter there were many, no doubt, aware of the liability of the Chinese to acquire lepra—perhaps even some who had become familiar with the general signs of the disease from having resided on areas of its prevalence. In New South Wales there was never any such gold-rush as in Victoria, neither were the whites ever so concentrated on conspicuously rich gold-fields ; nor, for want of the latter, were the Chinese ever collected in a few particular places in such large numbers as in Victoria. While the gold yield

in New South Wales has been very large indeed, it has proceeded as a rule from scattered and numerous fields of moderate extent. This circumstance has widely distributed the Chinese as well as the whites; and I believe the cases are extremely few in which the Chinese on gold-fields in New South Wales have at one time numbered more than a couple of thousand, and that for short terms only. So that it seems not improbable that this scattering of the population, both white and yellow, may have withdrawn any lepers there may have been among them from such observation as would lead to recognition of the character of their disease, or at least to its record. And yet the presence of these people has always been resented in the colony, orderly and useful as they generally are, and on some fields has given rise to riot against them and to bloodshed; so that the least suspicion of leprosy among them would surely have been seized upon (as at this day it is) as an additional argument for forbidding their entrance to the country. But I believe this argument was not commonly used against them until after the period now under consideration.[1]

Sect. XX.—INCIDENCE OF LEPRA ON THE WHITES IN NEW SOUTH WALES AND VICTORIA.

According to available information, the first native white whose case has been recorded or is remembered on these areas was attacked in 1862, and no other case in a white preceded his, except Hutchison's imported case in Victoria.[2] Whites had been present in gradually increasing numbers for seventy-four years before. Had they lived leprosy-free during that time? Was the first recorded case the first case to occur?

Clearly we here have to do with a matter of record, and not necessarily of fact. Now record of the seven cases in whites which stand first in Table XXVI was due to a kind of accident. They happened to fall under the notice of Dr.

[1] I except the speculative, and in some respects incorrect letter which appears in the Report of the College at page 82.

[2] But see the previous foot-note.

Cox, a gentleman who had become acquainted with the signs of leprosy almost, it may be said, by another accident—that, namely, of his happening to be a senior student able to profit by Dr. Fiddes' demonstrations, at a time when the latter carried his West Indian drawings, casts, and specimens home. A step farther can be taken. The disfavour with which Dr. Cox said his diagnoses were received in Sydney renders it likely that no one else who saw those earliest cases was competent to discriminate leprosy at that date. Yet the late Dr. George Bennett, who made report to the Colonial Office before 1867, and mentioned his having seen the disease in India and at Singapore, in support of his statement that during years of practice in Sydney which dated from 1842 or earlier he had never come across a case of leprosy, was in active practice in Sydney, and in a leading position there, at the time when Dr. Cox's diagnosis appears to have been scouted by some other leading members of the profession.[1]

If the farther assumption that the whites lived leprosy-free until 1862 were made, the circumstances to which attention has now been directed once again would seriously damage it. They are equally damaging to the former assumption, that the primæval autochthons on these areas were leprosy-free; for our sole source of information on that topic lies in observers of whose competency in this particular matter nothing whatever is known. In short, for the freedom of both blacks and whites before 1862, we have nothing but negative evidence of the very slightest sort.

I cannot refrain from breaking off here to remark that the experience I have gained in endeavouring to ascertain the history of lepra in this part of the world tempts me to regard with profound distrust several portions of many researches carried on in other parts of the world on a similar plan. And this has come about under circumstances certainly more favourable to success than very often indeed have obtained elsewhere.

[1] As already noted, my 1856 case in a native fell under Dr. Bennett's notice, the patient's account being that he, among many others, was consulted.

Specially favourable or not as those circumstances may be thought by others, farther inquiry now has to proceed upon assumption, and assumption of the vital point. We must *assume* that the whites in Australia lived leprosy-free until after arrival in the country of Chinese in numbers (about 1853), and until four or five years after the first record of the presence of lepers among the Chinese. Upon that assumption what are the facts, or rather what is the record?

I will recall the area of the two colonies to mind: they march together, and their combined area is very nearly 400,000 square miles; the area of Victoria is about 88,000, that of New South Wales about 311,000. The population of each is now about equal, and in each is about 1,200,000. Questions regarding density have therefore merely local interest even in the colony of smaller area; but, under this local aspect, density is probably greater in Victoria. Owing to its rich and permanent gold-fields the people of that colony live in towns in greater proportion than is the case in New South Wales. In the latter colony very numerous, but individually less important gold-fields have caused the population to be more widely scattered, and to be collected in towns in less proportion; and have fostered that wide-spread agricultural and pastoral cultivation which is the source of the great stability of New South Wales.

We have just seen that a steady succession of Chinese lepers was recorded in Victoria beginning (as a matter of record) in 1858; their number was uncertain, but the probability seemed to be that they were many: we know that they were entirely unrestricted in their dwelling, and in their coming and going among the whites; and we know that fresh occurrences of lepra among them very nearly ceased to be recorded long before notification of leprosy was made compulsory in that colony. And as to white lepers, having shown (Appendix, Victoria) that only three had ever been placed on record, I farther showed, in the course of remarks on the latent stage of lepra (Sec. XVI), that of those three at least one had been imported already ill, one had arrived well but had probably been imported during the

TABLE XXVI.—*Showing all the cases of leprosy in whites recorded in New South Wales to the end of* 1893, *their dates and places of birth, &c. &c.*

Case.	Name.	Sex.	Occupation.	Country in which born.	Year of birth.	Year of arrival in N.S.W.	Assigned place of residence.	Alleged date of attack.	Interval elapsed between arrival and attack.	Year in which the case was first observed.	Year in which isolated.	Form.
3	W. A.	M.	Labourer	Holland	1814	1825	Pambula	1866	41 years	1868	None	T.
4	M. K.	M.	Drover	N.S.W.	1826	Birth	Campbelltown	1862	...	1869	None	T.
5	J. H.	M.	Gardener	Baden	1820	1849	Sydney	1867	18 years	1870	None	T.
6	J. W.	M.	Sailor	England	1839	1859	Sydney	1869	10 years	1871	None	T.
7	E. M.	M.	Stockman	N.S.W.	1845	Birth	Barwon R.	?	...	1871	None	T.
8	W. N.	M.	Stockman	N.S.W.	1846	Birth	Windsor	1870	...	1872	None	T.
9	J. H.	M.	Labourer	N.S.W.	1853	Birth	Sydney	1871	...	1872	None	T.
10	M. C.	M.	Labourer	N.S.W.	1846	Birth	Sydney	?	...	1873	None	T.
11	P. S.	M.	Bushman	Nassau	1852	1855	Richmond R.	1876	21 years	1883	None	T.
12	T.	F.	Housewife	N.S.W.	1830	Birth	Sydney	?	...	1879	None	T.
13	W.	F.	Housewife	N.S.W.	?	Birth	Sydney	?	...	1879	None	T.
14	M.	F.	School	N.S.W.	1872	Birth	Sydney	1880	...	1881	None	?
15	G. R.	M.	School	N.S.W.	1861	Birth	Campbelltown	1871	...	1881	None	T.
16	F. M.	M.	?	?	1809	?	Parramatta	1880	?	1882	None	T.
17	?	M.	Locksmith	?	?	?	Sydney	?	?	1883	None	T.
23	M. L.	F.	Housewife	N.S.W.	?	Birth	Camden	1873	...	1873	None	T.
28	?	F.	?	?	?	?	Parramatta	?	?	1884	None	T.
34	F. G.	M.	Labourer	N.S.W.	1861	Birth	Sydney	1881	...	1883	1888	T.
36	H. B.	M.	School	N.S.W.	1872	Birth	Meroo R.	1885	...	1889	1889	T.
39	H. R.	M.	Bushman	N.S.W.	1862	Birth	Richmond R.	1888	...	1890	1890	T.

TABLE XXVI—*continued.*

Case.	Name.	Sex.	Occupation.	Country in which born.	Year of birth.	Year of arrival in N.S.W.	Assigned place of residence.	Alleged date of attack.	Interval elapsed between arrival and attack.	Year in which the case was first observed.	Year in which isolated.	Form.
40	A. G.	M.	School	N.S.W.	1876	Birth	Sydney	1888	...	1890	1890	N.
42	E. U.	M.	Bushman	N.S.W.	1868	Birth	Gunnedah	1889	...	1891	1891	T.
43	H. S.	M.	Fisherman	N.S.W.	1850	Birth	Hawkesbury R.	1877	...	1891	1891	T.
45	M. R.	F.	House	N.S.W.	1858	Birth	Sydney	1884	...	1887	1891	T.
50	R. W.	M	Bushman	N.S.W.	1844	Birth	Moree	1884	...	1891	1891	T.
51	I. L.	F.	Housewife	N.S.W.	1838	Birth	Sydney	1890	...	1891	1891	T.
53	C. D.	M.	Carpenter	N.S.W.	1868	Birth	Gunnedah	1887	...	1892	1892	T.
54	S. P.	M.	Commercial Traveller	England	1843	1863	Brisbane	1890	27 years	1892	1892	T.
56	M. E. K.	F.	House	N.S.W.	1849	Birth	Hunter R.	1888?	...	1888	1892	T.
58	W. W.	M.	School	Fiji	1879	1892	Mackay Q.	1889	None	1892	1892	N.
65	M. M.	F.	House	N. Zealand	1869	1893	Fiji	1881	None	1885?	1892	T.
67	N. G.	M.	Bushman	N.S.W.	1832	Birth	Parramatta	?	...	1893	1893	T.
68	A. M.	F.	Housewife	N.S.W.	1858	Birth	Sydney	1884	...	1893	1893	T.
70	E. R.	F.	School	N.S.W.	1877	Birth	Maitland	1892	...	1893	1893	T.

latent stage, while the third also had lived on areas where lepra was known to exist before he reached Victoria in apparent good health. In short, according to the record, no native of Victoria who had never left his colony has ever been known to acquire lepra.

In New South Wales the record shows, as we have just seen, that a case of L. nervorum in a Chinese was recorded in 1861; and that no other case of leprosy in a Chinese or other alien was afterwards recorded until shortly before 1883, or probably about 1880.

The preceding table (XXVI) shows the important facts regarding all the cases of leprosy in whites which stand recorded of New South Wales.

These cases, which number thirty-four altogether, can be arranged with reference to the probability of the disease having been acquired outside New South Wales as follows:

(*a*) Ten of them were either born outside New South Wales (7), or their birthplace is unknown (3); of the seven, two (58, 65) arrived after attack, one (54) had travelled widely outside New South Wales after arriving there, though still within Australasia; the remaining four (3, 5, 6, 11) had arrived at the ages 11, 29, 20, and 3 years, and were only attacked after a residence of 41, 18, 10, and 21 years; it is almost certain that Cases 3, 5, and 6 had not left New South Wales after arriving therein, and quite certain that 11 had not. So that among these ten immigrants there is a certainty that one, and a strong probability that three others were infected within New South Wales.

(*b*) Twenty-four were natives of New South Wales. Ten had never left the colony (12, 34, 36, 39, 42, 43, 50, 53, 56, 70); six had left it—15, 40, and 45 had visited either Victoria or South Australia only; 68 had visited New Zealand (a leprosy-area); 51 had visited Queensland, and 67 India (leprosy-areas); in the eight other cases the information is defective, but it is almost certain 9 and 23 had never left New South Wales.

So that of the total thirty-four there were ten indubitably infected within New South Wales, and three almost certainly, because they had only visited parts which have never (South Australia) furnished any lepers, or else (Victoria) have fur-

nished only imported lepers; and to these might well be added 9 and 23. Thus of the thirty-four, ten were, and five others probably were, indigenous lepers; all the rest are not positively excluded from this category, although some are. However, 39, 42, and 45 either had been, or might have been, in contact with earlier cases of leprosy within New South Wales.

Upon the vital assumption, be it remembered, which has been sufficiently dwelt upon already, the case now stands as follows:—In Victoria no cases of leprosy have been recorded among natives, though very many cases have been recorded there among the Chinese; in New South Wales the contrary statement holds good, namely, that a good many cases of lepra were recorded among natives who had never left the colony, in years during which only one case of lepra was recorded among the Chinese. And in both colonies the chief—in all probability the only practical—danger on any hypothesis of communicability lay in the Chinese, and in no other people.

The force of this antithesis may easily and well be weakened as regards the Chinese; it may be suggested that there probably were cases among the Chinese in New South Wales before 1880, although they (almost entirely) escaped record. But the contrast as regards the incidence of leprosy on the whites is thereby but strengthened. It is incredible that there should have been cases in whites which escaped observation and record in Victoria—in that very colony where the conditions brought Chinese lepers to general notice, and where, moreover, fear that the disease might be communicated from the Chinese to the whites was officially discussed so early as 1859, and was deliberately appeased by the Chief Medical Officer of the Government of Victoria fifteen years later, in a statement which derived all its force from reference to what was believed to be the known fact—that no such communication ever had occurred.[1] No; the most that record and probability alike warrant is a statement that lepra appeared among natives of New South Wales who had never left their colony, although lepers had

[1] See Appendix, Victoria.

never been imported there ; the least, that though lepers were imported to both New South Wales and Victoria, the disease attacked natives who had never left their colony only in New South Wales, although all the circumstances were similar in both colonies.[1]

This behaviour could not be expected of a disease which was known to be maintained by direct or indirect communication with the sick.

Sect. XXI.—PROVISIONAL CONCLUSIONS.

I might now proceed to further examine and compare the conditions under which individual indigenous lepers had lived before their disease showed itself ; but I do not propose to do this, at least on the present occasion. In a case where little that is essential has been ascertained, I prefer to draw attention to the broadest considerations and the surest conclusions. The facts concerning each white have been set out, as far as they are known, in the Appendix ; and I need only say, for guidance of the reader who may choose to examine them, that I believe those gathered by myself are as strictly accurate as the nature of such inquiries leaves possible.

Doubtful as many points remain after all, two seem to me to have been tolerably well established.

I. Although lepers were imported to Victoria steadily during a long term of years and in considerable number, and although they always remained entirely unrestricted in their movements among the whites, no Victorian native white who had never left the colony has ever been attacked. Moreover the disease died away in Victoria quite independently of restrictive measures against the liberty of lepers, which in fact were first taken only in March, 1893.

II. Although coloured aliens of many different races, all

[1] The mean annual temperature is about 5·5° F. higher at Sydney than at Melbourne.

of which have furnished cases of leprosy in Australia, have been imported during many years and in large numbers to all the better populated part of the country which extends along the coast-line from about the 146th degree of East Longitude, easterly and then northerly towards Cape York; and although native whites who had never left their colony have been attacked at various places in New South Wales and Queensland, there is no evidence, and no good reason for surmising, that any such native white has been attacked who lived south of the 35th parallel of South Latitude.

APPENDIX: CONTAINING THE DATA.

Sect. I.—PRELIMINARY.

There are certain matters to which it is convenient to advert by way of preliminary. They have reference to the area dealt with, the qualification of observers, and the sources of information.

With the continent of Australia the island of Tasmania is generally included, because it is an outlying portion of it, identical with it in physical respects, and separated from it only by subsidence during Tertiary times; because also there has been from the beginning the closest political connection between the two. The Northern Territory will, for convenience, be treated as a separate colony; it is a dependency of South Australia, having practically a separate establishment, and possessing a quite different and tropical climate. The term "native" is in general use to indicate persons born in Australia of white parents—the latter European, American, Canadian, &c., or themselves "natives," as the case may be. The autochthons are called "aboriginals" in common parlance. All other coloured races will be named in speaking of members of them or their descendants.

Although not unacquainted with leprosy, I had turned but little attention to it until I began to meet with examples of lepriasis in New South Wales. I pretend to no special knowledge of it therefore. In 1885, for instance, I felt unable to express a positive opinion (in my official capacity) concerning a case presented to me for diagnosis; but a little later I had acquired sufficient clinical experience to feel sure, on looking back, that the patient in question was suffering from L. tuberosa in an early stage (see Case 26, N.S.W.). I mention this circumstance explicitly because I shall have occasion in the sequel to remark upon the frequency with

which cases of lepra have passed unrecognised, or have been strenuously disputed ; and while that kind of error has been by no means confined to Australia, but has been committed again and again in countries where to meet with lepers must be a common experience instead of an unusual one, I wish to avoid an appearance of pointing out an oversight in others into which I have myself fallen without acknowledging my share in it. On the other hand, since the date mentioned I have acquired an experience not inconsiderable in extent, and under the most favourable conditions ; those, namely, which require a positive diagnosis to be given, with a view to immediate practical action. It was derived from cases which sometimes were examples of lepriasis, and sometimes of other diseased states. It will be well to mention also, under this head of experience, that, with exception of Western Australia and the Northern Territory, there are few places in this part of the world which I have not visited at one time or other. While my position with the Government of New South Wales has necessarily led to my learning most of strictly local details in that colony, I am acquainted, and in some cases familiar, with the mode of life in every other, as well as in some groups of islands in the South Seas.

For the early history of Australia—that is to say, for the years between 1788 and the middle of the present century—reference must be made to official despatches from governors to the Colonial Secretary, reports of local officials to governors, accounts of explorations, and some less specialised books of travel. The collection of such documents in the Free Public Library at Sydney numbers more than five thousand volumes relating to Australia alone. My reading therein has, of course, been comparatively small ; but I have taken advantage of the kindness of several gentlemen who were specially familiar with it, or who had recollection of early times, or who had explored unoccupied country originally. In this connection it is important to note that for many years Sydney was the seat of government for all settled areas, and consequently the repository of all archives relating to them. Those territories which are now self-governing colonies were then dependencies of New South Wales.

The useful documents which come next are the Statistical Registers and Census Abstracts, which contain the result of enumerations of the people as well as (in the former case) particulars of agriculture and trade: the earliest was compiled in 1822. The enumerations were thereafter made at frequent intervals, until censuses began to be taken regularly—in some cases at quinquennial, in others at decennial periods. Next to them come the Abstracts of the Causes of Death, which, speaking generally, first began to be issued by Registrars-General about the middle of the century. First the classification used by Farr was adopted; and Dr. Ogle's modification was substituted for it generally in the year following its publication in England. Between 1850 and 1860 official medical reports began to appear, and medical serial literature; but of the former there are but two series which contain information about lepra, namely, annual reports of the Victorian Board of Health which date from 1856, and annual reports of the Coast Hospital of New South Wales which date from 1884; to which in the case of the latter colony have to be added annual reports made under the Leprosy Act, dating from 1891. No other board but that of Victoria has regularly issued annual reports of its general proceedings, and no board but that of New South Wales has ever issued any separate account of the lepers under its official cognizance. The oldest medical periodical was published in New South Wales; it lasted one year only, from the middle of 1847 to 1848; the longest continued began to appear in Victoria in 1856, and has been issued in unbroken series to the present date; the most important began to appear in New South Wales in 1881, and still continues.

Abstracts of Causes of Death.—Lepra was distinguished in no returns but those of New South Wales; and in them not until 1886, when Dr. Ogle's classification was adopted, and causes began to be more fully exemplified in the abstracts. Were it otherwise, such returns would still be untrustworthy; for the motives which, under the present method of registration, often lead to concealment of the primary cause when that is syphilis or alcoholism, for example, would, in my opinion, operate as strongly in the case of lepra. One case, well known to many practitioners at the time, appeared medically certified in the register as a death from "exhaustion, two months" (Case 12, N.S.W.), and

although this is the only fact of the kind I have discovered, yet from the way in which lepra is frequently spoken of by relatives of newly reported sufferers, I suspect they would as soon have either "alcoholism" or even "syphilis" returned as it.[1]

Medical Serial Publications.—I believe the following is a complete list of all the medical serials which have ever been published in Australia:

'Australian Medical Journal,' Sydney, August 18th, 1846, to July, 1847.
'Australian Medical Journal,' Melbourne, from 1856.
'N.S.W. Medical Gazette,' Sydney, October, 1870, to 1875.
'Medical and Surgical Review,' Melbourne (?), 1873 (?).
'Australian Medical Record,' Melbourne (?), 1876 (?).
'Australian Practitioner,' Sydney, 1877–8.
'Australasian Medical Gazette,' Sydney, from 1881.
'Australian Medical Gazette,' Melbourne (?), date (?).

The first, second, third, sixth, and seventh of these I have searched; they contain nothing that is not referred to below. The others I have not seen; I understand that they were unimportant prints, which soon failed; and, at all events, their dates, or probable dates, were covered by one or more of the former. Additional to the serials are the long lists of annually published 'Transactions' of the several Royal Societies; the volumes of 'Transactions of the Australasian Association for the Advancement of Science,' which date from 1888; and the volumes of 'Transactions' of the Intercolonial Medical Congresses, which date from 1887.

Hospital admission and case-books might possibly repay search; but this could be thoroughly carried out only by persons living near the several hospitals, on account of the length of time which would be occupied. Cases recognised at the time of treatment, but not published, might thus be rescued—as I have myself rescued some by going through the Sydney Hospital admission books from 1850. But although the late Dr. Bancroft did discover in the case-books of the Brisbane Hospital one which probably had not been correctly recorded at the time, I think what would be found at the best is favourably exemplified by Case 53, N.S.W., where the account preserved at Prince Alfred Hospital, Sydney, scarcely enables a diagnosis to be made, though it would rouse suspicion. The notes preserved at Newcastle of Case 69, N.S.W., tell more strongly in the same direction.

But were all this otherwise, from such sources a complete

[1] Reports, under the Leprosy Act, of the Board of Health, N.S.W.

account could scarcely be hoped for; and in any case it would be necessary to seek information from practitioners in the locality under examination. This I have done in very numerous instances, and with fruitful results. Here is a suitable opportunity for acknowledging the co-operation of the gentlemen referred to, without which much of importance would be wanting to the following account, imperfect as it probably remains after all. Their contributions have been acknowledged whenever use has been made of them.

As to the order in which the miscellaneous data should be set out, it seems best first to establish the occurrence of leprosy in Australia by recording all known cases in connection with the colonies in which they were observed; afterwards such a summary of the whole number as turns out to be practicable will be presented. Detailed accounts of the cases will be given whenever possible; not merely in order to show their nature, but to make sure that no available information of ætiological importance shall be overlooked in connection with them.

Sect. II.—TASMANIA.

Up to a date before 1867 lepra had not been heard of in Tasmania, according to the returns made to the Colonial Office.[1] The following communication from Sir J. W. Agnew, K.C.M.G., M.D., showed that it had not been met with down to 1894.

"I have been either in active practice or in a position to know everything which has been going on in our medical world for upwards of half a century, and during all this period I have never seen nor heard of a single case of leprosy. I have just spoken on this subject to Mr. Bright, who has been in practice here since 1860, and who, having visited the Leper Hospital at Sydney, is familiar with the aspects of leprosy. He tells me he has never seen a case of the disease here. You may therefore safely conclude that leprosy is non-existent, and never has existed in Tasmania."

[1] The 'Report of the Royal College of Physicians' was published in 1867; the committee was appointed in 1862. Correspondents must therefore have replied between those years, but their communications were given without dates.

To which it may be added that Tasmania has but a small population, and only two important towns; so that Sir J. W. Agnew's opportunities of hearing of any case of extraordinary medical interest that might be met with were rendered as good as possible by the prominent professional rank he has always held there.

In 1890 the Secretary to the Central Board of Health wrote,[1] "No case has been known, although inquiry has been made at all the centres of Chinese population in the island."

Legislation.—There has been no legislation on this subject.[2]

Sect. III.—LEPROSY IN WESTERN AUSTRALIA.

Up to a date before 1867 lepra had not been met with in Western Australia, according to the return made to the Colonial Office. At later dates, which I have not succeeded in fixing, but which were comparatively recent, two Chinese were discovered at different times who were suffering from leprosy (form not mentioned). The following extract from a statement by Dr. Alfred R. Waylen, Colonial Surgeon and Principal Medical Officer, brings the information up to 1894:

"I have brought the matter before Drs. Barnett and Harvey, who with me form the Medical Board, and they both assert that they have not seen a case of leprosy in the colony either among the white or coloured population. Dr. Barnett, who was for some years in China, knows the disease well; he tells me that during the years he was in charge of the penal establishment at Rottnest Island he never saw a case among the aboriginals detained there. In my experience of the last thirty-five years I have not met with a case, nor has one ever been reported to me by a district medical officer."

That was written, of course, with unexpressed exception of the two Chinese already referred to. Dr. Waylen added in the same letter that the first discovered of the two "left the country;" and that the second, "after a long detention

[1] Off. Com., N.S.W. Board of Health Report on Leprosy, 1891.
[2] Ibid., 1893.

at the quarantine station, was sent to the leper hospital at Singapore, where he is kept at the expense of this Government." During his detention he was "kept in a hut erected for his accommodation outside the quarantine ground at Woodman's Point, a neck of land projecting into the sea about six miles from Freemantle;" [1] and he seems to have been transferred to the lazaret at Singapore at some date between the years 1890 and 1892.[2]

Legislation.—An Act to amend the law relating to the public health was assented to, August 20th, 1886. By the 37th section it was provided that the Governor in Council might make orders directing that provisions contained in the 38th section be put in force for the prevention of epidemic, endemic, and contagious disease. Those of the latter which related to the present subject ran as follows:

"38. From time to time after the issuing of any such order . . . . the Central Board (of Health) *may* make such regulations as the said Board shall think fit for the prevention, as far as possible, or mitigation, of such epidemic, endemic, or contagious diseases; . . . . and such regulations shall extend to all parts and places included in any order to be issued by the Governor in Council as aforesaid, unless such regulations be expressly confined to some of such parts or places."

And on August 19th, 1889, the Board issued such regulations with reference to the diseases cholera, smallpox, ... and leprosy, of which the third ran as follows:

"3. Any householder who may have reason to believe that any person upon his premises is suffering from one of the diseases aforesaid *shall* immediately report the same to the Local Authority. Any medical officer (' of the local board for the district,' elsewhere defined as the Local Authority) or medical practitioner aware of a case of such disease *shall* also immediately make a similar report."

Failure to notify was punishable by a fine not to exceed £50, fixed by sect. 40 of the principal Act. Others of these regulations required the L.A. to take all necessary steps for isolation, removal, and prevention of intercourse between the patients and the public, and to report daily to the Board.

[1] Off. Com., N.S.W. Board Report on Leprosy, 1890.
[2] Ibid., 1892.

Penalties for offences (except failure to notify) were fixed by sect. 127 of the principal Act.

Sect. IV.—SOUTH AUSTRALIA.

Up to a date before 1867 lepra had not been met with in South Australia, according to the information returned thence to the College. The following communication received from Dr. H. T. Whittell, formerly Registrar-General, at present President of the Board of Health, shows that it had not been observed there up to 1894:

"In South Australia proper[1] we have never had a case of leprosy brought under notice of our Board. Some years ago I was informed that there was a leper concealed by the Chinese in Adelaide. I availed myself of the police to look up the case, but after a prolonged search and inquiry we could not find him. There is no doubt I had been misinformed."

And with reference to his opportunities the writer added that he had practised in Adelaide for twenty years from 1859, during ten of which he was a member of the honorary staff of the general hospital; that he had always been on friendly terms with the leading practitioners, and believed he should soon have heard of any suspected case had one occurred; and that although he had had no clinical experience of lepra, still he had once met with a Chinese patient whose case gave him a passing suspicion, but soon cleared up under mercurial treatment.

I have at different times questioned various practitioners at Adelaide, and I have never heard anything which throws doubt on the general applicability to South Australia of the foregoing specific statement. All such negative information, however, is good only as far as it goes; and it should be read in this instance in connection with the history of Case 15, N.S.W. I believe that history is perfectly trustworthy, and it shows that the patient began to suffer manifestly during the second year of his ten years' stay at Adelaide.

To avoid possible doubts in future it will be best to mention the case of Lee Kee, which has become generally known. This Chinese had

[1] The implied exception had reference to the Northern Territory, for which see § VIII, below.

followed the calling of a market gardener at Port Augusta, S.A., for twenty years, when he fell ill early in 1894, and was reported as a leper during May. He was isolated. On being visited by a gentleman familiar with lepra on behalf of the Board his case was found to be of some other sort, and he was discharged from isolation (communicated by Dr. Whittell).

Legislation.—Leprosy is dealt with (in the Northern Territory) under the Public Health Acts Amendment Act, 1884.

Sect. 2. Upon proof . . . that smallpox, plague, cholera, yellow fever, or other dangerous, contagious, or infectious disease which may from time to time be declared by the Governor by proclamation in the 'Government Gazette' to be a dangerous, contagious, or infectious disease within the meaning of this Act, exists within a district . . . the Governor in Council may make an order empowering and directing such persons as the Central Board of Health may for that purpose appoint to stop the traffic into or through any streets, thoroughfares, or places, whether public or private, . . . and to limit or prevent ingress, egress, or regress of any persons to or from any house or premises within the streets . . . so specified. . . .

Sect. 3. The medical attendant at any house in which there is any person suffering from any of the contagious or infectious diseases before-named, or declared as aforesaid, so soon as he shall have satisfied himself of the nature of such disease, *shall* report the existence of such disease in such house to the Central Board of Health . . . (a fee to be paid for each such certificate; penalty for failure to comply £2 to £50).

Sect. 7. Where any suitable hospital or place for the reception of the sick is provided within any town or sanitary district, or within a reasonable distance thereof, any person who is suffering from any such contagious or infectious disease, and is without proper lodging or accommodation, or lodged in a room occupied by more than one family, or is on board any ship or vessel, *may*, on a certificate signed by any legally qualified medical practitioner, and with the consent of the superintending body of such hospital or place, be removed by order of any Justice of the Peace to such hospital or place at the cost of the local Board of Health. . . .

Under these sections a lazaret was established at Palmerston (Port Darwin), N.T., and lepers have been forcibly detained therein; lepra having been declared a dangerous, contagious, and infectious disease within the meaning of the said Act by proclamation published in the 'S.A. Government Gazette,' December 3rd, 1885, p. 1408.

Sect. V.—LEPROSY IN VICTORIA.

The earliest reference to lepra in Victoria which I have been able to find is the following:[1]

"Considerable alarm has at different times been created by the report of the appearance of a disease of an infectious nature among the Chinese, and during the latter part of the year 1858 attention was again directed to the occurrence of certain cases of disease at Castlemaine. It appears that much misapprehension exists both with regard to the diseases to which the Chinese are subjected, and as to the infective qualities of this particular disease (Elephantiasis Græcorum). In this instance, however, the disease could not be traced to infection or contagion or hereditary causes, and the investigations made into its origin and character have led to the following conclusions . . . ." (that it was connected with poverty and filth, and was not contagious).

This notice of the matter, published in a Parliamentary paper, seems to me studiously obscure. Probably it was thought undesirable to direct popular attention to the presence of lepra at a time when the prosperity and immigration which attended the discovery of gold were at their height. But clearly enough lepra had been observed before 1858 among the Chinese immigrants, who had been present on the gold-fields in great numbers since a short time before 1854.

The schedule of questions framed by the Royal College of Physicians was received by the Government of Victoria through the Colonial Office; and on January 10th, 1863, the chief medical officer (Dr. W. McCrea) sent a circular to every medical man practising in the colony, enclosing a copy of them, and requesting assistance in answering them.[2] At some time between that date and 1867 his report must have been transmitted. An abstract was inserted in the Report of the College, of which the following are the chief points:

Dr. McCrea said there were "about thirteen known lepers in the colony," but "it was probable there might be others unknown:" the disease "occurs exclusively among the Chinese." Ten of the thirteen were being maintained at the public expense, seven in hospitals, three in gaols, and the remaining three were at liberty,—that is to say, there

[1] Fourth Annual Report, Central Board of Health, 1859.

[2] 'Australian Medical Journal,' 1863.

were three in hospital at Ballarat, four in hospital at Castlemaine, three at liberty at Castlemaine, one in gaol at Beechworth, and two in gaol at Melbourne, whither they had been sent from the gold-fields. The name of only one other contributor was mentioned, and a short abstract of his contribution given—Mr. Hutchison, of Castlemaine. This gentleman said nothing as to the number of cases known to him, but he spoke of deaths from lepra as though they were not uncommon; so that it seems likely that several or many lepers had fallen under his notice, besides the seven mentioned by Dr. McCrea as existent in Castlemaine at the time his census happened to be taken; and, indeed, Dr. McCrea expressed the general opinion, "the disease has diminished of late years."

For the following account of admissions for leprosy to the general hospital at Castlemaine I am indebted to the interest taken in this inquiry by Dr. J. G. Carstairs, of Geelong, Victoria; he procured it from Mr. Mitchell, the President of the hospital, who extracted it from the books. All the patients were Chinese.

1868.—There were seven lepers in the hospital; one died; at the end of the year six remained.
1869.—Two were admitted; two left relieved; two died; four remained.
1870.—Four continued throughout the year.
1871.—One left relieved; three remained.
1872.—One left; one died; one remained.
1873.—One remained.
1874.—One remained.
1875.—One was admitted; one left; one remained.
1876.—One left.
1879.—Two were admitted; two left.

And since the last date Mr. Mitchell said no more had been admitted. One of the above was thought to have been removed to Ballarat.

Through the same channel a letter was received from Mr. Otley, dispenser at the hospital since 1858, from which I have extracted the following notes:—No doctors now survive who practised at Castlemaine at the time leprosy "was rampant." During 1859 there were four lepers under treatment. Because of the small number of beds the hospital then afforded, they were lodged in a tent erected in the grounds, about twenty yards from the accident ward; and sometimes there were six Chinese in the tent, for those who were ill in other ways did not object to occupy it with the lepers. Outside the hospital the lepers were avoided by their countrymen, but simply from inhumanity. At about the same time there were also three other lepers under outdoor treatment. It would seem that the in-patients were usefully employed about the hospital, for Mr. Otley mentioned one whose fingers, toes, and nose had almost disappeared, who used to pump water from an underground tank for general use.

This correspondent added that he never heard of a case of leprosy in a white.

So that, as there were four Chinese lepers in the hospital and three under outdoor treatment in 1859, and as there was a steady succession of patients during the eleven years 1869 to 1879, it is a probable inference that there was a similar succession during the ten years 1859 (or even earlier—cf. Dr. McCrea above) to 1868. Of this term Mr. Mitchell said nothing, and most likely the books had been lost.

The form described by Dr. McCrea, in his return to the Colonial Office, was L. tuberosa ; in the signs of this form he recognised the "distinguishing characters of the disease," which he described with great *netteté*. Evidently he had never met with (nor heard of in Victoria) any case of pure L. nervorum. But Mr. Hutchison, after describing L. tuberosa, said, "In another class of cases the disease seemed to develop itself more especially in the bones and joints of the phalanges of the fingers and toes," and mentioned one in which dislocation of the foot had occurred, as well as others in which the fingers were "contracted on the palms."

Mr. Hutchison mentioned that he had seen one case in a European, who had contracted the disease while resident in India (form not mentioned).

Dr. McCrea also said in the same return :

"Persons affected with leprosy are in this colony allowed to communicate freely with the rest of the community. They are, however, generally deserted by the other Chinese; it would seem rather from hopelessness of cure than from any fear of contagion, though they give their dread of contagion as an excuse for their inhumanity in deserting their brethren. There are no separate asylums or infirmaries for leprous patients, but they are admitted into the general hospitals. . . . There has been no instance of recovery. . . . Those treated in the hospitals died, and those treated in the prisons, who were all in an early stage of the disease, were discharged when their terms of imprisonment expired, with the disease somewhat alleviated, but by no means cured."

Thus their admission to prison was in the ordinary course, and not as a means of isolating or of providing for them.

A possible discrepancy which I have observed will be most conveniently alluded to here. At a later date,[1] when a comparison was being drawn between the number of lepers then ascertained to exist and that which

[1] Victorian Board Report, 1874.

had existed, with a view to show that the number had diminished, it was stated that a return furnished by the Chief Commissioner of Police on January 18th, 1866, showed that there were then in the colony *thirty-one* persons suffering from leprosy. But when the chief medical officer gathered information for his return to the Colonial Office, just quoted, I have no doubt at all that he learned the existing number of known lepers through the police—the only source of trustworthy information; and though the cases they reported might have been added to had any practitioner mentioned some they had missed, yet their list must have been taken as the basis of return. The fact is, however, that only thirteen were gathered from all sources taken together, according to the return furnished to the College—less than were subsequently said to have existed about the same time, and less by eighteen. On what date (between 1863 and 1867) did Dr. McCrea gather his thirteen cases together? Is it possible that late in the interval many more cases were discovered, but that an earlier report of thirteen only had to stand uncorrected? There are now no means of telling: on the one hand, the likelihood of a merely clerical error is diminished by the larger number having been given in words, not figures; while on the other, no other or more detailed reference to the thirty-one has been discovered, either in the offices of the Board or elsewhere.

The manner in which lepers were dealt with in Victoria is a matter of great interest and importance; I therefore introduce into this account the following extracts, in order to bring the circumstances before the reader as vividly as possible. The first was taken from the 'Ararat Advertiser,' 1865.[1]

"At the base of a range to the west of Ararat, and in a thickly growing clump of young trees, is a lonely and, to all outward seeming, a deserted tent. . . . The stranger passing near at certain hours, if perchance he stumble on the place, may see a can or plate of rice laid there for the occupant, or the haggard figure of a Chinese may be observed from time to time creeping towards the food. . . . This unfortunate creature, who has been deserted by his compatriots in all but the doling out of food, . . . is in an advanced stage of leprosy. . . . His feet and hands are covered with livid blotches, that show out darkly on his bronzed skin. One of his eyes is affected, and his lips present the appearance of being partly drawn away by the progress of the malady. . . . Ah Toy—for that is his name—has been in the hospital for some time, but was discharged as incurable, and in the stillness of his miserable home he is thus awaiting death."

In 1867 the 'Melbourne Herald' had the following:[2]

[1] 'Australian Medical Journal,' 1865, local item, p. 199.

[2] Ibid., 1867, local item, p. 32.

"A short time since a member of the Assembly brought before the House the fact that a number of cases of that frightful disease leprosy existed in this colony, and submitted a proposal that a special arrangement should be made for the relief of these unhappy people. . . . We would hope that the gentleman who has initiated this business in Parliament may succeed, . . . and so the colony be relieved of the melancholy spectacle ever and again seen of these dying specimens of humanity perambulating our thoroughfares."

A result of the public mention of this matter in the Legislative Assembly may have been the following:[1]

"At the weekly meeting of the Committee of the Melbourne Benevolent Asylum (for care of the infirm and destitute) on October 7th a communication was read from the Government, desiring to know if the committee would undertake the charge of the lepers now at Ballarat, provided the Government erected a suitable building and contributed the funds for their maintenance. . . ."

But notwithstanding the opinion officially expressed in the fourth report of the Board of Health (see above) that the disease was not contagious, the committee entertained a different opinion, and in consequence declined to undertake the proposed charge.

1869.—"The horrible condition of the lepers at Ballarat has lately furnished occasion for strong comment on the part of the local press."[2]

1871.—"The lepers at Ballarat are described by a local journal as in a horrible condition, avoided by their own countrymen, and virtually uncared for by Europeans."[3]

These special references to Ballarat suggest that there was a general lazaret there; and in fact, as will be seen immediately below, lepers were removed to that city "from all parts of the country." But it will also be seen, not only that all lepers were not removed there, but even that lepers resident in Ballarat itself were not obliged to resort there, but if they chose might and did remain in their own houses. For the rest, the strictures which, it seems, were commonly made upon the provision afforded there show that there could scarcely have been any organised institution such as might be called a lazaret; but probably helpless lepers were allowed to camp together on some more or

[1] 'Australian Medical Journal,' 1867, p. 318.
[2] Ibid., p. 163, local item.
[3] Ibid., p. 271, local item.

less remote area where they were furnished with materials to erect a shelter for themselves, and with rations by the police. However, a report of the Board, dated 1887, gives some particulars of the cost of maintaining two lepers at Ballarat, in which reference is made to "occasional attendance and other help given by their countrymen."

In the Board's report dated 1887 a history of admissions to this refuge was given, which went back as far as 1861 :

"From 1861 to 1865 the lepers were kept in a house within the Ballarat hospital grounds.[1] . . . From the annual lists of patients it appears there were three there in 1861, of whom one died." (There is no statement that these were the first received.) "In 1862 two were admitted; of the four, two were discharged in the same year 'cured or relieved.' In 1863 three more appeared, two being discharged 'cured or relieved,' and the remaining three were sent away in 1865 'cured or relieved.' From that time the lepers' camp at Ballarat East has been in existence, and early in the seventies there were three lepers there. Lepers were sent to Ballarat from all parts of the colony, until in 1878 there were nine in the lazaret. From that date they have died one by one. . . . The residents protesting, . . . no more have been sent there, and now there are only the two" already referred to above.

This report also mentioned one leper then at Bendigo, and one who had died at the latter place five years before ; so that even in 1887 the phrase, "lepers were sent to Ballarat from all parts of the colony," did not mean that all lepers were gathered there. The next extract shows that this phrase, doubtless of local interest at the time it was employed, is a meaningless embarrassment in relation to the general view of the subject now being taken.

In 1874 the Board, after referring to the interpellation in the Legislative Assembly mentioned above, gave the result of an investigation made by the Chief Commissioner of Police on October 16th, 1873, as follows :[2]

"The total number of lepers in the colony on the date mentioned was fifteen, who were thus distributed:—Four at Ballarat, three at the Woolsheds (near Beechworth), one at Buckland (in the same neighbourhood), one at Wood's Point, one on the Wimmera River (in the neighbourhood of Horsham), one at White Hills (near Bendigo), two at

[1] The city was laid out in rectangular blocks of five acres, one of which was reserved for the hospital.

[2] Victorian Board Report, 1874.

Melbourne, one at Castlemaine, and one whose residence was then unknown."

Whence it is clear that there had not been (and there never was) a general collection of lepers at Ballarat. The report under notice went on to condemn the "ignorant fear" of contagiousness, "which has condemned nearly all the sufferers from the disease in this colony to a cruel isolation, and, in some cases, inhuman neglect," and again recommended admission of lepers to the various Benevolent Asylums. This was supported by the following statement:—"The history of the disease in this colony has certainly not afforded any ground for apprehending its spread by contagion, no instance of the kind ever having occurred here, although in one town, Castlemaine, lepers have for the last ten years been admitted to the public hospital." While this statement is much too loose if it be taken to apply to the Chinese population alone, I suggest that it is indirect evidence that no case of lepra in a white, either a native or of long residence in Victoria, had at that date come to light.

The following abstract of a local item is evidence that down to 1876 even lepers residing in Ballarat itself were not obliged to go to the lepers' camp:[1]

A quack then professing to cure all diseases, including lepra, visited the lepers' camp at Ballarat, and afterwards proceeded to visit a Chinese leper, who was in a very advanced stage of the disease at his own residence. The gentleman seems to have paid weekly visits to Ballarat from Melbourne. ('Ballarat Star.')

To avoid possible misunderstanding, I note here that in 1884 Dr. McCrea, speaking of lepers in Victoria with reference to the question of contagion, said,[2] "They were isolated when I took charge. . . . ." But he was Principal Medical Officer from 1852 to 1879, and from what has now been said it is plain that he then spoke inadvertently.

In 1884 the following case of lepra in a native of New South Wales came under notice of Dr. Peipers of Melbourne, who reported it in 1889.[3] Those portions of the following

[1] 'Aust. Med. Journal,' 1876, p. 271.

[2] Australian Sanitary Conference of Sydney, 1884, at which Dr. McCrea sat as delegate for Victoria.

[3] 'Trans. Intercolonial Med. Congress,' 2nd session, Melbourne, 1889, p. 976.

extract which are within square brackets have been added to it from a private communication with which Dr. Peipers favoured me in reply to certain questions:

M. A—, m., æt. 30 [in 1889], native of Sydney, of Jewish descent. No hereditary taint of skin disease known. Five sisters and two brothers living, who have not evidenced any disease of the skin. [Lived in Sydney until his eighth year.] From his eighth until his fifteenth year lived in New Zealand, and then left for Melbourne [where he has lived ever since. Never mixed with Chinese or Maories. Never had any venereal affection until] in 1878 he acquired gonorrhœa. In 1879, after a suspicious connection, he had a feverish disease for three weeks, which was called typhoid. Soon afterwards there was fever and pains all over the body, swelling of the face, nose, ears, feet, &c. There were red inflamed spots on the dorsum penis. At no time had he ulceration on the penis or parts thereabouts. At that time his disease was pronounced to be syphilis. After that he was under specific treatment of every kind by several practitioners [among whom were some of the best known men in Melbourne], including mercury on seven occasions. When iodide of potassium was given the symptoms were exaggerated. Arsenic, iodoform, and sarsaparilla, were given in large quantities. The local lesions in the throat and tongue were treated with Arg. Nit. and Hydrarg. Nit.

On examination I found the hair on the head black, strong, with the scalp visible at the vertex. On the forehead, particularly on the right side, were a number of swellings, large and small, varying from the size of a threepenny bit to a florin. The swellings did not penetrate to the osseous structures beneath. The swellings presented an umbilicated appearance, and were raised somewhat distinctly at the edges. The epidermis between the swellings was apparently healthy. There was no ulceration about the forehead, but a peculiar oily brownish appearance of the diseased parts was observable. Similar tumours existed on the ears, cheeks, lips, and nose, forming together a general enlargement and disfigurement of the face—in fact, constituting the true typical facies leontina. Some of the masses were ulcerated. On the arms, wrists, legs, and hands particularly the same state of affairs was to be seen. The skin on the fingers and toes was very much ulcerated, in parts laying bare the tendons. Remarkable symmetry was exhibited by the disease in both hands, and in the feet too. A deep brownish discoloration, sharply defined from the healthy skin, was to be observed on both sides of the sternum, extending to a line corresponding with the umbilicus. The tongue showed at the tip a flat ulcerated surface, in size about that of a sixpence. Deep fissures, intersecting, covered the tongue. The uvula was almost entirely obliterated. A deep fissure extending into the pharynx on the left side of the uvula was clearly distinct. A localised anæsthesia seemed to be present in the left thumb. The internal organs, as far as is known and could be traced, were healthy.

Since 1885, and up to the present, his appearance has greatly changed, the swellings in most parts having entirely gone. Large cicatrices now cover the forehead, cheeks, ears, and nose, some of them contracting to such an extent that difficulty is found in opening the mouth. Part of the nasal septum has been destroyed. Anchylosis is now taking place in some of the finger-joints. An alteration in the skin of the chest and abdomen has taken place. However, on the back a similar discoloration is now showing itself. Unfortunately the condition of things in the throat appears to be tending towards a worse state. It may be mentioned that an anæsthetic state is being developed in the inferior extremities. [In 1886 I showed him up at a meeting of the Medical Society, pointing out the differential diagnosis from syphilis. . . . After the inspection one gentleman stuck to the opinion of it being syphilis. As he happened to be Health Officer for the suburb where the patient lived, and had to report on the case to the Board of Health, no further proceedings have been taken for his removal.] The patient died in May, 1890.

Dr. Peipers explained that he mentioned the patient's treatment by several other medical men, who had failed to make a correct diagnosis, in order to illustrate his opinion that but few there had ever seen the disease, and for that reason had not recognised this case when it came before them—an important remark, and necessary to be included in such an account as the present. But he had never heard of any other case in a white in Victoria. He added also that Dr. Oscar Katz, who in 1889 was working in Sydney, demonstrated the *B. lepræ* in this case during a visit he paid to Melbourne.

Reverting now to the reports of the Board, none were issued in the eight years 1877 to 1884. The series was resumed in 1885, and the report for that year contained a slight retrospect as far as 1883, when the Board had been reconstituted. In an appendix a very brief account was furnished by Dr. C. F. Porter, who signed himself "late Health Officer" (at Point Nepean, that is to say—see below), of two Chinese lepers maintained at the quarantine station; both were suffering from L. tuberosa. The report says that Ah Quong arrived "about six months ago;"[1] and Tin Goon (otherwise Gen Yung) arrived "a few weeks ago"[2] in a

[1] Probably November 28th, 1884. Off. Comm. N.S.W., Board Report, 1893.

[2] Probably May 5th, 1885. Ibid.

very advanced stage (the report was undated). Ah Quong had been transferred from Ballarat, and so probably had the other also.

In the report for 1887 it was noted that Gen Yung had died; Ah Quong still survived, and a new case had been admitted—Ah Yung.[1]

In their next report the Board recommended—

"That immediate notification to the health authorities, both local and central, of the appearance in the colony of any case of leprosy should be made compulsory, and power to remove and detain under supervision at the quarantine station or other suitable place appointed by the governor in council is also necessary."[2]

Legislation.—During 1888 an amending Public Health Act was passed. It contained provisions to the following effect:

The governor in council *may* from time to time direct that the middle quarantine station (at Point Nepean) or other suitable place be set apart for the reception and medical treatment of lepers, and may make regulations for the safe custody of lepers therein.

And then, secondly—

The Board *may* on certificate of the health officer of the council (Local Authority) and any two legally qualified medical practitioners that any person is suffering from leprosy, *and with consent of the council* (Local Authority), direct that such person be removed to and detained in such quarantine station or place, &c.

In their next report (1888) the Board pointed out that the Act just referred to "gave, for the first time, power to enforce the detention of lepers." They then reprinted the proclamation by which the middle quarantine station, Point Nepean, was declared to be a lazaret, and certain brief regulations for its management, made February 5th, 1889. And they went on to say that "four lepers (all that are now certainly known to be in the colony) are at present under detention."[3] But shortly before the date of writing there had been five; Ah Quong, mentioned above as the first leper (voluntarily) admitted to this lazaret, having only then died.

[1] Victorian Board Report, 1887.
[2] Ibid., 1888.
[3] Ibid., 1889.

The health officer (Dr. J. H. Browning) contributed to this report the following account of the four lepers:

Ah Kai, æt. 45, from Canton, arrived in the colony about three years ago, admitted March 29th, 1889. He states the disease appeared a few months after his arrival in the colony. There are all over the body small, ill-defined, reddish-brown, irregular patches, coalescing in parts. The skin is non-sensitive. These patches itch considerably, and when rubbed form small reddish, pustular swellings, which bleed and become scabby. Feet and hands, with the exception of the dark dusky colour of the skin, are normal, no deformity of fingers or toes. He has good health, suffers no pain, and with the exception of the violent itching is very well.

Gee Tai, æt. 58, from Canton, has been in the colonies about eighteen years, admitted October 5th, 1888. First noticed the disease sixteen or seventeen years ago. The body is covered with large elevated reddish-brown patches running into each other, skin hard, dry, and rough, very like a fish-skin. These patches extend down both legs and arms. . . . . About two months ago a portion of the right palm began to break down and slough. . . . . This ulcer is situated at the base of the second and third fingers, ... sluggish, ... with a fœtid discharge. . . . . He may soon lose his fingers. . . . . The lower part of his face is covered with small brown depressions; . . . . . says his face was never sore or ulcerated, nor has he had any ulceration on his body before the one on his hand. Died, and was cremated December 10th, 1892.

Sam Lue, æt. 50, has been in the colony over twenty years, admitted March 22nd, 1889. The disease first showed itself soon after his arrival in the colony, the parts rapidly ulcerating and sloughing away. He has lost his nose completely, his mouth is deformed, and he is totally blind. He has lost the fingers and part of the palm of each hand. His toes are gone, and part of the left foot; . . . . . the skin is healthy, and of the proper colour with the exception of a large brown, copper-coloured patch on the right side. . . . . There are no ulcerations. . . . . .

Dr. Browning furnished interesting photographs of this case and of the next case (Ah Yuat), and he said at the same time that Sam Lue had arrived in the colony about 1855, and had resided at Ballarat until he was admitted to the lazaret. Twenty-seven or twenty-eight years ago he suffered the changes shown in the photograph, and about twenty-five or twenty-six years ago his disease entered on a stationary phase, in which it has remained ever since. He has for twenty-five years been tended by his brother, who is quite healthy.

Ah Yuat, æt. 52, in the colony about thirty years, admitted March 22nd, 1889. He first noticed an eruption about twenty-two or twenty-three years ago, first in his hands, then in his face, then in his feet; the eruption rapidly passed into the ulcerative stage: active sloughing set in. He has lost his nose, all his fingers, and all his toes; the eyes have not been affected. These parts are now completely healed up, and have been for years. . . . . Body well nourished, the appearance of the skin normal. He has no eruption or discoloration or spots of any kind on the trunk. He died by suicide November 10th, 1890.

No mention was made in these accounts, which have been but slightly compressed, of the occupation and residence of these men before their admission to the lazaret.

At the end of 1891 a second case of L. tuberosa in a white came to light. The following account of it was written by Mr. A. W. Finch Noyes,[1] jun., F.R.C.S.Edin.:

"A. F—, a well-developed, robust-looking man, æt. 35, born in India of European parents, both of whom were free from any leprous taint. Till within six years ago, when he arrived in Australia, he had followed the calling of a sailor; since then he has been engaged in various occupations, but he has never directly or indirectly been brought into contact with leprous subjects. While at sea he traded to South America, Burmah, and India. The last case of leprosy that he saw was at Rangoon in 1883. Patient has suffered from the ordinary diseases of a tropical climate—diarrhœa, dysentery, &c.,—but otherwise he has enjoyed excellent health. In 1877 he contracted a chancre, which he says was treated as syphilis. He has, however, never suffered from any secondary or tertiary symptoms since. The first signs of the present disease commenced eighteen months ago,—that is, four and a half years after his arrival in Australia; thus, unless contracted in the colonies, a contingence far from probable, the disease must have had an incubation period of between four and five years. . . . .

"The disease began without any of the usual prodromal or febrile symptoms, its first appearance being indicated by a bluish-red, slightly elevated patch, about the size of a threepenny piece, situated over the left eyebrow. The patch was anæsthetic, so that the patient incised it with his penknife without producing any pain. A few weeks subsequently a similar nodule developed over the right eyebrow, and soon afterwards another showed itself in the centre of the forehead, the position of the latter being at present indicated by a scar. From this date the disease began to spread rapidly over the face, manifesting itself by the production of fresh nodules, which at first were separated by patches of healthy tissue, but later on they became fused into a sheet of leprous infiltration. About three months after the first appearance of the

[1] 'Austr. Med. Journal,' Dec. 1891, p. 574.

disease on the face, two coppery-coloured, non-raised patches appeared on the dorsum of each foot. These patches were followed by a succession of similar ones extending up the legs and thighs, and on to the trunk.

"*Present condition.*—All parts of the body surface are affected with leprous lesions, except the skin over the front of the chest and abdomen. The head and face are more extensively affected than other parts, the face appearing to be a mass of confluent lepromata, which, however, commenced as isolated patches of a bright scarlet hue, some of which have retained their colour, others have faded to a bluish or brownish tint, presenting an appearance not unlike disappearing ecchymoses. The whole face is much swollen, and those of the tubercles that are at present isolated stand out about one third of an inch above the surrounding level of the apparently healthy skin. The affected skin feels dry, tough, and leathery, with a glazed appearance. The nose is much swollen, due to leprous deposits in the skin and the lining mucous membrane. The ears are affected to a less extent. Cutaneous sensibility is much diminished wherever there is infiltration of the tissues of the face. The scalp is affected, and tubercles extend as far backwards as the coronal suture. The arms and legs are extensively affected, but the lesions present a marked clinical difference from those described on the head and face. These consist of coppery patches, varying in size from a split pea to three or four inches in diameter; they are for the most part circular in shape, but some adjacent ones having become confluent, large irregular patches have been formed. There is but little alteration in the consistency of the skin in most of the patches, but in some of them there is a certain amount of infiltration perceptible to the touch. Cutaneous sensibility is diminished, or even absent, in some; but in others it is somewhat increased, and in others again it seemed to be normal. The patches on the arms and legs are symmetrical, and follow to some extent the course of some of the larger nerves, especially the musculo-spiral in the arm, and the musculo-cutaneous in the leg. On the back of the hands the skin is of a deep purple, the hands and fingers are much swollen, and full of leprous deposits, which, according to the patient, have never been of patchy distribution. On the back the patches resemble those on the arms and legs, but the distribution is non-symmetrical, and without any special relation to the nerve branches. The nervous symptoms are marked, the cutaneous sensibility being much altered, not only in the majority of the patches described above, but also in the vicinity of these patches in skin which seems otherwise normal. A few months ago patient knelt on a hot-water pipe without knowing it; he did not feel any inconvenience at the time, but on going to bed he found the part blistered and inflamed. The knee-jerk is increased, but the chief superficial reflexes are normal; patient occasionally complains of tingling sensations in the feet. Sexual desire is much increased. There is no atrophy of any of the muscles as yet apparent.

"I was able to demonstrate to those who doubted the diagnosis the

presence of the lepra bacillus, and consequently the existence of leprosy in the patient."

This man was removed from Coburg, Victoria (not to be confused with Coburg Peninsula, N.T.), and admitted to the lazaret November 22nd, 1891,[1] and in the Board's report, 1892, reference was made to the case, and to three Chinese then under detention; so that, of the seven Chinese admitted to this lazaret since 1885, four had died by the end of 1892.

Farther legislation.—An Act to consolidate the law relating to the Public Health had been assented to July 10th, 1890; but it had no practical effect as against lepra until March, 1893. Up to the latter date the permissive law of 1888 remained the authority under which leprosy was dealt with, having been continued by section 124 of the consolidation statute. The latter had extended the powers of the Board; but a proclamation was necessary before they could be exercised in regard of particular diseases. Thus:

Sect. 122. Board to make regulations as to diseases.

Sect. 123. . . . The Board may from time to time, by notice published in the 'Government Gazette,' declare what diseases are, for the purposes of any Act relating to the public health, included in the description of "malignant, infectious, or contagious disease" "dangerous infectious or contagious disease," and "dangerous infectious disease" respectively, and such notice shall be binding on all persons and Courts.

The word "malignant," whether the same occurs in such notice or in any Act relating to the public health, shall mean that the disease is present in such a severe form that it has become necessary to enforce the provisions of section one hundred and twenty-nine of this Act.

Sect. 124. Recites the law already given above, 1888.

Sect. 129. The legally qualified medical practitioner in attendance at any house in which there is any person suffering from any smallpox plague, yellow fever, or other malignant infectious or contagious disease, *shall* furnish to the occupier of such house a certificate that there is in such house a person suffering from such disease, and such occupier *shall* thereupon report the existence of such disease in such house to the Council (L. A.) not later than twenty-four hours after receipt of such certificate; and if any person fail to comply with the provisions of this section he shall be deemed guilty of an offence under this Act, and shall, on conviction thereof, be liable to a penalty not exceeding fifty pounds for each such offence.

Farther legislation.—And, lastly, lepra was declared to be a malignant infectious or contagious disease by proclama-

[1] Off. Comm., Board N.S.W., Report 1893.

tion, dated March, 1893, thus for the first time bringing the provisions contained in the Consolidation Act of 1890 into force against lepers.

This completes the positive evidence concerning Victoria which I have been able to gather; I now add some negative statements made by gentlemen of long experience in some towns. I am entirely indebted for it to the interest taken in this inquiry by Dr. J. G. Carstairs, of Geelong. In the first place, Dr. Carstairs himself wrote to me as follows:

"Although in practice at Geelong since 1854, I have never seen a case of the disease or heard of one in this neighbourhood. But comparatively few Chinese live here, and there never was a camp in Geelong, as at the gold-fields."

Geelong is a considerable town close to Melbourne. Dr. Carstairs subsequently forwarded letters, from which I have made the following extracts:

Dr J. F. Usher, of Ballarat, wrote:—"I have been attached to the Ballarat hospital for nigh forty years, and to all the other local institutions for above twenty; so I think I speak *ex cathedrâ* when I tell you I never heard of a case of leprosy in a white man. Dr. Whitcombe never heard of a case. Dr. Jordan, of the gaol, and Dr. Holthouse, of the Benevolent Asylum, never heard of a case. Indeed, I feel pretty sure there never was a case in this district."

Dr. Carstairs noted that both Doctors Holthouse and Whitcombe were old residents at Ballarat—the former "from the fifties."

At a later date Dr. Usher wrote, saying, "Dr. Ochiltree tells me there was one case of leprosy in a white man known to him. The patient had lived in China for nigh ten years. He died in Ballarat. Dr. Scott told me he had seen 'a very doubtful case'" (presumably, in a white was intended).

Dr. Hinchcliffe, who has been resident surgeon at the general hospital, Bendigo, for about twenty-five years, wrote:

"In all my experience of leprosy here the patients were all Chinese, and I cannot hear of it occurring in a European in the Bendigo district."

Dr. Robert H. Dunn has been resident surgeon at the Maryborough Hospital for about forty years. He wrote:

"I delayed my answer in order to consult our register, instead of

trusting to my memory. With regard to leprosy in white people, personally I do not recollect having seen such a case, and no case appears in our records."

Lastly, Dr. Tremearne, of Creswick, wrote :

"I have during twenty-two years' practice in this colony never seen leprosy affecting white people. Although it has affected Chinese, no white person in this neighbourhood has ever to my knowledge contracted the disease."

No particulars could be obtained as to the two cases mentioned by Drs. Ochiltree and Scott.

The following table shows the cases which have been recorded above in their chronological order as fully as is possible :

TABLE I.—*Summary of known Cases and of Legislation in Victoria.*

1858.—During or even before this year there were some cases among recent Chinese immigrants. Number unknown.

1866.—Thirty-one Chinese lepers were enumerated by the police.

1867 (before, but not earlier than 1863).—Thirteen Chinese lepers were enumerated, and it was said that probably there were more.

White. Hutchison's case. At a date before 1867 a white leper, immigrant ill from India, was resident in Victoria.

1873.—In this year fifteen Chinese lepers were enumerated.

1878.—There were nine Chinese lepers at a camp or refuge at Ballarat alone.

1879.—White. Peipers' patient was attacked.

1885.—Two Chinese lepers, old cases, were transferred from Ballarat to the Middle Quarantine Station (voluntary isolation ; helpless).

1887.—Another Chinese was admitted as above.

1888.—Another Chinese was admitted.

First legislation.—Permissive ; authorised establishment of lazarets, and removal and detention of lepers therein.

1889.—Three more Chinese admitted. Four Chinese then survived, and at that time were all certainly known to be in the colony.

White.—Noyes' patient was attacked.

1890.—*Farther legislation.*—Permissive to Board. Notification of recognised cases might be made compulsory.

1891.—Noyes' case admitted to lazaret at end of year.

1893.—*Farther legislation.*—Proclamation issued, whereby notification made compulsory under penalties (of known cases only; no obligation to report suspected cases).

Additional white.—At some early date or other a man who had lived ten years in China was observed to be suffering.

Note.—The above groups must not be added together. However, it

seems most likely that there were many more cases of which no record remains. The Castlemaine Hospital cases have not been mentioned, as there is nothing to show which of them may be regarded as additional to the above. Cases which occurred at Creswick (see Dr. Tremearne above) have not been mentioned, for want of dates. The Chinese admitted from 1888 onwards were old, and generally very old, sufferers.

Sect. VI.—LEPROSY IN NEW SOUTH WALES.

Sydney Hospital is the oldest institution of its kind in Australia; I have been enabled to search the admission books for years subsequent to 1849. In 1853 the following entry was made:

William Porch, æt. 26, a ship's steward: residence, ship "Walter Raleigh;" admitted October 5th, 1853; born, England; length of residence in the colony, two weeks; disease, lepra; under Dr. MacEwen; discharged November 28th, 1853; relieved.

From the date at which the term "lepra" was employed I think it safe to infer that lepra vulgaris was the disease indicated.[1]

Dr. J. C. Cox, of Sydney, mentioned the following to me as the first case of lepra he saw or heard of in N.S.W.:

Case 1 (unpublished).—In the year 1859 he was visiting one of the lunatic asylums at Parramatta, when he noticed among the patients a coloured man—a West Indian—who was suffering from L. nervorum. The bones of all his toes had been absorbed, and even some portion of the metatarsal bones, but the nail-beds remained; and on search fragments of nail were found, apparently growing on the dorsum of the feet. His hands also were mutilated in a similar way. The case had not been recognised before.

Dr. Cox's recorded evidence is of great importance, as will be seen presently; and therefore I make no apology for describing the following circumstances, from which in part it derives its weight. He returned to Sydney in 1858, and commenced practice. Before leaving for Australia he had become acquainted with Dr. Fiddes of Jamaica, who had carried numerous pathological specimens, drawings, and casts of cases of lepra from the West Indies to Edinburgh,

[1] In the abstract of diseases treated which is appended to the annual reports of this hospital this term appears in many years from 1850 onwards, though not in the admission book.

and had demonstrated them there. Thus Dr. Cox learned some of the aspects of this disease, and had his attention effectually drawn to it.

After a prolonged search in many directions I have been obliged to conclude that the foregoing is the earliest case of lepra in New South Wales of which any information now exists.[1] For the next known case I am indebted to Dr. F. Milford, of Sydney. This gentleman had had his attention directed to lepra while at Brisbane between the years 1856–8; he met there with a form of disease not previously known to him, and after a time enabled himself to name it. His evidence, of importance in relation to New South Wales, has great importance in relation to Queensland also.

Case 2.—In 1861 a Chinese was admitted to St. Vincent's Hospital, Sydney, under Dr. Milford's care. He was suffering from L. nervorum, and an amputation was performed upon him. This case appears in the annual report of the hospital for 1861 in a table which mentions the diseases treated.

The next available evidence is that furnished to the Colonial Office.[2] The following are the points of present importance given in abstract:

The late Dr. George Bennett mentioned that he had seen the disease in India, and in the leper hospital at Singapore, and said that among the great number of cases of the various cutaneous diseases that had come under his notice during a practice in Sydney of twenty-five years (that is to say, since 1842 at the least), he had not observed a single case of true leprosy, elephantiasis græcorum. A statement to the same effect was made "by several other leading medical men in Sydney," whose names were not mentioned in the report; no cases of the disease had ever been met with among the Chinese or other Asiatics admitted to the hospitals there. Mr. Mason, of Tenterfield (gold and tin, on the Queensland border, S. lat. 29°, E. long. 152°), described without naming it "a cutaneous eruption consisting of small shining spots or tubercles of a livid colour, which often discharge a very offensive fluid, and are followed by silver-looking scales, which he had observed chiefly among the Chinese labourers engaged in mining. All the cases occurred in persons who had suffered from syphilis." Mr. Redhead, of Braidwood (gold, 35° 30′ S. lat., 149° 47′ E. long.) reported that it had been currently said about two years before that several

[1] Yet, a few months after these words had been written, I observed, and reported under the Leprosy Act, a case of pure L. nervorum in which the date of attack was fixed at 1856.

[2] Report R. C. P., 1867.

Chinese in that district were suffering from leprosy, but that on examination the disease turned out to be an aggravated form of itch. Mr. Street, of Hargraves (gold, 32° 38′ S. lat., 149° 29′ E. long.), mentioned that he had seen the disease in Madagascar and in the Seychelles, but never in New South Wales. However, he does not seem to have mentioned the extent of his opportunity of observation in the latter country.

Upon these statements the following comment can now be made. It is important first to note that two of the reporters implied that they had adequate clinical acquaintance with lepra; and, secondly, that none of them had heard of the three cases just mentioned.

The following are the accounts published[1] by Dr. Cox of the six cases in whites with which he met during his term on the honorary medical staff of Sydney Hospital, which he joined in 1862. I preface each case with a copy of the entry as it stands in the admission register;[2] and in its order I have inserted the admission record concerning a seventh patient, not described with the former:

"Believing that the existence of leprosy has not hitherto been recorded as existing in New South Wales amongst the native-born European population, I am induced to draw the attention of the profession to the subject by recording the following cases which have come under my observation during my tenure of office as physician to the Sydney Infirmary. I am happy to say that so far this disease has shown itself very sparingly, only six well-marked cases in native-born subjects of European parents have come under my observation. It is not uncommon to meet with cases of this disorder, the subjects of which have contracted the disease while resident in other parts of the world."

On several occasions I desired Dr. Cox to search his memory with reference to this last sentence. On the whole, it remained doubtful whether those words were written with deliberate reference to New South Wales; possibly they may have constituted only a general remark on the liability of all localities to include imported lepers among their inhabitants. He mentioned that his opinion of the disease seen in Case 3 and those which come next afterwards was received at first with disfavour; and opposition to it continued until a gentle-

[1] 'N.S.W. Med. Gaz.,' vols. iii, iv, and v, for 1872-3-4.

[2] The order in which the cases were published was—9, 8, 6, 3, 4, 5.

man, who had had charge of a lazaret in India, reached Sydney at a time when two of the patients happened to be at hand, and confirmed his diagnosis; whence there is an inference that at early dates there were more cases than have been recorded.

"But the fact of the development of this disease in persons whose parents have had no taint of this disorder in this colony is a matter well worthy the attention of the profession, and I believe this to be the first time such cases have been recorded. Cases of this kind are liable to be mistaken for secondary and tertiary syphilitic disease, as was the second case which I now record previous to its admission into the Sydney Infirmary, especially when there exists a history of syphilitic inoculation. The cases which presented themselves in an early stage of the disease have readily yielded under a liberal administration of cod-liver oil, generous diet, and a carefully regulated course of arsenic. It is gratifying to be able to state that in this stage the disease is not contagious unless under peculiar circumstances."

Case 3.—William Abraham, æt. 54, residence Pambula, labourer; admitted March 28th, 1868; born in Holland; forty-three years in New South Wales; elephantiasis Græcorum; under Dr. Alleyne; discharged July 1st, at his own request.

"This case is thus recorded by Dr. Schuette, then resident medical officer:

"Patient, æt. 54, has been a resident in this colony forty-three years; is married, and has three children. He states that he once had syphilis, thirty-six years ago, but always enjoyed excellent health till two years ago, when he caught cold several times by being obliged frequently to lie out in the bush. For the last four months he has not felt at all well; at the end of this time his tongue became swollen, and his forehead was covered with blisters: he noticed his feet also swollen. For these symptoms he did not obtain any medical advice or treatment. At present he is suffering from the same symptoms, except that the blisters which formerly existed now show only elevated scars; so severe are they on the right hand that the little finger is contracted by one of them; ulcers formed where many of the blisters were, and some of them are not quite healed. The appetite is good, the tongue clean, but its tip shows an oblongate sulcus, which he states is the effects of a blister on it; there are several round ulcers on the roof of the mouth. The surface of his body is very irritable, so much so that his rest at night is much disturbed; he has a slight cough; bowels regular; urine normal, of a dark colour; pulse 70; hands, feet, and legs swollen.

"July 1st.—This patient has not improved; the tubercles on the surface of the body are enlarging the legs are thicker, and there are large hæmorrhagic spots about the feet and legs, which often bleed, and keep discharging for some time; the hair of the head and face had

got thinner and finer; the nose bleeds frequently; the feet and legs are more swollen than they were, and walking causes much pain.

"The course of treatment followed out in this case was the administration of the sixteenth of a grain (gr. $\frac{1}{16}$) of the bichloride of mercury three times a day in solution; hot foot-baths of a solution of hydrosulphite of potash, ʒj ad Ox ʒj of water; gargles of biborate of soda and myrrh; Dover's powders occasionally at night. The bichloride was administered from March 28th to May 6th; subsequently a gargle of bichloride of mercury was used (gr. ij ad ʒxij) for a few days. On March 25th he was given the following mixture:—℞ Arsen. Alb., gr. $\frac{1}{2}$; Pulv. Pip. Nig., ʒij; M.; divide in pil. xij. One pill to be taken after each meal. Discharged relieved."

Case 4.—Michael Keighran, æt. 41, drover; residence Campbelltown; admitted July 28th, 1869; born N.S.W.; leprosy; under Dr. Renwick; discharged October 8th; improved.

"(With photograph); recorded by Dr. Schuette.—M. K—, æt. 41, drover, R.C., native of Campbelltown; admitted into No. 9 Ward, under Dr. Renwick, July 28th, 1869. Complained of hoarseness, sore throat, and especially of a purple eruption of face, hands, and feet; also a small patch on knee and elbow. He states that he first saw the eruption on forehead about six or seven years ago; it has been gradually extending in spite of medical treatment. The nails have fallen off the fingers, and the hands are stiff and useless. He had gonorrhœa ten years ago, but no chancre. The tongue is affected with the same eruption, purple, irregularly tuberculated in centre; appetite good; bowels regular; pulse 84; the eruption is not painful nor itchy. Discharged October 8th, 1869, somewhat improved."

Case 5.—John Hankle, æt. 50, a gardener; residence Petersham (a suburb of Sydney). Admitted July 11th, 1870; born Duchy of Baden; twenty-one years in N.S.W.; leprosy; under Dr. Browne; discharged July 22nd; incurable.

"(Also reported by Dr. Schuette).—J. H—, gardener, Petersham, native of Germany, Protestant, was admitted into Sydney Infirmary, Ward 4, on August 18th, under Dr. Jones.[1] Patient, æt. 49, has been twenty years in the colony, married, and father of two children; never had any syphilis, but always had good health. He had icterus once, many years ago. Three years ago became ill, with great weakness in both legs, and constant running from the eyes; his feet became swollen three weeks after; long bones of leg and small bones of feet were very painful; he found a numbness of ring and little finger of both hands, which affected the other fingers for a short time only. By degrees the right eye got worse and worse, so that he almost lost his sight for ten months, the nose has been drawn to the right side of face; the bridge is very wide; stuff mixed with blood is discharged from right

[1] This difference from the entry in the admission book, and one or two others which occur below, are merely clerical errors on one side or the other.

side of nose; smell is perfect. He has been under medical treatment without much benefit; was unfit for labour for six months, from September to March, 1869; from then he worked up to last three weeks, when he was obliged to give up, being unable to see. Complains of pain in the left side of the head, deep-seated, most during night; pain round both ankles; a curious feeling as if dead in both little fingers; the hands are always cold; the nails of all the fingers almost disappeared; skin of dark colour all over the body—thick on fingers, hands, face, and also the ears; for four weeks felt as if something was pressing on his throat, has difficulty in breathing and speaking; his voice is rough. On examination I find the uvula reduced to the small size of a pea, the whole pharynx covered with apparently round hard vegetations; appetite good, tongue clean, of sober habits, smoked much before admission, sleep disturbed with pain in head, bowels regular, urine normal, pulse 64. N.B.—No portrait was taken of this case, and no record kept of treatment pursued."

Case 6.—Joseph Wilson, æt. 30, a seaman, residence Sydney, admitted July 8th, 1871; born in England, eleven years in New South Wales; leprosy, under Dr. Quaife; discharged July 29th, incurable.

"J. W—, æt. 32, native of Yorkshire, Protestant, states:—My father is still living, a healthy, strong man; my mother died last year (aged seventy-two) cause unknown. I came to this colony in 1859. Previous to that and from the time of leaving Yorkshire I have been engaged as a sailor, and have visited many foreign ports—such as China, East and West Indies, Mauritius, Penang, Calcutta, and have also sailed up the Red Sea in company with a Lascar crew. On arrival in this colony in 1859 I was examined and passed as a first-class life in a benefit society. I married in Sydney nine years ago, and had four children born to me, all of which are healthy and strong. In June, 1869, I was at work as a labourer, excavating for the building of the new town-hall, on the site of the old cemetery. On the flat of the left foot, which I used to the shovel, a large blister rose, which on the following day I punctured, and afterwards returned to work, but my left leg became so swollen that I had to stop work altogether, and was obliged to give up work and place myself under the care of a medical man. On the second week after laying up I felt my tongue get sore; and up to this time I had no symptoms of constitutional fever, although my left leg became much more swollen and inflamed. The sore on the tongue has never since healed. This swollen condition of the leg remained so bad as to prevent my going to work for twelve months. Twelve months after my tongue became sore I felt a severe pain throughout my whole body, more especially in the joints than in any other part; and at this time my legs and arms as far as the axillæ of the latter, and the face, but not the body, became covered with large, rounded, raised, solid, discoloured swellings, which were very irritable, and had the appearance of having been stained with walnuts; most of these swellings still remain as they originally existed. I have never seen any white scales formed on their surface; the feet, hands, and face were more particularly

disfigured with these lumps; the nails of the fingers and toes split up almost to the quick, and became white, brittle, and almost crumbled away. At this time blisters would rapidly form on various parts of the limbs, which broke of their own accord, and from which exuded a dark watery fluid. Shortly after the nodular swellings first came out my throat became stiff and felt sore; the lips enlarged, and became thick and swollen, as if stung by an insect; the eyelashes and eyebrows fell off, and have never since grown; the hair of the head, the whiskers, and the hair on the body also were cast off, and what subsequently grew was soft, fine, and silky; the external ear became swollen and extremely enlarged and thickened; the lower lobe in particular was as large as a bantam's egg: the nose also was very swollen and nodular at the apex, and the alæ thickened, enlarged, and pendulous; a copious discharge of thick mattery character came from the nose, which continued for a year or two. Much distress was caused by a difficulty of breathing through the nose. The skin of the scrotum was somewhat thickened, and had a disposition to become scaly. No sores or excrescences were ever felt about the anus; the penis was in a normal state, and the skin not nodulised. I positively assert that I never had any sores on the penis or suffered from gonorrhœal discharge. Most of the medical gentlemen whom I have consulted have asked me if I have ever suffered from syphilis.

"This case first came under my observation while in charge of one of the medical wards in the Sydney Infirmary two or three years ago, and I have had him under my constant observation from that time. His general health had then become seriously impaired, but has since been greatly restored by careful nursing, good generous diet, and general attention to the *prima via*. When first I saw him the lips were large, swollen, nodose, and raw; the ears had the same general character, the lower lobe being especially enlarged. The nose, eyebrows, and the skin of the forehead assumed the same general aspect, and gave to the surface generally a very marked and characteristic nodose, rough surface. These nodules were of a livid hue, and the skin, where it was not nodular, was of a bronze brown. The tongue had a deep ulcer at the apex, with thickened edges, and the rest of the organ had the appearance of being made up of rounded nodular masses. The roof of the mouth was markedly nodose, not ulcerated, but the nodules separated by deep furrows. The soft palate was intact, and showed no symptoms of having been ulcerated, but at the same time presented the same nodular, lumpy appearance, the nodules being of various sizes and separated by sulci. The beard was scanty, and what there was of it was peculiarly fine and silky. The dorsal skin of the hands was smooth, but enlarged with puffy, hard thickenings, the palmar skin being very much transversely furrowed. The fingers were red and tender at the apex, and the nails appeared as if crumbled away. The arms as far as the shoulders were blotched with large, rather raised irregular brown markings; some few were hard and enlarged. A few of these same characteristic dark raised markings were found

on the back and shoulders. The elbows and wrists were more swollen than the other parts. The legs were more discoloured, swollen, and nodose than the arms, and very markedly enlarged about the knees and ankles. The feet were proportionately much more enlarged and more nodose than the hands, and the nails of the toes were split up, white, and broken. There was very slight thickening of the integuments of the genital organs. The voice was quite weak, the articulation difficult.

"The course of treatment pursued in this case was chiefly the use of arsenic, cod-liver oil, and mineral acids, with vegetable infusions and free use of lemon-juice. With such treatment, strict attention to diet, and enforced regular habits, the patient is now enabled to carry on a laborious avocation and earn a good livelihood; and by constant use of astringent washes the ulcer on the tongue improves, though not yet healed."

Case 7 (unpublished).—Edward Morris, æt. 26, stock-keeper, residence Barwon River district; admitted September 15th, 1871; born in N.S.W.; leprosy; under Dr. Quaife; discharged September 18th, at his own request.

Probably this case was not included in the series now under notice because the patient's short stay in the hospital had prevented any notes from being recorded. Both Dr. Quaife and Dr. Cox have told me they remember it well.

Case 8.—William Norris, æt. 26, a stockman, residence Richmond; admitted February 28th, 1872; born Windsor, N.S.W.; leprosy; under Dr. Quaife; discharged July 19th, improved.

"Patient, æt. 26, a native of Windsor, admitted into infirmary on February 28th, 1872. A drover of cattle; Roman Catholic religion; father and mother both living, aged—father 62, mother 45. His father and mother are natives of Windsor, on the Hawkesbury River. Has six brothers and sisters; two brothers dead—one brother was burnt to death at five years of age, and one died of low fever, three years of age. States that he is unmarried; at nineteen years of age he was loose in his habits, and had frequent intercourse with women. When at this age he was affected with what he thought were chancres; these were white pimples round the corona of the glans of the penis. He at once placed himself under medical care, and under treatment he got quite well. No secondary symptoms of the disease showed itself—such as sore throat, or blotches over the skin, no sores about the anus, or pains in the bones of the legs or head. In May, 1870, he brought cattle to Sydney, and at that time he was in perfect health; it was on his returning to the country that he noticed his face beginning to swell; at the same time the penis became so large that he could hardly thrust the skin back. Between the time he was in Sydney in April, till the time he noticed the swelling in May, he was exposed constantly, night and day, to wet weather—camping out every night. When he noticed

the swelling in May, it had the appearance as if he was becoming bloated, and his face of a dusk-red colour; the skin of the face became hard, the eyebrows dropped off, the hair of the head became fine and very soft, the lobes of the ears became large and heavy, the eyes became bloodshot; he could scarcely breathe through his nose, but no discharge came from it; the lips became thick and stiff. Up to this time he had no sore throat or irritation; it is now ulcerated. This ulceration never gave him pain, and only came on after he was admitted into the infirmary (February). About the end of July he noticed brown spots come out all over his body; they have always remained as they now are—of an irregular round shape, undefined at the edges, not raised, and showing no appearance of scales on the surface. About February the colour of his face changed somewhat; it had a livid blue colour, which has since gone off. He has never had any tenderness along the shins, or any lumps there, or on any other of his bones. He never had any sores or irritation about the anus. Up to about July, when the spots began to show out, his hands were quite natural; at that time they became enlarged with a soft puffy swelling, the skin being soft, the hair dropped off them, and also off his arms and legs, but did not fall from the head, chin, or pubes. The nails of the hands and feet became white and dead-looking, very brittle and ragged. The general surface of the hands was furrowed and cracked. The mucous membranes of the mouth and soft palate are thickened and lumpy, of a white ashy colour in front of the uvula, running forward on the roof of the mouth."

CASE 9.—John Holmes, æt. 19, labourer, residence Sydney; admitted March 19th, 1872; born N.S.W.; leprosy; under Dr. Cox; discharged June 11th, improving.

"Patient, æt. 19, native of Sydney, labourer at saw-mills, states:—My parents are now living; my father is fifty years of age, in excellent health, and has been so all his life; he is a native of Birmingham, England. My mother, a native of Ireland, forty years of age, a very healthy woman, Roman Catholic, has never had any symptom of the complaint I am suffering from. I have four sisters living, all strong and well. I lost one sister at the age of three years, and three brothers; one at eight years of age was drowned, one twelve months old from diarrhœa, and one fourteen months old died of convulsions and thrush. I was in perfect health up to fourteen months ago; at that time I felt severe pain coming on in the pit of my stomach, and found a difficulty in straightening myself; shortly after a lump came on my back, caused by a curvature of the spine, which has gradually got worse ever since. About ten months ago I first noticed my face becoming swollen, the eyebrows appeared enlarged and overhanging; the whole skin of the face then began to get brown, and the skin thickened and lumpy, most of the eyelashes and eyebrows fell out, the hair has got very soft, short, and fine, the lobes of the ears in particular became enlarged and lumpy, the lumps being smooth and of irregular sizes. My hands became swollen and enlarged by a thickened

and lumpy skin, they were of a livid colour and very soft, all the furrowed markings of the hands quite disappeared, and the nails broke off and split up longitudinally. The feet were swollen and enlarged the same as the hands, and soft, with a disappearance of the furrows; the nails broke off and split up. My lips became large and thickened, the chin covered with small round hard lumps, smooth and unbroken on the surface. I had a sore throat, it soon went off, and has never been bad since; nothing was used to the throat. When the disease first came on, I came out all over small dark brown spots; they had no scabs on them, they were spots like such as are caused by a blow. The eyes became weak and watered much, and have continued to do so ever since. At present the lobes of the ears are enlarged—not uniformly, but with large irregularly rounded smooth lumps. The body generally is marked throughout with rounded undefined blotches of a light brown colour, and showing no indications at present, or for the last three months, of becoming scaly. He sleeps heavily; the nose bleeds under very slight irritation of any kind; the breathing is heavy, which appears caused by the Schneiderian membrane of the nose being thickened, causing obstruction. Since the disease became thoroughly developed he has noticed an unpleasant discharge from the nostril. The mucous membrane of the roof of the mouth is thickened and lumpy—especially the soft palate—but not indurated; the uvula, in particular, is so much affected as to give it quite an altered appearance, but on no point is there the slightest ulceration. There is no history of any symptoms resembling condylomata. His father states that it was about fourteen months ago that he first noticed any appearance of the disease; it was after he had been exposed for some days to much wet and cold, and had slept several nights in damp clothing. He noticed his face swelling, his eyes began to run, and brown spots came out all over his body; they were almost darker than they are now. His tongue is large, irregularly nodose, but not ulcerated."

These descriptions are not so precise in all cases as to warrant a diagnosis. In the original account photographs of four of them were included, and I have been supplied with that of Case 9 by favour of Dr. Phillips of Parramatta. I have seen only one (Case 3) of the others; it portrays L. tuberosa quite unmistakably.

Case 10 (unpublished).—Matthew Cridland, a bush labourer, æt. 27, born New South Wales, was admitted to Sydney Hospital, September 25th, 1873, under Dr. Mackellar, suffering from leprosy, and he was discharged incurable January 28th, 1874 (extracted from the admission book; form not stated; no farther information).

Case 11.—P. S—, a bush labourer, æt. 30, residence Richmond River, was admitted to Sydney Hospital, September 30th, 1881, under Dr. Mackellar, suffering from leprosy, and was discharged incurable (to a

benevolent asylum) on October 4th (date of attack about 1875-6; form L. tuberosa. See Case 40 below).

Case 12.—The mother of A. M— was admitted to St. Vincent's Hospital at the end of 1879, L. tuberosa (see Case 67 below).

Case 13 (unpublished).—Dr. P. Sydney Jones supplied the following note from his case-book.—Mrs. W—, born in Sydney of Irish parents, and married to a Swede, who was examined separately from his wife and was found healthy, consulted Dr. Jones (once) on June 20th, 1879. His diagnosis was entered as tubercular leprosy, and as he added no comment he presumes (in default of recollection) that the case was clear.

Case 14 (unpublished).—Dr. Sydney Jones supplied the following also from the same source.—On March 15th, 1881, he was consulted (once only) in the case of M—, a female æt. 9 years. His recorded diagnosis was "leprosy;" form not mentioned. The child bore a Scotch name; was the fifth in the family, and the others were said to be healthy. She had been ill about a year—since the foregoing winter. No detailed record.

Case 15.—In 1881 Dr. Sydney Jones was first consulted in the case of G. R—, L. tuberosa (see Case 45).

Case 16 (unpublished).—Dr. Sydney Jones supplied the following, also from the same source.—November, 1882; F. M—, male æt. 73; residence near Parramatta; diagnosis, leprosy; two years' duration. The only additional note was "dark blotches over face, body, and limbs; coppery colour; thickening of the skin."

From the slight inquiry which alone I was able to make, I learned that a person of the name attached to Case 16—a peculiar name in both parts—died in the locality mentioned in 1884; and his father, of the same name, died there fifty years earlier. The second F. M— may therefore have been a native.

Case 17 (unpublished).—During 1883 Drs. Cox and T. B. Belgrave both observed this case, of which, however, no account and but few particulars remain. The latter wrote—"This patient was an English-speaking person, white, and impressed me as being an old colonial hand. The woman who showed things in the shop to me, perceiving that I was a medical man, entered into conversation with me, and said she had a case in the next room of which I had probably never seen the like, and took me in to see it. All I remember about it is that the face showed obviously distinct signs of leprosy, and that the man had been under the care of the late Dr. Gilhooley, and was then under that of Dr. Cox." The latter told me he remembered the man well, but had no notes of his case. He lived in Sydney. Form, L. tuberosa.

The following record has been taken from the Reports of

the Board of Health made annually under the Leprosy Act, 1890; and the detail notes from Appendices to the same documents, to which I contributed them in the years 1891-2-3.

CASE 18.—A. H—, m., æt. 42, Chinese, a gardener, admitted April 19th, 1883. Form (?)

CASE 19.—J. H—, m., æt. 32, Chinese, a gardener, admitted April 19th, 1883. Form (?)

CASE 20.—A. H—, m., æt. 34, Chinese, a gardener, admitted June 12th, 1883. Form (?)

These three were admitted to the Coast Hospital from one of the asylums for the infirm and destitute at Parramatta. No further information concerning them has been discoverable.

CASE 21.—Ah Mung, æt. 32, admitted October 28, 1883. *History.*[1]—Chinese, a tin-miner; arrived in Australia at Sydney in 1878; mined at Tingha for three years, then became a butcher at Tenterfield (in the same district), where he continued two years; he then came down to Sydney, and was admitted to the lazaret. The first sign of illness is said to have been an affection of a toe on his left foot while he was at work at Tenterfield; the toe dropped off. The mutilations to be described ensued gradually. *State.*—Is thin and pale, but very active, lively, and good-tempered; his general health said to be quite good. He shows no maculæ, and he says that he never had any; nor can any traces be detected. Cannot completely close right eye; orbicular of mouth not entirely under control; both ulnars enlarged, the left most and moderately tender; both peroneals enlarged, more than the ulnars, and more tender. *Left hand.*—Has lost all the phalanges, except first of thumb and part of the second, which is displaced and partly absorbed, and the metacarpal bones (except thumb) are shortened. *Right hand.*—The little finger is entirely gone, and only the first phalanx remains of the others, except the thumb, which still has a part of the second phalanx; the carpus has the bones separated by effusion. On this side no voluntary movement can be effected below the elbow; but the left stump can be weakly flexed and extended. *Left foot.*—The toes have nearly disappeared; the foot is dislocated at the ankle, and strongly everted; the joint resembles the wrist described above, except that the swelling is not so great. *Right foot.*—Shortened, and the toes defective, but less so than on the left side: the ankle-joint thickened. *General health.*—Now always good. He walks with some difficulty, but it is due merely to the mutilations. He is about all

[1] The histories of coloured persons were given by the patients themselves through competent interpreters.

day, and actively surmounts a window-sill to enter his quarters when he does not wish to walk round his house.

CASE 22.—Ah Ping, æt. 27, admitted October 28th, 1883. *History.*—Chinese, a tin-miner; arrived in Australia, at Sydney, about 1880; worked at Emmaville, then at Wilson's Downfall in the same district; thence reached Sydney again and was admitted to the lazaret. The first sign of illness was a macula which covered the right ear and cheek; this occurred in China; it went away; it returned after he had come to Australia; some time afterwards the fingers of the left hand began to contract. *State.*—Hair normal; maculæ are still visible, though very faint, on both cheeks, and that on the right is very slightly depressed. Cannot close his eyelids, nor at all move the lower lip, which is everted; the eyes are quite healthy. There is a dark brown and roughened macula on left shoulder tip. On the trunk are many large patches of pale but scarcely white skin, which are surrounded and well defined by delicate, narrow, rosy, and slightly mottled borders. *Right hand.*—The phalanges have either entirely disappeared or nearly, except the first row, which is permanently flexed. The left arm was amputated about three years ago, because the mutilation of the hand had become extreme and was attended by deep ulcerations from which a profuse and offensive discharge flowed constantly; the wound healed well, and the scar is normal. The right foot is not much deformed; it is slightly brown, the skin rough and peeling, and the toes a little shortened and bulbous towards the extremities. The left foot is dislocated at the ankle-joint, everted, and drawn up until it lies parallel with the bones of the leg; he stands (though seldom, and with difficulty) on the end of the tibia; the toes and foot are even less deformed than on the right side. *General health.*—Good. *Special senses.*—Unaffected, except sensation.

CASE 23 (unpublished).—Mrs. L— lived at Camden, near Campbelltown, suffered from L. tuberosa, and died in 1885; if not a native had lived in New South Wales from a young age (this was a well-known case, but no exact details have yet come to light; from Dr. E. Chisholm and Dr. G. Goode).

CASE 24.—G. H—, m., æt. 37, Chinese, a labourer, admitted October 27th, 1884; Sydney; transferred to a lunatic asylum. April 2nd, 1885. Form (?)

CASE 25.—K. K—, m., æt. 24, Chinese, a labourer, admitted December 21st, 1884; Bathurst. Form (?)

CASE 26.—J. B—, m., æt. 51, West Indian (coloured), admitted September 22nd, 1885; from Bermagui; discharged December 29th, 1885, at his own request, there being then no power to detain him. Form, L. tuberosa at an early stage. (This patient has not since been heard of.)

CASE 27.—A. Y—, m., æt. 29, Chinese, a gardener; admitted December 23rd, 1885; Sydney. Form (?)

CASE 28 (unpublished).—About 1884 a white woman was cut up by a tram in the streets of Parramatta. She was taken to the hospital,

and at a consultation held upon her case (during which she died) the late Dr. James Smith pointed out to Dr. Waugh that she was suffering from L. tuberosa. Dr. Phillips, who was present, first mentioned this occurrence to me; and Dr. Waugh recalled it on being questioned. I cannot doubt that the matter happened as described; and Dr. Waugh, late R.N., had become acquainted with leprosy during cruises among the islands. But I have failed to find any record of the case (the hospital books for that year being lost), or any further details.

Case 29.—Chek Bo, æt. 32, admitted January 29th, 1886. *History.*—Chinese, is a gardener; arrived at Sydney 1885, and has lived in the suburbs ever since. Can tell nothing as to beginning of illness. *State.*—Hair normal; left cubital nerve moderately enlarged, not tender; the right about normal in both respects. Both hands show wasted interossei, and both palms have the skin thickened, dry, and slightly cracked; fingers of left hand are permanently contracted *en griffe*, and some phalanges have slightly lost bone by absorption; the right hand is not deformed. On the trunk, arms, &c., are several large and well-marked maculæ, discrete, oval, of a very light cream colour, and bordered by a narrow red band which consists of papules and a darkish-red erythema. The feet are very slightly swollen, and the toes slightly altered from the normal; they are not deformed; two carry small, indolent, and shallow ulcers. The external popliteal nerves are apparently normal. The orbicular muscles of the face are under control.

Case 30.—A. S—, m., æt. 42, Chinese, a tin miner, admitted February 20th, 1886; Cooper's Creek. Form (?)

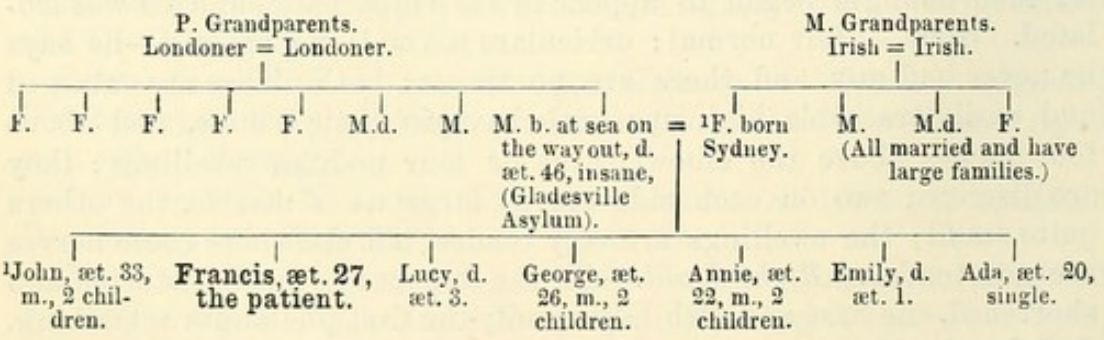
Case 31.—Charlie Taskill, æt. 29; admitted August 14th, 1886. *History.*—A native of Java; was a sailor; gives an imperfect account, but seems to have arrived in Victoria about twelve or fourteen years ago; afterwards he lived at Parramatta for several years; while there was engaged in gardening; at some date before 1886, but not long before, his right arm became weak and painful when he laboured with it; then changes began to appear in his right hand, and he was isolated. *State.*—Hair normal; orbiculars normal; no maculæ—he says he never had any, and there are no traces; both ulnars are enlarged and easily traceable high up; both have in their course, and about four inches above the elbow, three or four nodular swellings; they are discrete; two on each side are as large as a marble, the others quite small; the swellings are very tender, but elsewhere these nerves are not tender. *Right hand.*—All the fingers are much distorted and shortened, the first and fifth having only the first phalanges remaining. *Left hand.*—Nothing of the fingers remains, except the first row of phalanges; the thumb is stiff and displaced. The palms are flattened. He presents no other symptoms. His general health seems good, appetite and sleep are good, and he is industrious.

Case 32.—A. L—, m., æt. 44, Chinese, a gardener, admitted May 20th, 1887; Bathurst. Form (?)

Case 33.—Yek Sing, æt. 31; admitted April 20th, 1888. *History.*—

Chinese; a carpenter; arrived in Australia, at Sydney, in 1881; lived one year at Vegetable Creek (Emmaville), two years at Newcastle, the rest of the time in Sydney. The first sign of illness was a macula on the left foot, and that appeared in 1886. *State.*—Hair normal, except outer half of left eyebrow; a macula extends under the whole eyebrow, but only the outer half is thinned; ears normal; control of orbicularis of face imperfect, but at present he can just completely close the eyelids; there are maculæ on the face, of which latter the features are naturally thick and heavy, but are now also expressionless. The maculæ on the face and others over the trunk, thighs, arms, &c., have all the same character; they consist of undulatory margins half an inch wide, dark red in colour, and desquamating, which run in bold curves, and enclose large areas of skin of normal appearance; on the trunk these maculæ are unusually large, not numerous, and quite distinct from each other. The right ulnar nerve is enlarged, hard, and round, easily traceable high up, not very tender, and on pressure sensation is referred upwards as well as downwards. The fingers are rather distorted than mutilated, but the phalanges are slightly shortened by absorption, permanently flexed *en griffe*, the interossei wasted, the palm flattened, and power of voluntary motion but slight. The left ulnar is very greatly enlarged, and especially so from a short distance above the elbow, more sensitive than the right, and on pressure sensation is referred upwards and downwards; the left hand is much less deformed than the right, the interossei less wasted, the power of voluntary motion defective, but present in useful degree. Both peroneal nerves are enlarged; the right is not more than normally sensitive, the left is extremely sensitive. The left foot is discoloured brown at many points, the toes almost gone, and the power of voluntary motion almost wanting. On the right foot there are only a few maculæ; there is no deformity; voluntary motion small, but the limb useful. General health reported good.

Case 34.—F. G—, æt. 27, admitted August 21st, 1888. Pedigree:



History.—He was weakly during infancy, but has had no important illnesses. He lived with his parents at Penrith, Goulburn, and Bathurst until he was eleven years old; the family then came to Sydney, and he

[1] These persons were examined by me and were in good health. No constitutional disease reported in this family.

has lived there ever since. On leaving school he spent one year in the service of a cordial-maker; he then helped his mother, who kept a restaurant; his duty was to buy vegetables in the markets (frequently from Chinese), and he did this for another year or more. At about seventeen he became a carter, drawing building materials; and after a time he began to learn plastering. After some months of this work, during which his chief business was to beat up bullock's hair and mortar with a trowel, and being between nineteen and twenty, he found the trowel had broken the skin over the outer side of the right forefinger; with this sore his present illness is said to have begun. The finger swelled; it never recovered its natural size or appearance. According to his brother's account, anæsthesia of the hands and feet was among the earliest symptoms, it being observed that he sometimes burnt or injured himself without being aware of it. Three or four years later he had an attack which is now described as erysipelas and rheumatic fever, and from it general swelling and distortion of his hands and feet date. Two years later still he began to get a disease of the eyes, which has produced opacities of the cornea and adhesions of the iris, and has rendered his sight very imperfect. Lastly, a few months ago, he tried to cut his throat, but his mother and brother said that they saw no reason at the time to suppose him insane. The patient's family have always been in comfortable circumstances. He says he was never much in the habit of eating fish; was not very fond of it; ate it occasionally like other people.

State.—The mask is reddened—slightly, uniformly, without brown tinge, and looks rather as though it had been rouged and well powdered afterwards; the reddening ceases at the hair, except on the temples, where it stops a little short of the hair; it extends all round the neck. The skin of the face is loose and inclined to fold; it shows everywhere rather fine wrinkles, which are nearly longitudinal; they do cross each other, but at very acute angles. There is general thickening and distortion of the features; the nose is broadened and flattened, and the alæ appear to have lost substance, although they are said to have never ulcerated. There are numerous tuberosities in several situations, but most upon the cheeks; they are hypodermic, scarcely visible, but are very easily felt. The ears are not much deformed; there is no prominence of the brows. The scalp is unaffected, and covered with thick silky hair; eyebrows gone; eyelashes gone; he has no beard or whisker. The whole trunk shows a brownish red or dirty red mottling, which is not very strongly marked. Both hands are considerably swollen, bluish-red, and the fingers sausage-like in shape. Right hand: the first phalanges can be extended and flexed; the second row is permanently flexed; the third row is not distinguishable, but the nail-grooves and some firmly attached small fragments of nail remain; the thumb is similarly deformed, but not quite so much. Left hand: the changes are the same, but not quite so great; more of the nails remains, though they are altered. The legs show brown maculæ and brown mottling; on the right shin, from the insertion of

the patellar tendon downwards, is a row of cicatrices of old ulcerations. The feet are not so swollen nor so deformed as the hands. *Special senses.*—The sight is now quite gone (opacity of the corneæ); hearing good; smell (the left side of nose is permanently closed, the right only as a rule, but when the latter is free) is almost absent; voice hoarse and without quality; but there is no dyspnœa. *Sensation.*—There is general analgesia, but sensibility to an ordinary touch is present. I have detected no area absolutely anæsthetic. I found no spot on which he could distinguish between the prick of a pin which drew blood and a touch with the head. *General health* said to be perfectly good; seems strong and well nourished. He has no attacks of ill-health, and no pains.

Case 35.—Ah Hu (or Yu), æt. 29. Admitted September 30th, 1888. *History.*—Chinese; a gardener and tin-miner; arrived at Brisbane in 1885; stayed there three months, then removed to Tingha, New South Wales, a tin-field; came to Sydney from Inverell Hospital, central to his district. The first sign of illness appeared on the left temple, some time after he had settled at Tingha. *State.*—Hair entirely gone from face, thin and patchy on scalp, where, however, no leprotic condition is visible. Both ears are swollen, elongated, and bluish; the right only affords distinct neoplasms in the lobe. The face is enormously distorted by large tubercles and by dermic infiltrations which leave deep sulci between them; the colour is ashen-grey, rather more inclined to black than usual; tuberosities enlarging the end of the nose and the upper lip have lately ulcerated, and the septum of the nose has partly disappeared. The forearms and hands are swelled by hard œdema, and stained a deep copper-brown; along the extensor surface as far as the wrists and tending to the outer margins of the arms are numerous large tuberosities, which are now in process of absorption. The cubital nerves are slightly enlarged and slightly more than normally tender; but there are no deformities of the hands. On the trunk are numerous copper-brown maculæ, now not well defined at the edges; on the back the skin is roughened, desquamating, and dry, but not atrophied. The feet resemble the hands; the legs show no tuberosities. Sensation is almost wanting from a short distance below the knees; elsewhere also it is altered in usual ways. The voice is husky.

Case 36.—Lum Pak, æt. 18. Admitted December 22nd, 1888. *History.*—Chinese, a carpenter; arrived in Australia, at Sydney, in 1887, and has always lived at Sydney. The first sign of illness occurred just at or immediately after arriving, and was a rather large macula on the left thigh; about twelve months afterwards tuberosities began to appear on forehead and forearms. *State.*—Hair on scalp normal; gone from face. The latter is greatly distorted by large tuberosities and infiltrated patches, of a dark copper-brown colour; ears enlarged, elongated, and distorted. The trunk is covered with brown mottlings, not well defined nor separated from each other, and not in any instance deeply infiltrated, though many are quite slightly thickened or swollen. Forearms and hands are chiefly of a dark copper colour, the hands

swollen by hard œdema, bluish, cold to the touch, though not felt to be cold by the patient, and much numbed; on the posterior surface of hands and wrists are several small tuberosities, discrete and well rounded, in size from a pea to a hazel-nut; on the posterior and external margin of forearms are several much larger and less firm neoplastic deposits, which are of a purplish copper-brown. Feet like the hands, but no tuberosities about them or the legs. Special senses and voice unaffected, except sensation. He has pretty frequent attacks of feverishness, and then feels ill.

Case 37.—Hoy Kee, æt. 28. Admitted March 23rd, 1889. *History.*—Chinese; is a tin-miner; arrived in Sydney 1878, lived at Emmaville one year, and then seven at Tingha, whence in 1889 he went to Sydney and was isolated. While at Tingha he first observed maculæ on right hip and on the left side of abdomen, which are still visible as achromatic areas; but he cannot say that they first appeared then, nor whether they were present while he was still in China. Tuberosities appeared first about four years afterwards, and on the face. *State.*—Ears slightly enlarged and elongated, no tuberosities; hair gone from face, normal on scalp; features slightly swelled in general, and expressionless; soft parts of nose much sunken, and alæ partly destroyed by ulceration; upper maxilla prominent. Over both olecranon processes the skin is thickened, voluminous or baggy, and ulcerated. Ulnars moderately enlarged, and rather tender. Some fingers of both hands are permanently contracted; the interossei are wasted; the hands are flattened, and the skin of both palms is thickened, dry, harsh, and cracked. The trunk shows but few and not easily traceable achromatic areas, but in general the skin is atrophied, roughened, and desquamating. The legs and feet are slightly swollen, the skin shiny, deep brown; the toes slightly crumpled; at anterior end of first metatarsal bone of left foot and at the outer or inferior surface, is a deep ulcer which reaches to the bone; it is very slowly healing at present. *Special senses.*—Apparently unaffected, except sensation.

Case 38.—H. B—, æt. 17, admitted December 17th, 1889. Pedigree:

P. Grandparents, Irish.

[1]Father born at Penrith, New South Wales. Always lived in New South Wales. = [1]Mother born at sea before arrival in Australia. Lived always in New South Wales. (M. Grandparents, English.)

H. B—, the patient (and nine other children in good health), born and lived always on the Meroo River.

History.—The boy's father, formerly a publican, is now a selector and labourer, living on the Meroo (Mudgee), and has always been in fairly comfortable circumstances. This is an old gold-field, and there have always been Chinese there within his recollection; but communication of this family with them has always been strictly limited to purchases of tea and sugar, and occasionally such articles as boots from a store kept by some of them. Those who keep the store are said to have been

[1] These persons were examined by me and were in good health.

there very long and to be well. All other conditions seem to have been those usual in the bush. Fish was very rarely to be got, and canned fish was very seldom tasted by this patient. Until 13 years of age (1885) he was well, strong, intelligent, and active. The fingers of the left hand then began to contract, and the muscles of the forearm wasted somewhat, so that a doctor supposed he had injured the limb, and that it was wasting from disuse. Next, blebs appeared on the fingers, and loss of sensation to a small extent was observed. At about 15 years of age (1887) discoloured spots of reddish-brown colour appeared on the trunk, and afterwards on the extremities; under some treatment these disappeared or nearly disappeared a few months later, but they reappeared of a pure brown colour without the reddening. The right hand and foot in the meantime had become contracted and swollen, and lastly, about the age of 16 (1888) his face began to get discoloured, to swell, and to be disfigured.

State on admission.—The face is disfigured by an irregular swelling or infiltration, which is rather hard; a few distinct tuberosities are to be seen; in colour it is uniformly reddened, but more deeply in places, so that it looks patchy; the nose is broadened and thickened, the eyelids thickened, the brows prominent; the ears have the lobe slightly thickened, and not hardened, but the tragus is both thickened and hardened, and proportionately more deformed. *Eyesight* unaffected. *Hands.*—The fingers on both sides are contracted moderately and thickened; there is swelling or thickening at, and immediately above, both wrists. *Feet.*—Right foot is generally swollen and deformed, but the toes are only slightly contracted; it is discoloured (reddish or purplish); a blister appeared on the sole about a year ago, which broke, healed, appeared again and healed, and at last left an ulcer, which is now present. Left foot, discolouration only. *Trunk and limbs.*—These show very numerous patches of discolouration of irregular shape, which are of a quite clear brown, of the same shade as the back of a sunburnt hand; there is no reddening of these patches. They are anæsthetic, but the patient (as usual) denied this until he was shown that he could not distinguish between a touch with the head of a pin and a prick with the point.

Eighteen months later the following additional notes were made:—The whole mask is now enormously distorted by prominent, large, and more or less distinct tuberosities; it is very red, of a rather bright tint; the redness ceases where the hair of the scalp begins; both sides of the hypertrophied and flattened nose are generally stopped up, but sometimes are free; the ears show many lepromata, especially about the lobes; the hair of the scalp seems normal, although dry and not very thick; the eyebrows are almost gone; the eyelashes broken and short, or wanting; hair present and normal in armpits and on pubes (the maculæ mentioned below do not infringe upon the hairy surface, although they approach it very closely). The hands are much swollen (firm œdema) and of a bluish red; the fingers are sausage-like; they cannot be completely flexed; the nails are present; there are a few

neoplasms on the ulnar side of both forearms, and on both elbows; the skin of the back of the neck is thickened, red, and infiltrated. All other parts of the body are covered with maculæ: these, over the trunk, arms, and upper part of thighs, are of a dirty red colour, rather faint and mottled; on the lower part of the thighs and on the legs they are bistre-colour, leave no unaffected skin between them, or scarcely any, and are not uniform in tint, but mottled; there are among these latter patches many islands of matt white (achromatic) skin of different sizes, up to an inch in diameter. The feet are swollen, bluish-red, and slightly distorted. *Special senses.*—Hearing, taste, sight, and smell (when the nose is not stopped) seem normal. *Sensation.*—The achromatic patches on the legs are less sensitive than the bistre patches; in general, sensation to touch is said to be normal; at no part examined can a prick with a needle be distinguished from a touch with the eye end; there is therefore pretty complete analgesia everywhere, but not complete anæsthesia anywhere. There is no hyperæsthesia, nor any shooting-pains. *General health.*—Uniformly good; strength good. *Development.*—As this patient was undoubtedly attacked before the usual date of puberty it is necessary to note that the genital organs are well developed, and that pubic hair is present in usual quantity; his voice, however, although probably not affected by laryngeal disease as yet, is not virile, nor yet merely a boy's voice. Perhaps it may be described as "virile, but entirely without *timbre*." The tongue, mouth, and fauces show nothing.

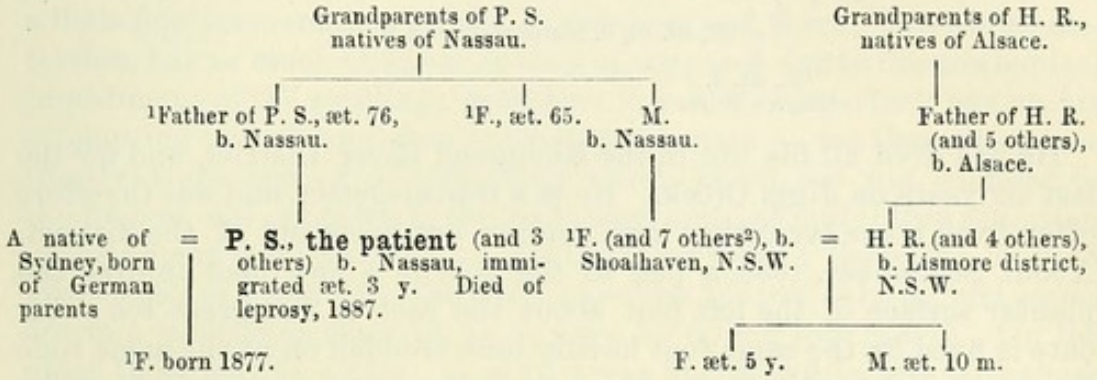
Case 39.—H. R—, æt. 28 (and P. S—, deceased; see Case 11), admitted August 8th, 1890.—The case of this patient should be read with that of P. S—, deceased, which accordingly is placed first. The details are from an extensive inquiry made on the spot among the many relatives of both men.

The case of P. S—, deceased.—L. S— immigrated from the Duchy of Nassau in 1855, bringing with him three children, of whom P. was the youngest, and aged about three years. The family travelled to Shoalhaven, and lived there till 1871. They next removed to the Richmond River District, and ever since have lived there in the neighbourhood of Jiggi Creek. P. was then about nineteen. He became a timber-getter; and he continued to live in the same neighbourhood, and to work in the surrounding district until prevented by increase of the illness which caused his death. His absences from the district were by way of holiday only; they lasted only a few weeks; and he did not travel out of New South Wales. About the age of twenty-three (1875), he was rafting timber, when he scratched his leg under the water in which he was wading at the time. This injury ulcerated, and healed, and broke out again several times. He showed it to a druggist, who suspected disease of the subjacent tibia; but no bone exfoliated. This ulcer having once more healed, he married at the age of twenty-four (1876). A few weeks afterwards it opened, and I suspect that he was never again well from that time; but all that seems certain is that about five or six years after marriage (that is, about 1881–2) he became

too ill to work any longer. I found it impossible to get a trustworthy account of the progress of his illness during the five or six years which followed the injury; but the sequence of symptoms was given by his younger brother, who lived with him during the last five years of his life (1882–7), as follows: First, the injury and ulceration mentioned above; next (the interval of time not being guessed at), a red patch on the same leg; then a breaking out of the skin over the knees and elbows; shortly afterwards, ulceration of the finger-tips and fingers, which lost their nails, and of the toes; the hands and feet became numb; the fingers became outstretched and stiffened; the ears were not affected, although there was a small ulcer at one time behind the lobe of one of them. About three years before death his sight began to fail, and was gradually lost; and he died, aged thirty-five, in March, 1887, or, as it seems, twelve or thirteen years from the receipt of injury to the leg. An authentic account of his state at the end of 1886 is contained in a report by the Government Medical Officer for the Lismore District (Dr. Bernstein), under date December 21st, 1886. He says: "Loss of sight complete; both eyes covered with a thick white film. Nasal bones apparently decayed, as the bridge of the nose has nearly disappeared. Voice husky and harsh, showing extensive mischief in the larynx. Hands swollen considerably, covered with bluish, glossy skin; all the nails disappeared, the colour about the roots darkish brown, some of them discharging a very offensive matter, others apparently dried up, the fingers being all outstretched without possibility of closing the hands. The toes present a similar appearance, with the exception of one, which is covered with dried-up nail. Below the right knee is an open sore, with a very offensive discharge. . . . He informs me . . . that about 1882–3 he went to Sydney and entered a hospital, whence he was transferred after a few days to one of the asylums for the infirm and destitute poor; but after a week his relations were communicated with by the authorities, ordering him to be removed, the reason assigned being that he was a leper." I discovered nothing which distinguished this man's course of life from that usual among other persons of similar position and occupation; but, on the other hand, a good deal which showed that as to association, diet, labour, exposure to weather, and the like, it was the same as that common to all who live and work in the bush. The country, both around Shoalhaven and around Lismore, is well watered, and broken by hills and ranges between which fertile valleys lie. Shoalhaven is on the sea on the east coast in S. lat. 34° 50′, the latter in S. lat. 28° 42′. Malaria is not (now, at all events) met with in either neighbourhood; and the difference of latitude, which carries with it a slight difference of mean annual temperature, seems to be the main distinction between the two.[1]

[1] Nevertheless, at a much later date I discovered that P. S— had been in communication at Shoalhaven in and before 1891 with a man (W. J. T—), the cause of whose death in Sydney Hospital during 1873

Communication between the present patient, H. R—, and P. S—, deceased.—I found it loosely asserted by relatives and friends that H. R— was a cousin of P. S—. The following table shows what the connection was, and that there was consanguinity only between P. S— and the children of H. R—. Pedigree:



It is difficult to form any useful estimate of the degree in which these two men were associated. After a rather prolonged inquiry on this point among the relatives and friends of both, I concluded that it was small, and, speaking generally, insignificant. The R— family preceded the S— family in settling on the Richmond River; but from arrival of the latter the several branches of both lived near each other and were associated as neighbours and as fellow-workmen. H. R—'s own statement that he "was not in P. S—'s house six times during the two or three years they lived near each other," which were the latter years of P. S—'s life, was borne out upon the whole by testimony of several independent witnesses. But he was present after P. S—'s death, and assisted J. D— and J. S— to place him in his coffin, even if (as he alleges) he had nothing to do with preparing the body for burial. As for wearing apparel which P. S— may have left behind him, I feel tolerably certain that H. R— had none of it, and that it was disposed of by burning or burial. It may be added here that I saw and examined P. S—'s father, mother, brother, aunt, wife, and child (æt. 13), who all occupied the same small cottage with him while he lived, as well as other persons less closely associated with him during life, and that none showed any signs of disease.

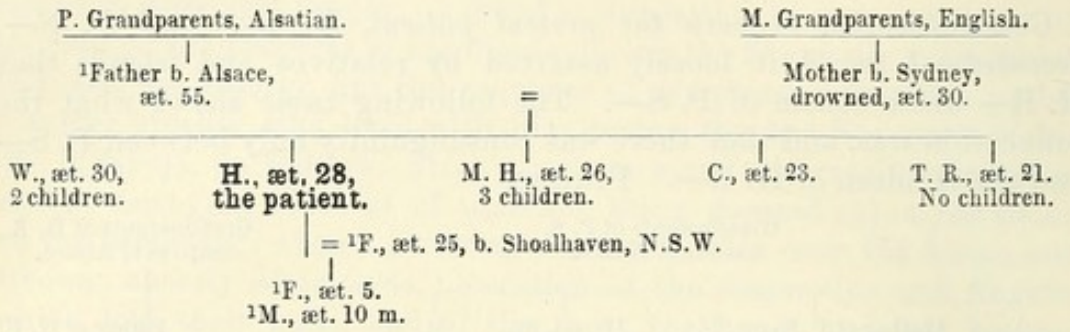
History of the present patient, H. R—.—The following history of H. R— before his admission to hospital is from information furnished by himself, his father, wife, and other relatives or connections who were in the habit of seeing him frequently. Pedigree:

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was registered as "constitutional syphilis," but who may possibly have been a leper. The matter is not free from doubt; but for all the known details the reader must be referred to the Appendix to the N.S.W. Board of Health Report, made under the Leprosy Act, for the year 1894, dated 1895.

[1] These members of the S. family were examined by me and were in good health.

[2] Some of these seven were examined by me and were in good health.



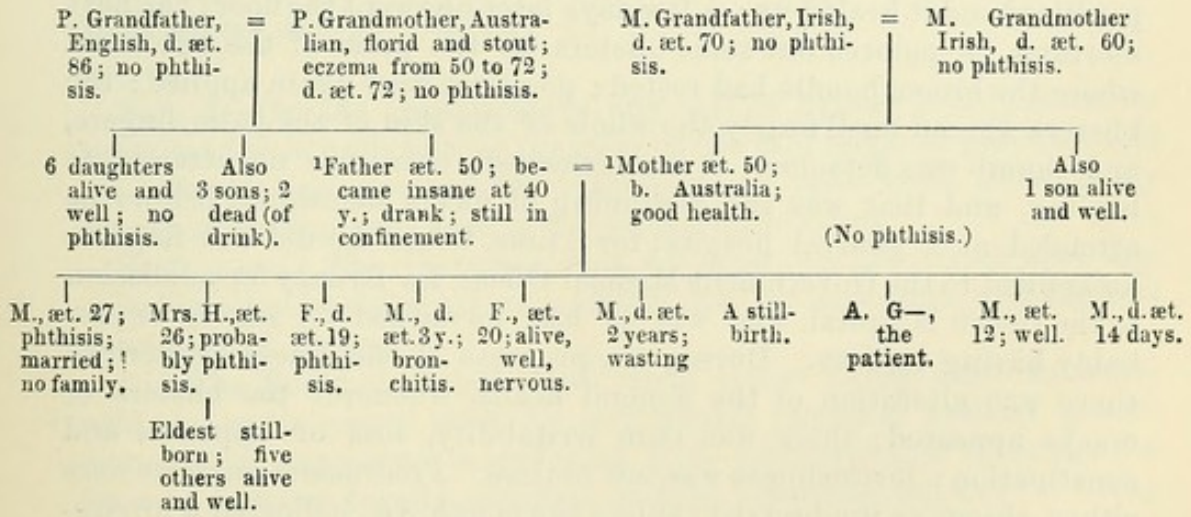
He has lived all his life in the Richmond River District, and for the last six years on Jiggi Creek. He is a timber-getter, and was therefore often from home for rather long periods, but never out of the district. About September, 1888, a peg in the sole of a new boot injured the plantar surface of the left foot about the root of the great toe; this date is fixed by the same foot having been trodden on at the same time by one of a team of bullocks which he had recently purchased from his father. An ulcer followed this injury; and although it healed up it broke out again from time to time (and is still present). He was not observed to have anything else the matter with him, either constitutionally or locally, until about August, 1889; a change of colour or reddening about his forehead and eyelids was then noticed (but his father and his wife thought that swelling of the hands was the first symptom, and that the reddening accompanied by swelling round the eyes followed very soon). He was well able to continue at work, and about the beginning of 1890 he engaged in clearing some swampy land several miles away. He continued at this occupation for three or four months. During these months the symptoms described below began to make appearance, and, as he then saw that he was suffering from a progressive disease of some kind or other, he went to Sydney.

State on admission.—Æt. 28; height, 5 feet 9 inches; weight, 10 stone; well-nourished and strong in appearance. Has been married eight years, and has two children; his wife never had any miscarriages. He denies all feelings of illness. There is a soft, puffy swelling of the upper eyelids and over the cheek bones; the skin is hyperæmic in the same situations; the swelling is quite soft, and without feeling of thickening or hardening; perhaps there is slight anæsthesia, but this remains uncertain. The brows are not prominent. On causing the light to fall obliquely on the cheeks, three rounded elevations become visible on the right cheek, the uppermost of which is an inch or so below the malar swelling mentioned above. One spot is three-eighths of an inch in diameter; the other two are smaller; they are not indurated; their surfaces do not look smooth, but incline to nodulation. The ears are unaffected. The upper part of the body presents only one patch of discolouration; this is about four inches in diameter, and covers the tip of the right shoulder; it is reddish, and perhaps brownish: it is not uniformly coloured; it is distinctly anæsthetic; the

[1] These persons were examined by me and were in good health.

difference between a touch with the head and a prick with the point of a pin upon it could not be perceived, although the touch was felt. The hands (of which the backs are covered with warts of moderate size, and flat at the top) are uniformly swollen and reddened; this swelling is accompanied by hyperæmia of the skin, and is easily seen; there is a little fine desquamation of the cuticle here and there; there is no distortion, but as much stiffness as may be supposed due to the mechanical impediment of the swelling; sensation is said to be perfect, but on his attempting to pick up a small object it appeared to me that there was (firstly) some loss of co-ordinating power which was not confined to the fingers, but extended to the right arm, and (secondly) that sensation in the fingers was impaired. As for the lower part of the body—on both knee-caps are scars. On the right knee-cap the scar is large, and seems due to a laceration, received, as he says, by falling over a box. On the other there may be a scar; he says it was burnt, and he sets both these injuries at about a year ago. But the appearance presented is not exactly or not alone that which would be left by such injuries. On the left leg are three circular brownish spots, which are anæsthetic, and the skin over them is very thin; he says there have not been sores there, but the appearance is that of the brown cicatrix over a healed ulcer. The feet are swollen like the hands, but not quite so much. At the root of the big toe of the left foot, on the sole, is a small circular ulcer covered with scab. On the heel of the right foot is a large and recent chafe, by which the cuticle has been entirely removed; he says he got this a week ago while ploughing in old and ill-fitting boots, and that he felt it at the time of injury. There is no distortion of the feet.

Case 40.—A. G—, æt. 14; admitted August 18th, 1890. Pedigree:



History.—Was born in Sydney in 1876, and always lived in one or other suburb, except a short visit to Melbourne. His father was a man of some little property, who drank to excess; ten years ago (when the patient was four years old) he became insane, and is still in confinement; the circumstances of the family have always been fairly good.

[1] These persons presented no signs of lepra.

They habitually bought vegetables from Chinese traders (in common with nearly every other family in Sydney), but none of them had any other communication with Asiatics than this customary dealing. The patient attended school from the usual age. He has always slept with his mother, because he was afraid in the dark; and she (chiefly) has dressed his sores. He was fond of fishing, and of fish; and he ascribed his illness to a bite he had from a cat-fish in the left hand shortly before it began.

History of illness furnished by his mother.—At ten years of age (1886) went with his family to Melbourne, where he stayed seven months; while there he had a cough, attended with a good deal of expectoration, and he wasted: on returning to Sydney he thoroughly recovered. At about twelve years (1888) he had some water-blisters on the fingers of the left hand, which broke and left small ulcers; he lost two nails; the attack lasted two months, and then the ulcers quite healed; soon (or immediately) after this, contraction of the fore and middle fingers was noticed, and a little later some wasting of the forearm; he attended at a general hospital for a few weeks; after this only some cracks occasionally appeared about the fingers; so far no other parts of the body were affected. At about thirteen years (1889) he one day drew his attention to his left heel, because he "thought there was something the matter with it;" it was seen that there was a considerable collection of matter under the hard skin, and when it was let out it smelt very offensive. The fingers of the left hand contracted more and more; next a macula was observed on the left buttock, then on the right buttock, and later still on the left arm and forearm; about three months ago an ulcer appeared on the left palm; it was poulticed and it healed up; a few days later he swept the floor; the next morning he pointed out some blisters on the palm of the left hand where the broom handle had rested; poultices were again applied; the blisters spread until nearly the whole of the skin of the palm, fingers, and thumb was detached; it was removed; there was no attempt at healing, and that was the beginning of ulcers mentioned below; he attended at a general hospital for a time, but as he did not improve he applied to the Government Medical Officer for Sydney for admission to the Coast Hospital, and was by him forwarded for survey as probably having leprosy. During the progress of the illnesses described there was alteration of the general health whenever the blisters or cracks appeared; there was then irritability, loss of appetite, and constipation; feverishness was not noticed. *Prodromal symptoms* were either absent or unobserved (unless the cough, &c., indicated a prodromal phase). *State on admission.*—He is an intelligent boy, small for his age, and without any indication of approaching puberty; he is still afraid in the dark; temperament lymphatic, with reddish hair (resembling his paternal grandmother in this respect, and in features); the upper eyelids are slightly full or swollen; he has had ophthalmia; the swelling is apparently not œdematous; there is a circular, red, and desquamating patch, about the size of a shilling, over the right

orbit, which is not anæsthetic; the left shoulder-tip and arm on its outer side show a continuous discoloured patch, not raised; it runs on to the left forearm, nearly the whole of which it covers; its colour is brownish and reddish, not uniform, mottled; the margins are rather strongly marked and serpentine. The left hand has all the second and third phalanges of the fingers contracted, stiffened and wasted; the index finger has lost its nail; the thumb is wasted and contracted; from all these fingers, the thumb, the palm, and a part of the dorsum, the cuticle is gone, and there is a shallow ulceration which varies in depth at different parts; there is no pain at all, and he says that it would not hurt him however it might be handled. On the nates are two tolerably symmetrical maculæ, of a rather deeper shade than that on the arm, and having strongly marked (or well defined) serpentine edges; the left leg has numerous smaller maculæ, rather resembling in colour that on the shoulder than those on the nates; all other parts of the body are unaffected. *Sensation.*—The maculæ on left shoulder and arm are distinctly analgesic, and so is the apparently healthy skin of this limb; the maculæ on the nates and legs are analgesic, but less markedly than the first-named part; sensation to touch remains, but he cannot at any of the parts named distinguish between a prick and a touch with a pin. *Special senses.*—Unaffected.

On November 26th, 1890, "An Act to provide for the notification of cases of leprosy, for the detention and isolation of lepers, the appointment of lazarets, and for other purposes," was assented to. Until this date there had been no law at all regarding lepra. The more important provisions ran as follows:

Sect. 3.—On the appearance of any case of leprosy in any house or premises the householder or occupier of the said house or premises, and also the medical practitioner attending the case, *shall* immediately report in writing such case to the proper authorities. . . .

Sect. 4.—(i.) The Governor may by proclamation direct that any suitable place be set apart as a lazaret for the reception and medical treatment of lepers. . . .

(ii.) The Board of Health *shall*, upon report being made as aforesaid, or upon report made by any legally qualified medical practitioner that any person is suffering from leprosy, cause investigation by two or more legally qualified medical practitioners, and on being satisfied that such person is suffering from that disease, *may* order that such person be removed to and detained in such lazaret until released by order of the Board, or be isolated in such place and in such manner as the Board may direct. . . .

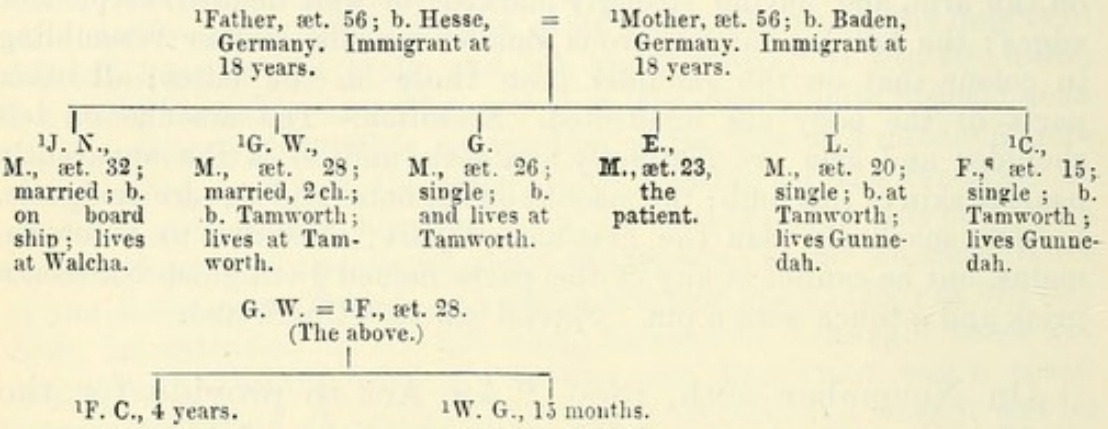
Sect. 6.—The Governor, upon recommendation of the Board of Health, *may* make and issue regulations for carrying this Act into effect. . . . Any person, not being a leper, who shall wilfully

disobey . . . any such regulation, &c., &c., . . . shall for every such offence be liable to a penalty not exceeding twenty pounds. . . .

Sect. 7.—Proceedings under the Act may be taken in a summary way; on conviction, penalty recoverable by distress and sale, &c.; in default of sufficient distress imprisonment with or without hard labour for any term not exceeding six months, unless the penalty and costs be sooner paid.

CASE 41.—(Unpublished.) During 1891, Ah Chin, who resided at Emmaville, was reported by Mr. H. G. A. Wright, of Sydney, to be suffering from L. tuberosa. He escaped, and has not been heard of again.

CASE 42.—E. U—, æt. 23, admitted January 16th, 1891. Pedigree:



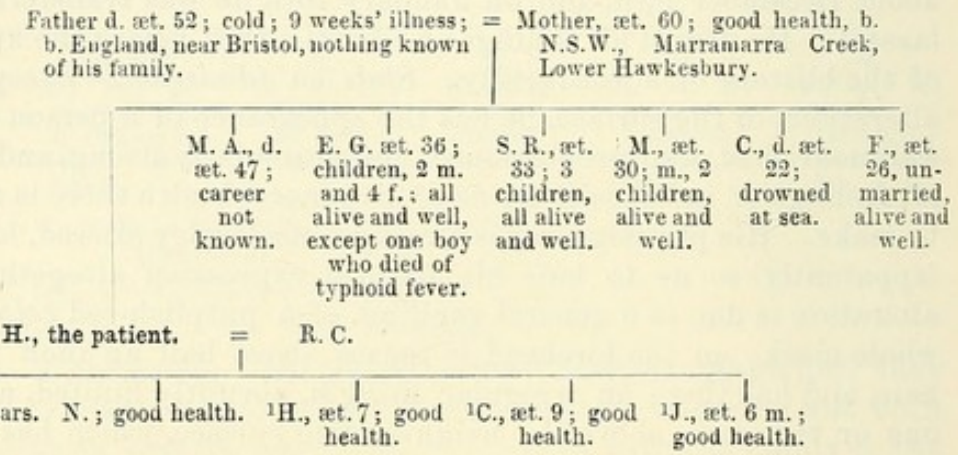
History.—Unmarried. His parents first lived at Singleton; they removed to a place twelve miles from Gunnedah, where he was born (1868); at eleven years of age (1879) he removed with the family to the town of Gunnedah; he became a labourer or bush-hand, and his chief occupations were fencing, shearing, and droving; he was always employed at different stations in the Gunnedah district, but once travelled sheep to Queensland, whence he returned to Gunnedah by way of Brisbane and Sydney; for four and a half years past has been employed on Wondooba run, and he left for Gunnedah only after his illness had become pronounced. Careful inquiry failed to elicit any circumstances which would distinguish his course of life from that common to others who live in the bush; he says he never had special communication with Chinese or other Asiatics; he was not fond of fish, had rarely opportunity of eating fresh fish, and has but seldom eaten canned or salted fish. *History of illness.* (From his own account, corrected by that furnished by his adult relatives at Gunnedah.)—In 1884 he had a whitlow, and lost the ungual phalanx of right index finger; the nail is present and normal, and the joint has without doubt been injured as alleged. He has had no other illnesses. In August, 1889 (the date being fixed by his having taken a stallion into Gunnedah to the show then held there), he had a small crop of blisters on the back of both hands, which "came of themselves," were not painful, lasted about a

[1] These members of the family were examined by me, and were in good health.

week, dried up without breaking, were unattended with ulceration, and have left no scars. At the same time the backs of the hands were puffy and the puffiness remained after the blisters had healed; at the same time (or at the latest a few weeks afterwards according to his relatives), there was a slight puffiness and redness about his eyes. He himself thought that all these swellings, after their first appearance, went away; but his relatives seemed certain that they remained, and stationary, until about the end of October, 1890. There was then some increase of the redness about the eyes and face, and of the swelling, and that caused him to consult a neighbouring doctor; syphilis was (and is) denied; however, he was treated with mercurials, and within a few weeks there was improvement. A little later still there was an exacerbation; the doctor's suspicions were aroused, and he was recommended to enter a general hospital in Sydney. He was admitted about December 25th, and on January 16th he was transferred to the lazaret. He denied all feelings of illness either before the appearance of the blisters or subsequently. *State on admission.*—Except for the alterations of the surface, he has the appearance of a person in health, well nourished, well proportioned, and muscularly strong, and he denies all feelings of indisposition; as to his general health there is no remark to make. His physiognomy is already considerably altered, but not yet (apparently) so as to hide his natural expression altogether. This alteration is due to a general swelling, of a purplish-red colour, of the whole mask; on the forehead it ceases about half an inch below the hair, and has there an irregular margin, abruptly limited, and raised one or two mm. above the neighbouring surface, which has a normal appearance. His nose is thickened and broadened; his lips thickened. Everywhere nodosites may be distinguished by oblique illumination, beginning to rise above the surrounding surface; the ears are of a bluish cast, rather bluish white than bluish red, slightly thickened in the lower half, and slightly distorted. These appearances cease about the margin of the lower jaw. His hands and his wrists about as high as over the articulation are uniformly swollen, and are reddish; the fingers have a sausage-like appearance; there are no traces of the vesicles of two years ago. The trunk and limbs (except the feet) show very numerous pale brown maculæ; these are thicker on the thighs than on the arms and trunk, and thicker still on the legs; in point of size they are, generally speaking, larger where they are fewer; on the body are many which are three or four cm. across, while on the legs there are perhaps none broader than one cm. or one and a half; two only, being large maculæ near the left shoulder, have acquired a white centre within which the skin is matt, and quite different from the normal white skin between the maculæ; the brown shade of colour is that of a sun-burned arm, but not quite so deep, and more transparent. The feet and ankles showed on January 16th a swelling not distinguishable from ordinary œdema; it was, however, not quite symmetrical, there being a distinctly larger swelling over the outer malleolus of the left leg. This swelling was quite different, both in distribution and in

consistency, from that of the hands; and three weeks later it had nearly disappeared. During the three weeks of detention in the general hospital his temperature, observed twice daily, remained normal (with irregular fluctuations not exceeding half a degree), and his urine was then normal in quantity, acid, without albumen, and its specific gravity 1020. *Sensation.*—He thinks that it remains natural; on examination it is found to be greatly dulled everywhere, and nearly gone at points on the face; but merely dulled elsewhere, not much, and so that it is not possible to distinguish greater sensibility of normal skin on the trunk between the maculæ, than on the maculæ themselves. Except the forehead, it should be noted that on January 16th the greater swelling of the left ankle seemed more markedly anæsthetic than any other part examined.

CASE 43.—H. S—, æt. 41, admitted January 23rd, 1891. Pedigree:



History.—Was born (1850) in the Lower Hawkesbury district, on Marramarra Creek, and lived there for a few years; the family then removed to Windsor, not many miles away and on the Hawkesbury, and he resided there for a few years; they returned to Marramarra Creek, and after an interval went again to Windsor. After this, H. left Windsor at the age of 18 to go to sea (1868); he spent three years in coasting-vessels, but never went out of New South Wales; his residence during these years was in Sydney. He returned to the Lower Hawkesbury (1871), where he engaged in boat-building, oyster-fishing, and running a ferry-boat. About 1877 he married and went to Sydney; he again went to sea in coasting-vessels, then returned to the Hawkesbury, and finally went once more to Sydney about 1886, and resided there until he died. Ate much fresh fish and oysters from time to time. Has had no serious illnesses. *History of illness.*—In 1877 had successive crops of boils; they lasted about a week each, and healed in a usual way; they were believed to be common boils; they appeared on the back of the neck, on the upper part of the trunk, and elsewhere, not selecting any particular region. About this time, but after the eruption of boils had ceased, he was engaged for some days in getting out cargo from a vessel partly submerged in Darling Harbour, Sydney;

[1] These persons were examined by me, and were in good health.

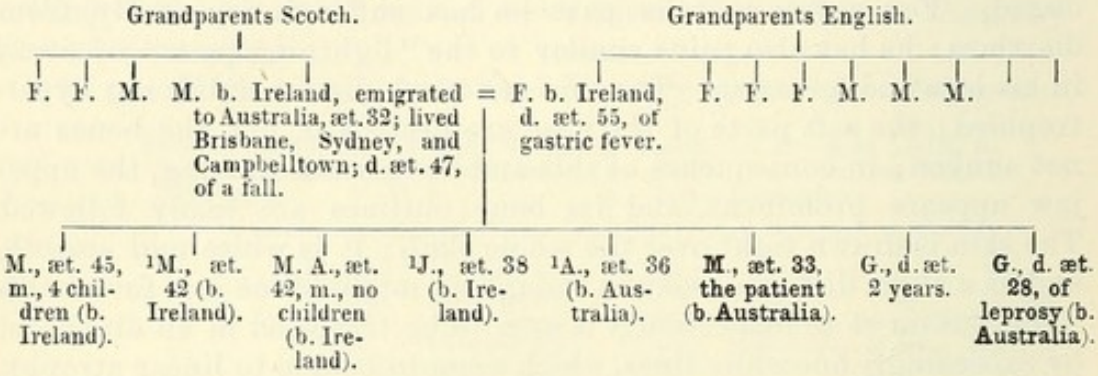
he was much in the water for several days. A month after this his wrists began to swell, and his nose became, and continued to be obstructed; later, swellings appeared in different features—eyes, ears, nose, &c.; but it was eighteen months before his physiognomy began to alter (1879), and after so altering he never recovered his natural appearance. During that time he had repeated attacks of feverishness, and severe sharp pains in the legs; he was laid up by them for a month at a time, and after each attack had an interval of apparent good health. His sight remained unaffected until six or seven years later 1885-6; then the right eye was invaded, and later still the left was attacked. *State on admission.*—He is very weak, and very much emaciated. For a few months past he has suffered repeatedly from diarrhœa: he has also pains similar to the "lightning-pain" of ataxy in his legs and forearms. The ears are much distorted, but not hypertrophied; the soft parts of the nose are destroyed, but the bones are not sunken; in consequence of this and the general wasting, the upper jaw appears prominent, and its bony outlines are easily followed. The skin is drawn tight over the whole skull; it is white and smooth, and at a short distance looks as though it might shine in a favourable light, but on close inspection it is seen to be traversed in all directions by exceedingly fine white lines, which seem to be due to linear atrophy. The body is emaciated in an extreme degree; the skin is wrinkled and roughened; it shows many large, ill-defined patches of a pale reddish-brown colour; elsewhere it is of something like clay colour. The fingers and toes are very much distorted and useless; the joints are displaced in several different directions; they show large, irregular, superficial ulcerations; I did not examine them closely enough to say whether any bones had been absorbed, or were wasting, but apparently neither had happened. As to sensation, he was under the impression that it remained normal, but after an imperfect examination I ascertained that it was uniformly dulled, but was not altogether lost anywhere. However, the ulcerations mentioned above were said to be painless. The right eye was almost useless, the left was affected to a less extent; upon the whole he could see tolerably well. His memory was quite clear, and he talked well and without apparent fatigue. He died February 4th, 1891.

Case 44.—Ah Lee, æt. 30, admitted February 6th, 1891.

History.—Chinese, a gardener; arrived in Australia, at Sydney, in 1884; lived in Sydney two years; the rest of the time, until admission, at Newcastle. The first sign of illness is said to have been seen a year before he was examined for isolation, and to have consisted in slight tuberosities which appeared over the right superciliary ridge, the right malar bone, and the right ear. *State.*—Hair of scalp normal; nearly fallen from eyebrows and beard; face much infiltrated, but showing a few tuberosities; ears infiltrated and full of small neoplasms; body and extremities, but especially below elbows, darkened to an unusual extent, and of a dull copper brown; in addition there are on the trunk very many nearly confluent round dark brown discolourations,

with fading edges about 1½ inches in diameter, as well as some much larger, beneath which is a thick bed of infiltration; these are, in fact, flat, nearly circular, lepromata. The hands are enlarged and stiff from firm œdema, but not deformed; the fingers still taper a little; the right ulnar is slightly enlarged, rolls under the finger, is easily traceable high up; the left is bigger; neither is much more than normally sensitive; on pressure, sensation is on both sides referred upwards and downwards; both peroneals are enlarged, the left twice as big as the right; in both sensation is referred above and below.

CASE 45.—M. R—, æt. 33 (and G. R—, deceased, Case 15), admitted March 11th, 1891. Pedigree:



The case of G. R—, deceased.—The following account is taken from information furnished by his sister and his brother separately, and from the case-books of Dr. P. Sydney Jones, of Sydney, whom he consulted on dates mentioned below. Was born at Campbelltown, thirty miles from Sydney, in 1861. He lived there until about 1868, when he removed to Sydney. About 1870 he went to Adelaide, S.A.; in 1880 he returned to Sydney, and he died there in 1889. He was always weakly. At about six or seven years of age (1867–8) he suffered from a chronic submaxillary or cervical swelling; this lasted two years, more or less, and receded without suppurating; at ten or eleven years (1871–2) he began to suffer repeated attacks of nose-bleed, and had brown patches on his body, which remained. At about eighteen (1879) his face swelled; this swelling disappeared, but not long afterwards returned and remained; at about the same age his voice altered as from disease, but intermittently, and from about twenty-four (1885) he could speak only in whispers; he lost his eyebrows, the hair of the scalp used to fall out, and became thin. He was 5 feet 11 inches in height, and "manly;" his voice altered in the usual way at about fifteen, and was a man's voice subsequently; but he never got either beard or moustache. Dr. Sydney Jones diagnosed this case in 1881, and furnished the following notes, with which the above account agrees nearly:—"December 16th, 1881, G. R—, æt. 19.—Said he had been ill twelve months, with breakings out on face, wrists, and legs, which were better and worse from time to time. Tubercles on various parts of

[1] These persons were examined by me, and appeared to be in good health. There was no family history of constitutional disease.

skin; reddish-brown colour; parts of the face scaly; some anæsthesia; features enlarged, ears and nose notably so; no syphilis. Leprosy." "February 2nd, 1882.—Said the remedies had cured sores. Seemed slightly better, but there was not much change. A tuberculous condition of mouth and larynx; hoarse." "December 22nd, 1882.—During this interval the throat has become seriously diseased; he spits large quantities of yellow matter, and occasionally blood." "April 26th, 1883.—Voice still very hoarse; does not complain of sore throat; thick scabs on hands, wrists, and face, not on trunk: tubercles of mouth and throat not changed." He did not after this date come under the same observation. The beginning of this case cannot (according to the several accounts) have been later than the tenth or eleventh year of age; but, apparently, development was not markedly interfered with, and it would seem that the usual puberal changes took place.

History of the present patient, M. R—, æt. 33.—She was the chief and almost the only attendant upon her brother G. R— during his illness.[1] About eight years ago (1883) she had a sore heel, attributed to a tight boot, which lasted about three weeks, and healed perfectly. There was no other sign for about a year; then discoloured spots were seen on the legs, and afterwards red spots on the face, which never quite went away (1884); later, brownish or reddish-brown spots and patches appeared over the body; she lost her eyebrows four years ago (1887); two years ago her voice was affected, but it recovered; about a year afterwards it altered again, and has remained whispering and stridulous ever since. A written note by the physician already referred to runs as follows:—"March 22nd, 1887.—Disease began about three years ago; whole body tuberculous; anæsthesia." Both this patient and her brother are said not to have much cared about fish; may be said to have eaten it, but rather less than ordinary.

State on admission.—Prodromal symptoms and illness during the eruptive stage are both denied. The face is deformed by moderate general swelling, and not large tuberosities; the brows are not very prominent, but the eyebrows are wanting; many tuberosities have ulcerated and gone, and have left behind them more or less circular, shallow cicatrices, over which the skin is white, and in some cases a little indrawn or puckered; the soft parts of the nose are nearly gone, but the bones seem intact; the ulcerated edges of the nostrils are indrawn, and this retraction has also involved the upper lip at its junction with the nose, whence the skin is tightly drawn over the upper maxillary bones; the tongue is large, red, fissured both longitudinally and transversely, and has two or three mucous plaques like those of syphilis, towards the tip on the left side. The ears are much de-

[1] But after this statement, made by M. R— and her sister and brother, had been published, Dr. Sydney Jones communicated to me a later note than any given in the text, which he had found in one of his case-books and which ran as follows:—"Has two sisters, who have been in much closer attendance on the brother (G. R—) than herself."

formed by tuberosities of moderate size. The general tint of the face is dull red, inclining to yellow, and there is some desquamation. The hands are enlarged by hard œdema; the fingers can be brought only to right angles with the palm, and not bent upon themselves (permanent extension of all three rows of phalanges); no phalanges have disappeared, but all the nails are deformed; there is fixed extension of the first phalanx of one or two fingers, and lateral displacement of one or two ungual phalanges; the skin is roughened, desquamating, reddened, and (on palmar surfaces) bluish, fissured everywhere, discharging so as to slightly resemble eczema, at some points slightly ulcerated and offensive. The forearms and elbows show numerous tuberosities, chiefly on the extensor surfaces. The feet resemble the hands, but are not quite so much damaged; she walked without apparent difficulty. On the upper part of the chest are some large patches of a rather deep reddish-brown tint, which extend over all the body; among them are small islets of matt white; symmetrically placed on the lower half of each breast is a small and superficial ulceration in a state resembling a healing burn; these are the only ulcerations, except as above noted. *Special senses.*—Sight weak (uses spectacles), but there is no appearance of invasion of the eyes; hearing good, taste and smell said to be good. Voice whispering and stridulous. *Sensation.*—The hands are sometimes painful and irritable; undid upper buttons of dress with right hand without great difficulty, and replaced them; sensibility to a touch remains, but there is analgesia, and on the upper part of the chest the patient could not distinguish between the maculæ and apparently healthy skin when both were tested with a pin. *General health.*—Fairly good; only rises at 1 o'clock; once a week takes a short excursion by steamer or train; every three or four weeks she becomes low-spirited, and has lassitude, diarrhœa, and bleeding from the nose; menstruates regularly and normally, and at the times just mentioned; appetite very good, but prefers fruit, vegetables, and milk.

Case 46.—Tommy Wood, æt. 29. Admitted August 6th, 1891. *History.*—Chinese, a cook; arrived in Australia, at Sydney, in 1879; has lived at a great many different places—at Emmaville; Stanthorpe, Queensland; Wilcannia; in the north-west on the Darling; and last at Narrandera in the south-west, whence he was admitted. The first sign of illness consisted in spots which appeared on the forehead about the beginning of 1891. About 1889 he contracted a sore on the foreskin, and gonorrhœa; he says that this was not followed by any secondary eruption or general illness, and he recovered after a few weeks. *State.*—Is well nourished, and not apparently suffering from any general indisposition. Shows maculæ of several different forms. The face exhibits brownish maculæ, which are raised above the general surface. The ears are normal and small. The eyebrows seem to be a little thinned towards their external ends; I am not satisfied that this is due to his disease. There is nothing on the scalp. There are old-standing reddish lines on the forearms—on the left side on the extensor, on the right on the flexor surface mainly; they are serpentine, a

quarter to half an inch broad, reddish brown, and enclose islets of bleached skin of a white resembling the normal European white skin, and not matt. All over the upper arms and the trunk, back and front, and on the legs and thighs, are very numerous white maculæ from the size of a pea to 1 or 1½ inches in diameter; the margins are very slightly but distinctly raised, and slightly reddened; some of the larger ones have a pink diffuse central spot, around which the white part appears as a broad margin. I was informed that this reddening appears after the white patch has formed. There are also a few maculæ which have the two colours in such proportion that they may be described as red spots with a narrow white margin. All of these white maculæ are said to have appeared since his admission. On the right loin, a few inches from the median line, is a large oval patch, 5 inches by 3½ inches, which is singularly coloured in distinct zones; the centre is pinkish, and is almost completely bounded by a reddish-brown band, which has the cuticle roughened; outside that is a dirty zone (without any red tint) which fades to white; next to the white is a red zone; and outermost is a white zone, which becomes brownish at its margin before it fades off into the natural yellow of the skin. Tests of sensibility applied to back of right shoulder towards the tip and the upper back part of the arm on the same side, showed conclusively that he could not distinguish between head and point; he guessed right only once out of very many times. Both cubital nerves are very distinct, swollen, and hard, about the size of a cedar pencil, and roll very freely under the finger. His fingers were very numb, so that he could not pick up a pin from a table, but had to slide it to the edge before he could seize it. Two months after his admission an eruption of bullæ suddenly appeared, and lasted for a week; it was confined to the legs, the face, and the back of the hands.

Case 47.—Quoy (or Woy) Cheong, æt. 40, admitted August 27th, 1891.

History.—Chinese, a gardener; arrived at Brisbane in 1882, but after ten days proceeded to Sydney, and has since remained in that neighbourhood. At some time during 1889 three small lumps appeared on his forehead; some months later his whole face began to get lumpy; and thus he was admitted after about two years' illness. *State.*—Hair entirely gone from the face, normal on scalp; ears enlarged in general, moderately swollen, elongated, and show some small neoplasms. Face is very much distorted by numerous distinct tuberosities, and by leprous infiltration; the colour of the surface is for the most part ashen-grey, which here and there gives place to something approaching the normal colour, or to a redder shade. Over the trunk (back and front), arms, and thighs, &c., are very numerous brownish tumours which are thickly infiltrated areas or lepromata; they usually average 1½ inches in diameter, and are raised above the surface. The hands are slightly swelled and bluish, the skin rough and desquamating. The legs and feet are both moderately swelled, shiny, and discoloured deep brown, as usual. The extremities are not deformed (except swelling). The eyes were attacked

a few weeks ago by a smart inflammation, attended by neoplastic deposits on the iris; at present the corneæ are nearly opaque—he can distinguish light from darkness, but not much more. *Voice.*—Unaffected. *Sensation.*—Disturbed as usual.

CASE 48.—Ah Hee, æt. 35, admitted February, 1891.

History.—Chinese, a storekeeper; arrived in Australia, at Sydney, in 1875; lived one year at Mudgee, fourteen years in Sydney, more than a year and a half at Mudgee again. The first sign of illness was a round spot the size of a halfpenny on the right cheek-bone, and this appeared somewhere about 1885 or 1886.

State.—Hair of face and scalp, ears, and orbicular muscles of eyelids and mouth, normal. Both ulnar nerves are moderately tender, and both are enlarged, but the right is twice as big as the left; it can be traced easily almost to its origin. The forearms from a little way below the elbows are covered with small brown maculæ which give them a mottled appearance. Both hands have the interossei wasted and the skin hard and dry, the index fingers much shortened (or almost gone on the left side), the other fingers deformed; the right hand is much more mutilated than the left, the first phalanges contracted, the others in great part gone. The trunk shows only one macula on the back, oval, about two and a half inches in its long diameter, of a very faint cream colour, and limited by a delicate, rosy, narrow, marginal line, which at its external margin is brownish. The legs are mottled like the arms, but to a less extent, the maculæ being rather widely separated. The feet are nearly normal in appearance and colour, but the second phalanx of the left great toe has been partly absorbed. *General health.*—Good, but has lost all liking for meat.

CASE 49.—Johnny Lumby, æt. (about) 26, admitted December 8th, 1891.

History.—A native of Tanna, Solomon Islands; arrived at Maryborough, Queensland, in 1882, under three years' labour engagement to a sugar-planter; at end of term elected to stay to work as a free boy, and went to a plantation near Southport, Queensland, for one year; to another on the Tweed River, New South Wales, for three years; and finally for two years to another on the Clarence River, New South Wales, whence he was transmitted to Sydney for isolation. At beginning of his engagement on the Tweed, or about 1887, noticed a single tuberosity (no longer present, or represented only by some little infiltration, but described by him as having been exactly like other tuberosities now visible elsewhere) on the outer side of the upper part of the right forearm; and then nothing until, during his stay on the Clarence (1889–91), a single tuberosity appeared over the outer part of right eyebrow. *State.*—Hair of moustache, beard, and scalp, normal; fallen from outer halves of eyebrows; normal on inner halves, although these are full of not very well-developed tuberosities. Ears normal. Superciliary ridges both prominent, but tuberosities larger and more distinct in outer halves, and most so on right side; on the cheeks are numerous discrete well-defined young neoplasms; the features are not

deformed (except superciliary ridges), and there is no intra-orbital swelling. The right forearm, mainly over its extensor surface and along its inner border, is much infiltrated and thickened, and at points of the infiltrated area many large and distinct tuberosities are present; on the left forearm are a good many young, smallish, and distinct tuberosities, and a less degree of infiltration. The right ulnar nerve is markedly enlarged, and easily traceable high up, but not more sensitive than normal; the left is not so large, but much more (though not excessively) tender. Both external popliteals are enlarged and tender, more so than the ulnars, but not excessively. The trunk, arms, thighs, &c., are uniformly mottled with small contiguous or coalescent maculæ of a lightish yellow colour, which contrast strongly with his natural black skin. He shows nothing else. Health undisturbed; appetite and sleep good; is cheerful and industrious.

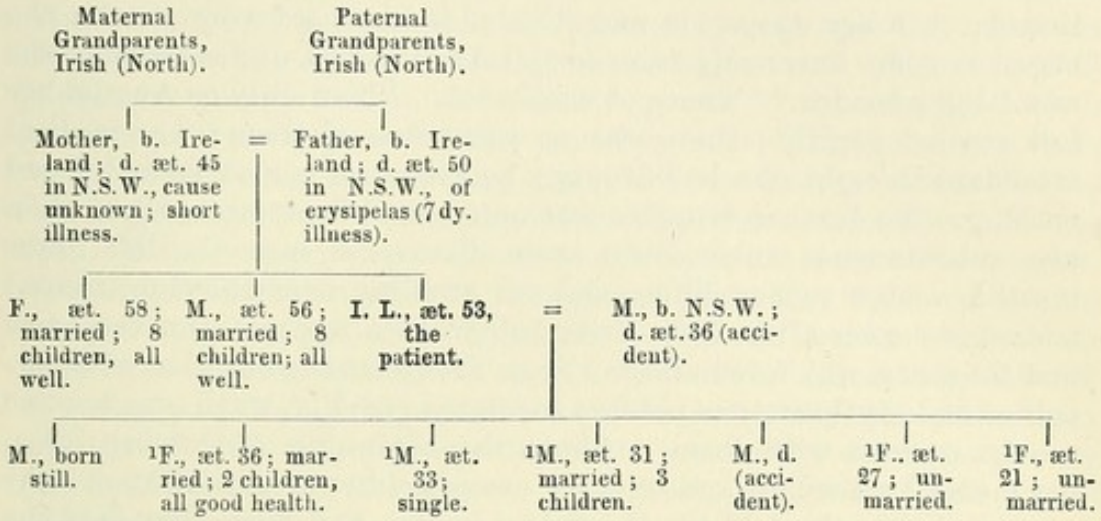
Case 50.—R. W—, æt. 47, admitted December 24th, 1891. Pedigree:

Mother, English, Kent; d. æt. 54 (suddenly) in 1856. =			Father, unknown.	
William; d. æt. 50—probably drink.	Margaret G., æt. 64; married. 6 children; 5 children married, 4 have issue.	Henry, æt. 60; has 5 children; some married, and have issue.	James, æt. 50; has 8 children; some are married, and have issue.	**Richard, æt. 47, the patient.** Married at 22; had 1 child, lived a few hours.

History.—Was born (1844) at Windsor, New South Wales; removed to Maitland during childhood, and lived there until he was twenty-two, when he married; he was then occupied in carrying. Afterwards he wandered about the country in the north-west, engaging in shearing, fencing, mail-coach driving, bush-carpentering, &c.; but he lived in, or had his headquarters at, Walgett for nine years (1875–84), and Moree for seven years (1884–91); and was living at Moree until he went to Narrabri for advice, and was thence sent down to Sydney as being a leper. For the last eight months only he has got his living in part by catching (river) fish. He believes his wife is in good health. *Clinical history.*—Had nothing at all the matter with him until seven years ago (1884). Was then about to begin shearing when he stabbed the base of the left thumb with the shears; a jet of blood followed; the wound was plastered with Friar's balsam and bound up; the next day he began shearing. About three weeks afterwards he first noticed that his left hand was numb; and in the course of the next few months he found that he was liable to injure that hand without observing it at the time; thus he burnt the thumb deeply with a soldering iron without pain, and burnt the little finger deeply with a cigar, and discovered it otherwise than by pain. He noticed no other signs until about the fifth year from the numbness of the left hand (1889); he then ran a nail into the sole of the left foot just over the first tarso-phalangeal joint; this injury ulcerated (and is still scarcely healed two and a half years afterwards). After this his left foot swelled, and has since remained swollen. In the meantime his left hand and forearm so far lost sensation to pain that one night when a log rolled out

of the fire against his arm he was roused only when the upper arm began to burn, the forearm and elbow being by then deeply burnt. Then two years ago there were floods, during which he was much exposed to wet; he caught cold, and has been hoarse ever since. He says that there was no swelling or distortion of the face until nine months ago; the right foot began to swell somewhere about the same time before or afterwards; he cannot say when swelling of his hands began. *State on admission.*—Hair very thin on scalp, and on the occiput is gone, though not from ordinary baldness; the scalp is rough, but not discoloured; eyebrows gone; no beard or moustache; says he shaves, but very little hair can be felt; the mask is generally swollen, but the forehead is free; superciliary ridges slightly prominent, and at outer end of each is a largish, ill-defined, soft swelling, which infringes on the orbit; cheeks swollen, but smooth, the left slightly larger than the right; nose so swollen as to have entirely lost its proper shape, and to be smooth and shining; lips much swollen; the chin has on each side of median line two largish soft swellings; the general colour is brownish about the forehead; elsewhere moderately red, or normal, with a cast of blue. The ears are considerably enlarged, chiefly as to the lobes, thickened, slightly bluish, the sulci a little blurred. Generally over the body the skin is atrophied and wrinkled, dry or even scaly and dirty-looking; it is yellowish-brown without much variety of shade; there are no distinct maculæ, but some large areas—the front of right thigh, for example—are of a brighter brown than the rest. Both hands have the palms covered with horny cuticle, which is fissured, and both are swollen by firm œdema, chiefly as to the fingers, and not excessively; colour bluish, of moderate intensity; the *right* hand is not deformed, except by firm œdema of the fingers; the *left* is much more swollen than the right; the swelling more decidedly involves the carpal portion and over the wrist-joint, and all the fingers have lost their terminal phalanges. On both elbows the skin is voluminous, thickened, and roughened. Over both knees are soft swellings and scars of old superficial ulcerations; the feet are uniformly swollen; at base of left great toe is the imperfectly healed scar of a perforating ulcer; in the left groin are some enlarged glands. *Sensation.*—Anæsthesia is most nearly complete over the feet and left hand, but there are other patches about the body where it is not very far from perfect; no hyperæsthetic patch was detected. *Special senses.*—Sight and taste are normal; is slightly deaf; smell—the nostrils are permanently closed. The voice is very husky, and he sometimes has slight attacks of stridulous breathing; on the soft palate are large red patches, and in the centre a whitish patch. *General.*—Has never had any nose-bleed, nor any drowsiness; and, as to lassitude, has worked and has maintained himself steadily; but during two years past has had attacks of feverishness, and since his hand began to be numb he says he has perspired as usual only about as far as the waist, below which he perspires at all events very little, if at all. Appetite and sleep are good.

CASE 51.—I. L—, æt. 53, admitted December 8th, 1891. Pedigree:



History.—She was born at Annandale, a suburb of Sydney: she lived with her parents in several neighbourhoods in or close to Sydney; married at about eighteen; moved to the city of Sydney about 1855, and lived there until 1888, when she removed to a suburb of Sydney, where she still resides. Has always suffered from flatulent dyspepsia of varying severity, and still suffers from it. At about twenty-two and at thirty years of age she had attacks of erysipelas (of which her father is said to have died), from both of which she perfectly recovered, and at about thirty-three, lead-poisoning (water); she has had no other acute or serious illnesses. She has had seven children, of whom the first was born still at six months. Her husband was killed when she was thirty-two years old (or in 1870). After his death she had to work very hard to support her children, but she was never in any sort of want; and she got her living by dealing in haberdashery in a small way. She has habitually dealt with Chinese for vegetables, like everybody else, and never had closer communication with Chinese or other coloured people. She does not remember having heard of or seen any other person suffering from leprosy, or at all as she is suffering. As to fish, she did not like it, but ate it sometimes.

Clinical history.—She continued in her usual health, which was deranged habitually by flatulent dyspepsia, until 1889; menstruation then began to be irregular, and she suffered more from headaches than had been usual. From that date to the following there seems to have been no other disturbance than usually attends upon the menopause. In April, 1890, she went to Brisbane to visit relatives; she stayed about three months; towards the end of her visit she noticed a circular red patch on the flexor surface of the right forearm; it looked to her and her friends like ringworm, for which they took it. She returned to Sydney in June, 1890; she was depressed by leaving

[1] These persons were examined by me, and were in good health.

her relatives. After she had been some time at home she said that she became "melancholy," and distinguishes this from the depression mentioned; then her dyspepsia and flatulence increased very much; she began to suffer extremely from occipital headaches, and sometimes she was "light-headed." The spot continued. About July or August her feet swelled greatly; there was no numbness of them; her medical attendant thought she had dropsy; he examined her urine and found nothing. No further eruption was noted until September, 1891, when two subcutaneous tuberosities were discovered over the left lower maxilla, and a rather diffuse and red swelling over the right frontal eminence; soon afterwards little tuberosities appeared on the arms and forearms, which remained. From that date the eruption of tuberosities and erythematous patches increased steadily, until she became nearly covered with them. About the beginning of October, 1891, her medical attendant and another examined her in consultation; she was exposed to the cold for about two hours; and from that date she began to have pains. These she describes as felt in the legs below the knee, and in the forearms below the elbow-joint; there was a severe burning apparently in the skin, and also sharp, or neuralgic pains; both were constantly present, and prevented walking, but were worse at night. From the same date the eruption increased greatly, the neoplasms becoming more prominent and the redness more marked. Four or five weeks ago (November, 1891) she had an attack of feverishness, which was supposed at first to betoken the onset of influenza, then epidemic; but it was afterwards thought not to be influenza. She has had no drowsiness nor lassitude; her nose never bled in her life; she perspired as usual. *State on admission.*—Says that when she went to Brisbane she weighed fifteen stone; she is now spare. She also says that her complexion has always been very high; her hair is iron-grey. *The mask* is very red, but not uniformly; there is slight general swelling, such as does not much alter her appearance; her nose is more swollen; she has diffuse swellings over the forehead, which are in consistency from elastic towards doughy; there are many discrete tuberosities which are almost entirely subcutaneous, easily distinguished by touch, not to be seen except by oblique light. *The ears* are generally enlarged; they are slightly or moderately swollen and thickened; the natural folds are distinct but blurred; there are two or three separate, rather diffuse swellings in each, which have not the hardness nor the sharp limits shown by lepromata elsewhere on the body. *Special senses.*—Sight, hearing, taste, and voice are normal. *The body* is nearly covered with small discrete tuberosities, and with erythematous patches of red and reddish-yellow discoloration; on the whole the tuberosities are thickest on the outer aspects of the limbs. The erythematous patches have no distinct margin—they seem slightly thickened towards central parts where the colour is deepest, and the latter fades away and then increases again to brightness and thickening at some neighbouring point without any interval of white skin. On the right forearm the original spot is visible just below the bend of

the elbow and on the flexor aspect; it is nearly circular; it is dirty red and roughened in the centre, which is about half an inch in diameter, and is surrounded by a dirty brown band about three quarters of an inch wide, over which the skin is atrophied and wrinkled. *Both hands* are greatly swollen as far as the wrists by an œdema which is not firm nor yet quite soft; they are of a rather bright red, and there is no blue tinge; the swelling and numbness prevent use. *The feet* are in the same state; there is no distortion of the extremities. *Sensation.*—This is everywhere disturbed in the usual way. The original spot seems almost anæsthetic, though not perfectly; other red maculæ are generally analgesic, and sensation is dulled; some maculæ on the legs, not distinguishable by appearance from other neighbouring maculæ, are highly hyperæsthetic (that is to say, the tests being carried out with pins and needles in the usual way, a firm touch with the head of a pin on these spots gave great pain, while close by the difference between a firm touch with the head and a prick with the point that drew blood could not be distinguished). She complains of disagreeable numbness of hands and feet, and of pins and needles in the legs occurring independently of pressure. From the elbows and knees downwards she still has the severe burning pain in the skin and the acute intermittent neuralgic pains which began ten or eleven weeks ago; they prevent sleep and locomotion. No part of the skin was found that had normal sensation, even in places nearest to natural in appearance. *General.*—She has lately menstruated again after an interval of three or four months. She dresses late in the morning and lies down most of the day; her general strength is fair; her appetite about as usual.

Case 52.—Ah Su, æt. 28, admitted March 24th, 1892.

History.—Chinese; is a cabinet-maker; has been six years in Australia, and always in Sydney. One year ago he had gonorrhœa (he took no medicine, used an injection, and got well in about six weeks), but not syphilis, as far as could be made out. *History of illness.*—About October, 1891, he got very weak, and two small patches, like but smaller than he now shows, appeared on the right and left cheek close to the ala of the nose. He took some Chinese drugs, and the patches disappeared in about a fortnight, but he continued very weak; he also had pains in his limbs, which from his description seem to have been rheumatic in character. After a time the pains disappeared as long as he remained lying down, but standing brought them back. About January, 1892, he placed himself under the care of a European doctor, who has attended him to the present date; his strength has not improved. A fortnight or three weeks ago the original spots on his face reappeared, but were much larger and plainer than at first, and at the same time many other and similar spots came out both on the face and on the trunk and limbs. *State on admission.*—On the right side of the neck are four or five achromatic spots close together, of which the largest is about three eighths of an inch in diameter; there are no other spots of this character. The site of the original spot on the right side of the

face is now marked by an erythematous patch about an inch in diameter; it has a rather irregular but well-defined edge, is slightly but not abruptly raised above the adjoining surface, and by oblique light has a lumpy appearance, which, however, is not distinguishable by touch. That on the left side is now represented by a large patch of erythema about 2½ inches by 2, of which the edges fade off rather gradually. On the face, arms, hands, feet, and legs there are a large number of similar maculæ, all of which are tumefied, and distinctly though slightly raised above the surrounding surface; one of them, near the right elbow-joint and on the outer side, is several inches in its long diameter. The lobes of the ears are almost or quite normal. *Sensation.*—He passed his finger-nail over many of the patches, in order to show that they were painful; there is, nevertheless, marked anæsthesia and analgesia of all the patches, as tested in the usual way with a pin. *Special senses.*—Unaffected. *General health.*—He is rather anæmic, but well nourished, and without obvious appearance of ill-health. But he has general muscular weakness; he cannot walk; he can stand on two feet, and on one with support of one hand, but only for an instant, and standing causes general pain over the lower extremities; in order to get off his bed he moved his legs with his hands: his power of squeezing with either hand cannot equal more than a few pounds. His appetite is good; he sleeps well sometimes, at others very badly; for the latter he attempted to give a reason, but it was unintelligible. A few days later it was ascertained (pilocarpine) that the sweat-glands had markedly diminished function over the maculæ.

April 20th.—On the face are numerous slight elevations on the maculæ, which are young tuberosities; the lobe of the right ear, which was almost or quite normal before, is now slightly deformed by a cluster of small and soft neoplasms. The maculæ on the body and limbs are now of a deep bistre-colour; they are much more clearly raised above the surrounding surface; they are shedding silvery cuticular scales very freely, which leave behind them elliptical ragged edges near the macular margin; they are no longer tender to a touch with the finger-nail, but are slightly tender when pinched up gently between the fingers. A pin being deeply stuck into one macula behind the right ear, he started quite naturally though slowly; he started in the same way when touched firmly with the head at the same part twice; and then, after showing him head and point, and explaining by an interpreter that he might be touched or pricked, he was touched only—when he started as at first, then stopped and hesitated, and, in short, did not know whether he had been pricked or touched. Muscular power has returned to a large extent; grip of right hand is now fairly strong, of the left much better but below normal; he cannot walk, but he now moves his legs about on the bed without difficulty.

June 29th.—He died; he got rapidly weaker during the last few days of his life; there is no record of other changes. His treatment was *nil* during the first month, and ordinary diet; during the other two months gurgun-oil emulsion, which he took irregularly. At some

time after the first month the slight tuberosities, which then were observed to be beginning, disappeared.

CASE 53.—C. D—, æt. 24; admitted April 30th, 1892. Pedigree:

Scotch = Scotch. | [1]W. L. D., m. æt. 58; b. England. = English = English. | [1]A. B., f. æt. 63; b. England.

J., d. in infancy.	A. D., b. 1857; 5 children.	M., d. æt. 1.	S., d. æt. 11 years.	[1]W. E., b. 1864; M.: 4 children.	C., d. in infancy.	E. A., b. 1865; M.; no children.	**C., b. Gunnedah, 1886, the patient.**	W. D., b. 1871.

Was born at Gunnedah, New South Wales, in 1868; always lived there, and has been away only for a visit to a town on the same line of railway, to various places in the bush within a radius of twenty miles or so, and once to Sydney as mentioned below. He was apprenticed to his father, who is a carpenter and undertaker, and has worked at his trade down to the date of admission. He had a quite casual, or street acquaintance with E. U. (Case 42), who seldom went into the township. *History of illness* (from parents, a brother, and hospital record).—At the end of 1886 or beginning of 1887 he and his brother were loading stone, when he crushed the little finger of his left hand; the nail came off. About this time, and while his finger was still sore, he helped in the course of business to coffin a Chinese, who was said to have died of blood-poisoning.[2] The wound healed in a usual way, but soon afterwards he discovered the finger was numb, although he retained muscular control over it, so that a pin could be stuck deeply into it without causing the least pain. After this he had some superficial ulceration about the fingers and toes; then a chronic swelling of the feet, by which he was obliged to wear slippers, and which lasted several or many weeks. Early in 1888 he noticed some small brown blotches on his legs, which in the course of the next few months spread over the trunk. At the end of 1888 he had an eruption of water-blisters on his hands. At the beginning of 1889 he went to Sydney, and was admitted to Prince Alfred Hospital, January 26th; he stayed there until March 3rd. From the hospital record it appears that on admission he said "he began to get much weaker about two months ago, and at the same time his hands swelled and became stiff, and his face and eyelids swelled;" and the following is a copy of the clinical account of his state and progress during his stay:

"On admission—much wasting, eyelids swelled, both upper and lower, thickening of skin of forehead, thickening of skin of hands and subcutaneous swelling, so that the hands are closed with difficulty;

[1] These persons were seen, and appeared to be in good health.

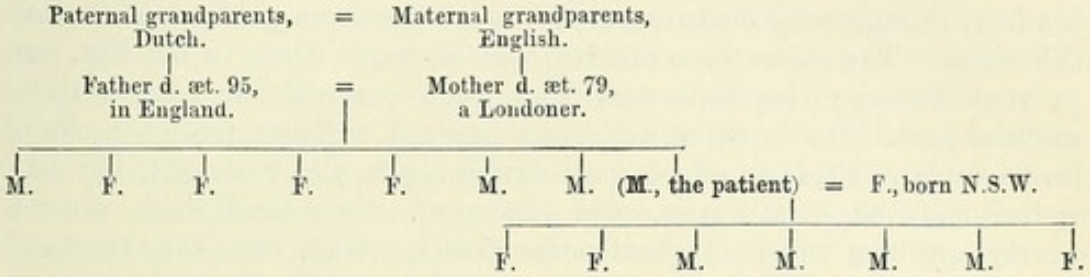
[2] I was able to learn nothing of this Chinese in the town, although I inquired on more than one occasion of the police, patients' relatives, neighbours, &c.; and I suspect the statement was due merely to casting back for a likely cause of his illness. On the other hand, the injury to the finger was well remembered by others, and in relation to the anæsthesia.

legs below knee swelled and pit on pressure. Skin of forehead discoloured by copper-coloured spots, some of which are raised above the surface; these spots run up amongst the hair of the scalp. The thickening skin of the face is discoloured as though it had been burnt by fire, but is of a semi-copper colour. Over the body, and especially on the legs, are brown smooth discolorations of the skin, varying in size from the palm of the hand to a pin's head; these discolorations are not raised, are of a uniform colour, with a sharp margin as regards colour. He has no painful spots or tenderness anywhere except that his hands are somewhat painful in consequence of the swelling. Since admission he has been taking Hyd. Bichl. and Pot. I., and there appears to be a steady improvement, the brown discolorations are decidedly paler in colour; the swelling of the hands, feet, and eyelids is less than it was, and the patient's general condition is improved. He says, 'he feels a lot better.' The brown patches before mentioned are now slightly brawny on the surface." During this space of thirty-eight days his temperature was taken twice daily, and from 103° F. on admission it fell to normal in five days, and thereafter varied between normal and 97° F.; but on the 23rd day of stay it fell to near 96° F. On discharge he returned to Gunnedah, and continued his occupation down to the date of his isolation.

State on admission.—Scalp free from eruption, but has seborrhœa, by which the hair is kept moist and sticky; the face is entirely devoid of hair. The mask is moderately swollen by dermic infiltration, the nose swollen, rather smooth, and distorted in shape, the lips and eyelids still more swollen, and the latter shiny at the tarsal margins; complexion reddish and opaque; the skin atrophied and roughened. Ears slightly enlarged by the same kind of infiltration, the sulci accentuated, colour bluish. Voice slightly but permanently (during several months) husky. Neck presents almost or quite the usual appearance of this part in one who has been much exposed to the sun; perhaps there is slight dermic infiltration. The left cubital nerve can be felt with ease, but is not larger than it sometimes is in healthy persons; pressure produces slight tingling in the ulnar side of hand; on the right side the nerve cannot be detected. Hands slightly swollen in general, and bluish red; the anterior surface harsh and dry as in psoriasis, and the linear markings accentuated; the fingers swollen and stiff, but still tapering towards the points, which carry yellow altered nails without polish; there is no mutilation, ulceration, or other deformity than is due to swelling, nor any difference between the two hands. Feet, the same general description applies to them; the toes are unusually long. Round the nails of both fingers and toes are signs of healed ulcerations which had never gone deep. The whole of the rest of the body is covered with large, coalescent, old maculæ, with diffuse and scarcely distinguishable edges of very faint orange and red shades of colour; atrophy and roughening of the skin, with slight desquamation here and there, and a general dirty appearance; on the front of the thorax are a few islands of apparently normal skin; there are no matt

patches. *Sensation.*—Dulled. *Special senses.*—The nose is almost always entirely stopped, and bleeds on slight provocation; smell is generally wanting for this reason, but the senses are otherwise unaffected. *General health.*—Said to be good.

CASE 54.—S. P—, æt. 49, admitted June 7th, 1892. Pedigree:



All other members of this family were said to be in good health.

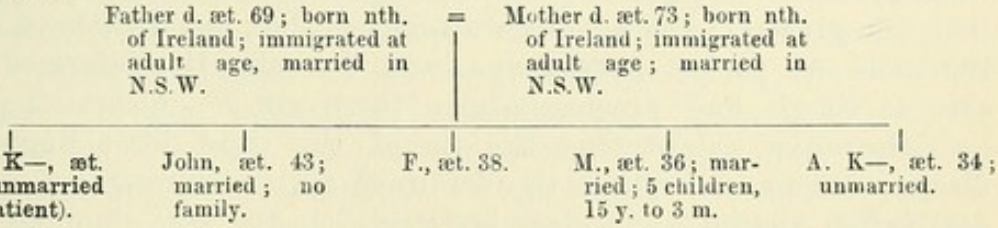
History.—Was born 1843, of Jewish parents, at London; is a commercial traveller. In 1862 he sailed to New Zealand, and in 1863 he crossed to Australia. He travelled in New South Wales, Victoria, and South Australia, and returned to New South Wales. In 1866 he went to Queensland, and travelled over that country, chiefly in the north and west; his headquarters were at Rockhampton during part of this time. In 1880 Sydney once more became his headquarters, and thence he travelled again over New South Wales. *Clinical history.*—Has never seen any other person suffering from leprosy, or as he is now suffering himself. Has usually had very good health; abstemious and regular in his habits. Has suffered all his life from dyspepsia, but more severely from about the age of thirty, since when he has been obliged to be very careful in his diet. He has three times had jaundice, the attacks having lasted about six weeks; the last occurred in 1889, and he recovered his health after it as he had done on previous occasions. In June, 1890, he noticed that he had a slightly raised, red, scurfy, round spot at the outer canthus of each eyelid, symmetrically placed; a doctor who was consulted called them patches of eczema; there were no constitutional symptoms whatever at this time; little was thought of them; they were subjected to treatment, nevertheless they persisted. Fifteen months later, or about September, 1891, the superciliary ridges and intra-orbital tissues swelled and became slightly red; spots now also began to appear on the trunk. About January, 1892, his hands swelled, and he became aware of some numbness in them, although still able to use them well. About March he walked about in a pair of tight boots, and severely abraded the toes of the left foot, but without becoming aware of it until he took his boots off during the evening; these injuries healed in a usual way after a few weeks. About June he held his hands near a fire while talking to a friend, and suddenly felt a sharp pain in the right, which he found blistered by the heat; a shallow cicatrix nearly 2 inches in diameter marks the spot. During the months since September, 1891, and only since then, he has had

certain symptoms of constitutional illness; he has got more easily tired by walking than usual with him, and has become aware of a loss of energy, or, as he calls it, of vitality, which he thinks distinguishable from the exhaustion mentioned; he has had severe pains in his hands, which were in part like a throbbing toothache, but sometimes like aching produced by severe swelling; and he had the same pains in his feet, though only occasionally; the left foot was always worse than the right. The pains were much worse at night than in the day, and prevented sleep; they have now been much lessened for two or three months past. He is certain that he has not suffered from attacks of feverishness. *State on admission.*—Height, 5 ft. 7 in.; weight, 157 lbs.; well nourished, intelligent, and educated. Face and neck show a pretty uniform deep copper-brown discoloration, but the forehead centrally and slightly above the superciliary ridges laterally gives at first sight an impression of blackish colour—but perhaps the yellowish and dirty appearance of an old wax model from which all red has faded is more nearly the appearance shown at these points; the subcutaneous tissues are swelled, and all furrows accentuated; the superciliary ridges are prominent; the bridge of the nose especially is swollen; the ears are generally enlarged as to superficies, thick, swollen, and bluish; the discolorations extend well above the hair-line on the scalp, perhaps about 2 or 2½ inches, but there is apparently no swelling of the scalp. Hair of scalp and moustache normal; of eyebrows thinned. Cubital nerves not more than usually prominent, but very sensitive; the sensation caused by pressure upon them is referred to the fingers. Hands swelled and bluish, the backs much puffed; fingers swollen and stiffish, but tapering and not sausage-shaped, the œdema being of the softer variety. Feet less swelled than the hands; the skin rough and slightly desquamating, at some points tense and shiny; they are discoloured of an obscure brown, which is not uniformly distributed, but yet does not present distinct maculæ. The trunk and arms are covered with extremely numerous small maculæ, mostly of a bright brown colour, which are also present on the thighs and legs, but are there much less numerous; they are slightly thickened, and for the most part quite small and distinct, from one fourth to one half of an inch in diameter; but over the left shoulder-blade and over the left lower thorax are three (two and one) much larger maculæ, of which one has a white central patch which is not matt, and which does not clearly differ from normal skin. There is no apparent atrophy of the skin. *Sensation.*—This seems generally dulled over all the body; over maculæ tested on the chest it is variable—over some there is analgesia, over others merely delayed perception; but over the three large ones head and point cannot be at all distinguished by the patient. *Special senses.*—Unaffected, except smell, from the nose becoming stopped up rather often, "as though from cold." *Voice* normal. *General health.*—Appetite reasonably good; sleeps well; spirits depressed.

Case 55.—Hok Gee, æt. 47, admitted September 19th, 1892. *History.*

—Chinese; is married; has four children; arrived in Australia, at Sydney, six years ago; went to Albury directly, and has stayed there ever since; is a gardener. *History of illness.*—None can be got; he says he was quite well fifteen months ago, but his present state suggests that he has been ill much longer. *On admission.*—His features are expressionless, and he is dull of intellect or possibly deficient; cannot close his eyelids; conjunctivæ reddened; orbicular muscle of mouth not affected; ulnar nerves very greatly enlarged and roughened; they would probably be oval in section, and about five eighths of an inch in long diameter; he says they are tender, but when his attention is distracted pressure does not seem to cause any discomfort. *Hands.*—All the interossei on both sides are wasted, and the fingers paretic; many of them are covered with dark brown maculæ, but the nails are normal. *Feet.*—Both are thickened, all the toes are shortened by absorption of bone, and but slight voluntary movements are possible; the little toe of the left foot is represented by a small fleshy tumour about the size of a pea, and just above it is a small sinus, at the bottom of which bare bone can be felt. *Trunk and limbs.*—The skin in general seems normal and well nourished, but there are many very large maculæ, which are marked out by a narrow band of moderately dark red tint, within which is an achromatic area; both band and area are slightly thickened, dysæsthetic, and analgesic. On a hot day it was easy to ascertain that the sweat-glands under the maculæ acted imperfectly; the surrounding unaffected skin sweated profusely—the areas very little, although they were not quite dry. *General health.*—Good.

Case 56.—M. E. K—, æt. 43, admitted September 21st, 1892. Pedigree:



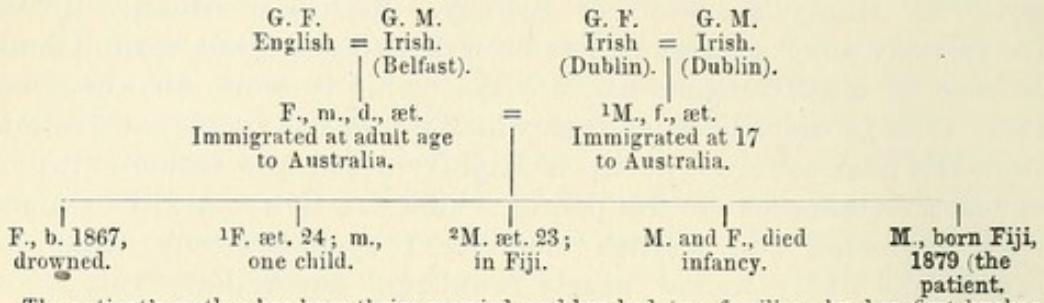
This patient was first seen by me four years ago. She was then not far from the commencement of the eruptive stage of tuberous leprosy; she had an abundant eruption of erythematous patches on face and hands, and there was slight œdema of the orbits. She was informed of the nature of her illness, but at that date there was no law which required her detention. *History.*—Very little information could be got either from the patient or from those of her relatives who were questioned; they were all afraid of damaging their own interests and those of the rest of the family. The following points are probably correct:—Was born in 1849 in the Hunter River district; has always lived there, and has never been out of New South Wales; is unmarried; is said to have got her living by housekeeping or in service, but belongs to a well-to-do family of farmers, &c.; special intercourse with Asiatics and other coloured people denied by her and by her relatives;

no recollection of having seen any person suffering as she is suffering. *History of illness.*—This also is very defective. The first signs are ascribed to a time about eight years ago (1884), and the stage of disease she now is in is not discordant with that statement; when I saw her four years ago I considered that she was in the first eruptive stage, and that it could not have lasted many weeks. *State on admission.*—Hair of scalp thin. The skin of the face is infiltrated and hardened over large areas, which leave channels between them of apparently healthy or slightly atrophied tegument; the lips are characteristically swollen and retracted, so as to slightly expose the teeth, but not paralysed; the septum of the nose has gone, and the alæ are deformed—the right ala especially, which, although spread, has lost parts of its substance by old ulceration; the tip of the nose, white, roundish, and shiny, is like a button sunk between the crumpled and broadened nostrils; the eyebrows have fallen, and the superciliary ridges are prominent; the ears are deformed, the auricles being crumpled by loss of tissue caused by old ulceration or absorption at their edges; the lobes are but slightly swelled, and enclose no distinct tuberosities; they are not (as a whole) enlarged as to superficial measurement. These changes are almost confined to the mask; they are present to some small extent behind and below the ears, and under the chin. The trunk and thighs show nothing, or only some doubtful and slight alterations, mainly of colour; there is no loss of subcutaneous fat, or scarcely any. The upper arms also show little or no change; the elbows have the skin over them thickened, voluminous, and boggy (as described in the case of R. W.); narrow rows of tuberosities extend from them to the wrists, and run mainly on the extensor and outer surface of the forearms. Both hands are enlarged by firm œdema (but not greatly); the fingers are stiffened, but not sausage-shaped; the nails are perfect except one, and but slightly deformed; the skin is rough and desquamating; there are no ulcerations, and no deformities except that the tip of the right little finger has disappeared by absorption, the deformed nail remaining. A similar description applies to the legs and feet, but the legs show no tuberosities, and the feet are less altered than the hands, and are not deformed. *Special senses.*—Unaffected except sensation, which is dulled as usual. Ulnar and peroneal nerves normal in size, and not more (nor less) sensitive than in health. The larynx is affected and the voice whispering; no difficulty in breathing. There is discharge from the nose; and she emits, probably with her breath, a sickening stench. *General health.*—Makes no special complaint; appetite fair; digestion good; bowels regular, with an occasional tendency to diarrhœa; is very weak, but gets up daily at seven. *Menstruation.*—This is said to have been always irregular, and not to have altered in any way since the beginning of this illness (but such details cannot in this case be relied upon).

Case 57.—Li Pik Hing, æt. 44, admitted October 12th, 1892. *History.*—Chinese; has been in Australia twenty-two years, and has

lived at many different places, but during three years past he has had a garden at Manly, a suburb of Sydney. *History of illness.*—He can give scarcely any; guesses he has been ill two years, but beyond doubt has been ill much longer; has not been able to work for about two years; tries to describe some rash which is now not visible. *On admission.*—His nose towards the tip is slightly broad and rather shiny; it has lost substance at several points, which are now marked by moderately depressed and whitish cicatrices; eyebrows very thin, and towards the outer halves nearly wanting; superciliary ridges are rendered slightly prominent by a soft swelling, and show no tuberosities; the lobes of both ears are enlarged by some small clusters of lepromata. Upon the whole his aspect would be little likely to attract attention. Both ulnar nerves are enlarged and tender. Hands and feet present no deformities, but the left foot on the dorsum is discoloured brown, and is a little swollen and shiny. *Trunk.*—The general surface is desquamating freely, and he has psoriasic patches on palms and soles; the subcutaneous tissues in general have wasted and the skin is wrinkled, and perhaps atrophied; in colour, the skin of the trunk is indefinitely altered to faint shades of red and orange, but not distinctly maculous; on the forearms this alteration is on the extensor surfaces, but is much fainter than elsewhere, and devoid of any distinct red coloration. On the extensor surfaces of forearms, chiefly just above the wrists, are some clusters and streaks of small neoplasms, but slightly prominent, reddish, shiny, and very vascular; upon both shins are rows of small circular rather deep ulcers, interspersed with circular white scars of similar healed ulcers. Nails perfect and well formed. *Sensation.*—Over parts of the back and the left forearm taken at random he has some hyperæsthesia; perception of pain is delayed, but afterwards is excessive; he could not tell head from point, and called both "point," the pain caused seeming about equal. *Sweat.*—This irregular; 14 mg. pilocarpine caused a good perspiration in six minutes; arms, hands, legs, and feet remained dry; large and deep red maculæ appeared running the whole length of the spine and on each side of it, the spinal furrow remaining unchanged; the skin in the furrow sweated freely, the maculæ remained perfectly dry; a small patch of skin anterior to each malleolus sweated freely. *Special senses.* Unaffected. *Mental state.*—Normal unless dull, but this is doubtful. *General health.*—Fair. Complains of being cold during the day and too hot at night, when he has also some pains in legs and arms. He likes to rub himself with carbolised oil.

CASE 58.—W. W—, æt. 13, admitted October 27th, 1892. Pedigree:



The patient's mother has been thrice married, and has had two families; by her first husband she had a son, now aged 33; married three children, all well; lived in Fiji for years, but now resides in Australia. Her second family, to which the patient belongs, is shown above.

History.—His father was a carpenter who went to Fiji in 1870, and held a plantation at Mata ni Quara, on the Ba River; he died in 1882 of an inflammation of the lungs,[3] having always suffered from a "weak chest." W— was born at that place in 1879. In 1883 he was taken to Sydney, where he lived until 1886; he was then taken back to Fiji, and he resided at Mata-ni-Quara again until November, 1890. He then returned to Sydney, but almost immediately left for Mackay, Q., where he stayed until July 5th, 1892, when he came back to Sydney again. As to certain circumstances of W—'s life in Fiji, the Principal Medical Officer of H.M. Government of Fiji (the Hon. Bolton G. Corney) has been good enough to furnish the following:— In 1883 this child travelled from Fiji in the same ship as Dr. Corney, and was not then noticed to be otherwise than healthy. While on an official tour of inspection in 1890 Dr. Corney saw a Tokalau man named Sau who had been seven or eight years in Fiji, was suffering from L. tuberosa, and lived about a mile from W—'s house (and W—, questioned at the lazaret, knew Sau and remembered him very well); then, he added, about 1 per cent. of all Fijians have leprosy (besides which both the Indian coolies and the kanakas there suffer to some extent); but there has never been a case in a white (see Case 63) except one doubtful one. And as to W—'s residence at Mackay, Q. (where there are several sugar plantations), the Government Medical Officer for that town and district has obligingly furnished the following. A Cingalese leper was removed, during the year 1887, from the plantation at which W— lived from the end of 1890 to the middle of 1892; then on October 31st, 1892, Aloha, an Api man, was transferred to the lazaret at Thursday Island, his illness from L. tuberosa having been recognised September 1st, 1892, at which date his general health remained unaffected; besides which it may be noticed that there were on this plantation a number of kanakas (Polynesians and Melanesians),

[1] These persons were seen by me, and were in apparent good health.

[2] See the second note which follows this account.

[3] From the Register it appeared that he had no medical attendance, and that the ascribed cause of death was rheumatic fever. Inquiry discovered no history of probable lung disease.

sixteen Cingalese, a Javanese, and a Madrassee, all of them men among whom leprosy occurs, as I have seen in Fiji, New Caledonia, and New South Wales. Thus W— has often been exposed to risk of contact with leprosy, and (in the case of Sau) is known to have actually been in contact with it.

History of illness (given by his mother).—M—, æt. 13, height 4 ft. 11 in., weight 77 lbs.; dark hair, grey eyes, freckled, intelligent; appearance generally healthy, so that the signs described below seem to indicate a local affection. At six years of age he had *coko* (*frambæsia*) in Fiji; the illness lasted only from six to twelve months; it has left the usual cicatrices; it was followed by some slight anterior curvature of the leg-bones, as is commonly the case with young children, which has disappeared; he was taken to the district medical officer, who recommended change to Australia. He has had no other illnesses, except as mentioned below. *Two or three weeks after arriving at Mackay, Q.* (*end of* 1890), *he told his adult sister* (*from whom I have this information*) *that he had a numbed patch of skin on the front of the right thigh; it was ascertained that pinching it did not hurt, and afterwards he amused his schoolfellows by letting them stick pins into it. The appearance of the skin was unaltered.* While returning from Queensland by steamer at beginning of July last (about June 24th to July 5th), the weather was very cold, and he complained much of cold hands and feet. About five weeks from the date of his arrival in Sydney, or about two months ago (say August 12th), he began to complain of pains in both hands; both arms ached painfully from the shoulder downwards, the left especially, and the interossei of the left hand were seen to be wasted; that hand became so far useless that he could no longer spread butter on his bread with it; but there was no symptom of general illness at this time. Some days afterwards his mother on going to wake him in the morning observed a large reddish spot on the buttocks; the colour was very faint. She took him to a doctor, who prescribed medicine for him, which he took for three weeks; his appetite improved; the spot faded a little, and sometimes could be scarcely seen. A few days later he had an attack of diarrhœa, which was severe; he was feverish; he had a foul tongue: the attack lasted two days, and he got very weak. Afterwards he continued weak, thirsty, and had a poor appetite for some days; during a fortnight afterwards he stayed away from school, and had nothing at all the matter with him except the very faint spot on the buttocks and paresis of both hands, but this also improved. He returned to school; one day he showed that the nail had fallen from the left ring finger, and, as he said, without causing any pain; in a day or two the nail fell from the right ring finger during the night. He was then taken to Prince Alfred Hospital, where he was admitted on October 7th. His case was reported as doubtful on October 22nd by the resident medical superintendent, who is the official held responsible in such circumstances under the Leprosy Act. *State on admission.*—Left hand: all the interossei are wasted, but those between the thumb and forefinger

and between the second and third metacarpal bones more than the rest; the ring finger has lost its nail, and has over the first phalangeal joint a circular swelling, in the centre of which is a slight superficial ulcer, the swollen ring around it being thickened and hardened, and not tender. Beginning about the head of the ulnar bone is a macula, which by a rather diffused or irregular margin curves across the palm until it passes a point above the base of the second finger, whence it returns to end at the inner side of the base of the ring finger (probably it includes the ring and little fingers, its other boundaries being indistinguishable); the second, ring, and little fingers are flexed slightly and paretic; they cannot be fully extended by voluntary effort, but are not restrained by any fascial or other contraction; the colour of all the fingers is altered to reddish, but especially that of the three last named, which have a slightly withered appearance; these three are also distinctly anæsthetic and analgesic, and regions of altered sensibility extend more or less (being different at different adjacent points) along the ulnar side of the hand and inner half of the palm (for instance, he thought a prick which drew blood was a touch with the head of a pin, and he located the place pricked an inch and a half from the true spot, which was about the middle of the anterior surface over the first phalanx of the little finger); there is a small macula on the flexor and outer surface of the forearm. Right hand: this hand shows similar changes, but they are less marked; perhaps there is no wasting of the muscles, and the fingers are less paretic; as a rule they are similarly flexed, though to a less degree; this ring finger has also lost its nail, and also has a swelling and a superficial ulcer over the first phalangeal joint; here, too, there is a macula on the palm, but it is circular and nearly central, about 2 inches in diameter, and has a well-defined edge; there are similar disturbances of sensation. Both ulnar nerves can be easily traced high up; they are both enlarged, but the left is the bigger; neither is tender, and both seem to yield normal sensations on pressure; the arms show nothing. *Face.*—This shows nothing; the orbicular muscles (eyes, mouth) are normal. *Trunk.*—There are here one or two small maculæ, about an inch or an inch and a half in diameter; the buttocks, and the back to about the level of the fourth lumbar vertebra show a large macula, which is roughly symmetrical; on the right side, however, it ascends higher, and extends downwards by way of the great trochanter to the front of the thigh, which it covers as far as the knee. *Lower extremities.*—There are one or two small maculæ on the legs; the feet show nothing. The peroneal nerves are enlarged and very easily traced; but, like the ulnars, they are not abnormally sensitive, and seem to yield normal sensation on pressure. There are many paræsthetic, and some analgesic areas on both feet. *Maculæ.*—These are all of them very faintly marked, and it is necessary to undress the patient and view the whole surface, so as to get the greatest advantage from contrast, before many of them can be perceived. They are all of them only faintly rose-coloured; the colour is not quite evenly distributed over them; on the larger ones (buttocks

and thighs) this unequal distribution is more apparent, though these also are but faintly rose-coloured ; on the other hand, these alone have well-marked undulatory borders (though still only of a slight rose-colour) of a characteristic form. On firm pressure the rosy tint everywhere disappears, and is replaced by a brownish or yellowish tint which is extremely faint, and only just deep enough to be recognised with certainty. Over both thighs there is in addition a slightly blue cast. *Sweat-glands.*—Pilocarpine produced a moderate general perspiration. On drawing the finger across the skin of the back so as to traverse a small macula in its course the latter was judged to be dry by the finger sliding easily over it, while it passed over the adjacent skin with a difficulty which was due to moistness; the same thing was observed on comparing healthy skin near by with any part of the large macula on the buttocks in a similar way; the legs to about the ankles sweated freely, but the feet as a whole remained dry. *Special senses.*—Unaffected except sensation. *General health.*—Said to be good, and apparently is so.

W. W.—I knew the W. family when living at Ba, and remember the boy W. W. perfectly. He was a wild and spoilt little fellow, and spent most of his time half naked playing about by the river, and often in it, with native boys for his companions. There were certainly one or more cases of leprosy in the neighbourhood; and the natives thereabouts are a particularly dirty lot, in their persons, habits, homes, and villages. I ascertained from the boy's brother while on a recent visit to Ba (November, 1892) that W. W. had *coko* when he was about six years old, and that it lasted with him between six and twelve months. I do not remember having noticed him with *coko* on him. I attended him once, but what it was for I do not exactly remember. I believe it was for some slight indisposition. The family lived in a homely fashion, and I think chiefly on a vegetable diet. They would be likely to get a fair quantity of fish, but I have reason to believe had very little butcher's meat.

I should say that, if leprosy is acquired by contagion, the habits of the boy were decidedly such as would render him liable to contract the disease.

FRANCIS J. POUND,
Late District Medical Officer for the Ba District.

The Chief Medical Officer, Suva.

Ba, December 4th, 1892.

I have seen G. W. (see pedigree above). His tibiæ are both fairly straight. I think myself that both bones are thickened, the left, the one from which I cut and scraped a good deal of necrosed bone, is very distinctly enlarged, and I suppose the enlargement is of the sort known as "strumous." There were two places that I cut into and explored; one of them must, I fancy, have been the node which you saw. They did very well in spite of the rather yawning pits that I left, and are now completely healed, though they will doubtless break down again

some day. He had some "rheumaticky" pains in the knee of the same leg two nights ago, which is a little suspicious. I do not know of any other strumous signs in him.

G. W. A. LYNCH,
District Medical Officer, Ba.

The Chief Medical Officer, Suva.

CASE 59.—Ah Lin, æt. 35, admitted November 3rd, 1892. *History.*—Chinese; has been in Australia twelve or thirteen years; has managed a garden at Bombala eight or nine years. He once (only—but compare Case 58) saw a Chinese in Australia who had leprosy; he used some medicine, got well, and went back to China long ago. Fell ill about seven months ago. As far as I can understand he then had large smooth red maculæ on his face only; he took the same kind of medicine mentioned above, and at the end of three months entirely recovered. He remained well for four months. About a fortnight ago he began to get the appearances he now shows. (I think he has been ill more than seven months. Some of his spots, &c., are of that standing, or longer; others have certainly not made their first appearance during the last fortnight.) *On admission.*—Is well nourished. *Face.*—Outer halves of both eyebrows have fallen; no superciliary prominence; left orbit slightly swollen; right orbit swollen, and an erythematous patch, with ill-defined borders, covers the cheek-bone and extends over the right upper eyelid, affecting the lower less; in front of each ear he has symmetrical reddened patches which are rough and desquamating: that on the right is little infiltrated; that on the left is thickly infiltrated, and is a leproma spread out; the inner margins of both are more or less clearly depressed and rather sharp, the normal skin on the outside and the plaque on the inside both rising above it; the macular redness involves the ears, which also are desquamating a little, and which have the lobes slightly swelled, but not by distinct neoplastic deposits; under the chin and at points on the neck are other smaller maculæ of irregular shape, and of the thickness and aspect of the maculæ of tuberous lepra. *Trunk.*—At points over the shoulders are rather indistinct whitish or white mottlings, which are achromatic areas at an early stage; the posterior aspect of arms, but especially of left arm, shows a large number of these areas much more distinctly, the general effect being of one large achromatic area until on careful scrutiny its composition is discovered; the whiteness and general appearance are not at all that of leucoderma, nor of such leprotic leucoderma as some of the patients in the lazaret show or have shown; it is faint but bright, and white as snow expresses the appearance very well to my mind. There are also very faint mottlings, scarcely traceable in detail, elsewhere on the trunk; when the surface including them is rubbed intervening portions turn normally red, while the seen or suspected mottled portions then remain unaltered, and by contrast with the reddened parts seem to have their normal yellow tint. *Tuberosities.*—On the face, and pretty uniformly scattered over it, are very numerous discrete nodules, of which none is larger

than a pea, and many are smaller; the forearms have similar nodules in large number, quite discrete, and only a little more numerous on external and posterior surfaces (except the right arm, where this distribution is well marked, though the flexor surface is not clear); there is one such nodule on the thigh above the left knee; and there are others, which seem to be the same, on the nates—more particularly on the right side. *Special senses and voice.*—Unaffected except sensation; the maculæ on the face and neck are so distinctly analgesic that the pin being stuck in and left standing, he thought himself touched with the head. *Nerve trunks* (cubital and ext. popliteal).—Normal as to size and sensibility; he cannot by the strongest effort completely close the right eye, the conjunctiva remaining visible through a chink about a tenth of an inch wide (this is the side of the swollen orbit); orbicular of mouth apparently normal. Complained of cold, and shivered while undressed, although a warm day.

Case 60.—Ah Quong, æt. 39; admitted November 15th, 1892.

History.—Chinese; when a boy, used to fish, and was often bitten about the hands by snakes (or he may mean eels). At fourteen the first signs of leprosy appeared about his hands. At nineteen he came to Australia, proceeded to the neighbourhood of Bombala, engaged in digging for a few years, and for the last ten or eleven has kept a store at Craigie, which is about 23 miles from Bombala. With reference to the above history of onset it should be noted that he was anxious to show that his disease was stationary (and not leprosy), presumably on the chance that he might be considered to have recovered, and so might escape confinement. *On admission.*—Is pallid and debilitated, but not markedly. Down to the knees there are no maculæ at all, but to the inner side of, and a little forward of the ischial tuberosities are two patches of hardened and abraded skin, and on the inner side of the left thigh close to the gluteal fold is a smaller and similar patch. He ascribes these to riding, and perhaps correctly; they have nothing characteristic about them. The orbicular muscles of the face are normal. The ulnars are enlarged and apparently insensitive; the left is the larger. *Hands.*—Both are in the same state, namely, the fingers are contracted *en griffe*; they have all lost more or less bone, and by absorption, but the nails remain; the interossei, but especially the first, are much wasted. *Legs and feet.*—The peroneals are but slightly enlarged; they are apparently insensitive; the legs show many ill-defined, indescribable, but well-marked alterations of the skin, which is scaly; several scars of moxæ; the feet are both deformed like the hands; the toes, which are wasted, either stand erect or fall back upon the dorsum of the foot; the useful part of the foot ends at the metatarsus, and though the displaced toes are there the general appearance is much that of amputation at the metacarpo-phalangeal joints, so much displaced and useless are they. *Special senses.*—Unaffected except sensation. *Note.*—This patient having scratched his back, very deep and persistent red lines marked the track of his nails; they could not be made to disappear entirely by pressure, for they were attended by

punctiform hæmorrhages. I could not understand whether there ever had been maculæ on the trunk or not.

CASE 61.—Jim Chung, æt. 38; admitted November 29th, 1892.

History.—Chinese; is married; no children; arrived in Australia, at Sydney, six years ago; went to Bodalla on the south coast almost immediately; has stayed there always; was occupied in timber-getting. No history of illness can be got from him; he says he has been ill only three months; but his state on admission shows that he must have begun to suffer several years ago, and possibly either before he left China or soon after arriving here. He is slightly deficient mentally, good-tempered and tractable, but slow and inclining to childishness.

On admission.—Height, 5 ft. 3 in.; weight, 136 lbs.; well nourished, and in average good general health; hair of scalp, beard, and moustache normal; of eyebrows very thin, and wanting towards outer ends. Cannot close his eyelids perfectly, but far enough to hide the irides by rolling the ball upwards; the orbicular muscle of mouth is less paralysed, but imperfectly under control. Advanced wasting of all the interossei of hands, and paralysis of extensors, but no fascial contractions; the feet also are wasted, though less than the hands, and movements of toes are small, and not under control; some part of the phalangeal bones of left great toe has disappeared by absorption, but the nail is perfect and healthy; there are no other deformities of fingers or toes, but nutrition of the former is markedly deranged, and the fingers are flexed in repose. The ulnar nerves are but slightly tumefied, though they are very tender. The conjunctivæ are slightly reddened, and painful; there is a slight opacity on outer margin of left cornea. On the body and limbs are several very large maculæ; they are placed on arms and forearms, and from about the last dorsal vertebræ downwards, over buttocks, thighs, and legs; feet and hands are free; the maculæ are uniform in appearance, and consist of a serpentine band about 3 centimetres wide, of a rather unusually dark purple-red, within which are very extensive areas of nearly achromatic skin; sensitiveness is markedly reduced, and response to punctures much delayed; yet he complains of general tenderness, and shrinks from ordinary handling of skin and limbs. *Special senses.*—These are otherwise unaffected.

CASE 62.—Ah Gom, æt. 26, admitted December 7th, 1892. *History.*—Chinese; is married; no children; arrived in Australia, at Sydney, five years ago; went immediately to Toongabbie, near Parramatta, and has always stayed there; is a gardener. Four years ago an ulcer formed about junction of lower and middle thirds of calf of right leg; at the same time he began to suffer from attacks of malaise, accompanied by severe headaches; the ulcer became very deep, but it healed and broke again two or three times during the next three years; in the meantime two or three other ulcers appeared close to the first; they healed and have been healed now for about a year. More than a year ago the ulcers or their scars swelled and became lumpy, and then a little later the site occupied by them began to become sur-

rounded by a macula, which is now of a bright bistre-brown, unattended by apparent structural alteration of the skin, extends considerably beyond the scarred and lumpy area, and ends abruptly at its margin without change of shade. About one year ago also small tuberosities began to appear over the face, and some alteration of the skin about the flexures of the elbows (not intelligibly described by the patient, and not now present) occurred at the same date. *On admission.*—Height, 5 ft. 5 in.; weight, 123 lbs.; general health, apparently good; hair of scalp and eyebrows normal; intra-orbital œdema (slight); chiefly on forehead, but less thick over the rest of his face and fore part of neck are numerous small tuberosities, which vary in size from a split pea to a little larger, are copper-coloured, scaly, not prominent, dysæsthetic; ears not affected; retains his natural expression. The general surface of trunk and limbs is desquamating; its colour is faintly altered—over the abdomen is a reddish mottling, over the chest and back are numerous faint serpentine ribbons of blackish-brown shade, within which the more nearly normal skin has less than its normal depth of yellow tint; on the margin of the right trapezoid is a purplish-red, slightly swollen, but not indurated oval patch about 1½ inches by 1. The hands are slightly but uniformly swollen; the feet to a less extent. At the back of the right calf is a large swollen and psoriasic patch; many hard nodules can be felt in it; it is in general purplish red, but is surrounded by a brown macula which occupies otherwise unaltered skin. This patch is insensitive. The ulnars and peroneals are but slightly tumefied, yet extremely tender; the general surface is apparently hyperæsthetic; and notwithstanding some anæsthesia, as tested by puncture, he cannot bear to have the tuberosities on the face handled.

Case 63.—Georgey Yaw, æt. 68, admitted December 31st, 1892. *History.*—Native of Amoy; arrived in Australia in 1848; is a cook, and has travelled all over the country; has twice resided at Mudgee, and lately for the second time; was admitted from Waterloo, a suburb of Sydney; is extremely deaf. *State.*—Is a very big man; pallid; fairly well nourished; he presents no abnormality down to the great trochanters; behind both of these is a brownish discoloration, over which the skin is rough and slightly ulcerated at the centre; tests of sensation having been made elsewhere, he intimated that these spots were as dead as the form he was then sitting on; on examination it turned out that a pin-prick gave him (apparently) sharp pain, but that the impression was not noticed for a second or even longer. Everywhere below the knees sensation was very deficient, being present, though delayed, at a few points only. Legs and feet are slightly swelled, shiny, and deep brown in colour—the feet less than the legs; the cuticle roughened at parts. *Right foot.*—The small and great toes are about normal, but incline towards each other; between them the other three are crushed together; all are flattened and shortened, but the middle toe is shortest; over and attached to the first metacarpal bone is a tumour the size of a hen's egg of bony hardness; the little

toe is deformed by a partial dislocation of the second phalanx, which rests upon and lies parallel with the second; the nails occupy a position rather behind the middle of the second phalanges. *Left foot.*—The three middle toes are shortened and crushed together, but not so much as those on the right foot; in this case the two halves of the metatarsus seem to have become bent downwards, so as to form a deep sulcus on the sole; by trying to straighten this out severe pain was caused; there is a similar but smaller tumour on this side, placed as on the right foot; nails as on the other side, but those of great toes normally placed. Sensation defective or delayed at many points of the trunk. Ulnars and peroneal nerves about normal. Pilocarpine (14 mg.) produced a moderate general sweat in about twelve minutes; on the back its distribution was irregular; two large patches of skin, one on left shoulder and the other across the loins, remained dry; the feet and legs and thighs remained dry; the feet sweated freely over some small areas (inner side of first metatarsal bones, a patch on the dorsum, &c.), but most of the surface remained dry. Four or five small achromatic areas about the size of a hazel-nut on the right upper thorax appeared, which were invisible before.

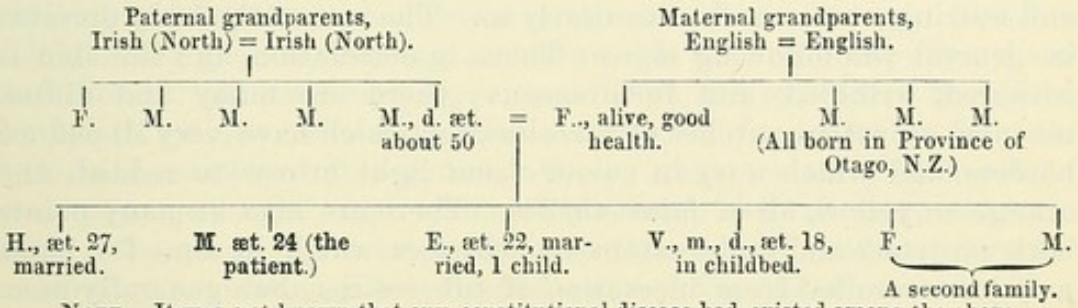
Case 64.—Ah Pung, æt. 33, admitted January 21st, 1893.

History.—Arrived at Sydney in 1886, from China, province of Canton. Has spent five years in Sydney, one year travelling in search of work, and one year in Sydney again. Is a woodcutter and labourer; denies having had syphilis or malarial fever, and has lived temperately. *History of illness.*—Says he was perfectly well until beginning of November, 1892; a small tuberosity then appeared over left eyebrow, then another about the middle of his forehead, then others over right eyebrow; he was out of health at this time; afterwards he had good health, but it was twice interrupted by attacks of sleepiness, which lasted for many days. *On admission* the following record was made:—*Face* slightly swollen, especially over superciliary ridges, where there is a good deal of infiltration and some dark red discoloration; a small tubercle over right eyebrow; a pale waxy-brown discoloration on back; an indistinct light brown patch over right shoulder, which fades gradually into surrounding skin. *Muscles* seem fairly nourished, and there is no wasting of those of the hands or loss of grasping power. Two oval brown patches over each hip, symmetrically placed; they are anæsthetic; a small anæsthetic spot on right instep, and furfuraceous scaling of both feet.

December, 1893.—Scalp and hair of scalp and face normal. There are several tuberosities irregularly placed on and over the superciliary ridges and higher on the forehead, and a good deal of general swelling, but no leonine aspect; the right eye is nearly closed by rather diffuse swelling, continuous from this side of forehead and extending over right cheek, which is infiltrated and hard; the left cheek is but little swelled; the swollen parts are of a rather dusky red; the right ear is rather swollen in general, and shows some small tuberosities; the left is less altered, and has no tuberosities. Orbicular muscles of face

perfectly under control. On the trunk are a few discoloured areas, which are infiltrated and thick, but which have no abruptly raised margin—on the nape and right side of neck; a large one covering right shoulder-tip; on the upper part of left arm; on both glutei, large, and symmetrically placed; and all are coppery-brown in colour, and have the skin over them slightly wrinkled and roughened. Right hand normal. Left hand, close above the wrist-joint is a tuberosity; the hand in general is a little swollen, and at present is sore from a burn. Both legs and feet have dry and harsh skin, and the right is worse than the left. There are the usual disturbances of sensation, not very well marked. Special senses and voice unaffected. *General health.*—Good; usually the wardsman has to turn him out of bed in the morning, but it is doubtful whether this is a symptom of his illness; is sturdy and well nourished.

Case 65.—M. M—, æt. 24, admitted February 27th, 1893. Pedigree:



Note.—It was not known that any constitutional disease had existed among the above-mentioned persons.

History.—Was born in the province of Otago, New Zealand (1869), but removed with her parents to Fiji when she was two years old (1871). There she lived at many different places, but last and longest on the island of Taviuni. Her family was always in fairly good circumstances; they had plenty of fish and poultry; there was often difficulty in getting fresh meat, but salt meat was not much eaten. She never had any other illness than the present, of which she is able to give only an imperfect account. At twelve years of age (1881) her left forefinger became sore; it got well again in a week, and the occurrence would not have been remembered but that it was immediately followed by severe aching pains in the arm, and by wasting and loss of power in the hand; at the same time there was some disturbance of her general health. In two or three months she recovered, but thenceforward suffered from aching pains in her legs and knees whenever the weather was damp; and after a time her right arm was attacked as the left had been, and her right hand wasted. The trophic changes on this side cannot have been very active, as the extremity seems normally developed and is much bigger than the left. After this (but she cannot say how long) maculæ began to make their appearance on several parts of the body. During 1885 her case was discussed by several medical men who had been consulted, and while two inclined to think it one of lepra, others then, and even later,

excluded that disease; however, at the end of 1885 the Principal Medical Officer (the Hon. Bolton G. Corney) examined her and diagnosed lepra. In 1888 I visited the Fijis, and had several casual opportunities of seeing her. Nothing was then noticeable except the wasting and paresis of the left hand, and enlargement of the knuckles; but I was not formally consulted, and did not examine her. Between 1888 and the present day extensive ulceration of the skin occurred from time to time. Menstruation began about the usual age, and has always recurred regularly and normally, except during two or three recent months, when some large ulcers were discharging freely.

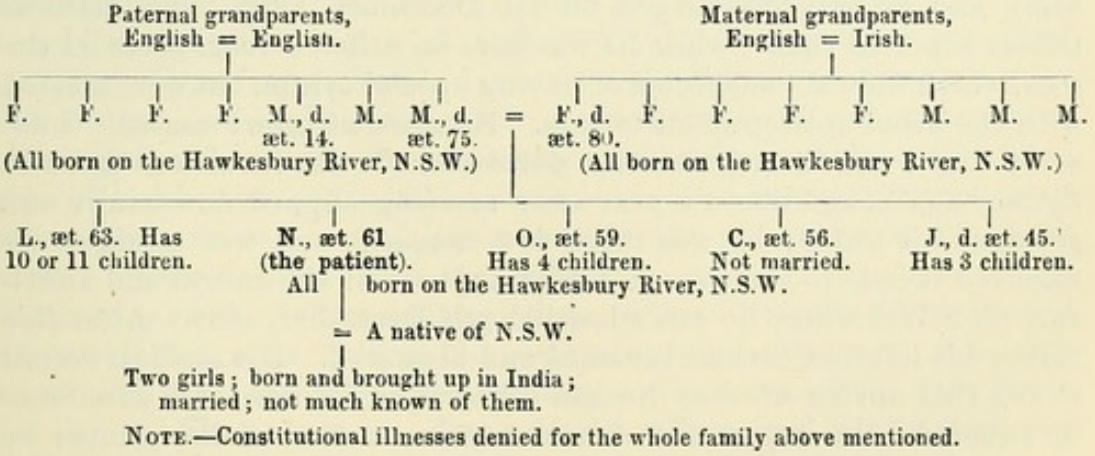
State on admission.—Hair of scalp normal, but not abundant; of eyebrows, wanting; orbicular muscles under control; there is slight general thickening (infiltration) of the features, and on the lower lip is a small group of young tuberosities; lobes of ears enlarged, withered, and enclose a few obscure neoplasms; nose but slightly swollen, stopped only sometimes; at other times smell is normal, as are sight and hearing; voice normal or nearly so. The rest of the body presents in general the following signs: There is emaciation, and the skin is withered, wrinkled, and furfuraceous; there are many and diffuse maculæ, or rather patches of discoloration which have very ill-defined borders, and which vary in colour from light brown to reddish and orange or yellow, all of faint shades. There are also at many points both on trunk and limbs extensive cicatrices, which in some few cases may have resulted from ulceration of tuberosities, but generally seem to have followed on wide-spread and comparatively superficial ulcerations of the skin; the skin over the elbows is baggy and slightly ulcerated, that over the knees is thickened, only slightly increased in volume, reddened, and not ulcerated. *Hands.*—Both present atrophy of the muscles, displacement and distortion of phalanges *en griffe*, no absorption of bones, nails present, some deformed. Right hand: Over the second metacarpo-phalangeal joint and on the extensor surface is a tumour as large as a pigeon's egg, free under the skin, attached in front; the thumb is generally enlarged; the first and second joints of all the other fingers are enlarged, and the skin over them is reddened and desquamating; sensation is dulled, but not excessively—she has burned this hand without being aware of it at the time, but she has not much difficulty in buttoning her clothes; cubital nerve not much above a normal size, but excessively tender; sensation on squeezing it is referred downwards only and to the end of the little finger. Left hand: This and the forearm are much smaller than the right, development having been arrested; there is a tumour similar to that mentioned above, but situated over the carpus and smaller; all the metacarpo-phalangeal joints are much enlarged; there is a displacement of the metacarpal bones; the phalanges can be imperfectly extended on the metacarpus, but not at all upon themselves; in this hand there is very little sensation; the cubital nerve seems scarcely enlarged, but it is very tender, though less so than the right nerve; on pressure sensation is referred to parts below and as far as the little

finger, but is not very distinct. *Feet.*—Both are moderately swollen, desquamating, and very slightly ulcerated round some of the nails; their general appearance is that usual in old tuberous lepra; both peroneals are enlarged, the right more than the left, are not excessively sensitive, and on pressure sensation is referred to parts below only.

Case 66.—Ah Toy, æt. 28, admitted April 15th, 1893. *History.*—Chinese; was born in a district near Canton; a woodcutter; arrived at Sydney in 1886; has since lived chiefly on the south coast (Bodalla, Cooma), but has occasionally revisited Sydney; he dates his illness back to 1891 only, but probably it is of somewhat longer duration; the first sign he noticed was a tuberosity over the left malar bone, which was soon followed by an eruption on other parts of his face, and then of his body.

State on admission.—Face slightly swollen; expression dull; nose thickened and spread; ears enlarged as to the lobes, which are also wrinkled, and contain numerous small and soft neoplasms. *Trunk.*—There is the general mottling and brownish and reddish-yellow discoloration of old tuberous lepra, and there are many flat neoplasms at several points. *Nervous system.*—Sensation is generally dull; the orbicular muscles of eyes and mouth are under control; both cubital nerves are enlarged, and abnormally tender, the left more than the right; the peroneals seem to be slightly enlarged, but they are not more than normally tender. *Special senses.*—Normal. *General health.*—Apparently good.

Case 67.—N. G—, æt. 61, admitted April 21st, 1893. Pedigree:



Note.—Constitutional illnesses denied for the whole family above mentioned.

History.—Was born at Windsor, New South Wales, in 1832; he removed to Sydney. While still quite young he went to gold-fields on the Turon near Carcoar, New South Wales, and lived there until he was twenty-five or twenty-six years old (1857–8), having worked as a gold-miner for several years (there were plenty of Chinese on the field at that date). He then married. Soon after he was invited by his brother-in-law to go to Calcutta. He went there at a date he cannot fix, and purchased a saddlery business which he carried on for some years. At the end of this term he returned to Sydney; he went back

to Calcutta, and again stayed there a few years, during which he was employed in the railway service; he can give no dates, but returned to Sydney for the last time soon after his wife died in India, which, he thought, happened "about twenty years ago" (1873). She had two daughters by him, who were brought up in the country, were married there, and have children; but he knows nothing about them now. He had jungle fever while in India; saw a few lepers in the streets, not otherwise. When he returned to Sydney he engaged in overlanding (droving over long distances). At this work he travelled widely over Australia. On January 25th, 1884, he was admitted to the Macquarie Street Asylum for the Infirm and Destitute (N.S.W.), and he left on March 10th, 1884; no medical record concerning him during his stay; no record of readmission. He returned to his occupation of droving, and in 1885 he was in the north-west of Queensland, when a coil of wire fell on his right foot and smashed some toes. He travelled a hundred miles to Charters Towers (Q.), and was admitted to the hospital there January 9th, 1886. The Medical Officer on being referred to stated, "He is entered up in the books as having been suffering from gangrene; there is no note as to the cause or nature of it. One of the wardsmen informs me that on his admission he stated he had been travelling in the bush, and became exhausted and lay down for several days, until somebody picked him up and brought him into the town. He said nothing about a coil of wire falling on him." After a year's stay he was discharged on January 7th, 1887, to Dunwich Benevolent Asylum, Brisbane (Q.). He was admitted there on February 1st, 1887 (the interval having probably been occupied in transferring him), and he was discharged on 1st December, 1887. The Medical Officer reported that "while he was here he suffered from sores on the toes, which were not suspected of having special origin, but were treated with the usual antiseptic ointments. He made no improvement. I am sorry that I can furnish no other particulars." He then went down to Sydney again, and about a year after arriving slipped downstairs and sprained his ankle; he was taken to a hospital, and was straightway removed thence to the George Street Asylum for the Infirm and Destitute (N.S.W.), where he was admitted 5th December, 1887. After this injury his left foot became inflamed and ulcerated. His medical record shows that during his stay he had illnesses as follows:—On admission he suffered from eczema and articular pains in the smaller joints; he was treated for gout. In February, 1889, he was under treatment by the Visiting Ophthalmic Surgeon (who could not recall the case, and is sure his ailment was trivial from no note at all having been made of it). In May, 1890, he had buboes in the groins, which suppurated, and subsequently entirely disappeared under poulticing and application of sulphocarbolate of zinc. In June, 1890, he had a trifling hæmatemesis. In August, 1890, he was under treatment for a cystitis which disappeared in a month (the patient positively denies being aware that he ever had anything wrong with his water). In August, 1891, he had "ulcers on the foot," thought to be of syphilitic origin; and during the

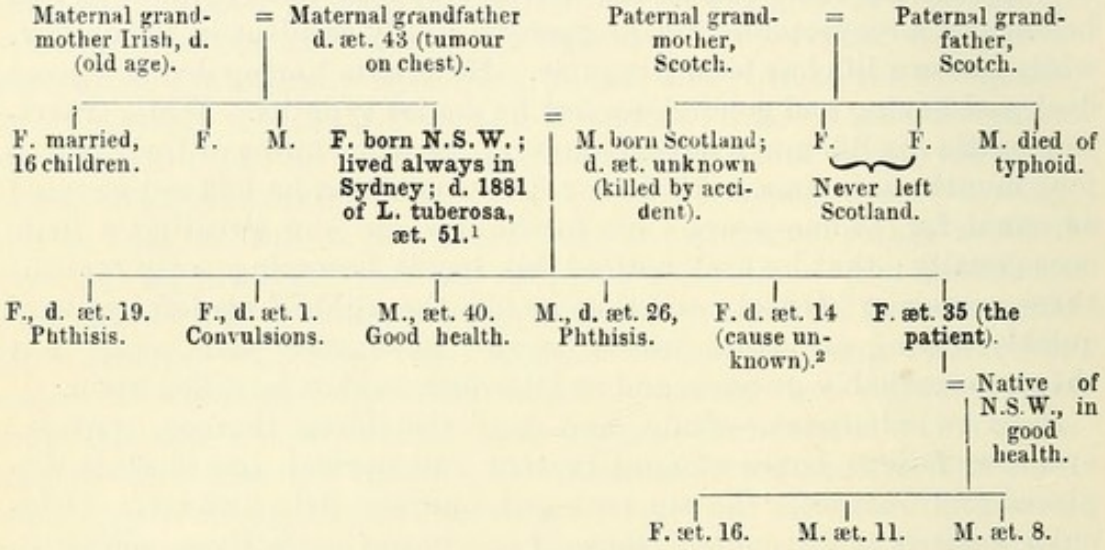
whole of his stay in this institution he was on the sick list, and in hospital quarters. During April, 1893, a West Indian fellow-inmate was told off to help in the sick wards, and refused to dress his feet on the ground that he was a leper, and he was transferred to the lazaret on April 21st.

History of illness.—Little can be added to the above. Although his memory seems perfectly good, he does not furnish dates which it might be supposed he would remember, at least approximately; however, he belongs to a respectable and prosperous family resident in the colony, while his own life has been irregular. He admits having drunk a great deal, and having had gonorrhœa, but he denies syphilis. While travelling cattle his life must have been very hard for terms of from two to four months at a time. All he could say was that he had not sweated as usual for "some years," his forehead alone now sweating a little occasionally; that he first noticed his hands becoming scaly "about three years ago" (1890); and that he lost the sight of his left eye very quickly during an attack which began "about two years ago;" but these are probably guesses, and at all events cannot be relied upon.

State on admission.—Scalp, and hair remaining thereon, normal; eyebrows fallen; bones of nose present and normal, but slightly displaced (old fracture); the tip enlarged, bulbous, pale, and soft. Orbicular muscles under control (those of mouth not perfectly so, perhaps). *Eyes.*—Left cornea cloudy and irregularly opaque; lids granular; can distinguish light only; right shows the same changes less advanced, and is still useful. *Ears.*—Normal. Generally, might be described as having a delicate complexion. *Trunk.*—The skin is roughened, dry, and desquamating minute scales; there are obscure changes of colour —reddish, brownish, yellowish, and muddy; there are no well-defined maculæ. *Upper extremities.*—Arms wasted; skin over elbows baggy, voluminous, and slightly ulcerated; right ulnar nerve enlarged; sensation is referred to the point of pressure, and very slightly to the ulnar side of hand; the left is in the same state, but pressure causes more discomfort; there are no enlargements in the upper course of either nerve. *Hands.*—Both have the interossei wasted, the metacarpus flattened, and the fingers contracted *en griffe;* the terminal phalanges absorbed, the nails broken, desquamating, and deformed; the skin harsh and dry; and they are analgesic and to some extent anæsthetic (as also are the forearms). *Legs and feet.*—Both legs are wasted, and their skin is desquamating and dry, changes which are also shown on dorsum of feet; there is the usual brown, dull, uniform discoloration. *Right foot.*—All the toes are shortened, the second and third entirely gone (see *History*); the foot as a whole is thickened. *Left foot.*—All toes present, all enlarged, bulbous at the end, and ulcerated. *Peroneal nerves.*—Both are wasted, found with difficulty, and absolutely insensitive. There is analgesia and much anæsthesia of both feet and lower part of both legs. *Special senses.*—Normal, except as mentioned; voice normal; nares occasionally plugged, but generally only slightly obstructed. *General health.*—Was very weak on admission, but soon im-

proved; is in fair general health, but looks older than his years; general senile changes; has good motor power over legs, and when sitting moves them promptly and normally to show his feet; but he cannot walk without crutches, owing (as he says) entirely to the sprain mentioned above, from which he never recovered.

Case 68.—A. M—, æt. 35 (see also Case 11), admitted September 7th, 1893. Pedigree:



History.—The following matters and her account of the beginning of her illness are probably correct. Born Sydney, 1859; lived there always, occasionally visiting Melbourne and country places in New South Wales. Married in 1877 (æt. 19); went to New Zealand in 1879, and travelled there for two years, visiting various large towns in both north and south islands; stayed a good deal at Auckland; while there had a very irritable eruption on chest and back, for which she took advice; it seems to have been subacute, and her description is of prickly heat; it has never recurred, and has left no trace. While in New Zealand she became interested in the Maoris, but only to the extent of conversing with them occasionally in the streets, and of occasionally buying small articles from them, but not fruit or food; has never had any coloured servants, but has twice lodged at boarding-houses where the cook was a coloured man—once a Chinese, once a Cingalese, Malabar, or West Indian in all probability. Since 1881 has resided in New South Wales (travelling), and for several years continuously in Sydney. Has had no serious illness; has been confined at term three times—1877, 1882, 1885; has also miscarried nine times at from two to four months on dates interspersed among her confinements.

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[1] Married a second time, and had two more children. The registered (and medically certified) cause of death was "exhaustion; two months."

[2] This death could not be found in the register.

[3] Only this person was seen by me; he was in good health.

This patient's mother (Case 12), born Sydney 1830, never left New South Wales, lived at Sydney, and seldom went to the country, died of *L. tuberosa* during 1881. She was admitted to St. Vincent's Hospital in December, 1878, and was discharged during the ensuing January. Her case was recognised at that time by the medical staff, but no account of it has come to light; however, a photograph then taken of her lies before me. It shows *L. tuberosa* very well, and, from the general appearance represented, the illness had probably then lasted several years already. This person's first husband and father of the present patient died by accident (see pedigree) while the latter was quite young. She married a second time, and this second husband had travelled much about the world; he also died after a few years from an unknown cause, but one said to have been quite free from suspicion of leprosy or of disease of the nervous system. The present patient said that being about to enter a fruit-shop with her mother at the age of eleven or twelve (1870) they encountered a man coming out, whose peculiar physiognomy impressed itself on her so that she now recognises his aspect in that of her own face and of one or two others in the lazaret with her. After the age of thirteen or fourteen she was only occasionally at home, her time between then and her marriage having been spent in visiting; but she returned home between the visits until her marriage in 1877, and during those short intervals was in communication with her mother. *History of illness.*—Some time before birth of her youngest child a brown spot appeared on the left side of her neck, and another over her right eyebrow; they disappeared after remaining a longish but not remembered time, and there were no others. Probably about a year afterwards (1886) she first noticed that her face was slightly swelled, and she thinks rather more about the right orbit than elsewhere; there was no marked alteration of her features until a later and unremembered date. *Prodromes.*—These denied; especially there were no attacks of drowsiness or unusual lassitude; nor of nose-bleed until comparatively recently, when the right nostril began to be habitually occluded. Menstruation has been uninterfered with, except for some months during 1892 when several ulcers on the legs were discharging freely; her habit is, and always has been, to menstruate during eight days at intervals of fourteen days.

State on admission.—Is very thin, but scarcely emaciated; has good strength; voice natural and strong, and conversation lively; complains of loss of memory, but offers no unmistakable evidence of this; recognises also a certain mental dulness or indifference. Scalp normal; hair normal, dark brown, beginning to turn grey; eyebrows and eyelashes wanting; general tuberous enlargement of features, and complete loss of natural aspect; nose thickened and enlarged, very slight or commencing ulceration at margin of alæ, and desquamation and tenderness of the skin over all—it has been slightly broken here and there, and has lately bled; the right nostril permanently occluded almost completely, the left free and never occluded; both upper and lower lips considerably thickened, and the upper beginning to retract,

in consequence of sinking of the bones of the nose; the chin presents very many subcutaneous tuberosities and general infiltration; the cheeks are in the same state, but also carry many puckered scars where old tuberosities have shrunk and disappeared (she says she never had any ulcers on her face); the ears much enlarged, and containing many tuberosities of different sizes. The right eye has a rather extensive corneal opacity, and is practically useless; if she covers it she can read a little with the left eye. Over the elbows is a moderate degree of the usual infiltration, bagginess, and superficial ulceration of the skin; the hands are uniformly swollen, slightly shining at parts, at others desquamating, reddish blue, the fingers inclining to sausage-shape; the right hand is slightly worse than the other, its forefinger more swollen and stiff; all ungual phalanges are shortened, and all nails very nearly wanting. The feet present similar appearances in a lesser degree; there is a slight ulceration about some nails, which last, however, are present and normal except for loss of polish. On the lower third of legs are extensive shallow ulcers, and many cicatrices which mark the site of former ulcers of the same kind. The body shows some ill-marked brownish discolorations at many points, but no well-defined maculæ; the subcutaneous fat is still present, and is slightly wanting only over the forearms. *Nerve trunks.*—Orbicular muscles of eyes are perfectly under control, as that of mouth probably is (thickening of the lips renders this doubtful). Both ulnars can be felt moderately enlarged and smooth, but at the notch are difficult to detect, and give an impression of separated strands; sensation on pressure is referred upwards only (and slightly) on the right side, downwards only and as far as the wrist on the left side. Both peroneals are easily felt, but hardened rather than enlarged (fibrosis), and sensation is referred downwards only and not below ankle. *Sensation.*—This is diminished on hands and face, but to a rather slighter extent than usual; on the hands are analgesic areas, not otherwise distinguishable from adjacent parts, but the finger tips retain what seems to be nearly normal sensitiveness (she could distinguish by touch alone between two soft materials of different degrees of roughness); over the tuberosities there are varying degrees of anæsthesia, from perfect to very slight. *General health.*—Good, but for some weakness. Some months ago was nearly carried off by an attack of diarrhœa, accompanied with fever.

Case 69.—P. M—, æt. 47; admitted November 3rd, 1893.

History.—Was born at Madras of a Syrian father and a Portuguese mother in 1846; no leprosy in his family. Is a Christian. In 1865 entered the police service at Madras; in 1870 entered the police service at Colombo; left the police, and entered the service of a coffee-planter for a short time, and in 1875 sailed for a sugar plantation at Mackay (Q.); in 1878 went to Sydney (N.S.W.), and worked as a cook; shipped as cook on sailing (and other) vessels, visiting England and India; about 1882 visited Brisbane (Q.), and then settled at work as a cook in a restaurant in Sydney, where he continued until 1887; in that year

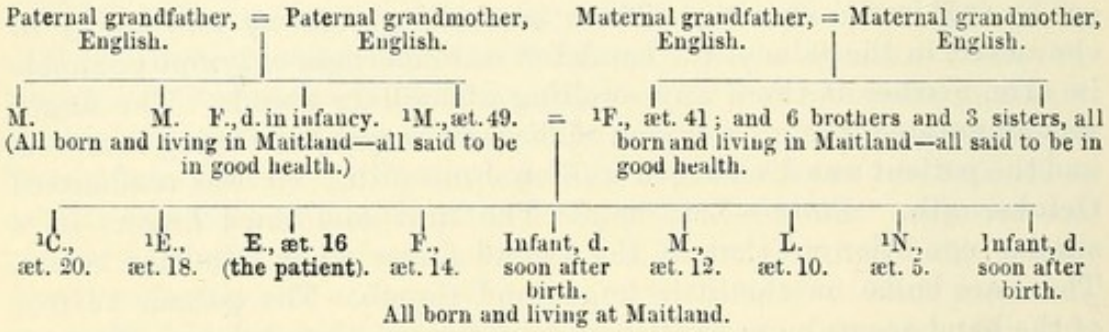
he went to Newcastle (N.S.W.), where he has maintained himself until the present time by selling fruit, ice cream, sweets, &c.

History of illness.—Between 1882 and 1887, while working in Sydney as a cook, he used to bathe frequently, and at some time or other between those dates he first noticed some small maculæ on chest or abdomen. At this time he used to drink too much. About 1885 he had an attack of "rheumatism." During 1890 he first noticed his fingers becoming contracted, and they were numb; he had also numbness of the left foot. On July 4th, 1892, he was admitted to Newcastle Hospital, and was discharged on August 5th. The record made by the late resident medical officer was:—"Suppurating corn, chronic ulcer of foot; cured." He was readmitted a year later (May 30th, 1893), and the following notes of his illness were furnished by the Resident Medical Officer on November 18th (that is to say, after the patient had been dealt with under the Leprosy Act):—"Said he was cleaning fish, and had run a bone into his finger, which was poisoned. *State.*—The middle finger of the left hand is in a state of moist gangrene, which is horribly offensive. There is no pain anywhere. Temperature ranges from subnormal in the morning to 99° or 100° in the evening. There is swelling, brawny and boggy in character, in the palm of the hand, but no tenderness of lymph channels in arm, neither is there any swelling of axillary glands. The finger was amputated, the greater part of the metacarpal bone being removed, and the patient was discharged well on June 26th. He was readmitted October 5th. *State.*—Left hand: The first and third fingers in a similar condition to that of the second finger when admitted before. There are bullæ on the little finger and thumb. The palmar surface of the hand seems more swollen and infiltrated than before. He complains of severe pains shooting from his gangrenous fingers up his arm. The condition described as 'gangrenous' is, in our opinion, a misnomer. It is unlike any condition we have before observed, but we have given it this name as there are large bullæ, a very offensive odour, and the ends of the fingers are evidently necrosed. Right hand: There is contraction of all the fingers and wasting of the muscles of the palm, producing a clawed appearance. There are bullæ on the extensor surface of second and third phalanges of the second, third, and fourth fingers, similar to those on the little finger of the left hand. Patient complains of lightning pains from the fingers shooting up the arm. He was placed in the isolation wards under observation. A consultation of the staff was subsequently held, when the unanimous diagnosis of those present was leprosy, and the Government Medical Officer was communicated with immediately." The latter reported to the Board that there was a "case in hospital like leprosy" on October 31st, and the patient was transferred to the lazaret on November 3rd.

State on admission.—Hair of scalp and face normal; cannot close his eyes; orbicular of mouth under imperfect control. Chiefly on the body, less on arms and thighs, has numerous and large maculæ; they are in part of a deep brown (a different shade from the brown of his

normal skin), in part tending to achromatic; but there is nothing regular about the distribution of these two colours; the margins are irregular and run into each other for the most part, but rosy margins, several inches long, can be seen at some places on the back and abdomen. Right hand: Fingers contracted *en griffe*, interossei much wasted, palm flattened, much numbness in general, but sensation pretty good in thumb and forefinger, which he relies on for use. Left hand: Fingers contracted *en griffe*; the ring finger amputated; the second and fourth ulcerated, the skin detached, bullous and stinking; the forefinger has lost its ungual phalanx by absorption; interosseous muscles wasted; the whole hand is swollen, and the whole is quite numb. Both cubital nerves are slightly enlarged and sensitive, but on pressure sensation is referred only to the spot touched. The feet present nothing remarkable. Injection of 14 mg. of pilocarpine caused a moderate sweat in ten or twelve minutes, maculæ and other patches of skin remaining dry by comparison with apparently unaffected parts; but no part remained absolutely dry.

CASE 70.—E. R—, æt. 16, admitted November 18th, 1893.



History.—Was born and has always lived at Maitland, New South Wales (pop., 1891, 7295). Three other houses in the town have been occupied by her family, and all were within five minutes' walk of that in which they now live; she has never been away from the neighbourhood; she has had no illnesses; she first menstruated in August last—that is, late in life for a native; her periods have recurred regularly since; has always been bright and industrious, and in the habit of assisting her very numerous relatives in their household occupations down to the present date.

History of illness.—This seems unusually clear and simple. In January or February, 1892, or about twenty-one months ago, she went to a village called Dagworth, not more than two miles out of Maitland; she stayed at a farm there for a week; the sole event during the visit she can remember is that in looking for melons she walked (with boots and stockings on) much above her ankles in mud, a stream bordering the farm having overflowed its banks shortly before. At or immediately after returning home she noticed several (more than one) purplish streaks on both legs somewhere between ankle and knee,

[1] These persons were seen by me, and appeared to be in good health.

quite slender, and about an inch or more long. After a moderate time these streaks had so spread as to form purplish discolorations under the skin. Some time after her face swelled a little, and some time after her face her hands swelled. She had medical advice. At the beginning of 1893 she was again taken to a doctor, who seems not to have noticed the case particularly, but although he then saw her only once he remembered it well enough to ask after her when he happened to be called to her parents' house ten months later upon other business (later the doctor said that on the occasion of her consulting him at beginning of 1893 he noticed that she had some raised patches on her forearms "like wet wash-leather spread on the skin"). During the interval she had continued to get worse steadily, and when she entered the room he at once saw that she was suffering from tuberous leprosy. It is important to note that during the whole of her life she had had no illness that could be remembered, and especially that for long before and for all the time after appearance of the streaks her general health remained absolutely unaltered from the normal, according to her father and mother interrogated at one time, and her two adult sisters and an aunt interrogated at another time, and separately from the former—all of them having been in daily communication with her always. This account she also herself corroborated. None of the family have had any communication with Chinese or other Asiatics except of the inevitable kind, namely, habitual purchase of vegetables from Chinese gardeners, upon whom the inhabitants of this and all other of the larger towns rely for such supplies. The family, including the patient, have never been in distress; the father has been in the same regular employment for more than twenty years. She often went to Newcastle (seventeen miles), but says she never bought fruit or sweets from coloured men because she did not like such people. (See Case 67.)

State on admission.—Scalp, hair, and eyebrows normal; there are some rather large, not hard or well-defined, tuberosities on forehead and cheeks, and a good deal of diffuse and soft infiltration; there is dull red and coppery coloration of these points, not uniform; the nose is thickened and slightly spread, but contains no distinguishable tuberosity; the chin has some indistinct tuberous swellings, or infiltrated areas; her natural aspect is, nevertheless, easily recognised; the ears are generally enlarged, and several small tuberosities, rather hard and well defined, are distinguishable; the orbicular muscles are under control; both shoulder tips are covered with bistre-brown maculæ, of the bright tint usual in the earlier stages; there is some ill-defined brownish discoloration over the spines of lower dorsal vertebræ; large brown maculæ on the buttocks; nothing on the abdominal surface. *Upper limbs.*—The shoulder-tip maculæ are continuous with similar discoloration of the arms; there are islets of normal skin; towards the elbow-joint lepromata *en nappe* begin to appear. Right forearm: From the elbow to the wrist over the ulnar bone are numerous tuberosities, and irregular, flat, rather extensive lepromata

en nappe; they are coppery brown in colour, and raised very nearly 3 millimetres above the normal surface, their edges being abrupt; just above the wrist similar changes extend all round; the hand is moderately swollen in general, and the fingers beginning to be sausage-shaped; the little finger is contracted from an old cut, of which the scar remains. The changes on the left side are similar, but the lepromata *en nappe* begin on the arm, and about the junction of upper and middle thirds; this hand is also a good deal more swollen, the fingers more sausage-shaped, and of a deeper purple colour; both cubital nerves are easily found, but are scarcely enlarged; they are very tender, and on pressure sensation is referred to the whole extremity from shoulder to tips of (all) fingers. Lower limbs: the right thigh has maculæ only; round the knee-joint is a good deal of infiltration and some spread-out specific thickening of the skin; the leg has shown many maculæ, of which only a few now remain, and the anterior surface is freest; there the skin is normal for the most part, but slightly roughened and desquamating at some points. This recession of maculæ is said to have occurred after there had been several separate eruptions of blisters on this leg. The foot is nearly normal, but the toes are much swollen, very purple, and the skin in general is dry and harsh. Left: like the right except in degree of change; there is much more thickening; the anterior part of leg is not free from maculæ; the dorsum of foot is markedly brown. On this side there has never been any bullous eruption. The external popliteals could not be distinguished, chiefly on account of muscularity and fatness of the patient; but they were both more than usually tender, and sensation on pressure was referred on both sides to middle of thigh, legs, and feet; but the right nerve was decidedly more sensitive than the left—that is, inversely as the now visible changes. Special senses: delayed sensation and a degree of analgesia can be easily made out at several points; otherwise normal. General health: seems perfectly good; is quite lively, cheerful, and industrious.

This case concludes the positive evidence regarding N.S.W. which I have been able to collect; it extends to the close of the year 1893. Now, for the sake of completeness, as well as for other reasons, I will recapitulate the negative evidence:

Mr. H. G. A. Wright, M.R.C.S., began to practise in Sydney in 1853; had heard of no case either in a white or a coloured person until he visited Case 6, which he believed he was first to recognise.

Dr. Walter Brown had practised at Parramatta (the oldest town next to Sydney, twelve miles therefrom, in a very fertile agricultural district) since 1851: for many of the earlier years he held the post of police surgeon at Sydney as well. He had heard of no case before Case 28 (except Cases 3—9).

Dr. Milford began to practise in Sydney in 1858. He had heard of no case before his own Case 2, nor did he hear of any afterwards until Case 3.

Dr. Cosby Morgan was in the colony from about 1855, and began to practise at Newcastle (coal, on the coast seventy miles north of Sydney, a considerable place) in 1860. He was acquainted with Case 4 both before and after his illness; was often in Sydney; never heard of any other before the series 3 to 9.

Dr. P. Sydney Jones (who furnished Cases 13 to 16, and contributed from his note-books Cases 10 and 37) remembered none before Case 12, except 3—9; he began to practise in Sydney in 1860.

Sir Arthur Renwick remembered no case earlier than Case 3.

All these gentlemen held, and still hold, foremost positions in the profession in Sydney, and it is only necessary to add that the later the date the more their attention must have been open to leprosy.

The following table sets forth the positive observations just recounted, in their chronological order.

TABLE II.—*Summary of known cases and of legislation in New South Wales.*

1859. A coloured West Indian observed by Dr. Cox in a lunatic asylum. L. nervorum.

1861. A Chinese admitted to St. Vincent's Hospital under Dr. F. Milford. L. nervorum.

1867. Several correspondents reported that they had never met with lepra in New South Wales (Rep. R.C.P.).

1868. White. The first of seven adult male whites was admitted to Sydney Hospital. L. tuberosa.

1869. White. L. tuberosa.

1870. White. L. tuberosa.

1871. Whites, two; both L. tuberosa.

1872. Whites, two; both L. tuberosa.

1873. White. Form?

1875. White. P. S—, discovered in Richmond River district towards end of life, was attacked about this date. L. tuberosa.

1879. White. Case 12 was admitted to St. Vincent's Hospital. L. tuberosa.

White. Mrs. W— consulted Dr. Sydney Jones. L. tuberosa.

1881. White. M—, a female æt. 9, consulted Dr. Sydney Jones. Form?

White. G. R— was attacked about this time; see No. 43. L. tuberosa.

1882. White. F. M—, male æt. 73, consulted Dr. Sydney Jones. Form?

1883. White. In this year a male was observed at Miller's Point, Sydney, by Drs. Cox and Belgrave. L. tuberosa.
Five Chinese were admitted to a refuge in connection with the Coast Hospital (helpless; voluntary isolation). Two had L. nervorum.

1884. Two more Chinese were admitted as above. Form?
White. At Parramatta a female was observed by Drs. Waugh and James Smith. L. tuberosa.

1885. One Chinese was admitted as above, L. nervorum; and one coloured West Indian, L. tuberosa.
Mrs. L. died at Carnden, L. tuberosa.

1886. Two Chinese were admitted as above; one had L. nervorum, and one Javanese L. nervorum.

1887. One Chinese admitted as above. Form?

1888. Three Chinese admitted as above: two L. tuberosa, one L. nervorum.
White, male, L. tuberosa.

1889. One Chinese; L. tuberosa.
White; male æt. 17, L. tuberosa.

1890. Whites, two. Male æt. 28, L. tuberosa; and male æt. 14, L. nervorum.
Legislation.—The Leprosy Act was assented to in November. It made notification of recognised cases of lepra compulsory, and authorised removal and detention of lepers, or their supervision in domestic isolation.

1891. Four Chinese legally isolated; two had L. tuberosa, two L. nervorum. Also one Tanna boy, L. tuberosa. One Chinese, seen and reported by Mr. H. G. A. Wright, escaped; L. tuberosa.
Whites, five. Three adult males, two adult females; all L. tuberosa.

1892. Eight Chinese legally isolated; four had L. tuberosa, four L. nervorum.
Whites, four. Two male and one female adult had L. tuberosa; one male, æt. 13, L. nervorum.

1893. Two Chinese, both L. tuberosa, and one Madrassee, L. nervorum, were legally isolated.
Whites, four. Two adult females, one female æt. 16, and one adult male; all L. tuberosa.

TABLE IIA.—*Showing the manner in which the above 68 cases were distributed among whites and coloured races, under sex and form.*

	Whites.		Coloured.		
	M.	F.	M.	F.	Total.
L. tuberosa . . .	19	10	17	–	46
L. nervorum . . .	2	–	16	–	18
Undistinguished . .	2	1	3	–	6
Totals . . .	23	11	36	0	70

Sect. VII.—LEPROSY IN QUEENSLAND.

According to the returns furnished to the Colonial Office[1] lepra had not been observed in this colony up to a time before 1867.

The earliest case of which I have been able to hear was mentioned in a paper by the late Dr. J. Bancroft.[2] He had extracted it from one of the old case-books kept at Brisbane Hospital; the following are the more important parts of the clinical notes:

Case 1.—April 10th, 1855, admitted Oun Tsar, Chinese, an old man, under Dr. Cannan. . . . . "Has had some disease of the first toe of left foot; it has been removed, and there is now an opening in the ball of the great toe of the same foot, from which there is a slight fœtid discharge, and the probe detects loose bone. The last phalanx of the second finger (*sic*) of the right also is dead and separating, and the soft parts have sloughed away. He is weak, and seems broken down in health." The diseased bones were removed, and in August he was discharged. In February, 1856, he was readmitted, and it was noted, "He is now admitted with pains, chiefly in the hands, which are contracted." He was again discharged, and was readmitted in December of the same year. "He is now in a very miserable state. The left foot is dark-coloured, hot, but without feeling. There is a very fœtid discharge from the spot where the great toe was removed. The left hand is swollen, hot, dark-coloured, and painful." A finger of this hand was removed. At the end of 1857 he was discharged, and noted to be incurable. He was readmitted for the last time at beginning of 1859. "This old man, whose hands and feet are quite crippled by repeated attacks of necrosis and senile gangrene . . . ." the only additional information as to his state being, that there was a sore swelling about "the dislocated wrist." He died soon after.

I believe no difficulty will be felt in recognising L. nervorum in this account. Dr. Bancroft also remarked that he felt sure there had been other (unrecognised) cases; and after searching the records myself during the present year I feel inclined to agree with him; although as far as the time at my disposal allowed me to carry the search through a series of books which began in 1830, I found no note at all comparable with that just quoted in point of detail.

[1] Report R.C.P., p. 15.

[2] Trans. Intercolonial Med. Congress, Sydney, 1892. Fourth Session.

Admissions for syphilis and scurvy alone or in combination seem to have been rather frequent, during the first thirty years at all events—though scurvy became much more uncommon during the latter ten of them; and rather hasty notes of such cases must always be liable to arouse suspicion in readers on the look-out for possible cases of lepra. At all events, I found no case worth quoting here, but I do not pretend that my examination of these books was thorough.

From 1856 to 1858 Dr. F. Milford, of Sydney, was a member of the honorary medical staff of Brisbane Hospital. He has contributed the case next in time of which anything is now remembered.

CASE 2 (unpublished).—Dr. Milford said that in 1857 he noticed an English-speaking white in the Benevolent Division of the institution who had L. tuberosa; the man believed, and it was generally supposed, that he was dying of syphilis.

I was not able to find any note probably relating to such a case, but as it was not under hospital treatment proper that is not surprising.

The late Dr. Bancroft took charge of the hospital as resident medical officer in 1868, and in the paper already quoted made mention of the following cases:[1]

CASE 3.—"I found on taking charge of the hospital a patient, a German, who had been a ship's cook, and had resided for a considerable period in the Sandwich Islands. He was usefully employed about the premises, and had well-marked tubercles of the face, eyebrows, and ears; his voice was hoarse, and the hands and feet too were anæsthetic in parts, as he discovered by at times burning himself; and the nails of the fingers and toes were defective. His appearance was remarkable, and I often interrogated him as to syphilis, which he denied having suffered from. A course of mercury did him harm, and it was only after reading Wilson's description repeatedly that I concluded the patient was a leper. With great difficulty did I obtain the concurrence in this opinion of some of my colleagues. He died, during my tenure, of albuminuria and dropsy."

The writer then said that he treated a number of kanakas with ulcers of the feet and carious bones at the hospital. He entered the cases in the books as "Islander's toe dis-

[1] No dates having been given, they appear here in the same order as in the paper from which they are quoted.

ease," and it was only after a time that he perceived that these also were cases of leprosy in another form. I have seen a photograph from Dr. Bancroft's collection which represents the feet of one such patient, and sufficiently establishes the diagnosis in the minds of those who have already seen this form of leprosy. On inquiry I found that these cases were well remembered in Brisbane, and were rather common some years ago ; their diminution more recently being probably accounted for by reference to the smaller number of kanakas now employed near the city. Especially Dr. John Thomson, who succeeded Dr. Bancroft at the hospital, remembered them ; he thought he had seen about twenty cases, from fifteen to twenty-five, altogether. So, also, some were remembered by the Hon. C. F. Marks, M.D., in practice in Brisbane since 1878.

The next case mentioned by Dr. Bancroft was one to which his attention was drawn by Dr. Thomson, who considered it to be a case of leprosy. I have abstracted the following account from the 'Lancet,' 1879, to which it was communicated by Cobbold from a letter written to him by Dr. Bancroft:

Case 4.—"So far as Dr. B. is aware this is the first instance of a European having leprosy in Queensland. Writing from Brisbane on the 22nd of November, he reports the case as follows:—A. B—, æt. 49; native of Exeter, England; in the colony twenty-five years; a labourer; has seven children, all healthy. He has worked among timber, and at several occupations (in the paper already quoted, Dr. B. said he managed a boiling-down or fat-rendering business in close proximity to Chinese gardens). Always lived in a suburb of Brisbane, and has used well and swamp water. Four or five years ago noticed middle finger of left hand to become mumb; afterwards a blister formed over the metacarpo-phalangeal joint; this led into the joint. The finger was amputated at Brisbane Hospital. Patient remarked at the time that the ring finger was losing its sensibility. This happened about twenty months ago. The little finger was next attacked; then the forefinger of the right hand. After this a water blister formed at the metacarpo-phalangeal joint of the little finger of the left hand, which led to permanent flexure of the finger. At the present time there is much loss of power and sensation in the hands; one forefinger has no sensation, and a penetrating ulcer exists on it. Right cheek is red and thickened, with disorderly sensation. On the thighs are several anæsthetic patches with sinuous reddish lines bounding them, to which

lines lead visible cutaneous vessels. One of these I punctured, and in the blood I found four filariæ. Patient complains of much debility and dyspepsia. He has never had syphilis. The feet are affected, but I have not yet examined them. He has inguinal hernia, and wears a truss."

I append a photograph contributed by Dr. Peter Bancroft from the same collection, which shows this patient's hands; it was probably taken at a late stage of his disease.

The writer quoted next said that there had been several cases of leprosy in Europeans in Queensland, besides the two he had already referred to; and mentioned the following:

Case 5.—"One was a German who worked on a sugar plantation. He had tubercular leprosy of the face. There was no evidence of his association with Chinese. He is now dead."

Dr. Thomson has informed me that this man also was for long employed about the Brisbane Hospital at light garden work, &c.; and when he became too weak he was transferred to the benevolent asylum at Dunwich (Stradbroke Island, Moreton Bay), where he lived in a tent by himself until his death a few years ago.

Case 6.—"A second was a grave-digger, resident of an inland town. He had carious bones in the feet, from which he suffered terribly, and died."

Of this case I have not been able to learn anything farther. Dr. Bancroft concluded his account after referring to an aboriginal leper, and three cases "now from a northern town." I do not doubt that Rockhampton was meant; and accounts of all four will be found below. This is the only document with which I have met, and I believe the only one ever published, which professes to give a continuous (if imperfect) account of leprosy in any part of Australia.

The extent of Queensland is so great that it will be more convenient to continue the subject in relation to localities rather than to time in this place; but a summary table at the end will show the time relation of the cases as before. First, then, to conclude the available information regarding Brisbane and its immediate neighbourhood.

CASE 7 (unpublished).—At the end of 1885 a Chinese—Ah Lay, gardener, from Canton, seventeen years in Queensland, suffering from L. tuberosa—was transferred from Brisbane Hospital to Stradbroke Island, where he declined to stay. There was no law to warrant his forcible detention at that time.

From police and departmental reports kept in the department of the Chief Secretary, which I was allowed to peruse and abstract by favour of the Minister through W. E. Parry Okeden, Esq., Principal Under Secretary, expressly for the purpose of compiling this account, I learned the following and other cases given below.

CASE 8.—A Chinese was observed in 1888 on the Darling Downs about 100 miles away. There was no farther information—at that date, too, there was no law authorising forcible interference with the liberty of lepers.

In 1890, Case 51, New South Wales, was attacked during the third month of the patient's stay in Brisbane. She arrived there from what must be considered a leprosy area; yet the described circumstances of her attack, and (apparently) the "primary sore" in which it began, make it necessary to mention her case in connection with this city.

CASE 9 (unpublished).—About 1890 a kanaka, concerning whom all details are wanting, except his residence in the environs of Brisbane, was seen to be suffering from L. tuberosa (I am, nevertheless, enabled to present his photograph, from the late Dr. Bancroft's collection, recognised and identified for me by other medical men).

Legislation.—On July 30th, 1891, the Executive Council gazetted regulations for the notification of cases of leprosy and detention of the sufferers in isolation, which had been framed by the Central Board of Health pursuant to general powers conferred upon them by the Public Health Act, 1884. The following were the more important points:

It was first provided, "when there is reason to believe or suspect that any person in any house or premises is suffering from leprosy, the householder or occupier of the said house or premises *shall* immediately report in writing such case to the Secretary of the Central Board of Health;" and "when any case of leprosy or suspected leprosy comes under the observation of any legally qualified medical practitioner he *shall* forthwith report the circumstances to the Secretary aforesaid." The Board on receiving such a report "*may* cause investigation to be

made by two or more legally qualified practitioners, and upon being satisfied that such person is suffering from that disease *may* order that such person be removed to and detained in such place as may from time to time be set apart " for the detention of lepers.

On July 20th, 1892, these regulations were superseded by an Act to provide for the treatment of leprosy, and the detention and isolation of lepers, which was then assented to. The following alterations were made by this law :

The provisions regarding the compulsory notification of cases or suspected cases of leprosy were the same as in the regulations ; but the power to order removal and detention of lepers, after being satisfied by medical reports, as before, of the nature of the disease, was vested in the Chief Secretary. And it was specially provided under Section 11 that when a person who was suffering from leprosy had sufficient means to provide for his proper maintenance and his medical attendance, the Executive might direct that he should be removed to some place to be specially appointed by them, instead of a lazaret, to be there detained under such supervision and treatment as the Executive Council might direct.

Already lepers had been deported under special Executive warrant to Dayman Island (Torres Straits, close to Thursday Island), and in other cases to Dunwich, on Stradbroke Island, Moreton Bay (Brisbane), where they were maintained in connection with, though separately from, the benevolent asylum established there ; those stations were now appointed to be lazarets within the meaning of the Act ; and all the provisions of the law with regard to lazarets were by the 11th section extended to such places as might be specially appointed for occupation by any well-to-do leper.

Case 10 (unpublished).—During 1892, Punjaubi, an adult male Cingalese suffering from L. tuberosa, was transferred from Stradbroke Island to Friday Island (close to Thursday Island) ; Dayman Island had been found inconvenient. No farther particulars.

Two informants at Brisbane, whose names I am not at liberty to mention, gave me the following particulars :

Case 11 (unpublished).—A youth, aged 20, was observed during 1894 to be suffering from L. tuberosa in all probability, and on being told of the opinion which would most likely be arrived at he fled, and was lost to sight. He was said to be the son of well-to-do people—English and Irish, to have a family history of phthisis on the maternal side, to have been born in Brisbane, to have suffered from cyanosis

from birth, of which, however, nothing was to be seen after puberty, and always to have resided in Brisbane, except for a period of about eighteen months during which he stayed at Gladstone (on the coast, 23° 50′ S. lat., 151° 20′ E. long.). He was then between six and eight years old, and immediately after his return brown discolorations appeared over the trunk and limbs. There was no alteration of the features until about twelve years of age, and it was only at about seventeen years that his disfigurement became so great that he was obliged to stay within doors except after dark. He had been under the treatment of several practitioners, but the nature of his illness had not been diagnosed until the present year (which was thought to be the twelfth of illness). During all that time he had lived as usual, as far as his strength allowed, with the exception mentioned. As is most usual in white cases, no association with coloured aliens or with any persons suffering in a similar way could be made out. There is, in my opinion, no doubt at all of the correctness of the diagnosis in this case.

Case 12 (unpublished).—In 1894 also, George, a kanaka, native of Lifu (Loyalty Islands), was removed to the northern lazaret from the environs of Brisbane. He was aged 30 (about), suffering from L. tuberosa, and said to have been ill for months. Bacillus found (Police reports and Dr. Salter in charge of the northern lazaret).

Also in 1894 the following case was removed from the lunatic asylum at Woogaroo to Stradbroke Island; I have the particulars from the report made by the Inspector-General of the Insane (Dr. Scholes) to the Chief Secretary, and from the patient himself :

Case 13 (unpublished).—J. S—, a placid man, suffering from mild dementia; admitted to the asylum in December, 1888, was reported suffering from leprosy in May, 1894 (Departmental report, by Dr. Scholes). Subsequently the bacillus was demonstrated.

On visiting this patient, in company with Dr. C. J. Hill-Wray, Health Officer at Brisbane, I made the following notes, the patient appearing coherent and reasonable, except in accounting for the time during which he had been confined as a lunatic:—Says he was born in Ireland of Irish parents; landed in Brisbane aged twenty-one; always lived in or in the neighbourhood of Brisbane; worked as a groom; now aged fifty-one (but perhaps looks older). Is a big, stout man; has considerable varicosity of the veins of both legs, less of thighs. He showed only leprous infiltration *en nappe* at several points, except on forehead and eyelid, where were some quite young tuberosities; the tuberous phase was of recent occurrence, and probably its onset drew attention to his disease. On the side of the nerves the case was far otherwise. He had very numerous maculæ (of L. nervorum) over the body and upper parts of the four limbs; these and some adjacent portions of apparently healthy skin were absolutely analgesic; sensi-

bility to a touch remained. The ulnars were enlarged and insensitive except at the point compressed. The orbiculars of the face were unaffected. Impossible to guess duration of illness, but considerable.

Maryborough.—There have been many kanakas in the neighbourhood of this town, which has been the centre of an important sugar-growing district for many years; and it is most probable that there have been more or less numerous cases of leprosy among them there as elsewhere. However, the following is the only positive information I have:

Case 14.—In 1889, Dr. F. Bowe, at that time practising in Maryborough, contributed a paper [1] on the diseases of kanakas, written from his experience among them on the plantations. After referring to other matters he said, "I should now like to draw your attention to the photographs of a Polynesian named Lambar, a native of Motlap" (Banks Group), "who is suffering from a disease which is new to me, and about whose cause and nature I have no idea." The description given by Dr. Bowe and the photograph he attached to it, showed very clearly that this boy was suffering from L. nervorum. The case was judged in the same way by the late Dr. Bancroft,[2] without reference to me; and, indeed, there is no room for error.

The following case was just referred to by Dr. Bancroft[2] in the paper already quoted; but I am indebted for the particulars to the Hon. W. F. Taylor, M.D., of Brisbane, as well as for the accompanying photograph.

Case 15 (unpublished).—On September 7th, 1892, Billy, an aboriginal, æt. about 50, was admitted to Brisbane Hospital suffering from L. tuberosa. He had lived with the remnants of his tribe in the bush about Tincan Bay, near Maryborough. He was transferred to the northern lazaret during the same month, and he died there in January, 1893.

This man had long ceased to be a myall (or wild aboriginal); he lived in a well-settled and prosperous district, and his status will perhaps be best indicated by reference to that of gipsies. I was informed that he insisted there were others of his tribe affected in the same way, but I have not heard that any inquiry was instituted; and it is possible he was making an attempt to have some of them deported with him for company in his banishment. The photographs have unique interest, since they are the only representations of

[1] Trans. Intercolonial Med. Congress, 3rd Sess.

[2] Loc. cit.

leprosy in an aboriginal known to exist; and their importance lies in the demonstration they afford that aboriginal Australians enjoy no immunity from leprosy.[1]

Rockhampton (23° 25′ S. lat., 150° 25′ E. long.).—For the following cases I am indebted to Mr. F. H. Vivian Voss, F.R.C.S., who holds several Government appointments in this district, including that of Inspector of Polynesians.[2] I have supplemented them from other sources as shown. In the first place, Mr. Voss's inquiries on the spot showed that no case of leprosy had been recognised in this district before the first case mentioned below; he referred to many old residents (the town was only founded in 1858–9), and among his informants was Dr. Callaghan, who had practised there for thirty years.

Case 16 (unpublished).—Dr. Kortüm, Health Officer at Cooktown, wrote, during 1894:—"The Chinaman kept in Rockhampton for three years was sent there from here. I cannot find any record of this case, but remember it well; it was the anæsthetic form, and he had large port-wine coloured patches on his arms. I diagnosed the case, and recommended that the man be shipped to China, but . . . . he was lodged in our reception-house for a time, and then sent as a vagrant to Rockhampton."

Mr. Voss contributed the following concerning this case, which he got from "a quite reliable informant, who does not wish his name mentioned:"

The late prisoner, Ah Sam, leper, was received in H.M. gaol, Rockhampton, November 14th, 1877, on a warrant dated November 1st, 1877; charge of assault; three months' imprisonment; signed by the

[1] Bundaberg is in nearly the same latitude; it is an extensive sugar-growing district, and during many years past thousands of kanakas have worked there. It is morally certain that there must have been lepers among them, and yet inquiry failed to reveal any case. In 1891, however, Dr. Rougier, of the Pasteur Institute at Sydney, happened to visit Bundaberg Hospital; and, as he has informed us, he observed a leper in the wards and demonstrated the bacillus. The patient was a male kanaka who was under indoor treatment for tuberculosis, and his affection with leprosy had not been suspected by the staff.

[2] This is the official term under which kanakas are referred to in this colony, but it is misleading. The boys are mainly Melanesians (or of Papuan type), and seldom of Maori type.

Police Magistrate at Cooktown. He came from China in 1873, was a labourer, æt. (about) 35 years. He died March 16th, 1881.

I have abstracted the following from an item published in the 'Sydney Morning Herald,' December 27th, 1877, into which it had been copied from the 'Rockhampton Bulletin :'

"The Chinese leper at Rockhampton has had his photograph taken. . . . . The man presents a sad spectacle; . . . . the face and arms are well covered with dark red blotches; the body is also spotted, but not to the same extent, though there are a few blotches on the back: . . . . the blotches belong to the first stage of the disease, but symptoms belonging to the second stage have already begun to make their appearance in the left hand and wrist. The circulation seems to be stagnant, the feeling has departed, and the hand is scarred with the characteristic white lines."

It seems to me that this description was written with assistance of a medical man imperfectly acquainted with the disease; and I give it at length in corroboration, as far as it goes, of Dr. Kortüm's diagnosis mentioned above. The paragraph went on to describe the way in which this man was lodged :

"His little house stands in the centre of the gaol paddock, and is surrounded with a fence. His keeper occupies a tent a little distance off; . . . . at night the door of his domicile is secured with an iron rod resting in two staples. The keeper never touches the door with his hands. His food is brought to the fence and left there, and after the attendant has retired the leper comes forward and takes what he wants."

With this account that of Mr. Voss's informant (who had the best opportunity of knowing what was done during the whole time of the man's detention) agrees; he wrote :

"He was located in the paddock attached to the old gaol about 300 yards"—here some words were omitted,—"and about forty yards from the railway fence which bounds the other side. He was located in a wooden house, which was locked at night. During the day he was guarded by a warder from the gaol, who had imperative orders not to allow anyone to come within the enclosure." When he died he was buried in the prison yard in which he had been located, about thirty yards from the railway fence and about 200 yards from the street fence"—these, probably, are the words omitted above—"in a grave which was about five feet deep. There were two bags of quicklime put in with him and covered over with earth."

When I visited the Rockhampton patient Q— (see below) I asked him whether he ever saw this Chinese. He said "I think so—in the door of his hut." But when he was asked whether he ever got close to him, he said, "No fear! Why, there was always a man with a rifle guarding him. We never went into the paddock." At the date of Ah Sam's death, Q— was twelve years old.

The noteworthy points here are the nature of the disease, its form, and the strict isolation in which the patient seems to have been kept. The following cases were contributed by Mr. Voss:

CASE 17 (unpublished).—J. Q—, æt. 21 in 1890. A cart driver for a steam laundry. Was born in, and has always lived in Rockhampton.

To this statement, after seeing the patient, I am able to add that his father was Scotch, his mother Irish; he had three brothers, of whom one died young of some disease of the brain; the others, together with five sisters, being alive and well: no phthisis or other constitutional disease in the family.

Always lived with his parents, whose house was about a quarter of a mile from the gaol paddock already mentioned. He used to be fond of fishing in adjoining lagoons, and occasionally would cook the fish he might catch, and eat them. This is a common practice, and the cooking is no doubt frequently underdone. On April 4th, 1890, I saw this patient with reference to general ill-health. I noted "contracted, ill-formed chest; mitral systolic bruit; right ear swollen; hands and feet purplish and cold, swollen but firm; enlarged from wrists and ankles down." His body was clean, also the rest of his limbs. Clearly he was then suffering from leprosy, but I did not recognise the disease. I did not see him again until December 8th, 1891, when I reported him as a leper. The parts then affected were the face, ears, neck, all the limbs, and the buttocks, the nasal and laryngeal mucous membranes. Finding he was a leper, he left under an assumed name, but was arrested on arrival of the steamer at Brisbane. He was transferred to Stradbroke Island.

CASE 18 (unpublished).—J. H—, æt. 26 in March, 1892, when he was reported by me to be a leper. Was a letter-carrier. Was born in Ireland, and arrived in Queensland at about seven years of age; his father was an Englishman, and lived in a house about a quarter of a mile from the gaol paddock already referred to, but the other side of the railway line (by which it was bounded on one side) and across a swamp. He had never been away from Rockhampton district. When

I first saw him he had been on leave since November, 1891, the cause being given as "mental aberration." I saw him two or three times, and saw no evidence of this. I was informed that his face, by its colour and swollen state, attracted attention so long ago as twelve months. It was then ascribed by the patient to sunburn. The face now presents appearance of cicatricial changes, is of a purplish colour, and skin somewhat thickened. Patient, now unshaved for a week, shows thin straggling hair-growth for moustache and whiskers; the eyebrows are well marked. Eyelids are thickened irregularly, right palpebral aperture being smaller than the left, and altered in shape. Above the right eyebrow is a group (size of a florin) of tubercles; on left frontal eminence is a brown patch of skin (size of a crown piece), thin, wrinkled, and glossy. The right ear, especially the lower half, is of a dusky purplish colour, thickened, and with a hard irregular nodular feeling. The left ear presents a similar condition, involving the whole pinna, which is larger than the right. It is covered with desquamating epithelium. This condition is ascribed by the patient to poulticing for an abscess of the ear from which he has recently suffered. The lips are dry, and are without the usual red margin, appearing as if some inflammatory affection had produced cicatricial changes in them. The right hand is enlarged; the skin of the dorsum purplish in colour, and evidently thickened in substance; surface thin, rather glossy, easily wrinkling. The proximal ends of fingers are similarly affected on posterior surface; the distal parts and nails are normal. Hairy down is over the dorsum of the hand. On the forearm tubercles are scattered along the posterior surface and ulnar border; these tubercles (of about the size of a fourpenny piece) are of a dusky red colour, slightly elevated, and only involve the substance of the skin. The left hand presents a similar condition, but more marked. On one small patch on the dorsum hair is almost quite absent, and sensation appears certainly impaired here. The nails are quite good. The feet show a slight purplish colour in parts; the nails are slightly affected. Both legs are covered with dry scale, more especially in front and on the outer sides; the skin is a little thickened. . . . Trunk of body, arms, and thighs are covered with a brown-yellow irregular eruption of scattered patches very slightly elevated, the skin feeling thickened when picked up: . . . . sometimes they run into each other; elsewhere the skin between them seems normal. . . . . The cavities of the mouth and nose show no abnormalities on superficial examination. . . . I can find no history of syphilis.

This patient was allowed to stay at home on parole, but he absconded, probably to another part of the world, and has not since been heard of. With reference to this well-marked case of L. tuberosa it is to be noticed that Dr. X— had been long in attendance on the patient, but the idea

of leprosy had not occurred to him. The history of the next case, also furnished by Mr. Voss, gives a similar hint.

CASE 19 (unpublished).—David Sillee, native of the Solomon Islands, 25 to 30 years of age, has been in Queensland for seven or eight years —five at Mackay, one at Bundaberg, about two and a half at Rockhampton—engaged in wood cutting; but before coming here worked on sugar plantations. I first reported that this boy was a leper in March, 1892. The case was then in a very early stage, the affection (which was only slight) being chiefly in hands and feet. There were whitened patches on the forehead and face, trunk, thighs, and legs. The hands and feet were swollen and glossy. The soft parts of the tip of the left fourth finger had ulcerated off, leaving the phalanx protruding to the joint. I found a patch on the leg which could be freely pin-pricked unknown to the patient. My diagnosis was not confirmed, . . . and the patient was discharged. I lost sight of him until March, 1894, when his appearance, as he sat in his bed in a hospital, at once attracted my attention to it as a case of leprosy. The condition previously existing had increased, and in addition tubercular leprosy of the face had commenced, and both ears were beginning to be affected. On examination of cover-glass preparations of the serum the *B. lepræ* was discovered in profusion. The case was transferred to the northern lazaret soon afterwards.

CASE 20 (unpublished).—Charlie Millar, aged 30 to 35 years, a native of Motlap (Banks Group), has been in Queensland at least twenty years, engaged at all sorts of labour, chiefly field and garden work, but also at a dairy. Attention was first drawn to the case by a letter in the papers. Examination showed syphilis, and on top of this commencing leprosy. There was a tubercle on the left eyelid, a small one (slight thickening only) on lobe of left ear, and being stripped he showed scattered tubercles about the body (see photographs). Cover-glasses prepared with serum from these all showed *B. lepræ*.

CASE 21 (unpublished).—*Cunnamulla* (28° 5′ S. lat., 145° 40′ E. long.). Jimmy Ah Loy, Chinese, was certified by Dr. Murray to be a leper in June, 1890. He died same place October, 1890. (Police Report.)

CASE 22 (unpublished).—*Mackay* (coast, 21° S. lat.). In September, 1892, Aloha, an Api boy (New Hebrides), was removed to the northern lazaret. L. tuberosa. (Cf. Case 56, N.S.W.)

CASE 23 (unpublished).—Jimmy, a Tanna boy (Solomon Islands), thirteen years in Queensland (Dr. Salter); removed to the northern lazaret March, 1894. (Police Report.)

CASE 24 (unpublished).—*Charters Towers* (20° 6′ S. lat., 146° 15′ E. long.). Ah Sam, Chinese, was discovered here 1888. Said he had left Cooktown three or four months before; Dr. Paoli certified. Returned to refuge at Cooktown. (Police Report.)

CASE 25 (unpublished).—Said Ali (a Malabar æt. 35, thirteen years

in Queensland, died of malaria—Dr. Salter); was removed to northern lazaret June, 1892. (Police Report.)

Cases 26 and 27.—*Townsville* (19° 10′ 10″ S. lat., 146° 57′ 56″ E. long.). In 1890 Dr. Joseph Ahearne, Health Officer, wrote,[1] "I believe I have in the course of my ten years' practice here met with two [lepers]: one, suffering from the anæsthetic variety, seen with me by Dr. van Someren, conveniently died from asphyxia a few days after he came under my observation; the other, a tuberculous leper, I shipped home to his country."

Dr. van Someren became familiar with leprosy in India under his father, Deputy Surgeon-General van Someren; he practised at Townsville for three or four years from 1886. He has told me that both the patients referred to were Chinese, though he saw the first only; this case was one of L. mixta. To the date of his departure from Townsville he had heard of no other cases.

Case 28 (unpublished).—An aboriginal, believed to be suffering from leprosy both by Dr. Ahearne and the Resident Surgeon at the hospital, was reported; he died very soon after, same place, January, 1892 (Police report).

Case 29 (unpublished).—Jimmy Cook, a Cingalese, æt. 42, was sent hence to the northern lazaret, May, 1894 (ibid.).

Georgetown (18° 20′ S. lat., 143° 20′ E. long.). Two supposed aboriginal lepers and one Chinese were reported by the police. Extract from 'Brisbane Courier,' telegram from Georgetown; preserved in police reports; no farther information.

Case 30 (unpublished).—*Geraldton* (18° 13′ S. lat., 146° 10′ E. long.). Ambiron, a kanaka, was reported at the middle of 1892; from a photograph it appeared he was suffering from L. tuberosa. He escaped, and remained at large for several months. Ultimately he was recaptured, but died before reaching the northern lazaret (Police report).

Case 31 (unpublished).—*Herberton* (17° 19′ S. lat., 145° 29′ E. long.). Lim, a Chinese æt. 45; twenty years in Queensland; duration of illness seventeen years.—Dr. Salter, certified by Dr. Bowkett; to northern lazaret, December, 1889 (Police report).

Case 32 (unpublished).—Ah Hing, Chinese; from a photograph appears to have had L. tuberosa; before removal to northern lazaret committed suicide, June, 1891 (ibid.).

Case 33 (unpublished).—J. W—, an Englishman, a tin-miner; in Queensland since 1877; immediately before that had spent five years in Cape Colony. Towards the end of 1891 was examined by Dr.

[1] Extract from address to Medical Society, 'Aust. Med. Gaz.,' vol. ix, 1889–90, p. 293.

Bowkett, who reported that he was probably a leper. In 1892 he was admitted to Herberton Hospital, when the opinion was expressed that he "might be a leper." He was transferred to Brisbane, where search was made for *B. lepræ* by a medical man without success. Thereupon he was discharged, and admitted to Brisbane Hospital (Police report). At a meeting of the Central Board of Health, Drs. Thomson, Taylor, and J. Bancroft said they were satisfied his case was one of anæsthetic leprosy ('Brisbane Courier,' February, 1893). The verbal description given me betokened this form clearly enough. He returned to Herberton.

Case 34 (unpublished).—*Cairns* (16° 55′ S. lat., 145° 49′ E. long.). Ah How, a Chinese, was certified by Dr. Koch, æt. 35; six years in Queensland; duration of illness, four years; form, L. mixta.—Dr. Salter (Police report). July 25th, 1889.

Case 35 (unpublished).—Jimmy Morrow, Solomon Islands, to northern lazaret, November, 1892; æt. about 33; fourteen years in Queensland; duration of illness, about three years and six months.—Dr. Salter (ibid.).

Case 36 (unpublished).—*Port Douglas* (16° 30′ S. lat., 145° 30′ E. long.). In August, 1889, Fim, a Cingalese, was certified by Drs. Dobie and Hughston; no farther information (Police report).

Case 37 (unpublished).—*Maytown* (16° S. lat., 144° 20′ E. long.). Ah Linn was reported March, 1892, and removed to the northern lazaret. Dr. Salter reported Ah Linn, æt. 47; in Queensland twenty years; duration of illness, seventeen years; form, mixed (Police report).[1]

Cases 38 to 46.—*Cooktown* (15° 27′ 20″ S. lat., 145° 25′ E. long.). From Dr. Kortüm, health officer at this port for many years, I have received the following by favour of Dr. van Someren. The first case of all of which he had knowledge has already been mentioned (see Rockhampton). Excepting that, he wrote:—"The first case of leprosy observed here was Ah Hoon, admitted to the hospital September, 1878. He had tubercular leprosy, and came from the Normanby diggings, about sixty miles from here. I was then not so sure about the diagnosis, and discharged him after a time. He was, however, brought in again, and lodged on the north shore (of the Endeavour River) with a second leper during 1881; and after a time, having very much improved, was discharged again, whereupon his mate committed suicide by hanging himself. If I remember right, that was in 1882, and the camp on the north shore was broken up, but not for long. Some more lepers turned up, and were located farther away, at a reserve on Leper Creek—a branch of the Endeavour, or small creek running into it near its mouth. I think at one time I had as many as seven lepers there, who were subsequently transferred to the leper station near Thursday Island, forming, I think, the first lot placed there. Ah Hoon was among them. I regret I have not kept any account of the cases, but they were mostly of the mixed sort."

[1] This seems to be the same as Case 31; however, the records were separate and under different dates as given above.

Dr. Kortüm did not say distinctly that all his patients were Chinese, but I have been informed that this was the case; and from an official paper I learned that Dayman Island was first appointed to be a refuge for lepers during 1889, and that in June of that year there were seven Chinese there. These were probably the seven mentioned by Dr Kortüm.

From another source I learned that at Cooktown the aboriginals were not allowed to stay in the town at night, and that those who hung about the town during the day retired to a place within reach of, or near, Leper Creek; that the lubras used to go to the Chinese lepers, and that some of them thus became infected; finally, that the infected ones in turn infected the lowest sort of white youths who commonly had intercourse with them. As to the infection of either aboriginals or whites I have heard nothing corroborative; on the other hand, the same tale was current several years ago when I happened to be in the neighbourhood, though not on the spot. Probably this rumour merely puts the sexual theory of communicated lepra in concrete form, and expresses rather what the laity commonly suppose ought to happen than what had actually been observed.

Barrow Point (about 14° S. lat.).—A police report, dated November, 1893, said:—"There is an aboriginal here apparently suffering from leprosy in an advanced stage, nose and part of his hands and feet being gone." It was also said that there were other aboriginals affected in the same way. Barrow Point has been for a few years past a pearling station; pearling having been carried on at points all along the coast from Cape Melville to Cape Grafton. The report was made by the pearlers to the police, who asked that the alleged lepers might be removed. No farther information; probably no action was taken. The pearlers are chiefly coloured men of one race or another.

In the remoter portions of the immense territory of Queensland, which as yet has but a small proportionate population, it must doubtless be a matter of great expense, if not of real difficulty, to get all reported lepers medically examined; and it would probably cost more, in most such instances, to send the suspects down than to examine them on the spot. Such notes, as a rule, can scarcely be accepted as evidence of the presence of leprosy without reserve; yet I venture to say that loss of parts of the hands and feet is

a sign which anybody can note, and, in default of injury, is most probably accounted for by reference to L. nervorum.

CASE 47 (unpublished).—*Thursday Island*, Torres Straits (10° 33′ S. lat., 142° 10′ E. long.), December, 1893. Dr. Salter reported Billy, a native of Rotumah, ten years in Queensland, a leper for about five years; bacillus found. Form, mixed (Departmental report).

Thursday Island is one of a large number of little islands between Cape York and New Guinea, and it is in the track of all vessels approaching Australia from the north. It has become the centre to which persons living about Torres Straits resort. The northern lazaret was first established (as a refuge) on Dayman Island, 1889, but it was found unsuitable, and towards the end of 1891 Friday Island was occupied for that purpose instead. Dr. A. E. Salter was Health Officer and Superintendent of the lazaret from its establishment until the middle of 1894, and he has furnished some details concerning the lepers under his charge, of which use has already been made above. The people who resort to Thursday Island consist largely of coloured aliens who are engaged in the extensive pearl fisheries which have existed in the Straits and at some points of the eastern coast of Cape York (between Cape Melville and Cape Grafton) for several years past. They are kanakas, Japanese, Cingalese, natives of India, Chinese, some Arabs, a few aboriginals, and others.

Burketown (at the head of the Gulf of Carpentaria, 17° 47′ S. lat., 139° 31′ E. long.). At the end of 1892 a Chinese leper was reported to be at a place forty-five miles away from the township. There were no particulars. (Police report.)

From the foregoing notes it will be inferred that this account is probably as imperfect as it often is deficient in detail. I think that in all likelihood there have been very many more occurrences of lepra in Queensland than have been brought to light. As regards coloured aliens there can scarcely be doubt of this; as regards whites, while the probability is strong, perhaps their number could not have been very great without general attention having been earlier attracted to them. Yet the frequency with which observers in general attribute the signs of this disease to syphilis as long as leprosy is neglected or forgotten by

them, renders even that doubtful; while Case 20 shows during how long a time a very well-marked case of L. tuberosa, to conceal which no sort of attempt had ever been made, went unrecognised even at Brisbane.

TABLE III.—*Summary of recorded cases, and of legislation, in Queensland.*

1855. A Chinese came under treatment at Brisbane Hospital. Probably L. nervorum.

1857. White. Dr. Milford's English-speaking white was in the Benevolent side, Brisbane Hospital.

1868. White. Dr. Bancroft's German was usefully employed about Brisbane Hospital. L. tuberosa.

From this year onwards a good many cases were observed among kanakas employed near Brisbane. L. nervorum.

1876. A Chinese at Cooktown; the first recorded case there. Sent to Rockhampton. L. nervorum.

1878. Another Chinese observed at Cooktown. Form ?

1879. White. Dr. Thomson's case, the first observed in a resident of Brisbane of known long standing. L. nervorum.

White. Dr. J. Bancroft's "grave-digger" was ill about this time. L. nervorum.

White. A second German, Dr. Thomson's, was usefully employed about the hospital. At last isolated at Stradbroke Island, where he died. L. tuberosa. (Photograph.)

1881. Another Chinese at Cooktown. Form ?

1882. More Chinese at Cooktown were isolated at Leper Creek, Cooktown. Number and form not known (unrecorded); but in 1889 seven Chinese suffering from L. tuberosa were transferred thence to northern lazaret (helpless, &c., voluntary isolation).

1885. A Chinese was under treatment in Brisbane Hospital; transferred to Stradbroke Island; refused to stay, and was discharged. L. tuberosa.

1888. Two Chinese observed—at Dalby, Darling Downs, and at Charters Towers. Police report. Nothing farther. Form ?

1888. Between 1886 and 1890 two Chinese were observed at Townsville. One had L. tuberosa.

1889. Dr. Bowe described his case in a kanaka at Maryborough; L. nervorum. Two Chinese were removed from Herberton and Cairns to northern lazaret; both L. tuberosa. A Cingalese was also removed from Port Douglas. Form ?

1890. White. Case 49 N.S.W. should perhaps be ascribed to Brisbane. L. tuberosa.

White. J. Q— observed at Rockhampton. L. tuberosa.

A kanaka, environs of Brisbane. L. tuberosa.

A Chinese at Cunnamulla; medically certified. Form ?

1891. White. J. H., Rockhampton. L. tuberosa.
Legislation.—The reporting of known or suspected cases was made compulsory by regulations issued by the Board of Health under the Public Health Act, 1884.
A Chinese at Herberton. L. tuberosa.
1892. A Cingalese; first heard of in confinement at Stradbroke Island. L. tuberosa.
Further legislation.—Leprosy Act assented to in July. Reporting of recognised or suspected cases made compulsory under penalties. Executive power removed from Board to Chief Secretary.
Four kanakas at Mackay, Geraldton, Cairns, and Rockhampton; all L. tuberosa.
A Chinese at Maytown. L. tuberosa.
A Chinese, reputed to be a leper, at Georgetown (Police report).
Two aboriginals: one at Marybrough, L. tuberosa; the other at Townsville, medically certified; died same time. Form ?
A Malabar. Charters Towers. L. tuberosa.
1893. White. An Englishman at Herberton. L. nervorum.
A kanaka, Thursday Island. L. tuberosa.
Aboriginals (probably more than one); not medically certified; at Point Barrow.
1894. White. W. H. D—, Brisbane. L. tuberosa.
White. An Irishman; from lunatic asylum to Stradbroke Island. L. tuberosa.
Three kanakas, Brisbane, Rockhampton, and Mackay. All L. tuberosa.
A Cingalese, Townsville. Form ?

Sect. VIII.—LEPROSY IN THE NORTHERN TERRITORY.

The Northern Territory was annexed to South Australia in 1863, at which date it had been visited only by a few exploring parties.

The earliest note of lepra was furnished me by Dr. Robert J. Morice, who was Colonial Surgeon for the Territory from 1877 to 1884. He wrote (p. c.) that he had become familiar with lepra in China and Ceylon, and never saw any case of L. nervorum in the Territory. He saw the first case of L. tuberosa in a Chinese in 1882. This man was shipped back to Hong Kong at expense of the Government, and soon after two others (as far as Dr.

Morice could remember) were shipped back. Before the end of 1884 three more were discovered ; these were left in the Territory. They lived in a hut somewhere near the town of Palmerston, and were supplied with rations by the police.

Dr. Percy Moore Wood has informed me (p. c.) that he was stationed to the Northern Territory gold-fields at the end of 1883, and that he succeeded Dr. Morice, with the title of Government Medical Officer and Protector of Aborigines, at the end of 1884. In December, 1885, the reporting of recognised cases of lepra was made compulsory, and detention was authorised (see South Australia above). Altogether Dr. Wood thought he discovered ten Chinese lepers during his term, which ended in 1889, and at his departure left three in the lazaret, which had been established (on Mud Island, afterwards named Leper Island). By favour of Dr. Whittell (see South Australia above) I was informed that no official record of occurrences of lepra in the Territory existed.

During 1885 Dr. Wood observed the following case in a white ; he reported it in the ' Australasian Medical Gazette, for 1890, from which I have taken his account.

M. B—, æt. 63, an American by birth, a teamster by occupation, and a resident in the Northern Territory for upwards of thirteen years, was admitted to the hospital October 10th, 1887. He had been under my care at various intervals for about eighteen months previously, the chief symptoms being progressive weakness and numbness in his feet, and burning shooting pains in his legs and feet during the earlier part of the night, which he used to relieve by taking laudanum. He said that he had suffered a good deal from venereal diseases and rheumatism, and he had contraction of the palmar fascia of the right hand, chiefly implicating, when I first knew him, the first finger. He had very deficient patellar reflex, and a staggering gait. In September, 1877, he came to me stating that he had a sore on the right heel, which he only found out on noticing that his sock stuck to it, there being no pain with it. On examining it I found the probe touched the os calcis. On account of its punctated appearance I examined his boots, and found a long nail sticking up in the heel. He never noticed it. This was removed, and he wore a pad to relieve pressure, and it began to heal. Shortly afterwards he came to me and said he had a sore on the gluteal region, which he only discovered by his trousers adhering to it. I then found that a great part of his gluteal region was anæsthetic, and I admitted him into the hospital, diagnosing his case at the time

as one of locomotor ataxy, with probably syphilitic deposits in the cord, interfering with nutrition of the skin. I placed him in bed, gave him anti-specific medicines, and by the time that I handed the hospital over to Dr. Bovill (deceased) on November 10th (who relieved me while I had leave of absence) the gluteal wound was well, and the heel wound looked to be drying up. The anæsthesia was no better, and more patches were found, especially over the ligamenta patellæ, and the skin over them was a trifle paler than the surrounding. The palmar fascia had contracted rather more, the nocturnal pains were not relieved, but his appetite was very good, and he said he felt better.

During my absence Dr. Bovill removed a loose piece of the os calcis, and the wound then healed. The anæsthetic patches got larger and whiter. They formed on his side and his arms; large bullæ used to form on his fingers very quickly, during a night or a day, and almost as rapidly dry up and heal. Nocturnal pains were unrelieved, and they occurred in his hands as well. He lost flesh, muscles began to waste, especially those of the thumb. The expression was very melancholic, and his temper very irritable.

When I returned in June, 1888, Dr. Bovill suggested to me that the case was one of elephantiasis anæsthetica, and I found him in the following state. Palmar fascia had contracted more, and now implicated all his fingers. His left hand remained unaffected; healed wound quite dry (? heel); gluteal wound quite healed. The anæsthetic patches on his legs and gluteal region were extensive, a large anæsthetic patch on his right side and several on his arms, and these appeared very white, owing to the brown colour of his skin from long exposure to the tropical sun. The pains in his hands and feet were intense, and only relieved by large doses of laudanum. Nothing to be noticed about his eyes. One of them was blind, owing to an injury received in his youth. . . . .

The case went on gradually getting worse. The patient gets feebler, the heel wound breaks down again; I find more loose bone and remove it, and it then heals, and kept healed until within six weeks of his death. The hands continue to have the bullous eruptions. They last about four days each crop, from the time they appear till the time they are healed. When moist his hands were kept covered with antiseptic dressings.

About October a small sore occurred on the left heel; this was caused by a stone getting into his shoe and thence into his heel. It was removed, and the sore quickly healed. He was then ordered to have strong canvas sewn on to his socks.

He gradually got weaker and very irritable; he was put into a small room by himself on account of his bad temper. About two months before his death, in March (he died in May), a sore appeared on the sole of his left foot. This made several efforts at healing, but gradually got deeper, but never quite perforated. The heel cicatrix got moist again; the pains in his hands and feet intense. The want of tone of his facial muscles made his facial expression extremely sad. About

fourteen days before his death he complained that he could not read long at a time, and that black spots kept coming over his eye. I then discovered that the conjunctiva and cornea had become anæsthetic. I noticed this by seeing a fly on the conjunctiva, and only frightened away when it went across the iris. The cornea was quite opaque before death. The mucous membrane of the mouth and nose was unaffected. About this time a sore was formed over the metatarso-phalangeal joint of right little toe. This joint was opened before death. The gluteal wound was just beginning to break down. The last nine days he became very lethargic, then weakness of his left side, then hemiplegia, general paralysis, coma, death.

The only remarks I will make on this case:—Urine was always low in specific gravity, pale and acid, and only towards the end contained albumen. The bullæ only occurred on his fingers, and contained a thin watery fluid. The sores secreted a thin yellowish pus, and the surfaces of the wounds were painless and of a greeny-yellowish colour. The anæsthetic patches became whiter with age, and had absolutely no sensation in them. The medicine that he found gave him the greatest relief was tincture of cannabis indica and bromide of potassium in large doses.

Dr. L. F. O'Flaherty succeeded to Dr. Wood at the end of 1889. He has informed me that he found two Chinese under detention when he arrived (one of the three mentioned as having been left by Dr. Wood had escaped); one of them died. Then another Chinese, and an aboriginal from Elsey Station (300 miles south of Port Darwin), were admitted, both in an advanced stage of L. tuberosa. The aboriginal died, and the two remaining Chinese escaped to the bush. One of them died there (as was officially reported—he was not found), and the other was replaced in the lazaret. At the time of writing, near the beginning of 1894, he was the only leper known to be in the Territory. Dr. O'Flaherty added, "In all cases of Chinese there has been tubercular thickening of eyebrows, lobes of ears, over malar bones, and alæ of nose, but none have reached the ulcerative stage."

TABLE IV.—*Summary of known cases, and of legislation, in the Northern Territory of South Australia.*

1863. The territory was annexed; there was a very small immigrant population for several years after.

1882. The first case was noticed in a Chinese by Dr. Morice, in the fifth year of his official residence. L. tuberosa.

1884. Before this date two other Chinese were discovered, both L. tuberosa; all three were returned to China as soon as possible after discovery. Three more were discovered, all L. tuberosa; they lived in a hut apart, but were not isolated.

1885. *Legislation.*—Report of recognised cases was made compulsory, and detention of lepers in a lazaret was authorised December, 1885.

1888. White. Dr. Wood's male patient reported to S.A. Government. L. nervorum.

1889. About ten Chinese were isolated between the end of 1884 and the end of this year.

1894. One Chinese and one aboriginal, both L. tuberosa, were admitted down to the beginning of this year. In February one Chinese under detention was the only known case in the territory.

Sect. IX.—GENERAL REMARKS ON THE SEVERAL LAWS ENACTED AGAINST LEPERS.

The laws enacted in the five colonies (Western Australia, South Australia, Victoria, New South Wales, and Queensland) to make the notification of leprosy compulsory, and against the liberty of persons suffering from that disease, differ slightly in the date at which they were put on the statute-books, in theoretical efficiency, and in the authority appointed to execute them.

The Parliament of South Australia was first to enact such a law in 1885; it applied to the whole colony, but the occasion of it arose in the Northern Territory; Western Australia came next in 1889, the occasion being disappearance from official view of the first of the only two cases which have been recorded in that colony; New South Wales followed in 1890, Queensland in 1891, and Victoria was the last to legislate (for compulsory notification) in 1893. In South Australia, Western Australia, Queensland, and Victoria, the necessary step consisted merely in issuing a proclamation under the several Public Health Acts which contained provisions empowering the Boards of Health, with consent of the Governor in Council, to declare any disease a dangerous infectious disease. This of itself was sufficient to set in motion all the machinery necessary to compulsory notification and isolation as soon as leprosy was so declared;

but in New South Wales, where there is no Public Health Act, a special leprosy Act was required. In Queensland, nevertheless, a special leprosy Act was passed after a proclamation under the Public Health Act had been in force for a year. The object of this step was not clear, but possibly it was taken with a view to remove a discretionary power (to permit home isolation in suitable cases instead of removal to a public lazaret) from the Board of Health to the Chief Secretary of the Government.

The executive authority is specifically empowered to permit the isolation of lepers in their own houses when the circumstances are deemed suitable, by the New South Wales and Queensland Acts only. Effect has been given to this provision only once, and in Queensland; the patient absconded.

The Board of Health is the appointed executive authority under the Acts in every colony except Queensland; there it is the Chief Secretary. As to the possible effect of this difference on prompt and complete notification I speak with all reserve, but it seems not unlikely that a doubt might arise in some minds whether those cases in which home isolation might properly be permitted would be as readily discriminated by a lay, as by a medical (or partly medical) executive authority. If so, reluctance to comply with the law might occasionally be felt by those on whom the duty of notifying is laid. This suspicion would run the less risk of being thought strained were I able to describe the kind of popular feeling which alone rendered passage of these laws possible, the manner in which they have occasionally been executed, and the harshness with which they often and unavoidably operate at the best; but my present limits forbid.

In estimating the degree of improvement effected in the foregoing records by compulsory notification, I am not inclined, upon the whole, to lay much stress on this provision of the law as a security for completeness. I have some reason for thinking, for instance, that at the end of the fourth year of compulsory notification in New South Wales (where, also, the Act is perhaps carried out more steadily and more thoroughly than elsewhere) one or more

cases of leprosy in whites still remain unreported. The actual fact is, of course, not within my observation, but I entertain that opinion. On the other hand, there is no doubt at all, generally speaking, that compulsory notification has very much improved the records, and has brought to light many cases which otherwise would either have been overlooked, or at least would have remained only locally known.

Sect. X.—CHRONOLOGICAL SUMMARY OF ALL RECORDED CASES OF LEPRA IN AUSTRALIA.

The data which have been collected in the foregoing pages can now be summarised and arranged in their chronological order. This is done in the following table, which constitutes a gross account, as it may be called—that is to say, no deductions have been made of cases in which the disease was probably acquired in other countries. The territorial divisions have been preserved, because an area of nearly three million square miles necessarily comprises different districts which under the conditions of recent settlement are in many cases almost as much separated by distance as are states by language.

Table V.—*Showing the years in which all the recorded Lepers were observed in Five Colonies of Australia, their race, and number, and in which Legislation against the Liberty of Lepers came into operation. From the beginning to the end of* 1893, *except as otherwise shown.*

	Western Australia.	Victoria.	New South Wales.		Queensland.		Northern Territory.
1855	...	...	...	...	A Chinese	1	...
1857	...	...	...	...	A white	1	...
1858	...	Some Chinese	...	...	...	..	...
1859	...	...	A coloured West Indian	1	...	..	...
1861	...	...	A Chinese	1	...	...	...

TABLE V—*continued.*

	Western Australia.	Victoria.	New South Wales.		Queensland.		Northern Territory.
1863 to 1867	...	A white (imported ill from India). 13 Chinese were enumerated	...	...	...	...	...
1868	...	...	A white	1	A white. From this date onwards many kanakas	1	...
1869	...	...	A white	1	...	...	...
1870	...	...	A white	1	...	...	...
1871	...	...	2 whites	2	...	...	...
1872	...	...	2 whites	2	...	...	...
1873	...	15 Chinese were enumerated	1 white	1	...	..	...
1875	...	...	A white	1	...	...	...
1876	...	...	...	...	A Chinese	1	...
1878	...	9 Chinese enumerated at Ballarat above	...	...	A Chinese	1	...
1879	...	A white	2 whites	2	3 whites (about this date)	3	...
1881	...	...	2 whites	2	A Chinese	1	...
1882	...	...	A white	1	7 Chinese (or were between this date and 1889)	7	A Chinese.
1883	...	...	A white, 5 Chinese	6	...	...	...
1884	...	...	2 Chinese 1 white	2 1	...	...	5 Chinese (since 1882)
1885	...	2 Chinese—additional?	A white, a Chinese, a coloured West Indian	3	A Chinese	1	'Legislation Report of Recognised Cases made compulsory'
1886	...	...	2 Chinese, a Javanese	3	...	...	...
1887	...	A Chinese—additional?	A Chinese	1	...	...	...
1888	A Chinese	A Chinese—additional. Permissive legislation	A white, 3 Chinese	4	4 Chinese	4	A white.

TABLE V—*continued.*

	Western Australia.	Victoria.	New South Wales.		Queensland.		Northern Territory.
1889	A Chinese—'Legislation Report of Recognised Cases made compulsory'	3 Chinese, white	A white, 1 Chinese	2	2 Chinese, a kanaka, a Cingalese	4	10 Chinese (about, observedsince end of 1884)
1890	...	...	2 whites—'Legislation Report of Recognised Cases made compulsory	2	A white, a Chinese, a kanaka.	3	...
1891	...	...	5 whites, 5 Chinese, 1 kanaka	11	A white, a Chinese—'Legislation Report of Recognised or Suspected Cases made compulsory'	2	...
1892	...	...	4 whites, 8 Chinese	12	A Chinese, a Cingalese, a Malabar, 4 kanakas, 2 aboriginals	10	...
1893	...	Further 'Legislation Report of Recognised Cases made compulsory	4 whites, 2 Chinese, 1 Madrassee	7	A white, a kanaka, some aboriginals?	2	...
1894	...	...	...	...	2 whites, a Cingalese 3 kanakas	6	1 Chinese, 1 aboriginal.

This table shows a general increase of recorded cases during years subsequent to 1877. It shows also a farther increase of recorded cases subsequent to effective legislation in New South Wales and Queensland—the two colonies which have yielded most recorded cases during the time dealt with. Thus:

TABLE VI.—*Showing the number of cases recorded in three colonies before and after compulsory notification.*

	New South Wales.		Queensland.		Northern Territory.	
	Period.	Cases.	Period.	Cases.	Period.	Cases.
Before :	31 yrs.	38	36 yrs.	28	3 yrs.	6
After :	4 yrs.	30	4 yrs.	20	10 yrs.	13

So that if the cases which came to light before and after legislation be divided among the years, apparently six or seven times as many per annum were recorded after legislation in New South Wales and Queensland as before it; only in the Northern Territory does it seem that cases were less often encountered afterwards than before. But this leaves the question of real increase untouched.

It is more important perhaps to note that cases were much more commonly recorded in New South Wales and Queensland shortly before legislation than at an earlier date. That seems to point to a real increase of cases, some of which (from the patients becoming incapacitated) would naturally come to notice. But the whole table is contingent—first upon attention, secondly on record, and both certainly began to take more general effect during the years now referred to and, indeed, furnished the practical basis for legislation. Besides, though I have no doubt at all that it is perfectly trustworthy as far as it goes, necessarily it says nothing of the probability that more or fewer unrecorded cases occurred during both earlier and later years. That probability is evident *a priori*, but reference must be made here to detailed facts which show not merely that cases of leprosy actually have been overlooked rather frequently, but that their nature has sometimes been disputed in the face of a correct diagnosis.

CASE 34, N.S.W., was shown by Dr. T. B. Belgrave[1] at a meeting of a medical society; his correct diagnosis was disputed by (at least) two gentlemen present: one, who had treated the case at an earlier date, maintained that it was one of secondary syphilis; the other, who had formerly been distinguished as a lecturer on ophthalmology at Netley, and who had served in India, maintained that it was one of tertiary syphilis. See also the manner in which Dr. Cox's earlier diagnoses were received by gentlemen in Sydney, who had never encountered

[1] 'Aust. Med. Gaz.,' June, 1883, p. 194.

lepra before. Notice that Mr. Noyes in the account of his case (V.) remarked that he was able to convince those who doubted his diagnosis by demonstrating the bacillus. Compare Dr. Peiper's statement concerning his case (V.)—that it had passed unrecognised by many and prominent practitioners who had had it under their care; he has also informed me that he exhibited the patient at a meeting of a medical society in Melbourne, when, it seems, a diagnosis of syphilis, was supported by appeal to the symmetry with which the lesions were distributed over the surface. Observe the note of Case 14 (Q.), and remark that this oversight occurred in a district in which it is morally certain that many cases of lepra occurred from the very large number of kanakas who have been employed in it for many years. See, farther, Dr. Wood's frank account of his case in a white (N. T.). I have myself had experience (in N.S.W.) of a practitioner in skin diseases who, on the one hand, named a disease lepra which bore no resemblance whatever to lepra in any stage or form (and which occurred, moreover, in a native white only four years of age); and, on the other, denied that Case 46 (N.S.W.) was one of lepra. I could extend the list of such occurrences very considerably. But the above examples will suffice, for the object is merely to establish for Australia a circumstance which is by no means characteristic of practitioners of medicine there, but which is well known in other parts of the world, and even in endemic seats of the disease. Practitioners in India have been reproached by a foreign writer for precisely the same oversight, though their opportunities of becoming familiar with the disease were infinitely greater than any which exist, or probably ever have existed, in any part of Australia.

To all this the objection may be made that the mistaken cases just referred to did come to light after all, and that this would have happened with a majority of those assumed to have been overlooked in earlier years had they really occurred. Perhaps there is something in this remark, but I think very little. The examples of oversight are necessarily drawn from known facts—the unknown is judged by analogy from them; now as to earlier times (say before 1870) there is little analogy in the sense of the objection, because up to about that date communication had continued to be tedious and expensive, and many a chronic case that now would fall under observation of several medical men then was seen by one only—or sometimes, perhaps, even by none at all. And as to later times (say after 1880), it is to be observed that the increase in recorded cases coincided with the closer attention with which lepra then began to be regarded all over the world, but especially in Australia in

relation to Chinese immigration. To this closer attention, also, the enactment of laws relating to lepra was in part due; there is no need to doubt that, and they in their turn, and at a still later date, caused more cases in greater time-ratio to come to light. But all this leaves the question of real increase still untouched.

Perhaps little should be said of cases assumed to have been overlooked, and only those which have been noted should be regarded. In that case the matter would be but little advanced, for real increase of cases of a chronic disease of long duration must be judged by dates of attack, not by dates of discovery. The particulars of cases in general are too defective to allow of that; date of discovery alone is trustworthy as a rule. But, as it happens, the date of attack can be fixed with all the accuracy usually attainable in leprosy in twenty-four out of the thirty-four cases known to have occurred in whites in New South Wales; and from the following table, in which they are arranged in chronological order, a hint may perhaps be taken of the right way in which to value Table V. Ten of the thirty-four cases have been omitted for the following reasons:—Nos. 7, 10, 13, 17, 28, 67, because in them the probable date of attack is unknown or very uncertain; Nos. 58 and 65 because the patients acquired their disease elsewhere than in New South Wales; and Nos. 51 and 67 because, as it seems to me, whether they acquired their disease within New South Wales is too doubtful.

TABLE VII.—*Showing the probable date of attack in twenty-four of the thirty-four cases of lepra in whites which are known to have occurred in New South Wales.*

Case No.	Name.	Date of earliest observed signs.
4	M. K.	1863
3	W. A.	1866
5	J. H.	1867
6	J. W.	1869
8	W. N.	1870
9	J. H.	1871
15	G. R.	1871–2
12	M.	1872–5 ?

Case No.	Name.	Date of earliest observed signs.
11	P. S.	1875–6
43	H. S.	1877–8
14	M.	1880
16	F. M.	1880
34	F. G.	1880
45	M. R.	1883
50	R. W.	1884
56	M. E. K.	1884
68	A. M.	1885
36	H. B.	1885
53	C. D.	1887
39	H. R.	1888
40	A. G.	1888
42	E. U.	1889
54	S. P.	1890
70	E. R.	1892

From this it appears that, as regards the only cases in which sufficiently accurate data are at command, those, namely, which occurred in whites who were natives of, or long resident in New South Wales, and in the latter case had arrived there from leprosy-free areas (except Case 5), there is no evidence of absolute increase of attacks as time went on, but rather of a tolerably steady succession. If the term 1863–92 be divided into quinquennial periods, the number of recorded attacks during each was 3, 5, 2, 3, 6, 5. Still it must be noted that there is no good ground for believing that all the cases of lepra in whites which have occurred since 1863 have been recovered; only any which have been lost, though they may have occurred late in the series, are more likely to be wanting to the earlier years.

I therefore feel obliged to conclude that the data are too imperfect strongly to support any positive conclusion. I think, however, that there is evidence that the apparent increase during more recent years which is shown in Table V is largely due to the greater attention which was turned to the disease during those years; and to the voluntary reporting of cases to authorities, and their record in professional journals, which gradually became more and more common after 1881, when, in consequence of the publication

of Professor Neisser's research, fears of contagion began to be once more entertained. The increase during the most recent years, or, say, during the last five, which that table renders apparent seems to me to be due, clearly enough, to compulsory notification. The only definite evidence available supports these two opinions; that, namely, which is furnished by the succession of certain cases in whites which occurred in New South Wales. I think, therefore, that a recent increase of leprosy on the continent of Australia has been alleged on superficial grounds, and that probably there has been no such increase.

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REPORT

ON THE CONDITIONS UNDER WHICH
LEPROSY OCCURS IN

CHINA, INDO-CHINA, MALAYA, THE ARCHIPELAGO, AND OCEANIA.

COMPILED CHIEFLY DURING 1894.

BY

JAMES CANTLIE, M.A., M.B., F.R.C.S.,

HONG KONG.

CONTENTS.

PAGE

Copy of Notice of Questions issued by the National Leprosy Fund 243
The Plan adopted to obtain Information . . . 243
Copy of Questions issued by the Author . . . 245
List of Persons addressed 248
Replies, number of 248
Conclusions 248
Notes on Questions and Answers 250

PART I.

CONDITIONS UNDER WHICH LEPROSY PREVAILS IN CHINA, COCHIN-CHINA, BATAVIA, AND THE MALAY PENINSULA.

A. Leprosy in China 267
China, physical features 268
Province of Chihli 271
,, Manchuria 276
,, Shantung 278
,, Kiang Su 281
,, Hupeh 283
,, Szechuen 285
,, Chekiang 288
,, Fokien 290
,, Kwantung 293
The Leper Village, Canton 301
The District and Port of Swatow . . . 305
Macau 308
The Island of Hainan 314
,, Hong Kong 315
,, Formosa 315
Korea 318
Eastern Siberia 319

PAGE

B. Leprosy in Cochin-China 323
Siam 329

C. Leprosy in the Malay Peninsula 332
Straits Settlements 332
Johore 340
Perak 342
Muar 345
Penang 347
Sungei Ujong 348

D. Leprosy in East Indian Netherlands (Batavia) . . 349
Sumatra 350
Java 354

PART II.

LEPROSY IN THE PACIFIC.

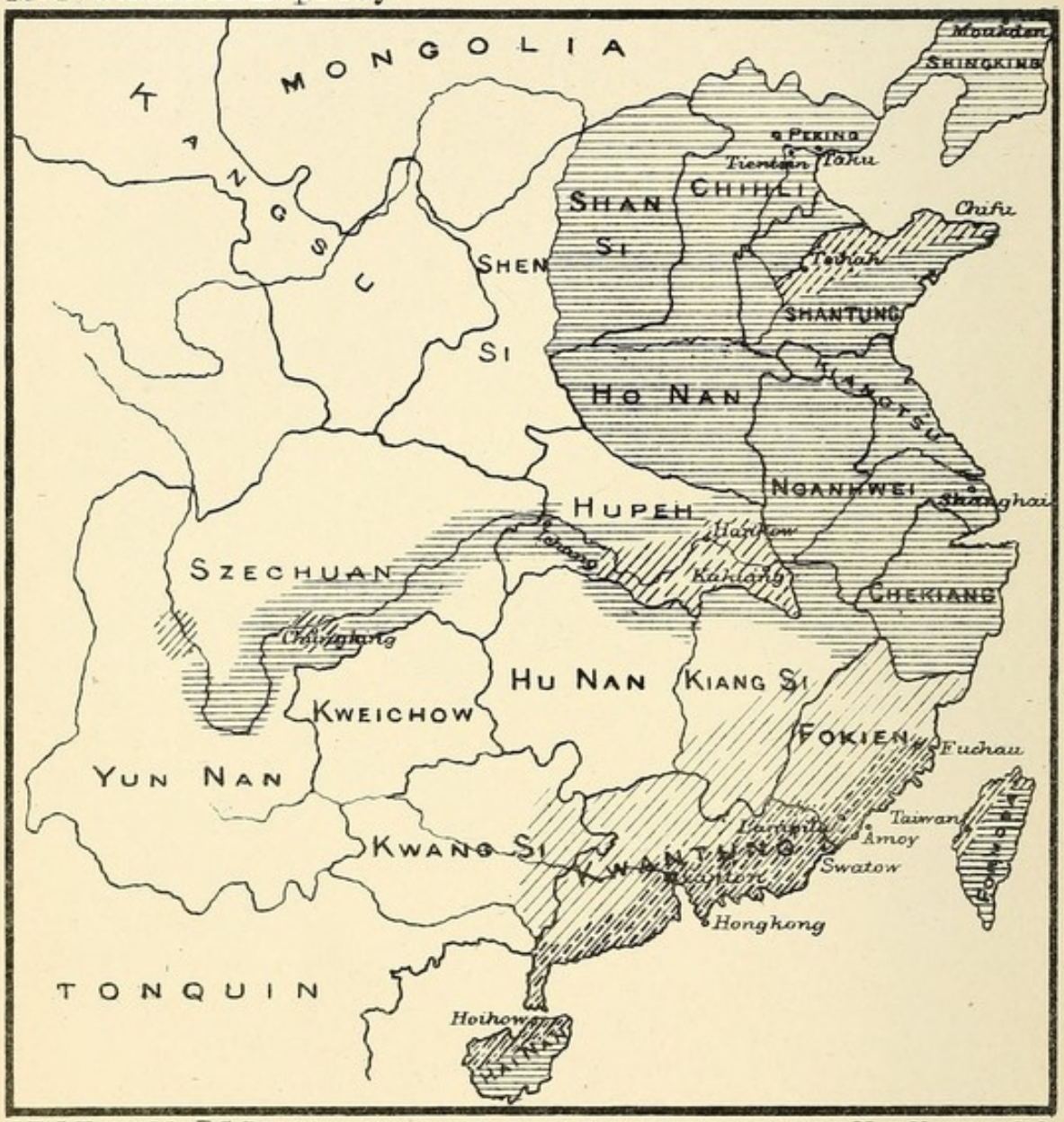
Hawaii 364
Honolulu 375
Fiji 377
Borneo 380
Philippines 384
New Guinea 386
New Britain 387
New Hebrides 388
Friendly Islands 389
Samoa 390

PART III.

PHYSICAL AND ETHNOLOGICAL CONDITIONS UNDER WHICH LEPROSY OCCURS IN CHINA, THE EAST INDIAN ARCHIPELAGO, AND OCEANIA 393

NOTES ON LEPROSY IN HONG KONG 407

Mr. J. Cantlie's "Leprosy."



S.B.J. Skertchly, F.G.S.
Hongkong 1894

West, Newman lith.

Rough Sketch Map.

Leprosy *known to be very prevalent.*

" Present *but less prevalent.*

" *probably* Absent.

No information.

LEPROSY IN CHINA, INDO-CHINA, MALAYA, THE ARCHIPELAGO, AND OCEANIA.

The following is the notice which led to this Report :—

(*'British Medical Journal,' January 13th*, 1894.)

"The National Leprosy Fund.

* * * * * *

"4. On the prevalence of leprosy in the islands of the Pacific, and the supposed exemption of certain groups.

"5. On the conditions under which leprosy at present prevails in China, Cochin-China, Batavia, and the Malay Peninsula.

* * * * * *

"10. The best essay on any subject connected with leprosy."

This Report refers to Nos. 4, 5, and 10, and is sent in as fulfilling all the conditions for the three Essays.

THE PLAN ADOPTED TO GAIN INFORMATION.

The method adopted to obtain information consisted—in the issue of a notification of the desire of the National Leprosy Fund; an accompanying circular and post-card; and a schedule of questions to be answered.

The issue was made in two languages, English and French. The great difficulty of the inquiry consisted in the enormous area of the globe over which information had to be gathered. The 'Journal' containing the intimation of the National Leprosy Committee did not reach Hong Kong until the end of February, 1894, and as the replies had to be in London by January 1st, it meant that my report had to be despatched a month previously, leaving me but nine months for work. It was impossible in many instances to ensure the circular reaching its destination in the time allowed, let alone the replies. At many islands in the Pacific a boat calls once in six months, and, unless the reply was ready in a day or two, another six months before a reply even started on its return journey must intervene. Many of the schedules came in during 1895, and even as late as the autumn of that year much valuable information was communicated.

For the guidance of future inquirers in this field, it is well at the outset to point out a grievous error. In the schedule I forgot to ask the very necessary question, "Is there any leprosy in the district?" In consequence of this serious omission many sent no reply until a second communication was made, when a letter of regret was received, stating that "I am sorry I cannot help in the inquiry, as there is no leprosy in the district." Leprosy is very far from being universally distributed, even in China, where most people believe it is a present evil in well-nigh every province. A second error was that the question of the practice of vaccination was not put more definitely. The question ought to have been, "Is vaccination practised? If so, how long has it been introduced, what proportion of the people have been vaccinated, and whence is the lymph derived?"

The total number of replies received far exceeds my most sanguine expectations, and the report actually covers the region mentioned in the request made by the National Leprosy Fund, enormous as that is.

I can only thank those who have supplied information, and the blame lies with myself if, from the excellent materials at hand, a report of scientific value is not assured.

COPY OF THE CIRCULAR SENT TO COLLECT INFORMATION UPON LEPROSY IN THE FAR EAST, 1894.

Inquiries.

1. State the physical features of your district, noting elevation, distance from sea, condition of soil, cultivation, rainfall, &c., and density of population.

2. Distribution.—Is leprosy more commonly met with amongst dwellers in plains or hills?

3. Heredity.—Do the natives believe in hereditary transmission?

4. Contagion.—Do the natives believe leprosy to be contagious?

5. Food.—Is fish or other food assigned as a cause?

6. Segregation.—Is it observed? if so, how?

7. Tuberculosis, Syphilis, and Malaria.—Do you observe any connection between leprosy and any one of these?

8. Vaccination.—Has leprosy increased with the use of vaccination?

9. Treatment.—What do you find the best? Do you know of any reputed native drugs?

GENERAL REMARKS.

The attempt to stimulate medical men to record their experience of leprosy in various parts of the globe is only one of the conceptions which redounds to the credit of the National Leprosy Committee Fund.

The Report of the Indian Leprosy Commission was useful in many ways. Amongst other points elucidated, it helped to furnish an estimate of the approximate number of lepers in proportion to the population. Outside Western Europe and North America there is nothing more difficult to arrive

at than the number of lepers relative to the population ; and the very indefiniteness of the number serves but to increase the mystery and actual dread of the disease. Not that the result of the work done for the Committee tends to lessen the precautions against the spread of the disease by allaying the public mind with assurances that only a fraction of the community are attacked ; far other is the aim of the present endeavour. It is meant to develop a sustained attempt to eradicate leprosy ; but it is necessary in the first instance to ascertain the habitat of the disease before further steps are taken, and it is to elucidate this essential point in the investigation now in hand that I have ventured to undertake an inquiry.

The most recent work of any magnitude on leprosy is contained in Davidson's excellent book on 'Hygiene and Diseases of Warm Climates.' At page 433 is found the following statement :—" Leprosy exists throughout the whole of the empire of China." If my inquiry has done nothing more than to prove this statement to be false, it will be of considerable value. That the assertion is false is to be gathered by even a casual glance at the text, for it will be read, and read with interest, that not one-third of China is under the ban of leprosy.

The task I have undertaken is classed under two headings in the list prescribed by the National Leprosy Committee for special inquiry and report. Of course the attempt was made because I have had opportunities of acquiring knowledge in several of the countries mentioned. I cannot pretend to personal acquaintance with more than a fraction of the regions ; they are so wide apart, of such enormous extent, and bear a population of no less than one-fifth of the human race. Added to this, also, is the great difficulty of obtaining information of even meagre exactitude from such a country as China, where a species of social order and an old-world habit defies the inquiries of the foreigner.

China delights in throwing dust in the eyes of all who would probe the records of her past, and cloaks her ignorance in the belief that she will thereby establish a renown for wisdom.

The knowledge to be gained from the Chinese is that of the individual. At most it extends to mere family tradition, and in no branch of knowledge is this more evident than in that of medicine. The Chinese medical man has no training; his potions and nostrums are secrets composed by himself or bought from some unscrupulous person who, more frequently than not, sells a false receipt. He belongs to the most illiterate class, and his own statement of cures is the only capital he possesses. It is evident, therefore, that inquiry amongst such a class of men is useless, is likely to lead one astray, and is calculated to teach one to reject their statements upon any scientific subject with unfeigned contempt.

Throughout the Malay Peninsula, throughout the Dutch Indies—Java and Sumatra—the same holds good. There also exist people of ancient name, and who, proud of their antiquity, think to protect themselves from the penetrating glance of science beneath the family tree of pedigree, and under the glamour of past deeds of mystical renown.

This is the reason why it is to Europeans settled in the districts named that I have applied for information. The native can tell nothing beyond his immediate ken; the power of generalisation is unknown to him; his Government does not require it, nay, strangles any attempt to develop it. It will be seen that the persons appealed to are doctors in general practice, missionary doctors, consuls, mission bodies, customs commissioners, and others scattered throughout the length and breadth of the Far East.

Of 383 appealed to, 75 sent in reports; many are short, several lengthy, and a few are full reports. All are valuable, all worthy of record; and the concise reply of "no case known" is perhaps the fullest of all.

I am grieved to say that I have nothing new in the way of cure to report. The same reply comes, "alleviation but no cure," from all corners of the Far East; the West echoes the same; and as through all the dim centuries, so at the close of the nineteenth, civilised and uncivilised man confront each other with the canker of incurable leprosy in their midst.

THE CIRCULAR.

A copy of the circular issued from Hong Kong to gather knowledge of leprosy in the Far East and the Pacific Islands was sent to the following :

Place.	No. of circulars sent.	No. of replies.
China	186	40
Cochin-China	60	3
Corea	23	4
Philippines	3	2
Fiji	7	1
Hawaiian Islands	3	3
Samoa Islands	2	1
Society Islands	2	0
Tonga Islands	1	1
New Hebrides	3	1
Hervey Islands	1	1
New Britain	1	1
New Guinea	2	1
New Caledonia	1	1
Straits Settlements	28	7
Burmah	7	0
Siam	3	2
Java	18	2
Sumatra	19	3
Borneo	13	1
Total	383	75

Out of 383 queries, 75 replied—a very good response, and many more than I anticipated.

Printed circulars, as a rule, do not command the attention the senders would wish, let the subject be what it may. With this before me, I am astonished at so many replies, and it only tends to show how great a number of persons take interest in leprosy and the leper.

CONCLUSIONS.

The conclusions arrived at from the study of the evidence brought forward in the following report are—

1. Leprosy is a specific disease, bearing a close analogy, ætiologically and bacteriologically, to tuberculosis, amounting in some points to identity.

2. It is not proven that leprosy is diffused by hereditary transmission, but the evidence is not strong enough to prove that it may not be so distributed.

3. Leprosy may arise in a leprous country independently of personal contagion.

4. Leprosy is to be feared as an inoculable disease, but there is no direct proof that it is such.

5. Vaccination is not believed by any natives of the Far East to be a factor in the spread of leprosy, except in a few cases where the idea has been suggested by Europeans.

6. Inoculation of smallpox is a common practice throughout China, but the geographical distribution of leprosy is totally independent of the frequency of the practice.

7. Leprosy in the Far East is centred in the south-eastern provinces of China—Kwantung and Fokien.

a. Three-fourths of the coolie emigrants from China are from these provinces, and the spread of leprosy in the Malay Peninsula, the Dutch, Spanish, and Portuguese East Indies, and in Oceania is in all cases coincident and concurrent with the residence of coolies from these provinces.

b. In no instance over this vast area has any native race acquired leprosy, except where Chinese coolies have settled.

c. There seem to be no native names for leprosy in the aboriginal languages, except in Malay, over the area named, though there are loan words.

d. The aborigines ascribe leprosy to the Chinese immigrants, and in several cases the name used shows the belief in the Chinese origin of the disease.

e. Leprosy disappears in some countries with the departure of the Chinese coolie, as in North Borneo.

8. The distribution of leprosy is independent of any geological, geographical, or climatic conditions.

9. Overcrowding, poverty, and bad food, but especially the first, render the individual susceptible to leprosy.

10. The eradication of leprosy is to be effected by improving the hygienic conditions of the centres of leprosy.

11. Leper villages, by which is meant quarters set apart

for lepers to find shelter in, but from which they can go at will to beg in the public streets and engage in work, do not show beneficial results as regards the check of the disease.

12. The British Government would be conferring a great service to humanity were a closer inspection of Chinese emigrants travelling by British ships insisted upon. The shipping lines of other countries, especially German, might be invited to co-operate.

13. The British Government, with the co-operation of the French, German, Spanish, Dutch, and Portuguese, the powers holding the important possessions in the Far East and Oceania, to which Chinese emigrants flock, might effectually check, or at least arrest, the spread of leprosy by a monthly inspection of coolies on plantations, in coolie quarters, and wherever Chinese congregate.

14. Deportation, and not segregation, is the proper method of dealing with the Chinese leper in (to him) foreign countries.

15. Segregation of Chinese lepers in an asylum in any country free of leprosy will in time render that country a fresh focus of leprous infection.

16. The great traffic centre of Hong Kong ought to be rigorously dealt with as regards leprosy by the colonial Government. In the meantime lepers beg in the streets, live in coolie quarters, and dwell in secluded spots in several parts of the island. In seven years, 1888–95, a minimum calculation shows from 600 to 700 lepers to have been, unknown to the Government, in the island of Hong Kong.

NOTES ON THE QUESTIONS AND ANSWERS.

Question I.—*State the physical features of your district, noting elevation, distance from sea, condition of soil, cultivation, rainfall, &c., and density of population.*

That the physical features of the area of inquiry would be many and various may be guessed when even a cursory glance

is taken at an ordinary map. From the Amoor River in the north to the island of Java in the south includes the region between Siberia in the north and Australia in the south ; or, to put it more exactly, between latitudes 53 N. and 5 S., and between longitudes 100 E. and 140 E. From north to south the region measures 4000 miles, and from east to west about 2500 miles, and bears a population of 600,000,000. The enormity of the area and the population renders it beyond the powers of one man in a lifetime, far less in the nine months available, to collect with exactitude information respecting the haunts and habits, the treatment, and the social ethics of the leper.

To deal with the physical features of the continent of Asia facing the Pacific Ocean is beyond my power ; but, fortunately, I can command the skill of an expert of the foremost rank. Mr. S. B. J. Skertchly, F.G.S., F.A.I., late of H.M. Geological Survey, is at present (1894) located in Hong Kong, and with the zeal of a true scientist has undertaken the task. Hence the report is from his pen (see special article and maps).

Question II. *Distribution.—Is leprosy more commonly met with amongst dwellers in plains or hills ?*

The answers are chiefly from dwellers on plains, and the report of leprosy amongst hill-dwellers is mere hearsay. Dr. MacDonald (Fatshan) writes, "More common in plains, but extends along the waterways into the hill country as far as Shin Kwan." Dr. Vinton (Corea) says, "Corea is practically all hills," and records but one case of leprosy seen during a four years' sojourn. At Gensan, on the east coast of Corea, Dr. Hardie saw no case in fifteen months ; but again in Fusan, in the south, Dr. Tata Shima says it is frequent ; he saw twenty cases in two years. From the Malay Peninsula, Dr. Gundry Fox (Perak) writes, "Commoner on plains ; never heard of a case in hills, but evidence is scanty." Mr. Wheatley (Johor Bharu) : "Said to be very common among Jakuns in hills." These are the only statements as regards hill lepers in the collection of evidence. It is very meagre, — due, no doubt, to want of observation. Corea is a seeming exception, but the

Corean does not dwell in the hills, he is too lazy to ascend an elevation of any sort; he grubs in the valleys and maintains a livelihood by the least possible amount of exertion. There is nothing of the hardy mountaineer in his lazy phlegmatic composition. Corea is really a country of hills and fertile well-watered valleys; the Coreans dwell in the valleys; there are no elevated people-bearing plateaus. Mr. Wheatley's evidence, he says, is only hearsay.

This report, therefore, brings no data to light whereby the question of the distribution of leprosy according to elevation of residence can be decided.

Question III.—*Do the natives believe in hereditary transmission?*

Out of the nineteen places reported on, fourteen state that the natives believe in heredity, and five give a negative answer.

Now there is a great difficulty in settling this point with natives. The people, as a whole, believe in heredity in the abstract, but the leper himself denies it in point of fact. No Chinese leper, of those I have seen, allowed that either father or mother or any relation had leprosy, nor will a leper voluntarily state that his child is leprous. Where, then, lies the truth? A visit to a leper village ought to settle the matter. A visit to the leper village at Canton, where lepers are allowed all freedom of cohabitation, and free ingress and egress, would be the one place, apparently, to declare positively once and for all whether heredity was a real factor in the disease. But here one is met with by a flood of opinion in another direction. *The third generation is without leprosy*, say the inhabitants; a fine healthy child is shown at the breast of a leprous mother, without blemish or stain. Children in the village are shown at all ages without marks of leprosy, and no imported leper allows that any of his ancestors had leprosy. On the other hand, leper children ageing from seven to fifteen are seen with leprosy developing; but the leprous parent takes a cheerful view of the fact, because they are under the belief that the children of such will not be leprous. I saw only one grandchild of leprous parents in the Canton

village, and certainly he was not affected; but that proves nothing. The child was only in arms, and leprosy might not develop until puberty, and certainly not before the third year.

It will be observed that this question receives an answer as regards native opinion only. The question really annuls the private opinion of the inquirer, and sets forth only the opinion of the native. Perhaps this was wrong, but the belief amongst Europeans so negatives the probability of heredity, that the matter seems scarcely worth inquiring into further. Leloir, almost alone, maintains that leprosy is directly hereditary, and all inquirers in the subject of leprosy have written his opinion down. Moreover, after the result of the inquiries into the subject by the Leprosy Commission in India, the question may be regarded as settled; and although I agree with the conclusion come to by the Commission that "leprosy is not diffused by hereditary transmission," in the present state of our knowledge it is perhaps better put that "leprosy is not proven to be diffused by heredity." The attempt to elicit from the natives what their belief is, in regard to the hereditary influence of leprosy, affords evidence of no scientific value. Their belief is for the most part that leprosy is handed down from parents to their children. A parallel inquiry carried out in any civilised country, as regards the heredity of, say, cancer or phthisis, would obtain the belief of the public, but it would not in all probability agree with the scientific opinion. As children born of leper parents are brought up under the same roof, and suckled by a leprous mother, contagion comes into the question, and it is difficult to disassociate contagion from heredity.

Question IV. *Contagion.—Do the natives believe leprosy to be contagious?*

Under this heading the subjects of infection, sexual intercourse, and inoculation are discussed.

Infection.—The spread of leprosy by casual exposure to the disease does not require serious consideration. No one, except impressionable women, ascribes any dread of passing a leper in the street. No mere touch or brush

against an infected person is ever seriously entertained as a means of acquiring the disease. When a leper appears in an out-patient room he is not particularly avoided, and when he quits his seat another person will not hesitate to occupy it. Before the new-comer sits down, in all probability he will fan the place where the leper sat; but that is all the precaution taken against infection. Nor did I ever observe any hesitation on the part of Chinese students examining leper patients. The present-day belief, throughout the world generally, is summed up in the action of the Chinaman when he *fans the seat* just vacated by a leper before occupying it himself. In other words, infection is not regarded as playing a part in the spread of leprosy.

Sexual intercourse is believed by the majority of Chinese as a potent factor in the spread of leprosy. On many occasions I have had a leper patient confess that he had connection with a leprous woman. The man at the time did not know that the woman was a leper, otherwise he would have rigidly avoided her. There is a belief, prevalent in Canton and elsewhere, that a leprous woman can rid herself of the disease by having connection with a healthy man. Leper women, it is well known, will come out in the dusk in the hopes of seducing a man to have connection with them. They select the evening or night so that their condition may not be observed. By connection they hope to get rid of the disease by handing it over to the man. Besides, there is a still more curious belief prevailing, namely, that sexual intercourse will act as a prophylactic against leprosy, and in the following manner:—A woman has a leprous husband; she may not have any signs of the disease upon her, but as a preventive to infection she will try to get a healthy man to have connection with her, so that she may hand over the disease to him, and thereby lessen her chance of becoming affected at all. This is termed "selling off leprosy," and is a very common practice in Canton.

Men who affirm that they acquired leprosy by sexual intercourse are most positive in their statements that the disease manifested itself in two to four months after the date of connection. It may be that the man had acquired

syphilis, as the date he gives of the appearance of signs coincides with the time secondaries manifest themselves. None of the cases, however, I examined, by whom sexual intercourse was stated to be the initial cause, showed any signs of syphilis.

In conclusion, the present state of our belief may be held to be that "sexual connection is a means of spreading leprosy." As a corollary it may be added, that even a single coitus when abrasion occurs may be sufficient to convey infection of leprosy.

Contagion. — Excluding sexual intercourse, leprosy is communicated from the diseased to the healthy only after prolonged and intimate contact. Few Chinese exclude their relatives from their home unless leprosy has advanced so far that the leper becomes objectionable, either from the smell emanating from his sores, or from the unsightly appearance of his face or limbs. Not only is this the case with the Chinese, but I have known more than one case of leprosy in a European family, dwelling in the East, in which a leper member of the family was kept in seclusion until death occurred. In one family the husband became a leper—in this instance avowed to be the result of a single coitus with a leper woman,—but he continued to reside at home, with the result that his daughter, an only child, developed leprosy when she attained the age of ten. The husband was at one time a resident in Singapore, but when leprosy was advanced he came to England. His wife was afraid to attend him, but his daughter—then a child of six—administered to his wants, rubbing in various ointments and applications which he had obtained in the East. He never called in an English doctor, in case his disease should submit him to separation from his family. Yet another case occurred not so very long ago. An old resident in the Far East had a "boy"—a personal servant—in whom he put trust, and to whom he had a great attachment. Whilst in his service the "boy" developed leprosy, yet his master kept him in his service. The two frequently travelled together by sailing-boat—a Chinese junk—and the master and his "boy" were frequently and intimately associated—so intimately, in fact, that when the weather was

cold the two used to sleep beneath the same blanket, even after the "boy" had become a pronounced leper. Subsequent to the "boy's" death leprosy attacked the master, thereby adding yet another instance of the effect of prolonged contagion as a means of spreading leprosy.

Question V. *Food.—Is fish or other food assigned as a cause?*

This question was asked in order to obtain information anent Mr. Jonathan Hutchinson's statement concerning fish diet as a cause of leprosy. The result of the inquiry cannot annul that statement, as in the course of the inquiry no people have been described with whom fish did not at some time form part of the diet. Few people have lived to maturity who have not consumed fish in some form. No religious sect that I have heard of disallows a fish diet. Vegetarians we know of; but they become so after maturity, and only when dyspepsia or sentiment gets the upper hand. We often hear it stated that negroes live on pumpkin, that the Chinamen live on rice, and many loose statements of the kind. I can at once positively declare that the Chinese do not prefer—nay, cannot live on—a rice diet. No coolie considers that he has had a proper meal unless both vegetables and fish or pork are supplied. Fish, fresh, raw, salted or rotten, comes not amiss to him, and he thinks he is badly used unless he gets it, be he a dweller by the sea or far inland. On the other hand, the Bajows of Borneo live almost entirely on fish; yet there is never a leper amongst them. The question may be reduced to a paradox: All consumers of fish are not lepers, but all lepers have consumed fish. There the question must be left.

Salt.—The absence of salt from the diet for any length of time is held to be a factor in the development of leprosy; and in India the rise and fall in price of rice is popularly believed to play a part in the appearance of the disease. The explanation of such a belief is easily enough interpreted. When any form of food is scarce, especially such an essential as salt, latent leprosy will speedily show itself; and persons, before they were deprived of the food in question, were perhaps never suspected of being lepers.

The two chief sources of salt in China are the salt wells in Sze-chuen, and the salt mills near Taku at the mouth of the Pei-ho river. The former may be considered the southern, and the latter the chief northern source. Now at first sight it would seem as if there might be something in the theory, for are not Kwang-tung and Fokien maritime provinces far removed from the salt regions? On looking more carefully into it, however, cause and effect are not so pronouncedly linked. It is true the hot-bed of leprosy, namely, Kwang-tung (Canton) and Fokien provinces, are between 2000 and 3000 miles removed from the salt sources; and in the neighbourhood of the Pei-ho river, the district whence salt is exported to the provinces mentioned as most leprous, no leprosy exists. Further, there is a salt tax in China, which no doubt tends to make the people look upon salt as a luxury more or less. Sea carriage from even Taku, or far-away Sze-chuen by river, is a very cheap transit in China; and the salt tax is not so heavy as to deprive the fairly well-to-do of the article. That the poor classes may be stinted at times there can be no denying. On the other hand, consider the salt supply of Manchuria; the salt has to be carried from the Pei-ho near the sea-coast, first by boats up the river, and then on camels' backs many days journey beyond the Great Wall—an expensive and somewhat precarious source, yet there is no leprosy met with in Manchuria. The deprivation of salt cannot, therefore, be considered to hold good in China as a cause of leprosy; although the want of salt in the diet of leprous people will no doubt hasten the development of the symptoms of the disease.

Question VI. *Segregation.—Is it observed? if so, how?*

By segregation is meant the voluntary or compulsory dwelling together of lepers. Isolation is often used synonymously with segregation; but isolation implies a complete retirement. Complete isolation is not known. The inhabitants of even the most strictly kept leper hospital are in daily contact with the healthy—be they medical men, nurses, attendants, servants, or clergymen. No leper community is in this sense isolated from the world. It may fairly be taken

as a proof that leprosy is a severe scourge in any district when a leper settlement is found attached to it; and it may be taken as an act of self-protection, or a mark of higher civilisation on the part of the inhabitants, that has induced them to establish the home. The word "home" perhaps best expresses the nature of the settlement, for it must not be imagined that a leper village is, in China, in any sense a hospital. They are not isolation asylums, but merely refuges, whence lepers who have not the strength to earn their bread may dwell. Nor is the idea this statement conveys quite true, for the majority are mendicants who daily go forth to obtain alms. They are to be met with in shops, in the streets, on the river,—everywhere, in fact, these dwellers in the village mix with the bustling crowd, handle the food exhibited for sale, and pay the cash they carry in their leprous hands. The village they dwell in serves merely as a hot-bed of leprous infection, and the disease will remain endemic so long as these nests of infection are maintained.

Compulsory segregation is practised by the Portuguese in Macau; that is to say, no leper is allowed to be about in the town or to dwell in Portuguese territory. Lepers must either leave the colony or they are seized and sent to the leper island, where a settlement is provided for them by the Portuguese government. Here we have, perhaps, as near an approach to complete isolation as can be attained; a separate island, a separation of the sexes, and no visitors except the doctor very occasionally, and the clergyman once a month.

The effect of such a segregation as that practised at Macau upon the prevalence of leprosy affords no conclusive evidence one way or another, as the colony is so open to the inroad of lepers from China that removal of a few to the asylum but creates a vacancy for another leprous mendicant.

At the present day the feeling is against compulsory segregation, and in favour of voluntary "homes." Were these made comfortable, not only would the leper's friends wish to send him there, but the leper himself would be attracted towards a retreat where he would be free from the gaze of his fellow-man.

QUESTION VII.—*Do you observe any connection between malaria, tuberculosis, or syphilis with leprosy?*

The relation of *malaria* to leprosy has been a burning question, nor is the belief quite dead. The provinces of Kwang-tung, Fokien, and Shan-tung are the most malarial, at the same time the most leprous. Again, England, when highly malarial, was also leprous. On the other hand, we find leprosy in many cases without malaria, and malaria without leprosy. The Chinese, however, do associate humid and low-lying damp localities with leprosy, and maintain that the association is no mere coincidence, but actually a cause of the disease. This statement does not imply that leprosy is a sequence of malaria, but that they arise from a common cause. That the one is no protection from the other is evident from the fact that many lepers suffer from malarial fever. The effect of drainage upon the disappearance of malaria is a well-established fact; whether or no it has a similar effect upon leprosy cannot be answered. On the west coast of Borneo, where the cultivation of rice necessitates a constant swampy condition of the soil, no native lepers are to be found. The present state of knowledge is, therefore, that no connection is made out between malaria and leprosy, nor can a climate which propagates the one be entertained as a cause of the other.

Syphilis.—No doubt many cases of leprosy and syphilis are confounded, and many of the wonderful "cures" claimed by native practitioners are cases of syphilis. I do not think this is a fitting occasion to enter into the discussion as to whether leprosy is a mere phase of syphilis. To my way of thinking, the two diseases are quite apart; and that neither is a protection from the other.

Tuberculosis.—This question is so interesting that I have ventured to express my views under a separate heading. Here I will let the subject pass, merely remarking that the bacilli are well-nigh if not wholly identical. On this basis leprosy may be discussed as a phase of tuberculosis.

QUESTION VIII. *Vaccination.—Has leprosy increased with the use of vaccination?*

At the first glance at the subject one would imagine that

in China we had a magnificent field to study this question. Closer investigation, however, will show that such is not the case, for we have to take inoculation into the argument, and the subject becomes more complicated straight away. Inoculation with the virus of smallpox was introduced into China as early as the eleventh century. It was first practised in the province of Sze-chuen, the knowledge of its power being learned from Central Asia. From Sze-chuen (see map) the practice travelled all over China. Not that inoculation was ever systematically enforced, but it was and is still extensively employed as a protection against smallpox throughout the length and breadth of China.

Vaccination was introduced into Canton in the year 1801, the lymph being brought from India by the traders of the East India Company for the purpose. The vaccine matter originally introduced is in use still, and has been humanised many scores of times. It is doubtful whether vaccination as practised by the Chinese with their attenuated lymph affords any protection at all. The arm-to-arm method is exclusively followed, the use of calf lymph not being understood by the Chinese. The vesicles raised by Chinese methods are of the most bastard description—a small attenuated mockery of a scab; but the Chinaman goes through the form without once thinking of the result. The art and not the science alone concerns him.

Children alone are vaccinated—adults never. There is no re-vaccination practised. With such a condition of things one would expect smallpox to be rife, and so it is. Smallpox is for ever present, and severe epidemics are the rule. Now we never find leprosy in babies under two years of age, and it is before that age that most are vaccinated. Therefore, for vaccine matter to be a carrier of the leprous bacillus, it is plain that we must believe in the inheritance of leprosy; or in what other way can we account for the transmission of the disease? The belief in the heredity of leprosy is scientifically dead, and to "the hereditary tendency of the tissues" no one has ever added an inherited bacillus. To the anti-vaccinators this line of argument gives no loophole, so I must supply them with one. Leprosy is most rife in the provinces of Kwang-tung and Fokien, and

it was in these very provinces vaccination was first introduced. Can anything be more conclusive? But what are the facts? Leprosy has actually *diminished* in the town of Canton since vaccination came in. Formerly there were two leper villages where now there is only one, and it contains fewer lepers than did either of the previous hospitals. In many parts of the province leper retreats are met with where the inhabitants are not leprous, but they still draw the leprous allowance granted by government. Further, in the seventeenth century the French mission had a hospital where some 800 inmates resided, but now only a very few (two or three) seek shelter there. They have not gone elsewhere, as they are not to be found in fresh leper villages, and indeed, we know one such village has actually disappeared. Leprosy is not on the increase in Canton and district, and the pretty argument I made out for the anti-vaccinators has fallen to pieces. No Chinaman voluntarily attributes to vaccination any implication that it is responsible for the spread or maintenance of leprosy. This is a great fact to establish, as no more astute observers exist than the Chinese; and with a foreign custom under trial there are no more conservative, not to say biassed, people. Those that know the Chinese are well aware that a mere sentiment will bring discredit upon any "foreign" practice, however salutary.

Question X. *Treatment.—What do you find the best? Do you know of any native drugs?*

To enumerate the various means of treatment reported would be to rewrite the communications of each contributor, as every district has something in the way of special treatment to record. The fact is, that leper patients, if looked after and fairly well fed, improve without medicine or special treatment of any kind. Ten cents' worth of food daily will do more than medicines, although iron and cod-liver oil help materially.

In the records of Indian investigation, it is to be regretted that when specifics, so called, are being tried, that collateral evidence is not forthcoming as to the diet on which the leper subsisted. That good food and clothing will not only

prolong a leper's life, but apparently stay the advance of the disease, is abundantly proved. In the leper villages of which I have any knowledge, the head man is invariably the longest liver. He is always the best clad, the best fed and the richest man of the leper community. These conditions are the natural outcome of one another; because he is the head man he becomes rich, and the other conditions follow. The answers to my questions cover the knowledge of treatment acquired by one-fifth of the human race, and there is nothing new to tell. Many customs and many drugs are recorded, but their incertitude is the best evidence of their being ineffectual. Some of the methods are more of the nature of incantations than of rational procedure. From Amoy we have it "that the leper is enclosed in the carcass of a freshly eviscerated bullock, where he remains an hour or more." A snake, the flesh of a dead child, a cooked placenta (human) are amongst the edibles lauded by the Chinese. Perhaps the most extraordinary method of all is the "selling off leprosy" by sexual intercourse, practised by women in and around Canton (see Contagion). What does the information amount to? 1st. That no European records a single case of cure. 2nd. That no native drug has been proved to be curative. This statement need not, however, stay our investigations, even as regards treatment. Many diseases are in the same category—as, for instance, phthisis. Consumptive patients are not left uncared for; the victims of syphilis, of malaria, the gouty, the scrofulous, in fact the sufferers from any so-called constitutional taint, inherited or acquired, can all be bettered by care and treatment, although the taint can never be removed. So with leprosy: the condition can be relieved as decidedly as any of those mentioned, and although cure cannot be secured, symptoms can be relieved and signs assuredly ameliorated. Dr. Horder, than whom there is no better authority, remarked to me, that in Pakhoi, "I treat my leper patients as though they were consumptives." Dr. Horder insists that a leper shall remain in his hospital for six weeks at least every year. During that period the leper is mostly confined to bed, he is provided with good food, iron and cod-liver oil are administered, and it may be some of the "specifics"

are employed. Under treatment the leper gains in weight; his ulcers heal; cough and fever, if there are such, disappear; and he returns to his native place much improved. Dr. Horder claims that in this way he can keep lepers alive for an indefinite time, that he can alleviate almost all symptoms, and that no disease is more amenable to simple hygienic laws than is leprosy. With Dr. Horder's theory and practise I entirely agree, and his statement offers a rational line of treatment to follow.

PART I.

THE CONDITIONS UNDER WHICH LEPROSY AT PRESENT PREVAILS IN CHINA, COCHIN-CHINA, BATAVIA, AND THE MALAY PENINSULA.

A.—CHINA.

THE PROVINCES OF THE MIDDLE KINGDOM.

The eighteen provinces of China are divided as follows :—

Northern Provinces—

	Capital.
*Chihli	Peking.
*Shantung	Tsinanfu.
*Shansi	Taiyuenfu.
*Honan	Kaifungfu.

Eastern Provinces—

*Kiangsu	Kiangningfu.
Nganhwai	Nganking fu.
*Kiangsi	Nanchangfu.
*Chehkiang	Hangchaufu.
*Fukien	Fuchaufu.

Central Provinces—

*Hupeh	Wuchangfu.
*Hunan	Changshafu.

Southern Provinces—

*Kwantung	Canton.
*Kwangsi	Kweilinfu.
Yunnan	Yunnanfu.
Kweichau	Kweiyangfu.

Western Provinces—

Shensi	Singanfu.
Kansuh	Lanchaufu.
*Szechuen	Chingtufu.

To each of these provinces circulars of inquiries were sent, and those from which replies were received are marked with an asterisk. When it is remembered that Chinese doctors generally belong to the ignorant classes ; that they

* Replies received.

have no qualification save the possession of a few nostrums, as often as not mere magic potions; that even if questioned they would not deign to reply; and, further, that European doctors are few and far between, and posts irregular and uncertain—it is not to be wondered at that the information is incomplete, and largely derived from the neighbourhood of the treaty ports.

China Proper (the Middle Kingdom).

China proper lies practically within the parallels of 20 and 44 north latitude, and is bounded on the east by the Pacific Ocean, and extends westwards from about east longitude 124 to 100.

Its orographical and hydrographical features are very striking, and are illustrated by the accompanying map, drawn by Mr. S. B. J. Skertchly, F.G.S., late of H.M. Geological Survey, from the best published sources, and from personal observations by himself and Mr. T. W. Kingsmill, C.E.

Its eastern area is the western limit of the vast tableland of high Asia, nowhere sinking below one mile in height, and sending long spurs eastwards, which, though somewhat broken in continuity towards the east, divide the country into three great drainage basins—the Hwang-ho in the north, the Yangtse in the centre, and the Si-kiang in the south.

Eastwards of the highlands, and extending to the coast, is a vast and generally fertile plain — the Great Plain of China,—which expands in the valley of the Yangtse in the central province of Hupeh, forming a secondary plain. Hills reach almost or quite to the coast in the provinces from Fokien southwards.

China is practically shut off from all rain-bearing winds, except the south-west monsoon, which blows from about April till October. This wind flowing in from the hot tropical seas, brings its burden of moisture from the south, and sheds it upon the hill and mountain country of the southern and central provinces. The bulk of that which can get across the Yangtse valley is thrown down against the mountains which separate the basin of that river from

that of the Hwang-ho. Hence the winds arrive as fairly dry breezes in North China.

North and west of China lies the vast plateau of Asia, with its colossal ranges stretching east and west, so as to intercept the moisture which might otherwise reach north China.

The result of this configuration of Asia is that China may be divided into two regions: (1) that of the north, or the Hwang-ho region, which is suffering from the secular desiccation of Central Asia, and steadily lapsing into desert; and (2) the southern region, comprising the basins of the Yangtse and Si-kiang, which enjoys the full benefit of the rain-bearing south-west monsoon.

This drying up of the north is inevitable; it is the direct result of the geological growth of the continent, which Skertchly and Kingsmill have shown to be of very recent date. Already the Hwang-ho has lost the drainage of Kashgaria; and the Tarim, once a tributary of the Hwang-ho, is now a continental stream, shut off completely from the sea. The traveller in North China, going west, is vividly impressed with this desiccation. He sees it in dying streams, in dry watercourses, in dwindling or deserted towns, and already the desert seems to be knocking at the western gates of Peking. Nor is this gradual decay of fertile land entirely owing to secular, and therefore irremediable, causes; much of it is due to the wilful destruction of trees by the Chinese. China is practically devoid of forests; the Chinaman cuts down every tree as though it were a curse, and his dislike of pastoral life is stripping the land of its grass. Fuel, in spite of the immense coal-fields, is scarce and dear, and the peasantry drag up by the roots every patch of grass they can lay hold of. This is hastening the time when North China will become uninhabitable. This it is which is driving the people coastwards; this it is which is sending them abroad over all the tropical lands, and much of the temperate. Their own country can no longer support them, and, with their utter lack of decency and cleanliness, they carry into their new homes not only the thrift of the trader but the filth of the savage. One of the evils of this steady migration is the spread of leprosy. Wherever the Chinese

coolie has settled leprosy will be found, and no impartial student of the question can fail to see that in the Pacific and the East Indian islands leprosy has dogged the footsteps of the Chinese coolie. There may be other causes; this is certainly one. If a trained man of science, say a geologist, were to make the circuit of the Pacific Islands, this would doubtless be made clear. The dread disease is independent of soil and elevation — independent of temperature and vegetation; but in the Far East it is dependent upon the Chinaman.

The distribution of leprosy in China itself will be dealt with further on; but in order to form an idea as to whether physical conditions influence the disease, it will be advisable to call attention to another marked distinction between the Hwang-ho area and that to the south. The map shows that from the borders of Shen-si this great river does not receive a single tributary of note, and moreover, that it does not drain the lands of Shantung.

Again, over the greater part of its course it flows over porous *loess*, or equally porous sands, which actually absorb a great part of the water. Hence, whereas the Yangtse is a noble river, entering the seas by a majestic *embouchure* sixty miles in width, the Hwang-ho at its mouth cannot compare with the Thames, and could not be entered by the smallest collier brig.

The climate in this porous northern district is in marked contrast to that of the south. Its summers are hot and dry, so that one's skin cracks and peels, unless it is oiled. Further south the summer is hot and damp, like an English greenhouse. The northern winters are bitterly cold; in the south they are only refreshingly cool.

We have, then, in China every variety of climate, elevation, and soil. Hill country and plain alike support the thronging millions of China; from mountain fastnesses, over a mile above sea level, to marshy river deltas, half awash with brackish tidal waters; from summer air saturated with vapour to summer air dry as a furnace blast. Coast ranges and inland mountains, plains which reach the sea, and those lying deep within the land—all are here. Yet when we come to the distribution of leprosy, all we can say is, that it

is commoner in the south than the north; that it is rare in the maritime portions of the north, but that it is far from absent from the interior of Shantung.

Different as the two regions are in other respects, they agree in receiving their chief rains during the summer, that is the S.W. monsoon. But whereas the southern region is fairly open to the influence of the warm monsoon, the northern region is cut off by Korea and Japan from the effects of the northern part of the monsoon. How effectually these mountain lands drain out the moisture is shown by the rainfall of Yuensan in East Korea being 49·37 inches, and that of Chefu only 26·84 inches per year. Further south the rainfall is much more excessive, reaching 136 inches at Tamsui in North Formosa, 107 at South Cape, Formosa, 91 at Hong Kong, and 41 as far inland as Ichang in Hupeh, on the Yangtse.

We have, therefore, in China an enormous area, differing in every possible way in climate, elevation, and soil, but all dependent for its rain on the same source. It thus affords an admirable field for investigating the supposed effects of the conditions of existence upon leprosy.

The Province of Chihli.

(Leprosy unknown.)

Chihli, the most northern of the maritime provinces (often called Pechihli, that is North of Chihli, on the maps), contains Peking, the capital of the empire.

The Great Plain reaches into this province, forming the whole of the eastern and north-eastern parts thereof, as far west as Peking. Here the mountains close in, approaching within a few miles of the city to the west, and thence circling round to the north and east.

The plain is composed of a sandy alluvium on the east, formed of re-arranged loess, which peculiar formation takes the ground in greater purity, but still showing evidence of degradation, on the west.

Towards Mongolia the massif of the mountains is archæan gneiss and granite, flanked with schists, which are in turn overlaid by rocks of the carboniferous system, containing valuable coal.

At Taku, on the Gulf of Chihli, the Pei-ho falls into the sea. This river receives numerous other streams, of which the Hwei, often called the Grand Canal, is the most considerable. It joins the Pei-ho at the large city of Tientsin.

Agriculture, the manufacture of samshu, a native wine made from sorghum, a little coal mining, and a large manufacture of salt at Taku, with a vast carrying trade, are the chief industries.

The reply concerning leprosy is very full and complete, and is contained on a post-card. It runs as follows:

"I should be pleased to answer your questions respecting leprosy in the district of Peh-chihli, but so far as I can gather, it is not known in this part of China. I have not met with a case here.—A. K. MARSTON, L.K.Q.C.P.I. & L.M."

I travelled through Chihli in May, 1894, from Taku, at the mouth of the Pei-ho, to Tientsin, Peking, and the Great Wall by road, and returned by the river to Taku, and never saw a case of leprosy throughout the journey, a distance of 400 miles. Along the road many beggars besought alms, but no leper was seen. Information obtained at Taku, supplied by Dr. Cheong, a Chinese graduate trained in European medicine at the Tientsin Medical College, confirmed the absence of leprosy in that district. Tientsin, famed as the centre of medical science in North China, endowed with a hospital under the immediate patronage of Li Hung Chang, distinguished above all other towns in China by the possession of a medical college for Chinese, contains no lepers. Were there any within hundreds of miles they would be attracted thither. So, without further comment, it may be safely stated that leprosy is not endemic in Chihli.

A stray case or two have appeared. In 1887 one turned up at the medical clinic, hailing from Chefu. The leper had travelled from that city across the Gulf of Chihli, to seek relief in Tientsin. Another in 1888 came from the same district—the great plain of Shantung.

Such cases, however, do not make Chihli an infected

province. Indeed, they point to the fact that the natives are not prone to the contagion. Chihli may be said to be as free from leprosy as the county of Middlesex.

In Peking, Dr. Dudgeon confirmed the statement as to the absence of leprosy in that city. Within the city walls are communities of all the northern tribes of the empire, Manchus, Tartars, other Mongolian tribes, and Chinese; still leprosy is not known.

The absence of leprosy from Chihli is not more wonderful than the freedom of the provinces north of Fokien, viz. Chekiang and Kiangsu; and were it not for Shantung the entire northern coast would be free from leprosy.

Away to the north of Chihli lie Manchuria and Siberia, of whose leprosy the public have of late years heard so much. But Siberia is a long way off. Elevated plateaus, some of the highest in the world, "antres vast," and snow-capped mountain ranges intervene between China and Siberia; the country is but sparsely populated, and this wide intermediate zone, nowhere less than ten degrees of latitude in width, or the distance between Madrid and London, forms the water-parting of Asia, Siberian rivers flowing north into the Arctic Ocean, China's rivers east to the Pacific. Again, the climate is totally different; Siberia is in the region of variable, China of monsoon, winds. No two parts of the same continent could be more distinct orographically, hydrographically, climatologically, or ethnologically. The great deserts of Gobi and Shamo completely cut off the Mongoloid tribes of Siberia from their cousins in China; and to crown all these, the deserts are rainless, so that the very vegetation fails to pass from the one region to the other.

I cannot pretend to any knowledge of Siberia, save that I visited Vladivostock in June, 1894, and made inquiries concerning leprosy; but no leper was known there. The native population which the Russians found there has disappeared. The present inhabitants of Vladivostock are Government officials, soldiers and sailors, and a few commercial men from the Baltic provinces of Russia, or the shores of the Black Sea. Amongst these specially selected men leprosy is not likely to be met with. Even the coachmen

and others who style themselves Siberians are free from leprosy, and no case is known in the district. Chinese are engaged as labourers on the railway, and they come from the contaminated provinces; but I heard of no lepers among them.

In Saghalien, again, there are no lepers; doubtless for the same reason, namely, the absence of natives, and the presence only of selected Russians from Europe.

Saghalien is the great political prison, but no leper is likely to be sent the long journey from Europe thither.

Still more interesting is the fact that the Siberian town of Alexandrovitch, near the mouth of the Amur River, is free from leprosy. Here is a Russian station of some importance,—so important, in fact, that were any lepers living along the lengthy course of the Amur, they would have drifted towards the capital for treatment.

Eastern Siberia, then, may be held to be free from leprosy, if the meagre details I have been able to gather from a visit to the region, and the extensive inquiries I have made, are to be relied upon.

Reports on the prevalence of leprosy in the province of Chihli.

Peking.—1. Dr. Dudgeon, a leading practitioner in the city, and of long experience, informed me personally in May, 1894, that leprosy did not exist in Peking, nor in the neighbourhood.

2. Dr. Marston, of the China Inland Mission, writing from Peking, May 30th, 1894, reports :—"I should be pleased to answer your questions respecting leprosy in the district of Pechihli, but, so far as I can gather, it is not known in this part of China. I have not met with a case here."

Tientsin.—This is a large city of over 1,000,000 inhabitants in the province of Chihli, and some eighty miles from Peking. It is the seaport of the capital, and the centre for an enormous traffic to the interior.

1. Dr. J. Frazer, L.R.C.P., &c., writing from Tientsin, province of Chihli, China, states, "No leprosy exists in this province."

2. Chung, a graduate of the Tientsin College of Medicine, and now house surgeon to the Alice Memorial Hospital in Hong Kong, informed me that during his five years' residence in Tientsin only one case of leprosy was seen in the clinic of the native hospital. The case was from the infected province of Shantung, not from Chihli.

3. Personal inquiries made by myself during my visit there in May, 1894, failed to elicit any other reply than that "leprosy is unknown in the neighbourhood."

Remarks.—How are the above statements to be reconciled with those quoted in the excellent prize essay written for the National Leprosy Fund by Dr. George Newman? He quotes at pages 81 and 82 a long extract from Doolittle's 'Social Life of the Chinese,' pp. 524—527, on two large leper asylums at *Tientsin*, which is to the following effect:

"There are two large asylums, or places of refuge and of residence, at *Tientsin*, for the wretches who are taken with leprosy, located on the outside of the city near the east and west gates. Two or three hundred lepers live at each of these asylums." A long report of this asylum is given. I can offer no explanation of this conflict of opinion. My information was obtained from medical men, European and Chinese, dwelling on the spot, and I went personally to Tientsin to gain information, but all attended by the same negative result I had received by the written records.

I may say at once this is a mistake; there are no leper hospitals at Tientsin. My reasons for stating this so positively are as follows.

1st. I personally visited Tientsin in 1894, and made extensive inquiries as to the prevalence of lepers and leper hospitals. I found neither the one nor the other.

2nd. The positive written statement of resident medical men, English and Chinese, well acquainted with Tientsin, that no leper hospital exists there.

3rd. As I was not acquainted with Doolittle's statement, not having seen Dr. Newman's report until after my arrival in this country, I wrote Dr. Irwin of Tientsin to make further inquiries as to the presence of leper hospitals at Tientsin, and asked him to telegraph his reply so as to be in time for this publication. He answered to my query "Are there leper

hospitals at Tientsin?" "No." From all these cogent proofs I conclude that the statement that leper hospitals exist at Tientsin is a misrepresentation or a misstatement, and that Chihli is free of leprosy.

Taku.—The fortified entrance to the Peiho River at Taku is surrounded by a populous city. Here Dr. Cheong, a graduate of the College of Medicine at Tientsin, informed me that "no leprosy is met with in the neighbourhood."

The Province of Manchuria.

(Leprosy unknown.)

Manchuria of the maps, and Manchuria as understood in China, express two different ideas. The former is the Manchurian province of Tsitsihar, lying between the main Amur River and its important tributary the Sungari; it, therefore, has no seaboard. But the Chinese include two other provinces as belonging to Manchuria,—Shinking or Liao-tong, stretching from the Gulfs of Liao-tong and Korea northwards to the river Liao-ho; and Kirin, which lies between Shinking and Tsitsihar. It is with the Shinking district—in which, in fact, the capital of Manchuria, Moukden, is situated—that my inquiries deal, as no information is forthcoming from the interior.

Manchuria forms the south-eastern part of the great table-land of Asia, but, as we are only concerned with Shinking, that province only will be described.

It is a mountain region, broken by the valleys of two rivers, the Yaloo and the Liao, both of which have broad alluvial flats bordering the water, and many miles in width.

The rocks are chiefly igneous and volcanic, with tracts of archæan and carboniferous rocks.

The plain of the Liao, on which Moukden is situated, is over fifty miles wide, undulating, and rising towards the interior, so that Moukden, 150 miles in a direct line from the coast, is only 300 feet above sea level.

The hills are well wooded, and the climate extreme and dry, the highlands of Korea cutting off the rain-bearing

winds to such an extent that only about 27 inches fall in the year, as compared with 60 inches at Fusan in South Korea. Other details are given in Dr. Christie's report.

I, the writer, very fortunately met Dr. Christie at Chefu in May, 1894, and learning that he came from Manchuria, availed myself of an interview with him on the subject of leprosy.

He told me that endemic leprosy seems to be unknown in Manchuria; the few cases seen were Chinese from the south (Canton). The occurrence of a few cases during an experience of many years does not, however, proclaim the country infected, any more than the case of the London butcher renders England a leper centre; nay, not so much, for the patients seen in Moukden were not even Manchus, but were as much foreigners to Manchuria as Norwegians are to England.

Manchuria has no infected seaboard, nor can it get infected from the north, considering that Eastern Siberia is free from the disease, as shown under the heading of Chihli. Northern Manchuria drains in the opposite direction to the flow of the rivers in Shinking, and the water-parting is a range of high mountains, so that there seems no liability of infection from this source even if leprosy did occur there, of which there is no proof.

Manchuria must, therefore, be declared free from leprosy, and the Manchus, the reigning dynasty of China, as a tribe non-leprous.

Report by Dr. Dugald Christie, L.R.C.S., L.R.C.P.Ed., Moukden, Manchuria.

(Leprosy unknown.)

Leprosy seems to be unknown in Manchuria; I have met with a few cases in Moukden, but they came from other parts of China. The larger part of the country is comparatively flat. Moukden, the capital of the province, though about 150 miles from the sea, is not more than 300 feet above sea level. The wide undulating plains are fertile, well watered, and for the most part densely populated. The soil is chiefly loam. In the east there are extensive mountain

ranges, some precipitous with deep narrow gorges, others rounded, wooded to the summits, and intersected by broad well-cultivated valleys. There is but little large vegetation in Southern Manchuria except on the hills, but wide stretches of forest are met with in the far north. The climate of Manchuria is distinctly continental, and not influenced by oceanic currents. There is no shelter from the cold winds which in winter sweep across the Siberian and Mongolian plains, and the temperature falls to 28° F. below zero in Moukden. The thermometer often stands at 97° F. in summer, but the atmosphere generally is clear, dry, and bracing, so that the senses do not indicate such extremes.

The total rainfall for 1893 was twenty-seven inches, of which, on two occasions, over three inches fell in twenty-four hours. There is little or no moist, damp weather.

Until the floods of 1888, when large stretches of country were under water, malaria was very rarely met with in Manchuria, but since then it has become more common. From 1882 until 1888 only twenty-eight cases were treated at the Moukden Medical Mission Dispensary. During 1893 over 400 came under observation.

The Province of Shantung.

(Leprosy is prevalent; occurs mostly inland.)

The northern maritime province of Shantung—the eastern hills—is washed by the waters of both the Yellow Sea and the Gulf of Pechihli, and through it now passes the lower course of the Hwang-ho. The capital, Tsinanfu, stands near the Hwang-ho, and from this district eastwards and southwards run, with many spurs and outliers, the sacred range of Tai-shan. These mountains, as may be seen by the map, rise above the great plain of the loess and other recent marine and fresh-water beds. They consist of archæan rocks to the east, overlaid westward by rocks of carboniferous age, of which the mountain limestone is a most important member, forming fine mountain ranges. The coal-fields occupy the depressions in the mountain limestone. For details of the geography and geology, with an account of the present and past meteorology, the reader may be referred to a paper by

Messrs. Skertchly and Kingsmill in the 'Journal of the Geological Society,' 1894.

The drainage is carried out by numerous small rivers rising in the mountains, and the Hwang-ho, dwindled by absorption to a third-rate river, enters the Gulf of Chihli. To this extraordinary river, aptly called "China's sorrow," Shantung owes the desolating floods which periodically waste so much of the otherwise fertile loess land.

The summers are hot and very dry, the winters are cold and bright, and the whole province shows unmistakable evidence of steady deterioration from desiccation. The plains grow vast crops of corn and millet, and every tree has been destroyed, save the ornamental willows and other trees around the towns and villages. The population is large, but almost confined to the plains. Most of the inhabitants are agricultural labourers, but there is a small population of miners who feebly scratch out a little of the vast stores of coal with which the country abounds.

Report by Dr. J. R. Watson, M.B., M.R.C.S., Chefu.

(Leprosy prevalent.)

Dr. Watson, of the Baptist Mission, passed through Hong Kong in April, 1894, on his way home after a sojourn of ten years in the province. The field of his labours is the district around Wei-hsien, far inland on the great plain at the foot of the hills. Some of this district is water-logged, and travellers hurry past it, for it has an evil reputation for malaria.

Every village of any size—and they are very numerous—has its one or two lepers, who are regarded as outcasts by the natives, and compelled to dwell apart.

Dr. Watson recorded a case of a boy who acquired leprosy through sleeping with a younger brother who was a leper. Here the question of heredity *versus* contagion crops up. As a brother he may have inherited it, as a bedfellow he may have acquired it; and thus it ever is and will be with persons living under the same roof. That leprosy is communicable by dwelling with lepers is an established fact, and this must obscure the evidence of heredity.

The leprosy is ascribed by the natives to marshy ground and damp houses; and when we remember how often this district is whelmed in the floods of the eccentric Yellow River, some colour of reason is given to the local belief.

It is interesting to note that after an interval of pretty nearly 1000 miles of coast-line, from Fuchow to Chefu, leprosy again appears, and again the natives assign marshy ground and damp houses as the cause. In the provinces of Kwantung and Fokien we found the same causes assigned, and all the Chinese outside these provinces ascribe the prevalence of the disease to damp ground.

Dr. Watson further stated that leprosy seemed more prevalent inland than on the coast. Here, again, is a seeming refutation of the world-wide belief that the disease is more common on the seaboard, and of the corollary usually added, "owing to the large consumption of fish by the dwellers by the sea." The inland dwellers, however, consume salt or rotten fish even more freely than do those living by the seashore.

Notes from information personally conveyed by E. W. Von Tunzelmann, M.B.Lond.

(Leprosy rare.)

The writer visited Chefu in May, 1894, and made personal inquiries as to the prevalence of leprosy. Dr. Von Tunzelmann stated that leprosy was very rarely met with at that port, and referred me to other medical men who had a few cases under treatment. Leprosy, however, proved to be a very rare disease, and the cases came from inland, from the great loess and marine-sand plain above described.

It was fortunate that Dr. Von Tunzelmann's and Dr. Watson's statements came to hand, otherwise in this report the grievous error of declaring the coast of China north of the Formosa Channel as free from leprosy would have been committed. Here, however, the bold promontory of Shantung arrests attention, and we find the purity of the coast somewhat soiled.

North of this again the leper disappears, so that Shantung

stands isolated among the coast provinces of Northern China as being a leper-bearing land.

How did the disease reach this province? The great, but here sadly diminished Hwang-ho, or Yellow River, flows through Shantung, to fall into the Gulf of Pechihli. Is it along the valley of the river that the disease has travelled? I can give no answer; I have no information. The Europeans, if there are any dwelling along its banks, have sent no replies to my queries. It is an interesting point to follow up. The mightier Yangtse rather neglected the water-carriage of the disease, considering its absence from Shanghai, and so we have no proof that leprosy is brought down stream. Yet how else, except by water, is leprosy to reach the coast of Shantung? A possible answer may be found in the constant stream of caravans from far away Thibet, that is always flowing through Shantung.

Perhaps the consideration of leprosy in Korea and Japan, the coasts immediately opposite Shantung, may throw some light on the subject.

The Province of Kiangsu.

(Leprosy not indigenous.)

The maritime province of Kiangsu is intersected by the great river Yangtse, whose waters, carrying their burden of yellow mud into the sea, give origin to the name Yellow Sea. The land is for the most part level, consisting largely of delta and other recent deposits of the Yangtse, and the bay that the river has filled with its alluvium. To the west, hills and mountains rise from the plain like islands from the sea, and islands they once were. Large lakes and irreclaimable marshes abound, but the climate is considered healthy, and the land yields large crops of grain, cotton, and tea. Nanking, Suchau, and Shanghai are the chief cities.

Shanghai is important not only as being the largest of the treaty ports, and the natural outlet of the vast wealth that pours down the Yangtse from far beyond the limits of even this great empire, but also from its proximity to the great and ancient cities of Suchau and Nanking, cities whose histories date back thousands of years.

Notwithstanding the immense and continuous influx of visitors from all parts of China, and indeed all parts of the world, Shanghai is not inflicted with a leper community; indeed, Mr. Skertchly two years ago visited all the hospitals, native and foreign, and inquired of the medical men in the vain hope of finding a solitary leper for the edification of a medical visitor.

Nor is it likely that leprosy is indigenous in any district within many miles, many hundred miles, along the Yangtse waterway. Lepers travel enormous distances to see foreign doctors. I had a patient in Hong Kong, a leper from the shores of Lake Tien-chi, in Yunnan, a distance of 900 miles as the crow flies. He came to Hong Kong because a man passed through his village on his way inland whom I had operated upon for a huge lymph scrotum. The leper, failing in obtaining a cure from his native doctor, found his way down the Canton River, and after months of travel reached Hong Kong. Therefore Shanghai, with its wealth of medical men, could attract lepers from yet more distant regions, did leprosy abound in the area drained by the Yangtse.

The conclusion may be fairly drawn, therefore, that in this vast area, in the words of Dr. Jamieson, "leprosy is the rarest of rarities."

Letter from (the late) Dr. R. A. Jamieson, Shanghai, May 24th, 1894.

"I should be very glad to answer your questions respecting leprosy if there were any specimens of the disease to be found here. It is the very rarest of rarities in Shanghai, so rare that I should be afraid to say how few cases I have seen in the twenty-six years during which I have been without interruption connected with large hospitals for natives."

Nothing could be more to the point than Dr. Jamieson's statement. Shanghai is so great a centre of commerce and traffic, and so well supplied with European doctors of wide-spread reputation, that, were any lepers in the province of Kiang-su, they would be sure to congregate there, either

for alms or for treatment by the foreign doctors. Kiang-su may be pronounced free of the disease.

Letter from Dr. BURGE, Shanghai, May 22nd, 1894.

"I am sorry I have very little experience as regards leprosy. I will, however, see if I can collect a little information on the matter."

Dr. Burge's statement bears out Dr. Jamieson's. It is evident that leprosy need not have been seen in Shanghai by either of the observers, so that it may be conclusively stated that leprosy is not indigenous to the province of Kiangsu.

THE PROVINCE OF HUPEH.

(Leprosy occurs in isolated parts of the district.)

The central province of Hupeh takes its name ("north of the lakes") from the maze of lakes which lie within the central plain, as may be seen on the map. Its area is about 50,000 square miles, the southern half of which is alluvial plain, the northern mountainous, for here the Kiu Long mountains terminate.

The Yangtse flows through it from west to east, and into this mighty stream falls the Han River, flowing from the north. At the confluence stand the united cities of Hanyang and Hankow, and across the Yangtse, here a mile wide though it is 600 miles from the sea, is the city of Wuchang, the capital of the province. To Hankow come the largest ocean steamers, for this is the very centre of the tea district.

Report by S. R. HODGE, M.R.C.S., &c., Hankow, Province of Hupeh, China.

(Leprosy no great scourge; no segregation.)

Hankow is situated on a flat alluvial plain on the left bank of the Yangtse, some 600 miles from the sea. The

subsoil is constantly damp, and the whole country highly malarious. The summers are short but intensely hot, and during the spring and autumn sudden variations of temperature are the rule; the country is thickly populated, and rice-fields are everywhere.

Distribution.—There are no mountains within 100 miles of Hankow.

Heredity.—The natives are very decided in the opinion that leprosy is hereditary.

Contagion is only believed in to a moderate extent; the ordinary intercourse of daily life is not feared, but they will not sleep with a leper. If a girl is betrothed to a man, and subsequently it is found he is leprous, the match is broken off. Still the direct and positive contagiousness of leprosy is not quite admitted. A native confessed (to Dr. Hodge) that he knew a man leprous for five years, but that his wife never took it.

Food.—Some associate leprosy with eating bad fish; others blame the eating of reptiles.

Segregation is not observed in Hankow.

Vaccination.—No information. The Chinese practise inoculation for smallpox here.

Treatment.—Amelioration, but no cure, can be obtained by some one or all of the present-day methods of treatment.

The Chinese have several reputed "curing drugs."

Report by A. Morley, L.R.C.S.&P., Teh Njan, near Hankow, September, 1894.

(Leprosy rare.)

I have carefully gone through my note-book, and I can find only ten cases of which I was certain of my diagnosis.

Heredity.—The Chinese seem to find a special connection between ascites and leprosy. They deny that leprosy is hereditary, but consider that ascites in their ancestors predisposes to leprosy. Two lepers stated that their fathers died of the disease; a third stated that father and uncle were both lepers, and a fourth that his uncle died of leprosy.

Contagion is not believed in.

Food.—The Chinese lepers here do not ascribe leprosy to fish.

Segregation not practised.

Treatment.—The cases I have seen came to me apparently for diagnosis; consequently I have never had an opportunity of treating cases.

Extract from letter sent by Herbert Brady, Esq., H.B.M. Acting Consul, Ichang, June 12th, 1894.

(Leprosy unknown.)

"From inquiries which I have made it appears that the disease is not endemic here. Dr. Aldridge, of the I. M. Customs, who has had charge of the Church of Scotland Mission Dispensary—the only (native) hospital in the city—for some years past, informs me that he has not met with a single case, and I notice that the disease is not mentioned in any of the 'Customs Medical Reports,' which go back to the year 1877."

The Province of Szechuen.

(Leprosy rare. Leprosy does not follow the Yangtse course.)

The western province of Szechuen is the largest of the eighteen provinces of China, having an area of no less than 107,000 square miles. It is essentially a highland province, none of it being below 1500 feet and much of it over 5000 feet above sea level, as a glance at the map will show. Its name—the Four Rivers—indicates that it is a province of valley plains as well as of hills and mountains, and its plateaus and many of the hill-sides are under cultivation. Unlike most of China it is well wooded, large forests of pines clothing the mountains, especially in the east. The mountains at several points overtop by some thousands of feet the snow-line.

The rocks are mostly sandstone and limestone, and coal seams of carboniferous age, overlying archæan gneiss and schists, which with granite crop out on the flanks and cores of the higher ranges.

The Yangtse flows through it, its huge volume receiving large additions from several considerable rivers and a multitude of smaller streams.

Rice, wheat, barley, millet, sugar-cane, tobacco, and of late potatoes, are largely cultivated. It is, moreover, the district which yields the chief supply of Chinese medicines.

The Szechuen inhabitants are less jealous of foreigners than usual in China, and generally more civilised, as shown by their roads, which though not good in a European sense, are much better kept than elsewhere in China. Yet even here famine lays its gaunt hand upon the land, as it always will till China perceives the value of facilitating the means of communication between her provinces.

On the hills and in the mountain fastnesses the aboriginal race, usually called by the collective name of *Man-tze*, still exists in considerable though steadily diminishing numbers. They are Chinese in feature, but with more regular teeth, and Gill makes the almost incredible statement that they are dirtier than the Chinese. They speak dialects of the Thibetan language.

My information from this far-off province consists of three communications, one from Dr. Davenport, of the London Mission. During a three and a half years' sojourn he has seen at most but four cases of leprosy, and this too at a hospital where from 7000 to 8000 patients have been treated during that time. Leprosy cannot, therefore, be considered a severe scourge in his district.

From the headquarters of the French mission, however, in Hong Kong, I learn that their missionaries state that leprosy is frequently met with in Szechuen, so much so that they have written to headquarters for money to build a refuge for the lepers.

On the other hand, the city of Ichang, near the border of Szechuen, but in the province of Hupeh, is free from leprosy, according to the statement of Mr. Brady, the British Consul. Ichang, like Chung-king, whence Dr. Davenport writes, is on the Yangtse-kiang. Ichang, therefore, intervenes between Chung-king, in the upper reaches of the Yangtse, and Hankow, 844 miles lower down. At Hankow and its neighbourhood leprosy is known, and it

is absent from Shanghai, which may be considered as practically at the mouth of the Yangtse, 600 miles from Hankow. In a distance of 1500 miles from the mouth of the river upwards we thus have centres of leprosy at Hankow, 600 miles, and Chung-king, 1500 miles, with hundreds of miles between free from the disease. It may hence be reasonably inferred that leprosy does not follow the flow of the river.

Extract from letter sent by Dr. Cecil Davenport, Chung-King, Szechuen, June 27th, 1894.

(Leprosy very rare.)

"I am unable to give any information concerning leprosy, for I have seen only three or four cases among the 7000 or 8000 out-patients I have seen during my three and a half years here. I had one case in my hospital which did very well under creolin dressing (20 ♏—℥j) and the internal administration of tonics, iodide of potassium, &c. I am sorry I cannot tell you more facts, but glad that there appears to be so little of the disease in this district."

Extract from letter sent by Dr. C. H. Finch, Sui-fu, Szechuen, July 4th, 1894.

(Leprosy very rare.)

"During a three years' residence here I have seen very little leprosy in this district. I hope to be able to answer your questions in another twelve months."

Segregation is not observed.

Vaccination is in practice in other parts of the district, but not here, and leprosy is observed only in Min-Lin-Shien.

Treatment.—Several native drugs are used, but none are reliable. Modern European drugs have been used in this district only quite recently.

N.B.—It is significant of the presence of lepers in the district that my information was gathered from a French missionary from Szechuen, who had come to Hong Kong to get the necessary funds wherewith to build a leper hospital

Report by French missionaries, Min-Lin-Shien, Szechuen, November 27th, 1894.

(Lepers occasionally seen. No Lolos (aborigines) are lepers. Leprosy confined to the Chinese. Where vaccination practised, no leprosy.)

Physical features.—The district in question is in the southern part of the province of Szechuen, not far from the source of the river Kien-Chang, one of the affluents of the Yangtse, and not far from the borders of Thibet. The district is very mountainous, treeless, and devoid of marshes or swamps. Rain from end of March to the beginning of July. Heat is intense during summer, very cold during winter. Population is very sparse. Rice-fields occupy the plains.

Distribution.—The hills are occupied by the Lolos, the aboriginal inhabitants, who never intermingle with the Chinese, and who are not lepers. Leprosy is only met with amongst the Chinese.

Heredity.—The natives believe leprosy to be hereditary, but they take very few precautions in their marriage contracts.

Contagion is not considered as a ready means of propagating leprosy.

Food.—Fresh fish is not obtainable, and salt fish is used but very sparingly. The ordinary food is rice, vegetables, and pork. Generally lepers are to be found only in the parts of the district where food is bad or insufficient.

Province of Chekiang.

(No leprosy.)

The maritime province of Chekiang is the smallest of the eighteen into which China is divided, being only about 39,000 square miles, or about 7,000 square miles larger than Ireland.

Situated in the south of the Great Plain, its surface is level except in its southern portion, where the Nan-Ling

range terminates. It is very fertile, densely populated, and the city of Hangchau is among the richest in the land.

It is drained by numerous small rivers, and is one of the centres of the silk and cotton industries.

Immediately the northern frontier of the province of Fokien is crossed, leprosy seems to well-nigh if not entirely disappear. The town of Wenchow, situated on the coast, is but a few miles from the southern frontier, and Dr. Lowry, well known as a careful observer in Pakoi and Wenchow, makes the statement that no cases of leprosy have been seen by him, and that the Chinese deny all knowledge of its existence.

Dr. Molyneux declares Ningpo and its environments free from lepers, the only case he reports being from a distant inland town.

The fact of the cessation of the prevalence of leprosy is interesting, and further interest attaches to Dr. Molyneux's statement that, while the seaboard is free from lepers, the disease prevails inland. This is contrary to the almost universally prevalent belief that leprosy is most widely spread along the seaboard. We have seen the same fact in the case of Shantung further north, p. 278. It is so difficult to obtain any information, even from a few miles inland from the coast of China, that the statement that lepers find their way from inland towards the sea-coast, from an infected to a clean district, bears a significance one might dwell upon at length.

Letter from Dr. Lowry, Wenchow, Chekiang, July 15th, 1894.

(No leprosy.)

"I am sorry I cannot help you in your leprosy inquiry. During my three years' residence here no cases have crossed my path, and from inquiries among Chinese it does not exist in this district."

Dr. Lowry is so well known for his excellent researches on leprosy in Pakhoi, that this statement is of great value, as any leper in his district would be sure to have gone to Dr. Lowry for treatment.

Wenchow is a town on the seaboard, and only a short distance north of the borders of the Fokien province. It is interesting to note the abrupt limit of leprosy in this region.

Letter from Dr. Molyneux, Ningpo, Chekiang, October 16th, 1894.

(Leprosy not indigenous.)

"There has come under my notice no case of leprosy from Ningpo or its neighbourhood, and I hear of no cases from the priests or the itinerant medical missionaries. The only two cases I have seen came from Show-shing, many miles inland from here."

It is interesting to note that on the sea-shore no leprosy is known, the two cases reported by Dr. Molyneux coming from the far inland town of Show-shing, likely Shau-hing of the maps.

Province of Fokien.

(Leprosy a scourge.)

The maritime province of Fokien lies between Kwantung on the south and Chekiang on the north, and faces the Formosa Channel.

Fokien is essentially a highland province, the hills in most places reaching to the coast, and continue into the islands that flank it. This mountainous mass is broken through by two rivers and their tributaries,—the Min, on which the treaty port of Foochow stands; and the Keu Lung, at the mouth of which is the treaty port of Amoy.

The mountains, at least near the coast, where alone Mr. Skertchly has examined them, belong to the same series of granites and volcanic rocks of carboniferous age which extend southwards through Kwantung. Inland, in all probability, the usual archæan and carboniferous rocks will be found.

The country produces rice, barley, and wheat, but not in sufficient quantities for home consumption. Tea is largely grown inland.

The climate is like that of Kwantung.

I class the province of Fokien with Kwantung as the cradle of leprosy in China. Mr. Sadler's short statement that "leprosy is mostly found in Fokien and Canton provinces, and little in the north," is most comprehensive and telling. He therein announces a great truth, and one of which I was not aware until I commenced this inquiry.

In regard to vaccination he mentions that there is a fear that leprosy is spread by 'wrong' lymph, but he does not say if this is the belief of the natives or of Europeans. If the fear exists among the Chinese, it is the only record we have that vaccination has ever been thought of in connection with the subject; though one or two cases in the Fatshan report gave vaccination as a possible cause of the disease.

Dr. Burno writes in Spanish from Lampilao in the south of the province, about eight miles from the coast, and 2000 feet above sea level. He gives some interesting details.

The number of lepers he has seen is very few, only three in twenty-three years. However, the natives seem well posted in all the dangers of leprosy, which they would not be were they not aware of its encroaches. This is very different from the way the natives of Northern China regard it, for they dub the disease *Tai Ma*, or Large Itch, signifying that it is regarded with no dread, but only as a severe and lasting form of scabies.

The Chinese have evidently anticipated science when they think "that it is caused by a microscopic animal that flies unseen."

Dr. Wong I Ek, a graduate of the College of Medicine for Chinese, Hong Kong, confirms the statement that leprosy is very prevalent in Foochow.

Letter from B. L. Paton, B.A.Lond., M.B., C.M.Edin., Tsoan-chow-foo, Fokien, June 4th, 1894.

(Leprosy not prevalent.)

"I am sorry I have not the information necessary to answer your questions respecting leprosy in this district."

The remark that Dr. Paton has not the information means to say that there is but little material to gather

experience from. Where Tsoan-chow-foo is I cannot locate, but I infer it is an inland town some way up country from Amoy.

Extract from Mr. SADLER'S report, Amoy, Fokien, July, 1894.

(Leprosy a scourge.)

Distribution.—Leprosy is mostly found in the Fokien and Canton provinces, and but little in the north. It seems to occur both amongst the dwellers in the plains and hills.

Heredity.—The natives say that three out of ten cases of leprosy are transmitted.

Contagion is considered a likely way of acquiring leprosy.

Food.—Improper food is believed to cause the disease.

Segregation is observed. There are separate abodes in some places.

Cause.—It is thought that the disease sometimes arises from evil sores and taking wrong medicines.

Vaccination.—There is a fear that by the use of wrong lymph the disease may increase. It can be spread by lymph taken from a leper.

Treatment.—Tai-fung-tsz is most used by the natives.

Translation from the Spanish of a report by Rev. Fr. G. BURNO, O.P., Lampilao, Amoy, May 27th, 1894.

(Leprosy uncommon. Vaccination not remarked upon.)

Physical features.—The district of Lampilao is situated at about 1000 feet above the sea level, and two hours' journey inland from Amoy, the seaport. The district consists of a narrow valley surrounded by mountains. Nine years ago the mountains were covered with pine trees, but they are now quite bare, the trees having died in consequence of a worm, the "moakatai" of the natives.

The soil is very rich, but frequently there are droughts, originating, it is believed, in the absence of trees. Population very dense, distributed mostly in villages.

Distribution.—There are no villages in the mountains. I have seen few lepers, in spite of their houses being full of water during the rainy season. In twenty-three years I have seen three lepers only.

Heredity.—I know two Christian families (Chinese) in another district in which leprosy has been transmitted from the grandfather to the children and grandchildren. In some it appears when young, in others when they are about forty years old.

Contagion.—The Chinese believe leprosy to be contagious, and have great fear of contracting it, as according to their theory it is caused by a microscopic animal that flies unseen.

Food.—I have never heard the Chinese say that fish or other food may be the cause of leprosy. They declare that after having drunk samshu (Chinese wine) it is dangerous to fall asleep in a draught, in case of developing leprosy.

Segregation.—There are no attempts made at isolation; the leper girls are engaged as servants, and allowed to do all household duties as if nothing was the matter.

Tuberculosis, syphilis, and malaria.—No observations recorded.

Province of Kwantung.

(The cradle of leprosy.)

From this province replies were received from Canton, Fatshan, Swatow, Pakhoi, Hainan, and our own observations in Hong Kong and Macau, which geographically belong to Kwantung.

Kwantung is one of the southern maritime provinces, and is about twice the size of England. It is for the most part hilly, becoming mountainous to the north on the borders of Hunan and Kiangsi, but is broken by the broad and fertile valley of the Pearl River, the common discharge of the Sikiang and other streams. This alluvial tract, with the delta, supports a vast population, both on the land and on the water. The coast and adjacent islands consist chiefly of granite and associated volcanic rocks of car-

boniferous age; further inland archæan rocks occur, which in turn are overlaid unconformably by the mountain limestone and other rocks of the carboniferous series.

Kwantung is intersected by the Tropic of Cancer, and its products are those of warm countries. Rice is largely cultivated in the low ground, and this province is the northern limit of the cocoa-nut palm. The people are, as is usual in China, mostly agricultural, the mineral wealth being entirely neglected. The carrying trade supports a large floating population, and traders are numerous.

The summer is hot, moist, and rainy; the winters, cool from November 1st until March 1st, are dry and bright.

First among my correspondents in Kwantung is Dr. Kerr, whose answers are entitled to all respect and consideration. He has spent well-nigh forty years in Canton, and has been a careful observer of many points of scientific interest, and is engaged in daily medical and surgical work in the hospital at Canton.

The province of Kwantung is so densely populated, and so large a centre of leprosy, that many opportunities exist for observation. Perhaps no more advantageous opportunity is offered, than the city and surroundings of Canton afford, to get at the connection between vaccination and leprosy. Vaccination was introduced into Canton by the East India Company about the year 1801, since when it has been extensively practised. The importation of lymph to a region so remote as Canton was a great and serious difficulty to the continuance of the practice.

Lymph was also brought across South America from Spain, and thence to the Philippines, a Spanish possession in the China Seas. The East India Company sent fresh lymph from Calcutta, and so a supply was kept up. In time, as the practice was carried further afield into China, human lymph was used time after time, recurrence to the original source being impossible. The lymph at length became attenuated, and the small vesicles raised by the native lymph were mere abortions, and the protective power of vaccination against smallpox almost *nil.*

In spite of this the Chinese—and they are astute observers—never assert that leprosy has increased with vaccination;

and not only so, they even declare leprosy to be less prevalent now than a hundred years ago.

Dr. Kerr has never heard a whisper to the effect that leprosy has spread with vaccination; and I can bear testimony to the same effect in Hong Kong. Dr. Kerr, however, words his answer with scientific caution when he says, "No data exist by which an answer to this question can be given."

The reply from the French mission in Canton is most comprehensive and valuable. The statement that the natives of Kwantung and Fokien believe those provinces to be the centres and hotbeds of leprosy, is fully borne out by all the reports. Lepers have a peculiar knack of always belonging to somewhere else than the place at which they are encountered. Many of the reports from outside Kwantung testify to the truth of this statement; and few of the hundreds of the itinerant lepers I have seen in Hong Kong ever admitted having seen another case of leprosy in the place of their nativity. I am convinced that the two provinces of China bordering on the China Sea, Kwantung, and Fokien, are the chief seats of leprosy in China. The Chinese outside these provinces ascribe this to the heat and damp. This is mere coincidence, but later on this fact will be fully dealt with.

The records of the French mission go back to the seventeenth century, before the introduction of vaccination into China, and the answer given to the question of any connection between vaccination and leprosy is, "I have never heard that vaccination increased leprosy."

Leprosy seems to be diminishing according to their report, for in two old leper hospitals, dating from the seventeenth century, which used to shelter seven to eight hundred lepers, only a few cases are now met with.

Swatow (Kwantung).—Swatow is a treaty port in the northern part of Kwantung, on the river Han, which must not be confounded with the greater river of that name which flows into the Yangtse at Hankow. It has only achieved importance since the British established it as a trading port for the city of Chow Chu some thirty miles up

the river. Previous to this only a few Chinese inhabited the place.

Dr. Cousland states that the Chinese affirm that leprosy has increased within the last thirty years or so; but there is no evidence to show that vaccination has had anything to do with it.

He makes the interesting statement that the first lepers brought the disease back with them from Annam and Siam, where they had been resident for some years. Whether this is the mere natural tendency to ascribe leprosy to a foreign source or not will be discussed afterwards.

Dr. Anna Scott also testifies to the prevalence of leprosy around Swatow. The all-important question concerning vaccination receives very careful attention from Miss Scott. All the members of the mission station with which this lady is connected have been forced to the conclusion that leprosy has increased among children, and they ascribe it to arm-to-arm vaccination, as practised by certain Chinese "doctors." Dr. Anna Scott also remarks upon the prevalence of phthisis among leper children.

Fatshan (Kwantung).—Fatshan is practically a suburb of Canton, and is situated on the same alluvial plain.

The apology with which Dr. MacDonald's report opens is surely not required. The careful clinical records he sends of 122 lepers is, perhaps, the most valuable contribution to the study of leprosy which ever emanated from the Far East. It will be found in another part of this Essay.

Dr. MacDonald is inclined to believe that an increase of leprosy has been due, or may be partially ascribed, to Chinese vaccination.

Pakhoi (Kwantung).—Pakhoi, the most southerly treaty port of China, is a great focus of leprosy. Dr. Horder personally related to me in Hong Kong his treatment of lepers. He has an admirable hospital, maintained at an infinitesimally small cost, and thither lepers come for treatment.

He is convinced of the possibility of relieving leprosy of its worst features. He insists on the lepers coming to the hospital at regular intervals, say for a month or two every year. Good food, rest, cod-liver oil, and the applica-

tion of some of the medicines recommended for external use invariably afford relief.

Dr. Horder is of opinion that a leper, if not too far advanced, can be kept alive; and not only so, but that the disease can be well-nigh arrested by submitting the leper to much the same treatment as a patient suffering from chronic phthisis requires.

In this I entirely agree with him. We see, as a rule, only neglected lepers, outcasts, beggars, or those of the coolie class, who are poorly fed at all times, and who, when they become lepers, practically starve. Is this to be wondered at? Leprosy is not a more frightful or deadly disease than is neglected syphilis. Neglected phthisis gallops its victim to its grave, and could the leper be relieved, even to a limited extent, he would be in no worse a plight than is the subject of phthisis, cancer, or neglected syphilis, except that he is avoided as a source of infection.

Hainan (Kwantung).—The island of Hainan lies close to the southern coast of the province of Kwantung, of which it is a separate department. It consists of a central mountain system rising from a plain. The Chinese inhabitants are chiefly descendants of emigrants from Fokien, but the true natives, who live in the hills, belong to a different branch of the Chinese group, and have little communication with the people of the plains.

The report of Mr. Parker shows how much knowledge upon such subjects as leprosy can be supplied by educated men endowed with keen powers of observation. I am deeply grateful for the information from this outlying island.

Mr. Parker's observations tend to show that the Chinese of Hainan believe leprosy to be hereditary, and that the disease can be acquired by connection or inoculation. Vaccination or inoculation for smallpox has never been suspected of conveying leprosy by the Chinese.

Evidently leprosy is very prevalent around Hoihow, from what I have learned from other sources.

Hong Kong.—See separate report written by author in 1890; and added as an appendix.

Extract from report by J. G. Kerr, M.D., LL.D., Canton, Kwantung, August, 1894.

(Leprosy a scourge.)

"*Physical features.*—South and south-west of Canton is a large, well-watered delta within tide-water mark. The soil is alluvial, rich, and well cultivated, yielding fine crops of rice, vegetables, and fruits. North and east of Canton is hilly, with well-cultivated valleys along the river courses.

Rainfall in the spring months is usually abundant, the atmosphere being charged with moisture. During summer months showers are frequent. The autumn and winter months are usually dry.

Meteorological Register.

Fatshan, near Canton.

1887.	Mean height of barometer.	Minimum temperature.	Maximum temperature.	Mean temperature at 4 p.m. in shade.	Do. Wet bulb.	Amount of rainfall.	Number of rainy days.
	in.					in.	
January . .	30·15	40	73	56·2	54·6	9	11
February . .	30·16	40	73	57·0	53·5	$\frac{3}{4}$	8
March . .	30·08	52	79	64·0	62·4	6	12
April . .	29·98	55	86	73·8	69·6	$6\frac{1}{2}$	9
May . . .	29·48	69	90	79·0	77·3	$7\frac{1}{2}$	14
June . . .	29·85	70	91	84·5	81·5	$4\frac{1}{2}$	11
July . . .	29·75	72	92·6	85·0	80·8	6	19
August . .	29·85	72	93·3	85·6	80·8	$6\frac{1}{2}$	14
September .	29·01	75	93	84·5	81·3	$8\frac{3}{4}$	11
October . .	30·08	62	86	77·2	72·0	$2\frac{1}{4}$	1
November. .	30·49	55	81	69·8	65·0	$\frac{1}{4}$	2
December . .	30·22	44	76	64·0	59·9	$\frac{1}{4}$	3
Total .	...	...	...	...	...	$58\frac{1}{4}$	115

Distribution.—Leprosy is met with chiefly amongst dwellers in the plains.

Heredity.—The Chinese believe leprosy to be hereditary. In the betrothal of children great care is taken to be sure that no taint of leprosy exists in the family of the other party.

Contagion.—The belief that leprosy is contagious is not definite. In many instances lepers are allowed to remain in the family, while in others they are not. They are allowed to pass to and fro in the streets without interference. In our out-patient rooms at hospital a patient will fan the seat just vacated by the leper, so as to blow away any emanations from the previous occupant. It is a general belief that the disease runs out in the third generation.

Food.—Fish, both fresh and salted, is in universal use as an article of food, which would not be the case if it were considered the cause of a disease so much dreaded as leprosy.

Sexual intercourse.—The Chinese believe sexual intercourse is one of the chief causes of propagating the disease.

Segregation.—There is a leper village a mile or two outside the east gate of Canton. The inmates go and come without any restriction, and are engaged in begging or some kind of light work during the day, and return to spend the night. Some lepers live on boats, and go about on the river begging.

Tuberculosis, syphilis, and malaria.—I have not observed leprosy in tuberculosis or syphilitic cases. The leprous cachexia seems to be antagonistic to these two forms of disease. I am not prepared to say that there is no connection between leprosy and malaria, but I have not seen marked malarial diseases in leprous patients.

Vaccination.—No data exist by which an answer to the question, "Has leprosy increased with vaccination?" can be given.

Treatment.—No treatment is curative; spontaneous cures are said to take place, in which the disease is supposed to descend from the upper parts of the body, and gradually go out at the lower extremities. Palliative measures consist in giving the patient good sanitary surroundings, nutritious food, and removing as far as possible anxiety of mind. Arsenic as a tonic and alterative is the drug which I use most. Iron and other tonics may be useful. There is a species of snake which is considered by the Chinese very efficient in the cure of leprosy.

Extract from report by a member of the French Mission, Canton, November, 1894.

(Translated from the French.)

Physical features as at page 298; in addition we read, "The principal cultivation is rice, and the plains, covered with rice-fields, are under water during the summer. Sugar-cane is largely grown, and so are pistachio nuts, sweet potatoes, tobacco, millet, and indigo, chiefly on the higher sandy soil. The mulberry abounds only in the delta of the Canton (the Pearl) River. In these regions the population is very dense. The mountainous country is but little cultivated. Some rare plantations of tea are to be found, with stunted pines and coarse grass. Here the population is very insignificant.

Distribution.—Leprosy is most frequent in the humid plains. The Chinese declare that the provinces of Kwantung and Fokien are alone infected, on account of the heat and damp.

Heredity.—The Chinese do not doubt the effect of hereditary transmission. Nevertheless there are admittedly certain exceptions,—as, for example, when one of the parents only is contaminated. Leprosy tends to purify itself. Thus we have two old leper hospitals in Canton dating from the seventeenth century, which contained seven or eight hundred lepers; to-day there are only a few rare cases which spring up from time to time.

Contagion.—The Chinese admit that leprosy is contagious, especially during sexual intercourse, but even by external contact, and by the effluvia from the patient, is the disease considered communicable. Various methods of communication are reported from time to time. A missionary is stated to have been beaten with a stick maliciously smeared with the blood from a leper, and to have died subsequently of leprosy. The urine of children is used as a medicine in several ailments by the Chinese, and the urine of a child tainted with leprosy is stated to have been the means of infecting a healthy person.

Food.—Neither fish nor other food has been assigned as being the cause of leprosy. Damp and heat, emanations

from the soil, contagion, and hereditary transmission are held to be the principal causes. Nevertheless an individual the member of a tainted family must practise severe asceticism if he does not want to incur the risk of developing leprosy. Heated foods, particularly beef and chicken, are prohibited.

Segregation.—All large towns in this province have leper settlements somewhere in their outskirts. The Imperial purse grants an allowance which is paid at certain times of the year for the maintenance of the lepers ; and lepers who desire to enter one of these communities must pay a fixed sum to the head man. It has happened that when a case of leprosy has declared itself the parents, after having drugged the patient, burn him alive. Usually the leper is sent to a leper village, but the richer classes keep a leprous member of the family privately in their own homes.

Varieties.—The Chinese admit thirty-two kinds of leprosy, but the moist and dry are the two chief classes ; these practically correspond to the tubercular and anæsthetic types.

Treatment.—The best is a regular life, and to have no intimate connections with the outcasts of tropical countries, whose morality is proverbially very low.

Although the Chinese boast of being able to cure leprosy I do not believe in the efficacy of their remedies ; the evil remains, at least in a latent state, and any imprudence makes it break out afresh. They have certainly some remedies which retard and relieve the symptoms, but none which radically cure. They use datura stramonium, arsenic, sulphur, mercury, and a number of secret remedies.

The Tonquinese praise highly the Wang-nam, the bark of a tree which is found in the forests of Annam. The same drug is used in France for the treatment of several skin diseases.

The Leper Village, Canton.

The leper village is situated one and a half miles outside the east gate of the city. On the way thither lepers are met with, some begging, some pursuing their course city-wards to beseech alms.

In front of the village is a large pond surrounded by tall trees ; around these the inmates disport themselves, and engage in such useful pursuits as rope-making, straw-braid plaiting, and such like occupations. The community turned out to meet my party (my wife, a guide, and a student interpreter, Sun Yat Sen), and was surprised to find that we meant to enter.

A brick wall faced the village, and we entered the doorway to find a roughly paved lane with low houses, all of brick and lime. Many of the inmates could only summon strength to crawl to the door of their abode to gaze on the foreigners ; but the rest of the community, men, women, and children, accompanied us, and conducted us to what answered the purpose of a town hall or reception chamber. The utmost merriment was evident, children romping and calling on their playmates to look at us ; and their mothers stood round, most of them with a broad good-natured smile on their faces. Not all were lepers—not by any means. I believe not one half are lepers. The inhabitants say less than half of the 650, or 300 only, are accredited with leprosy. It seems that a village existed on the spot before the lepers were driven thither by the command of the Cantonese authorities. The village aboriginals refused to move, and further, they did not object to the lepers coming ; it increased their trade. Thus, with the usual divine nonchalance of the Chinese, they dwelt side by side with the lepers. Again, during the last big rebellion in China—the Tai Ping—several proscribed families sought refuge in the village, and the authorities either lost sight of them there, or did not care to follow them to their leprous den of hiding. This adds further testimony, if such were needed, to the statement that although the Chinese declare leprosy to be contagious, and so forth, they practically ignore the belief.

They made statements which refute all our notions of leprosy. They declared that not one of the non-leper residents ever contracted leprosy. This cannot be believed, but from what I saw personally many of the men and women had escaped. Non-leprous people there certainly were, and my audience informed me that the majority had gone out to their work. One woman, hale and hearty, I saw

who had had *three* leprous husbands; yet she was not a leper. Healthy children were seen at the breast of leprous mothers; boys and girls of eight and ten were romping about, healthy in every respect, whilst on others of the same age leprosy had laid its foul hand. This village life is in no sense segregation, it is merely a refuge; the leper inmates cohabit with the healthy; the leprous and non-leprous children play together; the adults sally forth to beg in the streets of Canton, and enter the shops to claim food. Perhaps the most interesting feature in the village was the fact that the head man, through whose fingers all the money passes, had been in the asylum in that function twenty-two years, the longest lived leper in the community. He was reputed to be a rich man; he was certainly well dressed in fur and silk. It was January, heavy clothing was requisite. He smoked a wonderfully decorated pipe, he wore jade ornaments,—in fact, gave evidence of being a man well off. His fingers, however, were fewer than they had been, his ears were cropped close, his left eye stared when his right was closed, and his face and neck bore signs of old leprous scars. Still he was fairly strong, and all this after being a leper for a quarter of a century. It shows what good food and clothing do for the leper; it is the key-note of all treatment. In 1873 Dr. Wong, the well-known Chinaman, who was educated in medical science in England, and practised in Canton, stated that there were two leper asylums near Canton, "one having about seven or eight hundred inhabitants, and the other over a thousand;" and adds, "the greater proportion of whom, however, are merely descendants of lepers, with little or no trace of the disease upon them."

At the present moment, November, 1894, there is but one village for lepers near Canton, a distinct proof of the decadence of the disease around Canton.

In addition to the lepers met with in the village from time immemorial, several hundred lepers dwell on the river in boats.

Report by Roderick J. J. MacDonald, M.D.Edin., Fatshan, near Canton, May 18th, 1894.

(Leprosy a scourge, probably increasing.)

Physical features.—Fatshan is distant from Canton only fourteen miles, and the physical features of the towns are practically similar. Fatshan is on a creek of the Pearl river, which is tidal up to and beyond the city. The plain is everywhere diligently cultivated. The population is very dense.

Distribution.—Leprosy is more common in the plain, but it is met with along the waterways extending into the hilly country in the north of the province as far as Shinkwan, to my certain knowledge.

Heredity.—Hereditary transmission is believed in. Some say leprosy dies out in the third generation, some at the fifth. I have not been able to learn whether they believe that the third generation secures immunity from the possibility of contracting leprosy or not.

Contagion.—Belief in the contagiousness of leprosy is proved by their action in driving lepers out of house and home, and refusing to live with them. In country districts the Chinese are more careful to insist on segregation than in the towns. The Chinese say leprosy is contracted by sexual intercourse, by continuous contact with lepers, and by "Fung Shui" (spiritual) influence.

Food.—Many kinds of food are mentioned as favouring the development of leprosy. Shrimps, mussels, dog, duck, wild fowl, beef, spirits, goose, &c., are all regarded with suspicion by tainted families. Handling manure (human), sleeping on an infected pillow, witchcraft, measles, smallpox, dead men's "breath," night dews, and teething are among the numerous alleged causes.

Segregation.—Lepers are segregated in villages and in leper boat communities. In Fatshan lepers are allowed to beg in the streets and handle food on the stalls. Anæsthetic leprosy being less evident is not subjected to segregation, and in fact nowhere is segregation sufficiently strict to be effective.

Allied diseases.—I cannot prove any connection between leprosy and any other disease.

Vaccination.—I think leprosy is on the increase with the increasing population of the country, and that vaccination is a slight factor in the increase. Lack of efficient segregation, however, accounts for most of it.

Treatment.—I know of no native specific. Lepers have a notion that eating the flesh of a dead child will cure them. Leper women believe they can get rid of the disease by having connection with a healthy man. All modern European remedies have proved unsatisfactory.

The District and Port of Swatow.

(Leprosy a scourge.)

The port of Swatow is situated at the mouth of the Han river, and serves as the place of embarkation for the enormous coolie trade of the densely populated regions of this part of the province of Kwantung. Next to Canton it is the port from which the majority of Chinese start on their voyage to southern fields of labour, in the Malay Peninsula, the French provinces of Indo-China, the Dutch settlements in Java and Sumatra, Borneo, and the islands of the Pacific generally. It is important, therefore, to be thoroughly well acquainted with the physical features of this region, as the district of Swatow is one of the two districts where leprosy is endemic, and from whence it is spread by the numerous emigrants.

Physical features (gathered from the reports of Dr. Cousland and Dr. Anna Scott).—The prefecture of Swatow in the province of Kwantung extends along the coast of China for a distance of 150 miles, and reaches inland about sixty miles. The elevation of the plain is only a few feet above sea level; inland the hills reach a height of some 5000 feet. The plain consists of the delta of rivers, and is wholly alluvial. Vegetable mould is almost unknown, and the soil requires constant manuring. The contents of cesspools are constantly used for this purpose. Every scrap of land that can be cultivated is most carefully utilised. Rice is the chief crop, but sugar-cane and sweet potatoes are extensively

grown. The population of the plain is very dense, but no correct estimate can be formed. The rainfall is similar to that of Hong Kong, and the seasons are the same (see Hong Kong). The cultivation of rice (paddy) necessitates irrigation, and the humidity of the district is no doubt largely affected thereby.

Dr. Cousland's Report.

Distribution of leprosy.—The Chinese are of opinion that leprosy is much more common on the plains, proportionately to the population, than on the hills.

Heredity.—Belief in heredity exists to some extent. A native before adopting a child is very chary about taking a child either of whose parents is a leper.

Contagion is not believed in so long as the leper is not actually offensive from ulcers or discharging sores.

Food.—No one food is assigned as a cause throughout the entire region, but it would seem as though each locality had its own ideas; *e. g.* in one place one must not give a child certain kinds of fish, grain, fowl, or flesh for four months after vaccination, measles, or smallpox, for fear of developing leprosy. There is no general agreement as to these articles; indeed, in one place the only kind of fish forbidden is the only kind allowed in another. Coarseness of texture seems to be the one thing to be avoided in fish.

Segregation.—Lepers are allowed to move about freely; retreats for lepers are not maintained now-a-days. Formerly segregation was, in all probability, observed, for there are still villages called leper settlements; the inhabitants, few of whom are lepers, are drawing a certain amount of rice from the public funds. They also possess prescriptions and secret concoctions for the treatment of leprosy.

Tuberculosis, syphilis, and malaria.—I have not observed any connection between leprosy and any of these diseases. Leprosy is not more common in malarious districts.

Vaccination.—The Chinese affirm that leprosy has increased within the last thirty years or so, but there is no evidence to show that vaccination has anything to do with it. Vaccination was introduced about forty years ago.

Whether the increase of leprosy is general or not it is difficult to say ; of the increase in some towns there is no doubt.

Treatment.—The best internal treatment is arsenic; patients at the hospital are given a month's supply of Asiatic pills. These consist of $\frac{1}{8}$ of a grain of Acid. Arseni. with black pepper, administered thrice daily. Many patients have taken these pills for a number of years with much benefit to their health.

In one town, twenty-five years ago, there were nineteen lepers ; four years ago there were said to be 390. In my chief assistant's town forty years ago there were no lepers met with ; now there are ten at least. The people say that leprosy was brought to the district by coolies coming back from Siam and Annam, where they had been resident for some years.

Dr. Anna Scott's Report.

Physical features.—See page 305.

Distribution.—On the hills the population is rather scanty, and leprosy is said to be more rare proportionately to the numbers than on the plains, where it is very rife.

Heredity.—The natives believe in hereditary transmission, but admit that the exceptions are numerous, and ask why it is the children of leprous parents so often escape the disease.

Contagion.—This is believed in to a certain extent only. Sleeping in the same bed, using the same towels, commodes, &c., are considered the means of infection. The Chinese do not, as a rule, fear living in the same house, sitting at the same table, or handling the same articles. They often buy food prepared by lepers, and have no fear of contagion. They also hire lepers to care for their children, and seemingly have no thought of danger.

Food.—The more ignorant class of natives assign as a cause of leprosy the eating of the Lin fish, the fighting cock, the laying hen, and the flesh of geese. The better class say food has nothing to do with it.

Segregation.—To a very limited extent is segregation

observed. I know of only two or three places where a dozen or so of lepers are separated from the people. The manner of segregation is very imperfect, the lepers being allowed to make purchases and sell their products at the common stores and vegetable stalls.

Tuberculosis, syphilis, and malaria.—I have thought I could trace a connection between leprosy and tuberculosis. The children of lepers are often consumptives.

Vaccination.—I answer a most emphatic "yes" to this question. The increase of leprosy among children is frequently remarked upon by our (mission) people, and I have been forced to the conclusion that the vaccination from arm to arm, practised by a class of Chinese (quack) doctors, has caused this very marked increase.

Treatment.—Arsenic and iodide of potassium internally, Gurjun oil and salicylic ointment externally have seemed to relieve and retard development. I know of no remedy, either foreign or native, that produces permanent good. The native drug most in use in this neighbourhood is the mugwort, and it is prepared from the leaves of *Artemisia chinensis*. This woolly substance is burnt into the tendons of lepers and the children of lepers, with the purpose of preventing the contractions of tendons.

Macau—Part of Kwantung Province.

(Leper villages.)

The little Portuguese settlement of Macau, the oldest European settlement in China, having been occupied since the year 1557, is situated on a rocky granite peninsula at the entrance to the Canton River.

I visited the leper establishment of Macau in January, 1891, and forwarded a report to the National Leprosy Fund, but have heard nothing of it since.

1. In the settlement of Macau, in connection with one of the churches, a small leper hospital is maintained for Portuguese only. Here never more than three or four inmates have been secluded at a time, and this may be

considered to represent the actual number of Portuguese afflicted with the disease. The entire Portuguese population is estimated at 4476, and taking the maximum number of lepers as four, the proportion would be just under one per 1000.

This must be held to be a very small number when one considers that the Portuguese settlers are largely Mongoloid in feature, and yellow-skinned through intermarriage with the Chinese. They dress in European style, dwell for the most part in European houses, but the poorer classes live on almost the same food as the Chinese, namely, pork and rice.

2. The male asylum for Chinese lepers is situated on an island some three miles by sea from Macau. The village is out of the road of all sea traffic, and is admirably isolated. A shelving, shallow, sandy shore renders landing in anything but a skiff impossible, and generally necessitates a long wade. Hence the very character of the coast acts as a natural barrier against leper deserters.

The village consists of some twenty huts of bamboo and palm leaves, snugly pitched on flat ground, surrounded by a girdle of low hills. These, again, serve as a prison wall, as the lepers say they have not strength to scale the heights. That they are not neglected by the clergy I had personal proof, for a service was being conducted by a native (leper) pastor during my visit. The bishop, or one of the priests, from Macau visits the settlement once a month to celebrate mass, and supplies them with stores, and such luxuries as tobacco, &c.

The lepers in January, 1891, varied in age from ten to sixty-eight years, the total number being forty. This is the nearest attempt at complete isolation I have seen, and unless the leper is confined in a high-walled asylum it is the nearest approach to perfect isolation one could obtain from the "village" form of seclusion.

A plot of ground testified to the meagre powers of cultivation, owing, the lepers say, to physical weakness on their part.

Isolation may be desirable, nay, imperative, but it is a depressing scene never to be forgotten, and a more pitiable picture than that presented by the few lepers who could

walk the hundred yards or so to see my boat leave their shore has never been painted.

3. The female village is also upon an island, but separated both from Macau and the male village island by a strip of sea some three miles in width.

Here the inmates are isolated by the natural surroundings, and housed in a well-built stone building. All necessary steps are taken by the Portuguese authorities to promote their comfort. The only danger to which the inmates are exposed is a raid of thieves, who do not hesitate to break into the asylum and steal blankets off the patients. This is especially the case at the beginning of winter, when blankets are served out. It illustrates to what depths a Chinese thief will sink, and it also bears witness to the fact of how little the Chinese fear contact with the leper or his clothing.

The separation of the sexes has only been enforced since 1885, before which time they dwelt together, but the increase in population demanded intervention.

Dr. Silva's statement as to numbers and admissions is interesting and very useful. Thirty-nine inmates were in the male village when he sent in his record, and the average annual admittance is fifteen.

Taking forty, the number of inmates at the time of my visit, as the average, it gives as the mean life of a leper (after admission) as fifteen to forty, or an average of two years and eight months. The lepers sent into the asylum are all far advanced in the disease before admission.

The number of females was twenty-five, with an average admission of six, a statement which suggests several queries.

(*a*) Do females live longer than male lepers after being attacked?

(*b*) Are female lepers secluded at an earlier stage of the disease than males?

(*c*) Is the proportion of female to male lepers always so small?

(*d*) Are the habitations and food of a better description in the female than in the male village?

These questions will be discussed in the sequel.

The Leper Village.

Answers to questions by Dr. Gomes da Silva, Colonial Surgeon.

Questions.	*Answers.*
1. What is the average number of males in the settlement ?	1. At present there exist thirty-nine. The annual average of admission is fifteen.
2. What is the average number of females in the settlement ?	2. At present there exist twenty-five. The annual average of admission is five.
3. Does the place where the lepers are settled belong to China or to Portugal ?	3. The territory is in dispute.
4. How are the lepers maintained ?	4. A boat sent weekly by the Portuguese Government to the establishment, carries food for every patient.
5. Is money sent ?	5. No.
6. Is food and clothing sent ?	6. Yes.
7. What is the average cost ?	7. About $20 (twenty dollars, or £2) per head per annum.

Remarks.—Before 1885 the patients, male and female, were dwelling together, but the population beginning to increase, not only by addition of admitted patients, but also by children born to the settled ones, the Government was obliged to interfere and separate the sexes. Since then males stay at D. Joas Island, where they live in matshed dwellings. Females inhabit a stone building on the island of Colowan, some three miles away.

Macau (Kwantung Province).

Letter from Mr. E. P. C. Werner, H.B.M. Vice-Consul, Macau.

(Leprosy prevalent ; segregation practised. See Leper Village.)

Macau, a rocky granite peninsula at the mouth of the Canton river, belongs to Portugal. The Portuguese, now a half-caste people to the number of some 5000, represent the European element of the 70,000 occupants. The island is undulating, here and there low-lying, with cultivation of vegetables and rice. Average summer temp. 84°, winter 66°.

Distribution.—The Chinese lepers met with in Macao are sent to the leper asylums, one for males and one for females, on separate islands off the littoral of Macau. There they are maintained in food and clothing by the Portuguese authorities. There is a home for Portuguese lepers in the city of Macau under the care of the R. C. Mission. Two or three Portuguese lepers usually occupy the home.

Heredity.—The natives believe that the disease is inherited for three generations only.

Contagion.—The Chinese do not fear contagion, but owing to the belief in the presence of numerous germs (called worms by the Chinese) in the lepers' surroundings, infection is possible under certain conditions, *e. g.* during assumption of the squatting attitude. Sexual intercourse will transmit the disease.

Food.—No modern food has acted as a cause. Leprosy originated in ancient times, and present cases have all been transmitted from previous ones.

Segregation.—Separation asylums and separation of the sexes rigidly maintained. This endeavour to segregate lepers in Macau is the most complete attempt of the kind in China.

Tuberculosis, syphilis, and malaria.—There is no connection of leprosy with any of these diseases according to Chinese beliefs ; they consider all these as new diseases, but leprosy is from ancient times.

Vaccination.—No information as to the connection of leprosy with the use of vaccine matter.

Treatment.—The flesh of the Hung-she, a very rare snake, dissolved in strong wine, and taken internally, is said to be a cure for the disease.

Observations.—(1) The number of lepers in Macau it is well-nigh impossible to estimate, as their numbers are continually being altered owing to the free intercourse with China. In the leper asylums during my (the writer's) visit in 1891 there were thirty-nine males and twenty-five females. This, however, cannot be used as an estimate of the relative prevalence of leprosy to the healthy population, as lepers are beggars and migrate freely, and some come to Macau when very feeble, on purpose to get sent to the asylum.

(2) The lower classes of the Portuguese mingle freely with the Chinese in every-day life, and their habits of life are almost identical with the Chinese. The whole class are more Mongolian than European in appearance.

Letter from Dr. Gomes da Silva, Colonial Surgeon, October, 1894 ; extracts.

The climate of Macau is considered to be healthy ; instances of longevity are frequent. The highest land in the island does not exceed 400 feet. Rice is cultivated in the plains outside the city. Formerly large numbers of Chinese lepers were allowed to beg in the streets of the city, but now they are all removed to an island which is under the Portuguese jurisdiction, or are sent back to their native places. Many Chinese mendicants affected with the disease live in the neighbourhood of Macau. Cases of leprosy are sometimes seen amongst the Portuguese.

The summer ailments of Macau are malarial fever, diarrhœa, dysentery, and hepatic troubles ; during the winter months the ailments of more temperate climates are met with. The medium temperature of Macau is 73° F., the maximum and minimum being respectively 96° F. and 42° F.

The climate is very damp and foggy during certain seasons of the year, the hygrometer marking sometimes 100°.

Island of Hainan (Part of Kwantung Province).

Extracts from report of E. H. Parker, Esq., H.B.M.'s Consul, Hoihow, Island of Hainan, China.

Physical features.—Hainan is an island off the southern coast of China, in lat. 18° N., having Hoihow as its principal seaport. Inland it is mountainous, but around Hoihow the country is a rather flat rolling plain. The town is on all sides subject to salt-water influence. Soil light and of the nature of sandstone. Cultivation everywhere ; graves exceedingly numerous ; population thickly spread over the plain. Good water in the town rare, and must be brought in from the country. The Chinese inhabit only the northern and western shores of this island. The aboriginal tribes are of two classes, the semi-civilised—the Shu-li ; and the wild—the Shong-li. The Chinese settlers came from the province of Kwantung, where leprosy is rife. The aboriginals are allied if not identical with the Laos of Northern Siam, a mixed Caucasian and Mongolian race, at one time of great prominence. So far as is known the Chinese alone are leprous, the aboriginals never mixing by marriage with the Chinese on the coasts.

Heredity. — This is believed in universally. Sometimes the disease does not manifest itself, but eating corrupt food, especially fowls, and consorting to excess with even healthy women, are said to "bring it out."

Contagion.—The Chinese believe leprosy to be contagious only by having connection with a leper. Leprous women think they can "sell leprosy," *i. e.* get rid of it, when slightly attacked, by getting a healthy man to have connection with them.

Food.—No food is considered to be an initial cause ; bad food only serves to "draw it out."

Segregation.—It is observed strictly for sleeping purposes. Lepers are made to sleep in villages apart, or if in towns they have to sleep in the streets. Further, it is not believed that mere sleeping together will contaminate ; there must be contact, as by sexual intercourse, kissing, or contact of

parts naturally or unnaturally. Moreover lepers are free to beg and to hawk goods during the day.

Vaccination.— I have never heard it suggested that vaccination in any way affects the spread of leprosy.

Hong Kong.

See report by author in 1890, appendix.

Island of Formosa.

The "continental" island called Formosa (The Beautiful) by the Portuguese, and Tai-wan (Great Bay) by the Chinese, is 200 miles long, and varies in breadth from 20 to 80 miles. Through the centre runs a fine mountain range, culminating in Mount Sylvia, 11,300 feet high. The "steep-to" side is the eastern, where the coast often presents magnificent precipices. To the west the slope is more gradual, and leads to a fine plain, as shown on the map. Its area is about half that of Ireland; the Tropic of Cancer cuts its southern portion, and it is separated from the coast of Kwantung and Fokien by the Formosa Channel, which has an average width of 100 miles.

Of the geology little is known, but the usual granitic and volcanic rocks, archæan beds, and coal measures of the adjacent mainland are known to extend into Formosa.

It is even more tropical in its fauna and flora than the adjoining mainland, and the rainfall on the east side is excessive, being 74 inches at Tamsui in the north, and 95 at South Cape in the south. Otherwise the remarks upon the climate of Kwantung apply very well to it, with one exception. Along the east coast of Formosa the winter is the wet season, especially where the mountains are so high that the strong north-east wind is forced to ascend quickly. In China, on the other hand, July is the wettest month of the year.

The inhabitants belong to two races, the Chinese and the aboriginal Igorotes. The Chinese are settled on the low lands, where they have been for centuries; while the mountains and the east coast still remain to the natives, who live in deadly feud with the Chinese.

[Since this was written in 1894, Formosa passed into the hands of Japanese in 1896.]

The aborigines are of Malay stock, and still speak a dialect of the Malay language. They are distinguished by the Chinese as the Cheng Fan, or savages, and the Shu Fan, Pe-po Fan, or Pe-po Hoans, who are half "civilised," wear the Chinese dress, and alone form the bond of intercourse between the Chinese and the wild Cheng Fan. They dwell along the foot-hills on the western side of the island. The Shu Fan keep to their mountain fastnesses, and very little is known of them.

The only Chinese who have shown courage enough to cope with the aborigines are the hardy Hakkas, who of late years have been interposed between their less warlike compatriots and the daring natives, and have proved themselves a resolute foe.

The Chinese in Formosa number about 2,500,000 ; the amount of the aboriginal population is unknown.

We have in Formosa the spectacle of the Chinese, chiefly from the cradle of leprosy, face to face with a people of entirely different race and habits, and it is interesting to try and trace the spread of leprosy under such conditions.

Dr. Angear's letter from North Formosa brings to light the fact that leprosy was carried thither, as to so many other countries, by the Chinese. He states that the cradle of leprosy in Formosa is on the west coast, at a point where Chinese from Fokien would naturally land.

I was very anxious to establish, as a fact, whether or no the aborigines had leprosy in their midst ; but except for Dr. Angear's statement that it is not known among the Pe-po Hoans, the semi-civilised natives, I have little else to go upon. Neither Dr. Myers nor Dr. Cairns, whom I interviewed on the subject, has any data to give. Surgeon-Major James, A.M.S., who travelled some distance into the interior from the south, observed no lepers even amongst the beggars.

Now the "civilised" aborigines would be more likely to contract leprosy than their wild brethren, seeing that they must have mingled with the Chinese to acquire their mode of culture. If they are free from leprosy after such exposure, it might reasonably be inferred that their small suscep-

tibility stands in good stead as a factor in the attempt to prove that leprosy is unknown among the savage aborigines. Such I believe to be the case, and though the evidence might be stronger, we may fairly look upon Formosa as a place to which leprosy has been carried by the Chinese, but that the enmity between the races has forbidden intercourse, thereby saving the aborigines from the curse of leprous infection.

Communications.

1. Dr. Angear, writing from Tamsui, North Formosa, November, 1894, reports:

"Leprosy does exist with us amongst the natives (Chinese) who reside along the west coast. In fact, almost every case comes to hospital from a place some ten miles from here; the disease is endemic in this quarter. The locality consists of a large fertile plain, populated by Chinese, and but few of the inhabitants migrate to other parts of the island. The region was one of the first places occupied by the Chinese, now some three hundred years ago, when they descended on the Formosan coast after the expulsion of the Dutch. The immigrants came from the mainland opposite, that is the province of Fokien. Among the Pe-po Hoans (civilised aborigines) leprosy is not known to exist."

2. Dr. Meyer, writing from Takow, South Formosa, October, 1894, reports:

"Leprosy does occur in South Formosa, but is comparatively very rare. Both varieties are met with; in the tubercular I have found iodoform in pills have a most marked and beneficial effect; and so has Phillipps of Jamaica, whose attention I called to it, and he reported to the B.M.A. branch in most enthusiastic terms."

3. Dr. Murray Cairns, of Tainanfu, South Formosa, January, 1895, sends a full report.

Physical features.—Seaboard. Soil very sandy. Most of land under cultivation (rice, paddy). Rainfall the usual tropical condition. Population dense in cities; large rural population.

Distribution.—The hill population being aboriginal, opportunities of observation have been almost *nil.*

Heredity.—I have not heard any expression of belief in heredity.

Contagion.—The natives may believe in it, but judging by the freedom of social intercourse between the affected and unaffected, the belief would not appear to give rise to any special anxiety.

Food.—No kind of food is assigned as a cause.

Segregation.—No instance of segregation has come under my observation.

Vaccination.—Vaccination is extremely popular everywhere, which I take to be sufficient evidence that the Chinese, who well understand the evils of leprosy, do not note any increase of leprosy with the use of vaccination.

Treatment.—Iodoform internally I have tried, and Gurjun oil, but cannot speak confidently as to results.

Korea.

(Leprosy in south ; diminishes towards north. Not a great scourge. Koreans possess a Caucasian strain.)

The mountainous peninsula of Korea forms the eastern boundary of the Yellow Sea. Down the centre of the peninsula runs a chain of high mountains, descending abruptly to the east, and more gently to the west. In this they are like those of Shin-king (see Manchuria), which they probably agree with in structure. They average over 5000 feet in height.

Except along the valley of the Yalu river, Korea has practically no stretch of low lands. Numerous streams flow to the west and south ; on the east there are many small mountain rivulets. Korea stretches from 35° to 43° N. lat.

The climate in summer is hot and moist ; the winters, especially in the north, are of great severity, and the rainfall in 1882 was thirty-four inches at Yuensan in the north-east, forty-seven at Fusan on the south-east, and thirty at Chemulpo on the west.

The natives belong to the Mongolic stock, with some obscure Caucasic affinities, and the language is intermediate between Mongolo-Tartar and Japanese, written with a true

alphabet of twenty-seven letters, though the Chinese character has of late been usurping the native and more convenient method.

The population is estimated at about 9,000,000. Many Chinese and Japanese are settled in the land, and between native and foreign corruption the country has fallen into a pitiable condition. The Koreans are possibly the laziest people in Asia, and thus are in violent contrast with their Chinese and Japanese neighbours.

They have a national dress, do not shave the forehead or wear the queue, and they are taller even than the Northern Chinese. But for their inveterate laziness—they seem to be born tired—they would be a fine race.

Laziness and dirt go together, and if these can breed leprosy the Korean ought to be contaminated. Leprosy is most prevalent in the south, and dies away towards the north, where Dr. Hardie reports "no cases;" but Dr. McGill, who lives near the same town, has seen five or six cases, but does not record whether they were seen by him in Gensan or elsewhere in Korea.

It is, however, plain that leprosy disappears as one travels northwards in Korea, and this is in harmony with the evidence from surrounding districts.

To the north of the peninsula lie Manchuria and the maritime provinces of Eastern Siberia, whence no lepers are recorded. Southward the peninsula juts into the Yellow Sea, and its shores are in the highway between Japan and Shantung. Both these countries are leprous, especially Japan; and if there is any truth in the suggestion that leprosy follows a maritime highway, then ought Southern Korea to be infected. This is in accordance with fact, but leprosy is so capricious in its distribution that it may only be a coincidence.

Careless in everything, the Korean does not attempt segregation, but leaves his lepers, as he leaves his crops, to increase as they may.

Notes taken down at a personal interview with Dr. Tatashima, Fusan, (South-east) Korea, May 25th, 1894.

(Leprosy met with.)

Leprosy is met with to a considerable extent in and around the town of Fusan ; during ten months Dr. Tatashima had met with twenty cases.

Heredity.—The Koreans believe leprosy to be hereditary. The observer stated that he was a firm believer in hereditary transmission, and quoted a case where a father and mother were lepers, and then two children became so. This he regards as a proof of heredity, but on interrogation it came out that the children dwelt with the parents, and showed no signs of leprosy until they were six years of age. This only proves contagion, not heredity.

Food.—Dr. Tatashima does not believe in the salt-fish theory ; such a conclusion, however, seems scarcely justifiable, as the staple nitrogenous diet of the Koreans and the Japanese themselves is salt fish.

Vaccination.—According to the statement of this observer, the Koreans of the south did not practise vaccination or inoculation (this is not quite correct) ; consequently, he added, smallpox is plentiful.

Segregation.—There are no hospitals or villages for lepers.

Notes taken down at a personal interview with Dr. Hardie, Gensan (Yuen-san), Korea, May 27th, 1894.

(No cases seen during a residence of fifteen months.)

Gensan is a seaport not far south of the northern frontier of Eastern Korea. Here Dr. Hardie reports "no cases" during a residence of fifteen months. This contrasts favourably with his statements concerning the other towns of Korea in which he has resided. When in Seoul he saw one case, but he was only there four months. In Fusan he met with twenty cases in a stay of two years.

Leprosy prevails in these towns in the following order, according to Dr. Hardie :—Fusan, 20 ; Seoul, 1 ; Gensan, 0 ;

and this proportion, 20 : 1 : 0, gives a fair idea of the distribution of leprosy in Korea, which may be expressed geographically—South Korea, 20; Central Korea, 1; North Korea, 0.

Contagion.—Lepers go freely about in the south; there are no leper villages.

Food.—Millet, wheat, and fish.

Segregation.—Not observed.

Vaccination.—Vaccination and inoculation are practised to some extent.

Leprosy seems to have made as little way in North Korea, according to Dr. Hardie, who is an American missionary, as has Christianity.

Extracts from combined report by J. F. Oiesen, Esq., Imperial Maritime Customs, and H. B. McGill, M.D., Gensan (Yuen-san), Korea, June 26th, 1894.

(Cases of leprosy met with in the north of Korea are importations.)

The main part of the population live near the sea-coast; the interior is but sparsely peopled. Houses are of mud, and of the poorest, most filthy, and insanitary description. Heavy rainfall from June to September. Spring and autumn very dry; a good deal of snow in winter.

Heredity is believed in, *contagion* denied.

Food is not assigned as a cause. Leprosy is held to be a punishment sent by the gods, or rather the devils, for transgressions, such as disturbing a grave or burying parents in an unfavourable place. Lepers may mix freely with the people; there is no *segregation* practised.

Extract from report of C. C. Vinton, M.D., Seoul, Korea, June 25th, 1894.

(Leprosy not often met with in the capital.)

Physical features.—Hill and valley is the topography of Korea. The valleys are fertile, and the population occupies the low levels. The humidity of the country in summer is intense.

Distribution.—Leprosy is pretty well confined to the plain-dwellers in the southern provinces.

Heredity is not believed in.

Contagion.—Only the more intelligent of the natives and those who have had touch with foreigners seem to regard leprosy as contagious.

Food.—No species of food has ever been regarded by the Koreans around Seoul as a cause of leprosy.

Segregation is not observed. A member of a family, particularly a slave, is sometimes turned out to beg his way from village to village.

I have observed no connection between leprosy and any other disease.

Vaccination is only just beginning to be known in Korea.

Treatment.—Neither native nor foreign drugs have any repute here as specifics.

B.—COCHIN CHINA.

(Leprosy amongst the Annamites widely spread. Segregation extensively practised.)

So many changes have taken place in this part of the world that the term Cochin China has almost ceased to be a living geographical term. As we shall use it, Cochin China is to be understood as the eastern part of that rounded peninsula which has Siam and Lower Burmah on the west. All this part is under French influence, and it includes the old states of Tonkin, Annam, and Cambodia.

It is a southern projection of China from the Tibetan plateau, and through it flows the grand river Mekong.

The climate is tropical, and much of the country is covered with dense jungle.

The inhabitants of the northern regions, Tonkin and Annam, belong to the Giao-shan group of the Mongolic stock, and (especially the Annamese) are distinctly lower in culture than the Chinese. In Cambodia we come across a very curious race, forming several tribes, of distinctly Caucasic type.

The question really asked by the National Leprosy Fund is how far the disease affects Cochin China. I take it Cochin China is considered to represent the French possessions, stretching from Tonkin on the north to Cambodia on the south—an enormous stretch of country, including people far removed in race and habits from the Chinese.

Speaking generally, we have in the north a great and fertile alluvial plain, highly cultivated, through which flows numerous rivers, of which the Songkoi is the largest. In the south a similar plain forms the greater part of Lower Cochin, the Mekong being the largest of many rivers. Between these plains, and forming the chief portion of Annam are hills and mountains which also lap round the

plains. All kinds of rocks, from Palæozoic to Tertiary, with fine coal-fields, are found in the area.

Tonkin.—This country, the northern plain, is a land of damp paddy-fields and rank vegetation. The replies from Haiphong, the capital, are very interesting, but unfortunately throw no light upon leprosy there. Dr. Touren recounts his experiences in New Caledonia, in the Pacific, and the Guadaloup Islands in the West Indies, and much of this information I have been able to utilise.

However, from private inquiries among travellers and priests, I know leprosy to be prevalent to a considerable extent. Segregation is observed, as in the neighbouring Chinese province of Kwantung to the north, and in the district of Saigon to the south.

The fact that a people segregate lepers is sufficient proof that leprosy is rife, and that the disease is so prevalent that it calls for stringent dealings. This is in marked contrast with the leprosy in Java and Sumatra. I do not mean to say that the Cantonese or the Annamites are stringent as regards confinement to the leper settlement, but any attempt at segregation even emphasises the fact of the existence of widespread infection.

Cochin China.—The term Cochin China has no more to do with China than it has with the Indian town of Cochin; it is from *Kwe-Chen-Ching*, the kingdom of Chen-Ching. Its population consists of—

Annamese	1,710,000
Cambojans	110,000
Chinese	60,000
Chams and Malays . . .	10,000
Hill-men and others . .	10,000
	1,020,000

To Mr. Tremlett, of the British Consulate, I am indebted for the communication from this district. He had much difficulty in obtaining the required information, but at last succeeded in getting Dr. Pineau to write the valuable letter I now present. It will be seen that the communication is very general, and speaks of the Annamites as a whole.

Isolation is practised here also, and in some places rigorous measures are taken in dealing with lepers. This is sufficient to establish the extreme prevalence of lepers, and from what I gather leprosy is perhaps as prevalent amongst the dwellers of the Siam-Cochin-China group of countries as in the province of Kwantung itself.

The country reported upon is marshy and damp, consisting of paddy-fields; and fits well with the Chinese belief that damp and heat are the invariable concomitants of leprosy. This may be and probably is merely a coincidence. Still Kwantung and Fokien certainly have these features in common with Cochin.

The Annamites declare that leper parents always give birth to leper children, although, on the other hand, the malady does not declare itself before the eighth, tenth, or even twentieth year. Here, again, disbelievers in heredity find the loophole for debate, and declare that this is no true example of heredity, but a mere infection by prolonged dwelling under the same roof.

In conclusion it may be stated that—

1. Leprosy is deeply rooted and widely spread among the Annamites.

2. Segregation is extensively, and in some instances rigorously, practised.

3. Heredity is believed in, although the proof is not conclusive.

4. The climate, soil, crops, and natural features are similar to those met with in the Kwantung province.

Report by C. F. Tremlett, Esq., H.B.M.'s Consul, Saigon, July, 1894.

(Mr. Tremlett obtained the valuable reports from two French doctors.)

Physical features.—Cochin China is entirely flat, consisting, indeed, of paddy (rice) fields, except that part of the coast north from Cape St. James, which is mountainous, and the higher lands near the frontier of Cambodia. Saigon itself is forty-two miles from the sea. The soil is marshy

throughout the plains; the elevated parts are of all kinds—sandy, volcanic, &c.

The greater part of the country is under cultivation for paddy (rice). On the shores of the Gulf of Siam pepper flourishes fairly well, but of other products there is little.

Cochin China covers 1361 square miles, and the population is about two millions.

There are no publications upon leprosy in this country. The disease is essentially similar to that met with in other parts.

Its spread seems to be slower here than at Réunion, for instance. Europeans are rarely attacked.

Food.—Fish or other food as a cause of leprosy is absolutely unknown.

Treatment.—Chaulmoogra oil, externally and internally, is a common remedy. Arsenic seems to do good.

RÉPUBLIQUE FRANÇAISE.

Liberté, Égalité, Fraternité.

Institut de Microbiologie et de Vaccine de Saïgon.

Notes sur la Lèpre en Cochinchine.

La lèpre est également répandue chez les habitants des plaines et des montagnes, ou n'a pas signalé de différence. Les indigènes pensent qu'elle est transmissible par hérédité. Les parents lépreux donnent toujours naissance à des enfants lépreux. La maladie se déclare souvent plusieurs années après la naissance, car elle évolue très lentement. Des enfants en puissance de lèpre pouvent ne présenté des signes appréciables de cette affection que vers l'âge de huit, dix ans, et mêmes vingt ans.

Les Annamites considèrent la lèpre comme très contagieuse d'après eux on peut la contracter par et simple contact par cohabitation. L'Annamite lépreux ne se marie pas et si la lèpre se déclare après le mariage il ne partage pas le lit de sa femme de peur de lui donner la maladie. Les lépreux sont isolés dans les villages; ils habitent des cases separées

des autres, mais prennent part à tous les travaux corvées comme s'ils n'étaient pas malade.

Dans *certains régions* cependant, ils sont tenus à l'écart d'une façon très rigoureuse. Les cases et les meubles, nattes vêtements qui leur ont servi sont brulés. Ils doivent se tenir en dehors des routes fréquentées et suivre des chemins spéciaux. Ils ne peuvent pas passer sur les grandes voies de communication.

Le poisson n'a pas d'influence sur la lèpre, disent ils mais la viande de bœuf est souvent reconnue belonpeux comme cause de la maladie. Les lépreux qui mangent de la viande de bœuf ont aussitot après des démangeaisons violentes sur le corps, surtout le bras, aussi les lépreux n'en mangent pas.

Bien puqil soit *probable* que la lèpre, la tubercule, et la syphilis ait une action réciproque l'une sur l'autre, je n'ai pas de faits d'observation à ce sujet. Les Annamites n'ont pas donner aucun détail à ce sujet.

Tous ces renseignements sont d'origine Annamite.

Saïgon ; 12 *Juillet*, 1894.

Dr. J. Pineau.

(*Translation.*)

Saigon.

Notes on Leprosy in Cochin China.

Leprosy is found as much among those people living in the hills as on the plains, and no difference is observable. The inhabitants think it is transmissible by heredity. Leper parents always give birth to leper children. The malady declares itself often several years after birth, as the disease develops very slowly. Children predisposed to leprosy would not show signs of the disease before the ages of eight, ten, and even twenty years. The Annamites think that leprosy is very contagious, and could be contracted by simple contact, even by cohabitation. The Annamite leper does not marry, but if leprosy declares itself after marriage the husband avoids his wife's bed for fear of giving her the disease. Lepers are isolated in the villages, they live in

separate localities from one another, but they take part in all ordinary labour as if they were not diseased.

In certain places, however, they are segregated very rigorously. Huts, furniture, mats and clothes are burnt. They are compelled to keep away from frequented roads and to follow special paths. They are not allowed to go on the high roads of communication. Fish has no influence on leprosy, so they say, but beef is often considered (*belonpeux*) a cause of the disease. Lepers who eat the flesh of beef are immediately afterwards seized with violent irritation of the body, especially on the arms; therefore lepers avoid it.

Although it is very probable that leprosy, tuberculosis, and syphilis have a reciprocated action one on the other, I have not made any observations on the subject. The Annamites have no information to give on the subject.

All this information originates from Annamite sources.

SIAM.

(Leprosy rife in parts ; Chinese chief sufferers ; no leper establishments in Southern Siam.)

Siam forms the greater part of the obtuse peninsula between Tonkin and Burmah. It is physically an extension of the southern part of the high plateau of Eastern Asia, where it breaks up into a remarkable series of parallel mountain ranges, each with its own river.

The magnificent river, the Mekong, flows through the country, and forms large alluvial plains reaching into Cambodia, which is practically its delta.

Geologically the country is like the Malay peninsula ; climatologically it is like the interior of South China, and is distinctly continental.

The Siamese proper belong to the Mongolic stock, but there are said to be tribes of Indonesian origin in the interior, of whom little is known. In Siam, curiously, Buddhism maintains a firm hold, probably a relic of the lost civilisation of Cambodia.

In Siam leprosy prevails to an extent which in a European country would be considered alarming. Every hamlet has its leper, and every village and town has its leper quarter. This is the information supplied by Dr. Cheek, who for ten years took careful notes in connection with this subject whilst travelling throughout the length and breadth of Siam.

The region reported upon by Dr. Cheek is in the heart of the country, a district in the northern part of Siam wedged in between Burmah and Annam. The maps place Chiang Mai in the Shan country, and represent it as the capital of this part of the country. It is difficult to obtain information from a place so out of the way, and it is owing to the

author meeting Dr. Cheek in Hong Kong that so much valuable information has been obtained. It would seem that at present segregation is observed in Siam, but only after the fashion obtaining in the leper villages in China. The leper throughout Siam is met with in the streets begging, and the idea seems to be rather to provide a shelter than an isolated asylum.

Abstracted from Official Reports.

I. *Occurrence.*—Chiefly among the Chinese.
II. *Age.*—Not stated.
III. *Race.*—Chiefly among Chinese.
IV. *Conditions.*—Not stated.
V. *Heredity.*—Siamese and Chinese say *yes.*
VI. *Disease.*—Not stated.
VII. *Contagion.*—Siamese and Chinese say *no.*
VIII. *Segregation.*—None; but certain priests attend to the lepers, and allow them to live on the premises of the temples.
IX. *Establishments.*—None.
X. *Number maintained by public.*—None.
XI. *Increase.*—Not answered.
XII. *Treatment.*—Not answered.
Authority.—Consul Kurtzhalss.

Report by Dr. Cheek.

Distribution.—I have met with no case of leprosy except among the inhabitants of the plains.

Heredity.—The natives believe in hereditary transmission.

Contagion.—Leprosy is believed by the natives to be contagious.

Food.—The natives do not attribute the disease to any particular diet. The diet of the natives is principally vegetable; they consume a considerable quantity of fish, usually dried, and also a preparation of fish in an advanced stage of decomposition. Their meat diet is principally pork. Beef is eaten to some extent, and is preferred pretty fairly rotten. The flesh of animals dead from anthrax is eaten.

Segregation.—Segregation is observed. The lepers live in a village about thirty miles south of the capital on the main river; they come periodically to the city for alms, and in fact considerable numbers of them are in the city daily, going from house to house begging.

Tuberculosis, syphilis, and malaria.—I have not observed any particular connection between leprosy and the above-mentioned diseases. The people are remarkably free from tuberculosis and syphilitic diseases. During a practice of ten years I met with only two cases of syphilis, both secondary and imported, one from Moulmein and one from Bangkok.

Vaccination.—No increase of leprosy attributed to vaccination.

Treatment.—There are no reputed native drugs. Arsenic, citrate of iron, and quinine seem to alleviate symptoms for a time.

C.—MALAY PENINSULA.

STRAITS SETTLEMENTS.

(Leprosy is rife. Chinese are the chief sufferers. Several aboriginal tribes are non-leprous. Chinese by some considered to have introduced leprosy.)

The Malay Peninsula, of which the Straits Settlements form the southern portion, comes within that remarkable zone of equable temperature which lies about the equator.

This equatorial belt possesses well-defined characteristics, unknown elsewhere. It includes roughly all the region within 12° of the equator, and is marked by a wonderful uniformity of temperature by day and night, as well as throughout the year. The greatest heat seldom exceeds 90° or 91°, and rarely falls below 74°. The maximum may be taken at 95°, and the minimum at 68°. The usual daily range is only 11°.

This remarkable uniformity is brought about by several causes. *First,* the days and nights being pretty equal in length throughout the year, there is no excess of night to cool the soil by radiation. Hence the soil is maintained at a uniformly high temperature. Thus, whereas the soil in England attains the mean annual temperature at a depth of about forty feet from the surface, in this equatorial region this line is reached at about five feet; and whereas the temperature is only 50° in the former case, it is 80° in the latter. The soil is, therefore, maintained at a high temperature day and night throughout the year. Similarly, the waters which lave the shores are heated to the same high temperature.

Second, the aqueous vapour in the atmosphere helps to maintain the high temperature; for though the degree of

humidity is not greater than in England, the quantity is much more, averaging about five times as much.

Third, the uniform high temperature is maintained by the large amount of heat liberated during the condensation of aqueous vapour in the form of rain and dew.

The rainfall is excessive, averaging about eighty inches. The whole belt is practically a forest girdle round the earth; and across these hot, damp forests no typhoons or great storms of any kind sweep to stir and vivify the air, for it is a region of almost perpetual calm.

This equatorial region is, therefore, in marked contrast to the tropical region of which Kwantung forms a part. There we have fiercer summer heat, cool winters, well-marked rainy seasons, periods of great humidity and of parching drought, and the terrible typhoons keep the air in constant motion.

In the equatorial region we have, apparently, every condition requisite for the production—for the natural cultivation—of the disease-breeding bacteria. It becomes, then, a matter of prime importance to inquire whether leprosy is endemic therein, and if so whether it is of a severer type than elsewhere.

Running down the peninsula, and forming a broken backbone to it, is a mountain system, and as a rule the country is rugged, save for the alluvial stretches which border the numerous rivers and *sungeis,* or brooks. The rocks are chiefly granite and archæan, with overlying sandstones, &c., of Tertiary age in places. Civilised life is one uninterrupted struggle against the vegetable world. Plant life is so vigorous and rapid, that a year or two of neglect serves to reduce cultivated land into secondary, but very dense, jungle.

The *ethnology* is interesting; for we have here to deal with quite different stocks from those of China. The wild tribes may be divided into the *Orang Benua,* that is men of the country, who are primitive Malays, and the *Jakuns* or *Sakai,* a Negrito people inhabiting the fastnesses of the interior. The civilised Malays occupy the coast, and all the important towns and villages, which of course are their own erections. In the ports large numbers of Chinese,

chiefly from Kwantung and Fokien, have settled as traders, some of whom are very wealthy. Other Chinese are marching inland wherever planting is making progress, and this labouring or coolie class forms quite a large section of the community in such localities. With them, generally as a somewhat higher class of plantation hands, numbers of Japanese are to be found; and there is a constant influx and efflux of these Japanese and Chinese coolies. In the trading centres, such as Singapore, Penang, and Malacca, many of the stores are kept by Tamils, Klings, and other natives of India. As an illustration of the complexity of types in the large centres we may cite Singapore, whose population is made up as follows:

SINGAPORE.

Chinese	121,098
Malays	35,992
Indians	16,035
Europeans	5,254
Other nationalities	1,776

The Indians include Tamils, 12,503; Bengalis, 3,452; Burmese, 26; Parsees, 54. Besides these there are Arabs, 806; Japanese, 287; Siamese, 211; Jews, 190; Singhalese, 159; and Armenians, 68.

In dealing with the Straits we must always bear in mind this predominance of Chinese over the native races, especially when treating of the towns. Taking the states of Singapore, Johore, Pahang, Negri Sembilan, Sungei Ujong, Selangor, and Perak, from which details are available, we find that out of a total population of 739,645 no less than 439,752 are Chinese—that is more than half. We must also bear in mind that this is not a permanent population, but one which constantly changes. The Chinaman's one idea is to amass wealth enough to return to China; hence there is an enormous yearly influx of fresh Chinese blood, and with it an equally great and constant chance of introducing disease.

We are, in the Straits Settlements, brought face to face with two commercial races, the Malays and Chinese, of dif-

ferent types, but belonging to the same great Mongolic group; and they are engaged in the fiercest struggle for existence. The Malays are essentially a seafaring race, and they have been one of the greatest travelling people on earth. From their home in Malaya they have spread and carried their language all over the East Indian Archipelago. The coasts of India are fringed with them, Madagascar is Malay in blood, in Zanzibar they abound. They visited Mauritius, and the vast area of the Pacific owes much of its native population to them; finally they have spread northwards into Chinese waters, and from the Philippines have stocked Formosa, which knows no real native race.

Now this great area is receiving another wave of immigration—the Chinese; and everywhere, and nowhere more markedly than in his own country, the Malay is being ousted by the Celestial. Nor are the causes far to seek.

The Malay is a courteous gentleman, of staid demeanour, proud of his blood, with no trace of servility, keen to resent as he is slow to give offence, brave to desperation, easy-going, careless and thriftless, a gambler to the core, and with the roving instincts of a viking. He travels because he likes it, he trades because it enables him to travel, and so long as he gets his daily wants supplied—and they are very simple and easily met in these gardens of the sun—he takes no thought for the morrow. He drives a hard bargain, and is indifferent to commercial honour; lies are as the breath of his nostrils.

The Chinaman is the opposite of all this. He leaves home to make money; and he never thinks about anything else. He can live on as little as a Malay, and though a gambler he in foreign countries prefers the safer *rôle* of keeper to the more exciting one of frequenter of fan-tan tables. He is unrivalled in driving a bargain, and as hard to get money out of as a Jew tax-gatherer. His commercial integrity is of a high standard; and once his word is pledged, he will in no way depart from it. He can be most obsequious to attain his ends; he never lets his angry passions rise to interfere with money-getting, and he has unrivalled powers of passive resistance. It is fickleness *versus* steadfastness, and the fickle Malay has no chance in the struggle. The

Chinese coolie becomes a street hawker, then a stall-keeper, and ere long the proprietor of a store, and finally he returns, a wealthy man, to his own country.

The propelling force of this resistless wave of Chinese emigration is necessity; conditions of life are hard in over-populated China, and the thrifty, patient, law-abiding native is driven far afield to seek that competence which his own land denies him. Nothing can stop this wave; and hence, in treating of the Straits Settlements in connection with the leprosy question, we must clearly realise that Malaya is as much the home of the Chinaman as of the Malay.

The Malays are subject to leprosy; there is as much evidence of its presence amongst them as amongst the Southern Chinese. Leper villages and unwritten social rules testify to the scourge, and all the natives, however secluded, know of the disease, which they call *kosta*.

Singapore is the headquarters of the British Government of the Straits. Here a large and well-appointed leper hospital affords refuge to many patients, chiefly Chinese, but a number of Malays, a few Portuguese, and occasionally a European are met with amongst its inmates.

The vexed question as to the place where leprosy developed crops up, and, as at other places, Singapore may claim that the disease is not endemic there. If not prevalent in earlier times, the presence of a leper hospital, although it may be a blessing to the sufferers, and may minimise the possibility of infection, must act as a germ-bearing and disease-producing centre, likely to render leprosy endemic to the soil.

Penang is in much the same position as Singapore as regards leprosy. In the words of Dr. Kerr: "So far as Penang is concerned, few cases of leprosy arise here; though we have a large leper asylum the cases are imported from other countries, principally China." That leprosy is endemic to the island may be denied by even an unprejudiced authority.

Perak.—In this state the Malay is being gradually ousted by the Chinese, who already form half the population. As usual the Chinese are chiefly from the provinces of

Kwantung and Fokien, Swatow and Amoy sending the chief number of emigrants.

Dr. Fox does not lay the introduction of leprosy at the door of the Chinese, yet these people are more frequently the subject of leprosy than the Malays, as shown by the Singapore and Penang asylums.

In Perak we meet with aboriginal tribes, still in a state of savagery, who, through timidity or disdain, keep aloof from the intruders, be they Malay or Chinese. Their numbers are few (5700 in Perak), and there is no evidence that they have leprosy amongst them.

Sungei Ujong.—From this state the report is confirmatory of the general statement that may be drawn from a perusal of these valuable communications from the peninsula.

The Chinese form more than half of the population, and it is chiefly among them that leprosy is found ; indeed, the Malays in Sungei Ujong are quite free from it. The Sakais or aborigines are not reported upon by Dr. W. L. Braddon.

Johore.—Dr. Wilson, writing from Johor Bharu, the capital of the kingdom, on the strait which separates Johor from Singapore island, conveys the information in his letter that the Chinese are again the offenders. Out of thirty cases three were affected before landing, and the remaining twenty-seven developed the disease in the district. We are not told whether the men affected herded with the unaffected, so that it is impossible to ascertain when or how the disease was acquired ; it may be because leprosy is endemic in the neighbourhood, or it may be that their leprous countrymen spread the contagion directly to their fellows.

An interesting statement is made that the aboriginal Sakais are reputed to suffer severely from leprosy, and that they compel their lepers to dwell apart. Dr. Wilson reports that though he travelled many miles inland he never saw a leper. He met with many cases of pityriasis and ringworm, which might be mistaken for leprosy by ignorant people. Still Dr. Wilson does not doubt the statements he has heard, and the fact of Jakuns being met with *minus* toes, &c., seems confirmatory.

From the Muar district, which abuts from Malacca,

Mr. Wheatley bears out the statement that leprosy is chiefly met with among the Chinese. There are 15,000 Javanese in the province, and though Mr. Wheatley mentions them, he does not speak of leprosy amongst them.

Very great interest attaches to leprosy in the Muar district, for it is the region in which gurjun oil is produced. The high esteem in which this oil is held must have originated here, and yet we find ourselves reporting upon leprosy at one of its foster-beds.

Mr. Wheatley remarks that he has seen few lepers, and that it is the Chinese who are mostly (if not wholly) affected. Ringworm and pityriasis are very prevalent, and the oil is freely used for these ailments. May not the Malays and Jakuns include ringworm and pityriasis amongst the mild forms of leprosy, as did the Israelites of old (see report on Hong Kong), and as do the Chinese (*ibidem*) at the present day ?

Mr. Wheatley says he has seen the oil do some good in the early stages—a valuable communication, but a feeble testimonial to its virtues from the resident medical officer in the gurjun oil district.

The evidence from the Straits Settlements strengthens the opinion that has been forcing itself upon me ever since this investigation began, namely, that the Chinese are the carriers of leprosy ; but the facts are not exhaustive enough to warrant more than a cautious suggestion to that effect. Still, it is very remarkable that even in Malaya itself it is the Chinese who are the greatest sufferers ; and as not one of these Chinese in a hundred is born in Malaya, and few remain many years, and as we know that leprosy is happily very slow of incubation, it certainly does seem more and more likely that leprosy is being constantly brought in afresh from infected Kwantung and Fokien. The Chinese mix very little with any but their own people ; and though leprosy is undoubtedly endemic in some parts of the Straits, its comparative rarity among the Malays is hard to account for except on the theory that the Chinese introduced it, and by their exclusive habits have not spread it as widely as they might otherwise have done.

To look at the matter from another point of view, the Malays and the aborigines seem comparatively free from the

scourge, yet the Sandwich Islanders, their relatives in blood, are the most leprous people on earth. How can this anomaly be accounted for? It may be, though it is only a suggestion, because the habits of the Malays and Hawaiians are so different. The Malay is a born rover, he is always coming in contact with other people, and his constitution is inured to change. The Hawaiian, on the other hand, is an isolated being, who till less than a hundred years ago never saw a soul but of his own race. Such isolated communities are always prone to new diseases, as we may see even on the little island of St. Kilda, and hence the Hawaiian constitution was more fitted for the reception of leprosy than that of the Malay.

The information received from the Malay Peninsula justifies us in drawing the following conclusions:

1. In the Straits Settlements leprosy is rife.

2. Three leper hospitals have been found necessary, viz. Singapore, Penang, and Johor Bharu.

3. The Peninsula is inhabited by Malays, Chinese, Japanese, Indians, and aboriginal tribes.

4. In the places reported upon the Chinese population equals or exceeds the native Malay race.

5. Chinese are the chief sufferers from leprosy.

6. Chinese form the largest number of the leper patients in the hospitals.

7. Some Chinamen were lepers on landing, but the majority developed the disease during a residence in the Settlements.

8. Jakuns are reported to have leprosy amongst them to such an extent that they have adopted compulsory segregation. No Jakun has been seen by any of the contributors to have actual leprosy on him.

9. Gurjun oil is produced in the Muar district of Johor, but is not, at all events, a prophylactic against leprosy.

10. Whilst inclined to lay the presence of leprosy in the Straits at the door of the Kwantung and Fokien immigrants, the facts will scarcely justify the conclusion.

11. Whether imported recently or not, leprosy is now endemic in the Straits Settlements.

12. Vaccination is not accused, in any place, by any people as a contributor to the spread of leprosy.

Johore.

Report by Dr. J. P. A. Wilson, Senior Medical Officer, Johore, July, 1894.

(Leprosy prevalent. Chinese more leprous than Malays; Jakuns [aborigines, perhaps a Negrito tribe] have never been *seen* to be leprous.)

N.B.—The first glance at Dr. Wilson's paper would lead one to believe that the Jakuns were leprous, but on reading more carefully it will be seen that the information as to their being leprous is mere hearsay. Dr. Wilson has taken great pains to elucidate the point; he has himself made extensive journeys into the Jakun country, and his assistant at Muar—a neighbouring district—has reported at length. Dr. Wilson found many skin diseases, but no leprosy.

Physical features.—The territory of Johore, including Muar, extends from Pahang on the east side to Muar on the west, being surrounded by the sea on three sides. Chains of hills run along both the east and west sides, but are very much broken up; the highest hills vary from 2000 to 3300 feet in height.

Most of the plantations are situated inland, and are reached from the numerous rivers. These at their mouths are generally great tracts of mangrove swamp, but further inland are bordered by sloping lands rising toward the mountain ranges, and are under cultivation as gambier, pepper, and coffee plantations.

Along the sea-board the land is flat and sandy, and cocoa-nuts and areca nuts are principally cultivated. Further inland, where the land is higher, pineapples are grown; in addition to cultivating these plantations the Malays and Chinese settled on the coast engage largely in fishing.

The population is extremely difficult to estimate, probably about 150,000 excluding Muar.

The population of the town of Johor Bharu, the capital, is about 1500, mostly Chinese.

The average rainfall is 106 inches; the average maximum temperature is 84° F.; the average minimum temperature is 72° F.

The Chinese outnumber all other races—Malays, Japanese, and aborigines—as three to one.

Distribution.—Most of the lepers, admitted to the leper ward of the Johore Hospital, are Chinese from the plantation flat ground along the various river banks. It has been reported to me that leprosy is very prevalent among the Jakuns (original inhabitants) in the interior and unopened districts. They generally have their villages at the river sources among the great ranges of hills. When affected by leprosy they are stated to voluntarily segregate themselves in small villages, and are avoided by the other Jakuns. In several inland journeys I made I came across Jakuns suffering from severe pityriasis or advanced body ringworm, *not leprosy*.

Heredity.—The natives, both Chinese and Malays, believe in hereditary transmission. I have reported two cases where leprous Malays had leprous children. Out of thirty Chinese patients, twenty-seven denied hereditary transmission, three acknowledged it and gave the following histories:—One had a father and two uncles lepers; a second had a leprous father; a third had a paternal uncle a leper.

Contagion.—Both Chinese and Malays believe leprosy to be contagious.

The Chinese state that if a healthy man urinates or defæcates after a leper, he is likely to contract it.

The *Malay theory* is, that if they have sexual intercourse with a menstruating woman, and she conceives, the child will be leprous.

I have under observation two Chinese who keep leprous women for the last two years. They have shown no signs of leprosy so far, and they state they do not consider leprosy contagious.

Food.—Fish is never given as a cause, and as the population here live almost entirely on fish, I think leprosy would be much more prevalent if it were a cause. The Chinese state that if a duck or goose or old cock is eaten by any one suffering from smallpox, or any exhausting disease, leprosy will follow; five out of thirty patients gave this cause.

One Malay gives as the cause of his leprosy the cutting up of a dugong or "sea-cow;" this was followed by intense skin irritation, "itching and burning," and the leprous tubercles developed shortly afterwards.

Segregation is observed very imperfectly by the Chinese and Malays. They generally compel the leper to live and eat apart from the rest of the household. At the Johore Hospital the leper ward is situated in a marsh as inaccessible as possible, all food and clothing is kept separate, but the ward is too near the town, and abscondings and night visits to town are too frequent.

Tuberculosis, syphilis, and malaria.—I have noted several cases in which the first signs of leprosy were with difficulty diagnosed, owing to the syphilitic history. Out of thirty patients in hospital twenty give a history of syphilis; one contracted syphilis after the signs of leprosy had appeared.

Malaria.—Ten out of thirty had suffered severely from malaria, and continued to do so after leprosy was developed.

Tuberculosis.—One out of thirty suffers from pulmonary tuberculosis.

Vaccination.—I have met with no cases. [This question, "Has leprosy increased with the use of vaccination?" has evidently been misunderstood.]

Treatment.—Chaulmoogra oil and gurjun oil internally and locally seem to afford relief. Marked improvement has followed the use of arseniate of iron in a few cases. I have not heard of any native drugs being used with success.

Perak.

Report by Dr. Gundry Fox, Perak, Straits Settlements.

(Leprosy wide-spread. Aborigines [Sakais] not known to be leprous. Malays extensively affected. Chinese extensively affected.)

Physical features.—The state of Perak, situated on the western aspect of the Malay Peninsula, between parallels of 3° 45′ and 5° 29′ north latitude, and 100° 22½′ to 101° 40 east longitude, has a coast-line about ninety miles in length

and its size is estimated at about 10,000 square miles. The country is well watered with rivers, mountain ranges abound, and in some parts reach altitudes varying from 7000 to 8000 feet. Everywhere the land in its natural state is covered with thick jungle. There are no towns on the hills, only a few houses, which are used as sanatoriums for Europeans. Thaiping, the capital of Perak, is situated at the foot of a range of hills, the highest of which is about 5000 feet in height. The soil is very rich, and has been proved to be suitable for the cultivation of coffee, tea, cocoa, pepper, cinchona, and cardamoms. Although a Malay state, nearly half the entire population are Chinese, and are the real workers in the state; all the mining and trade are in their hands. Malays are a lazy, unambitious race, too indolent to be other than contented and polite; they are not prolific, families of more than two or three are rare; and owing to their ignorance and supreme indifference to medical and sanitary knowledge the death-rate among them is high. A Malay's chief occupation is the cultivation of his land, together with fishing; he is a good sailor, being very active in a boat. Physically they are a small race, average height 4 feet 10 inches to 5 feet, but perfectly symmetrical in proportion.

At the census of 1891 the population of Perak was 214,254, of which 96,719 were Malays, 94,345 were Chinese, and 366 Europeans. The average mean temperature is about 70° F. in the night, and in the day 87° F. There is no cold weather or any real wet season; the atmosphere is very moist. Rainfall is about 100 inches a year, more in some stations situated near a range of hills.

Distribution.—Leprosy is commoner among the dwellers on the plains. The aborigines, about 5779 in number, usually inhabit the hills; they are very timid, and generally run away at the approach of strangers. I have never heard of any of them being lepers, but it is very difficult to ascertain their true condition.

Heredity.—Speaking generally, the Malay inhabitants do not believe in hereditary transmission. It is but seldom that all the members of a family are similarly affected; sometimes one, sometimes both parents are lepers, and the

children are found free from disease, but occasionally one or more of the children are lepers when the parents are not leprous.

Contagion.—The Malays believe leprosy to be contagious, if their opinion can be gauged by their treatment of leprous people. They compel lepers to dwell apart, and exclude them from all social and domestic rights. Lepers usually inhabit humble dwellings on the outskirts of their native village.

Food.—No food is assigned as a cause of leprosy ; all Malays eat fish, fresh and dried.

Segregation.—Malays of their own accord have adopted a system of segregation. A husband developing leprosy is at once separated and lives apart from his wife, who takes all the children with her ; or if the wife becomes diseased, the same plan is adopted. Arrangements are now being made by the Government to compel lepers to live on an island, which they will not be permitted to leave, at the same time giving them land, and generally trying to make their lives as little miserable as possible.

Tuberculosis, syphilis, and malaria.—As far as my observations go I have failed to recognise any connection between leprosy and tuberculosis, syphilis and malaria. I consider them quite different diseases. While travelling in the interior two years ago, in search of lepers, I found several Malays who had leprosy suffering from malarial fever.

Vaccination.—There has been no evidence to show that leprosy is increasing in Perak, although arm-to-arm vaccination has, until quite recently, been in vogue for the last ten years. There is no case on record where leprosy has been contracted through vaccination.

Treatment.—Lepers are usually treated by rubbing in gurjun or chaulmoogra oil, with arsenic and cod-liver oil internally ; most cases improve at first, but soon the disease appears to develop unchecked. I know of no reputed native drugs.

MUAR.

Report by Dr. J. J. L. WHEATLEY, Muar, Malay Peninsula, dated July, 1894.

(Leprosy uncommon. Chinese suffer mostly; Malays rarely. Aborigines not commented upon.)

N.B.—This is the region whence gurjun oil is obtained.

Physical features.—The Muar district is very varied in feature. Skirting the sea-shore is a belt of low swampy ground, fringed with mangrove for about a depth of a quarter to one third of a mile. Further back is an extensive alluvial plain, flat country elevated but a few feet above spring tides. This plain is about thirty miles long and about ten miles broad, reaching to the bases of groups of isolated hills about some twelve miles from the chief town (Bander Maharani). The Muar River, which takes its source somewhere about 120 miles in the interior, runs a very tortuous course through this alluvial plain, and almost at its very mouth the town has been located on the southern bank. The soil of the plain is almost entirely alluvial deposit, clayey to a very considerable depth, and, except in places where settlements have been made, is covered more or less with rank grass and scrub. There are extensive timber forests in the far interior. The chief cultivation of the district is the areca palm, producing the betel nut; but in the higher reaches of the river, where the soil is good loam, Chinese settlers cultivate gambier and pepper. Of late years tapioca and Liberian coffee have also been introduced, and promise well.

The rainfall, as observed at Bander Maharani during the past five years, shows an annual average of 94·92 inches; the greatest annual rainfall being 106 inches, and the least 84·87 inches. The average annual maximum temperature is 88·4° F.; the average annual minimum temperature is 74·1° F.; the highest recorded reading is 98·5°, and the lowest 68·2°. Strictly speaking, there are no seasons. The period from May to October is the south-west monsoon, during which the rainfall is greater than from November

to April, when the north-east monsoon is prevalent. The average number of rainy days during the year is 167.

It is difficult to form any estimate of the population of the Muar district. The Chinese have settled in large numbers, chiefly along the river banks and its neighbourhood, cultivating pepper and gambier, and may safely be estimated at about 75,000. Javanese, who reside chiefly in the padang or plain, having plantations of the areca palm, perhaps number about 10,000; and interspersed throughout the district the Malays, perhaps about 10,000. These figures are only approximate, and are not to be relied on.

Distribution.—There have been very few cases of leprosy observed in the district, and as the people are very migratory, it is not possible to give a definite reply to this question. Leprosy is seen chiefly amongst the Chinese, very rarely among the Malays.

Heredity.—The natives, Chinese and Malays, believe leprosy to be hereditary.

Contagion.—All believe in the contagiousness of leprosy.

Food.—Fish is not assigned as a cause. It is the most common adjunct to rice by those dwelling on the seaboard. Salt fish is much used by the inland tribes.

Segregation.—No strict segregation is practised, nor is it possible under the conditions in which the natives live; but every care is taken to avoid contact with lepers.

Tuberculosis, syphilis, malaria.—No direct connection between leprosy and any of these, but very often evident traces of secondary and tertiary syphilis are combined with leprosy.

Vaccination.—No data. [Dr. Wheatley does not state there is no vaccination for smallpox practised.]

Treatment.—The natives have no reputed drugs for leprosy. In the Muar district, where wood oil (gurjun oil) is very plentiful and an important item of export, it is very generally used for all skin affections. The various classes of aborigines suffer much from an aggravated form of ringworm, in which the epidermis scales off in flakes; for this and other skin diseases the wood oil is greatly used, generally *after* having tried the leaves of *Cassia alata*, which

grows plentifully in all waste lands. The leaves are ground into a paste with lime juice, and applied freely to the parts affected, but I cannot say that it generally proves successful.

So far as I have seen tried, the inunction of gurjun oil made into a saponaceous emulsion with lime water, and the internal administration of gurjun oil or chaulmoogra oil, give a certain amount of relief even in well-marked cases of leprosy; but there is no actual curative effect. In the early stage of the disease it perhaps arrests the development. I have not seen more than this.

J. J. L. Wheatley.

Penang.

Report by Dr. W. Kerr, Penang, May, 1894.

(Leper asylum in Penang. Chinese chief occupants.)

Dr. Kerr writes:—"So far as Penang is concerned, few cases of leprosy arise here. Although we have a large leper asylum, the cases are imported from neighbouring countries, principally China. That being the case, I am not in a very good position to answer the queries or give any information of value."

Penang is an island between Sumatra and the Malay Peninsula, situated at the north end of the Straits of Malacca. It lies in latitude 5° 20′ N., and extends fifteen miles by five. It is the great mart and trading centre for a wide district, and is a shipping port of the first magnitude. A leper hospital is an essential feature in a cosmopolitan centre of the kind when situated in the midst of leprous peoples. Not only does the great Eastern focus of Chinese leprosy, Canton, send its emigrants hence, but the port of Penang is also open to infection from the north—Ceylon, India, and Burmah; and from the south—Sumatra and Java.

The leper asylum is placed on a small island in the strait opposite the chief city.

Sungei Ujong.

Report by Dr. W. L. Braddon, F.R.C.S., dated Sungei Ujong, Malay Peninsula, July, 1894.

(Leprosy rare. Chinese only sufferers. Malays not affected. Aborigines not reported upon.)

Physical features.—Sungei Ujong is a territory some 500 square miles in extent, bordering on the shores of the Straits of Malacca, in latitude 2° 8′ north.

The country consists of dense jungle, many streams, and mountains rising to the height of 4000 feet. Cultivation is sparse and mostly of rice (paddy) in valleys and hillsides, but besides rice, coffee, cocoa, tapioca, pepper, and gambier are raised.

The population consists of Chinese mainly, dwelling in scattered hamlets. Rainfall (mean annual) 85 inches. The original inhabitants of the peninsula—Sakais,—driven by Malay invasions from the coast, form the very thinly scattered population in the jungles of the hills. The Malays, who constitute the present "natives," occupy the valleys, and are not numerous, the Chinese immigrants forming more than half the population. Although the Malays incur leprosy, I have noted no cases in this state; the very few cases coming under observation are Chinese immigrants who have contracted the disease before entering the country.

Heredity is not believed in.

Contagion.—Leprosy is regarded as contagious.

Food.—No food is considered to be a cause of leprosy.

Segregation is not practised.

Vaccination.—It is not possible to estimate the relation between vaccination and leprosy.

Treatment.—No native remedies are known here.

D. BATAVIA.

EAST INDIAN NETHERLANDS.

[*Abstracts.*]

(Leprosy prevalent but decreasing. No distinctions of race; not contagious. Moluccas most infected. No leprosy in North Celebes or Sunda Islands.)

Report by A. F. McLachlan, Esq., Acting British Consul, Batavia, June, 1894.

Mr. McLachlan sends a report from the medical department of the Dutch East Indian Army on the subject of leprosy.

Abstracts from Official Reports on Leprosy.

I. *Occurrence.*—Affects natives and Europeans; the latter not till after two years' residence.

Forms.—Maculosa, tubercular, anæsthetica.

Distribution.—More frequent in Moluccas than Java; absent from North Celebes and Sunda Islands.

II. *Age.*—Leprosy may appear at any age from childhood upwards.

III. *Race.*—Equally among Europeans, natives, Arabs, and Chinese.

IV. *Conditions.*—Commoner on the seaboards than in the mountain ranges. Drunkenness and want aggravate the disease.

V. *Heredity.*—Lepers always produce healthy children; but these sometimes have become leprous in after years.

VI. *Disease.*—No proof of any correlation with syphilis, frambœsia, &c.

VII. *Contagion.*—"Not one case ever recorded."

VIII. *Segregation.*—Yes, up to 1865, when the Government, from experience, rescinded the regulations.

IX. *Establishments.*—Fourteen hospitals up to 1865, eight then gradually abolished, six still (1886) serve as voluntary asylums for lepers. In 1883 there were 189 inmates.

X. *Number maintained at public expense.*—See above.

XI. *Increase.*—No reply.

XII. *Treatment.*—All treatment ineffectual. Temporary benefit only.

It is curious that in the West Indian Netherlands, and in Surinam, segregation is very strictly enforced.

Authorities.—Spenger van Eyk, Colonial Minister, Holland; Dr. J. van Deventer.

The East Indian Netherlands comprise *Sunda Islands, Borneo* (part), *East Timor, West New Guinea, Java, Madura, Moluccas, Celebes.*

Sumatra.

(Leprosy is frequent. Chinese are the chief sufferers. Natives almost exempt. Koch's tuberculin used as a treatment.)

This great island, 1070 miles in length, is, like Borneo, bisected by the equator, and therefore comes within the equatorial region of climate. Its average breadth is about 200 miles, and its area about 128,000 square miles. It is, as are all the Sunda Islands, fully exposed to the Indian Ocean and the south-west monsoon along its south-eastern coast.

It is traversed by a fine range of mountains, rising to 15,000 feet, mostly volcanic, and on the east side is bordered with plains. In addition to volcanic rocks, it contains archæan beds, and wide stretches of coal-bearing sandstones of Tertiary age. Much of the eastern side is an alluvial plain but little elevated above sea level, and liable to floods. This great plain covers about 40,000 square miles.

Owing to the lie of the land, most of the rivers flow eastwards. It possesses fine mountain lakes.

The inhabitants consist of Malays, and several Indonesian tribes which belong to a pre-Malayan period. The Malays occupy most of the area, and have from time immemorial had permanent settlements in the districts of Menangkabau and Palembang, and from this centre a large proportion of the Malay migration has started.

The Indonesian tribes, the true aborigines, include the Battacks of the north, the Kubus of Central and the Passumahs of South Sumatra. The Achinese of the north, a mixed race, have never been subdued by the Dutch.

It should be noticed that Sumatra is not included in the list of places to be reported upon published in the 'Medical Journal,' to which this report is a reply.

Batavia is the place named. Surely some mistake is here? Batavia is merely a city in Java, its capital. After asking for information over such huge areas as the Chinese Empire and the Malay Peninsula, and the Pacific, to suddenly drop down upon a mere town seems irrelevant; so I have taken the liberty of returning replies from Sumatra as well as Java.

Dr. Graham's communication emanates from Lankat near Deli, the centre of the celebrated tobacco district, and the information he gives is the more important on that account.

The racial representatives enumerated agree with the observations in Java and the Malay Peninsula as to the relative susceptibility to leprosy. He mentions one European as attacked; this is interesting, as in most leprous countries a case occurs once in several years. The Netherlands minister, in a report to the Hawaiian Government, states that a few European lepers return to Holland. The explanation Dr. Graham gives of his patient is valuable, as all such illustrations are eagerly sought after; and it is in accord with other evidence collected in the course of this inquiry. It is a vital question to Europeans dwelling in a leprous country; and when we find that intimate and prolonged contact is necessary, it serves to allay the dread some people entertain. On this point see also the case related by Dr. Wong, of Canton.

The Chinese are in Deli and the district the principal offenders as usual, and once more a statement bears proof

of the Chinaman as the leper-carrier in the Far East. Dr. Graham writes, "Nearly all my cases have been among Chinese immigrants; among the native proper the disease is rare." This might be taken as the report from all the countries to which the inhabitants of Kwantung and Fokien emigrate; it is the reply from the islands of the Pacific, from Australia, California, and all the countries bordering on the China Sea.

Vaccination is promptly denied by Dr. Graham as being reputed by the natives to have increased the number of lepers. Here be it observed, moreover, that the Dutch Government are very exacting as regards the immigrants being vaccinated before they are employed on the various plantations.

The statement that Koch's tuberculin had a decided effect will be dealt with under the heading "Koch's Tuberculin in Leprosy," by the writer.

Letter from J. C. Graham, M.A., F.R.C.S., M.D., Lankat, Deli, July 22nd, 1894.

My report deals with leprosy in the lower division of Upper Lankat. Among the natives proper, viz. the Malays and Battacks, it is almost impossible to get any reliable information.

Physical features of Lankat:—A large plain about 100 feet above sea level, distant from the sea about 20 miles. Soil mostly clay, but very variable in colour and consistency. Tobacco is principally cultivated, here and there in higher-lying districts a little pepper and coffee.

The area of the district reported upon is about 160 square miles.

The population consists of—Europeans, 216; Chinese, 13,592; Bengalis, 1282; Malays, 12,727; Bandgerese, 1204; Battacks, 16,702.

Leprosy is met with almost exclusively amongst the Chinese; one European contracted the disease in Lankat seven years ago; two cases of leprosy only have I seen amongst the Bandgerese, and three amongst the Bengalis.

Distribution.—I have no statistics as to the relative

frequency of leprosy amongst dwellers in the hills and plains.

Heredity.—The natives believe in hereditary transmission.

Contagion.—Natives believe leprosy to be contagious.

Food.—No kind of food is assigned as a cause.

Segregation.—There is a small wooden hospital in the vicinity of the principal town of Deli—Medan, which is far from sufficient to meet the increasing demands for admission. Nearly all my cases occur among Chinese immigrants; among the natives proper the disease is rare.

Tuberculosis, syphilis, and malaria.—I have observed no connection between leprosy and any of these diseases.

Vaccination.—Leprosy has not increased with the use of vaccination.

Treatment.—Tuberculum Kochii had a very decided effect on two cases, but I lost sight of them. I have seen improvement with chaulmoogra oil, and also with mercury and iodide of potassium. I am now using the raw thyroid gland of the pig with apparent good result in a case of leprous ulcer of great toe, but cannot claim a permanent cure in any one case.

Rainfall observations, 1890–94.

Monate.	1890.		1891.		1892.		1893.	
	Dage.	Mm.	Dage.	Mm.	Dage.	Mm.	Dage.	Mm.
Januari . .	12	147	10	354	8	230	4	106
Februari . .	12	139	9	115	3	82	8	239
Maach . . .	3	56	5	42	7	178	8	79
April . . .	13	197	6	23	11	301	11	256
Mei . . .	12	196	9	210	12	212	15	218
Juni . . .	5	80	9	152	5	116	8	109
Juli . . .	9	128	4	47	6	111	12	200
Augustus . .	16	228	16	231	12	108	13	222
September . .	18	414	15	370	12	108	9	173
October . .	22	532	11	252	17	340	12	223
November . .	14	428	18	305	10	169	19	492
December . .	6	66	12	212	15	312	7	110
Totaal . .	142	2611	124	2313	118	2267	126	2427

Java.

(Leprosy rare. Chinese mostly affected. Of four hospitals three are for Chinese. Where Chinese coolies come, there is leprosy prevalent.)

Java, the richest and most populous of the East Indian Islands, is 622 miles in length, and has an area of about 52,000 square miles. The island of Madura is physically and politically part of it.

It is traversed by a double range of mountains, knotted together in places, and rising to over 12,000 feet. Fine plains exist in the north, and it has many rivers, the chief of which flow northward into the Java Sea.

Its mountains are eminently volcanic, forty-six being true volcanoes, twelve of which are active.

The rainy season is during the winter monsoon, and the climate at sea level is equatorial, but is mild and salubrious in the highlands.

The natives belong exclusively to the Malay race, and here attain a high degree of culture, chiefly under Hindu influence.

The Netherlands minister reports that leprosy is rare in Java, but more frequent in Madura. He states that the disease attacks equally Europeans, natives, Arabs, and Chinese; a statement that must be read in the light of fuller reports, as it can only mean that lepers have been known among all these races. As a matter of fact, the Chinese form by far the greater proportion of the lepers.

The British Consul at Batavia kindly sent a copy of an official inquiry into leprosy in Java, and the report will be read with interest.

Formerly, that is up to 1865, there were fourteen leper hospitals in the Netherlands East Indies, but as the disease was neither very prevalent, nor considered contagious, they were gradually abolished, until in 1886 there were only six, and now only four, all voluntary establishments. Dr. J. van Deventer distinctly says, "The number of sufferers (in Java) being always very small."

Of the four existing hospitals, one is for lepers of all

nationalities, but how the numbers are distributed is not stated. The other three are significantly stated to be for Chinese natives, and one of these is supported by the Chinese. The Chinese are placed first, as no doubt they required a retreat more urgently than the other natives; in fact, Mr. Powell goes so far as to write that "leprosy is met with everywhere, only it is said to be imported by the Chinese; it seems to have been unknown before the arrival of the Chinese in Java." Mr. Skertchly suggests that this should be taken as meaning "since Chinese coolies began to arrive."

Another significant fact is that all the existing leper hospitals are on the north coast, to which, in fact, the Chinese flock.

It will be seen in the report on the Malay Peninsula that leprosy is not met with among the Javanese immigrants, and Mr. Skertchly tells me the same is true in North Borneo.

I am not prepared to discuss the statement that the Chinese actually brought leprosy into Java (see Skertchly on the physical conditions, &c.), but I can well believe that the prevalence of Chinese in Batavia caused an actual and relative increase in the number of lepers among the natives. The great tendency is to disclaim leprosy as existing or arising in the district one inhabits; it is the same here in Hong Kong as elsewhere; not only merchants, but several medical men, have said to me, "But there is no leprosy in this neighbourhood, is there?" and that, too, in the very home of leprosy, for Hong Kong is but a suburb of Canton as regards its disease register, the communication being so free.

The course of the recent epidemic of plague will bear me out in this statement, and we have a constantly recurring proof afforded by the wave of smallpox.

Report by B. W. Powell, U.S. Consul, Sourabaya, September, 1894.

(Leprosy everywhere. Imported by Chinese. Unknown before.)

Physical features.—The city of Sourabaya is very low-lying, close to the sea; the soil is composed mostly of hard

clay; the people cultivate sugar-cane, rice, and all sorts of vegetables. Rain falls from December to May. Leprosy is met with everywhere, only it is said to be imported by the Chinese, it seems to have been unknown before the arrival of the Chinese in Java.

Distribution.—Leprosy is met with in all latitudes of Java.

Heredity.—The inhabitants believe that leprosy is handed down only in those families which are tainted by the disease. Sometimes it occurs in each generation, sometimes only in the second, third, or fourth does it reappear.

Contagion.—The natives do not consider leprosy to be contagious; they will marry a girl from a contaminated family, not thinking of the danger to their children. No man ever became affected by marrying a girl from a leprous family.

Food.—No food is considered capable of developing leprosy. A sea-fish named the "moonsing" when eaten causes huge white blotches upon the skin; this is not contagious.

Segregation.—In Java there is one establishment where lepers are segregated. Could this be done universally we would soon see the end of this sickness.

Tuberculosis, syphilis, and malaria.—As regards tuberculosis and malaria no connection is traced. Syphilis may be, but the only real cause of leprosy is said to be what the French call "christalline" (the syphilis produced by Sodom).

Vaccination.—Question misapprehended.

Treatment.—The best drug used is still the Boston (U.S.) remedy—cuticura, but it does not seem improvable. Natives have no drug whatever for leprosy.

There is a native superstition that in its early stage leprosy can be checked by introducing into the veins of the arm a small diamond or a small piece of gold. In this case the body, they say, gradually dries up, having eventually the appearance of a walking mummy.

An inquiry made all over Java, beyond producing some statistics of little value to the points at issue, brought nothing new to light.

"A positive opinion regarding the hereditability and contagiousness of leprosy can only be established by extended,

careful, and frequent observation ; the period of incubation being long, and the predisposition small, it is impossible to draw conclusions from a short series of observations. The necessary leisure for such studies is precluded to most medical officers of the Dutch East India army, owing to the extent of their duties ; whilst the matter is further impeded by the small number of cases which are offered for their investigation.

" According to reports received, leprosy is not often met with in Java. In Madura, however, it may be said to present itself more frequently. The Rembang district is the principal centre of the disease in Java.

" The opinions of the different officers, based as they are on insufficient data, vary considerably.

" Hereditability and contagiousness find both opponents and supporters, but neither side can advance conclusive proof ; though most officers are inclined to follow the present prevalent opinion as to contagiousness, they at the same time believe in hereditability."

" There are four leper hospitals in Java, the principal of which is that at Pekalangan, Mid-Java, where sufferers of all nationalities are taken in. The three others, in which only natives and Chinese are treated, are the Chinese hospital at Batavia and Samarang, and the Semawong Hospital at Sourabaya, in which at the present moment there are seventeen, eleven, and eleven patients respectively, concerning which no detailed reports are forthcoming."

Extract from the report of Dr. M. Albricht (translated from the Dutch), Sourabaya, Java, November 12th, 1894.

(Leprosy rife in Java.)

Distribution.—Lepers are met with most frequently on the plains.

Heredity.—The Javanese believe leprosy to be hereditary.

Contagion.—The natives of Java consider leprosy to be contagious.

Food.—Fish is held to be a cause of leprosy ; lobster and the roe of several fish are maintained to cause leprous in-

fection. The fish from the island of Madura opposite the town Sourabaya is held to be deleterious.

Segregation.—The moment leprosy declares itself the leper is expelled the town or village. A hut is built for him, and his friends take food to him regularly. The food is carried on a leaf and deposited at the door, and the friend departs quickly in case of infection.

Vaccination.—I cannot bring decisive proof that there is a connection between vaccination and leprosy, but the tendency of belief is in that direction.

Treatment.—Native treatment is unsatisfactory. I am myself (M. Albricht) working at a special form of treatment which will be published next year, the success of which is undoubted. [We have not yet heard of the cure—1897.]

PART II.

LEPROSY IN THE PACIFIC.

LEPROSY IN THE PACIFIC.

But little need be said specially respecting the cause of leprosy in the Pacific, and the apparent immunity of certain groups of islands; as the whole course of this inquiry has evolved itself into bringing out this answer, viz. :—Leprosy is found where Chinese coolies have settled; it is absent where the islands are free from them.

My information is very incomplete, and I would fain have more time and greater opportunities to study this problem, for it raises questions of even more serious import than that of the cure of leprosy. It affects the whole case of Chinese cheap labour; it deals with the possible infection of fresh groups of islands; it means the preservation or destruction of whole races.

Though my information is all too scant, it is not likely that any great centre of leprosy in the Pacific has been missed. Practically there are three homes of leprosy in the Pacific—Hawaii, Fiji, and New Caledonia. At once the thought strikes one, Hawaii is practically American, Fiji is British, New Caledonia is French. Yet the Americans, the British, and the French are not leprous, and cannot have introduced the disease. Leprosy is not indigenous in any part of the Pacific, yet there must be some common factor in the three centres which has determined its presence. That fact—indeed, the only common factor—is the Chinaman, and he *is* leprous.

Fiji has a population made up as follows:

Europeans	3,513
Fijians	114,891
Asiatics, chiefly Chinese .	2,409
Polynesians	5,650
Half-castes	791
Others	190
Total . . .	127,444

Referring to the report on Hawaii, and the suggestion therein made as to the cause of the susceptibility of the Hawaiians to disease, we find a good illustration of the same principle in Fiji, where some years ago 40,000 natives died of measles. We have no information as to when leprosy first appeared in Fiji, but from the fact that it is happily still rare, it cannot have long been there. The danger is there, and the case of Hawaii should be a salutary warning not to neglect rigorous measures to prevent the spread of the disease.

New Caledonia has already its quota of lepers. It is a coral-girt island, of volcanic origin, and inhabited by the same dark race as in Fiji, there being two distinct divisions.

We have no data as to the time when leprosy was introduced, but M. A. Mondiere, writing some ten years ago, does not mention leprosy among the natives. His words are—

"*Maladies.*—Les plus communes sont la scrofule et la phthisie, qui amène le plus de décès : moins cependant qu'à Taiti et à Nouka-Hiva. Du reste, les Européens, qui arrivent en Nouvelle-Calédonie avec la germe de cette dernière affection, voient leur maladie prendre une marche excessivement rapide. Pas des fièvres intermittentes, malgré la presence de nombreux marais. Les maladies de la peau sont très communes, surtout les affections pustuleuses. L'éléphantiasis est assez fréquent et prend, au scrotum, des proportions enormes."

With regard to Hawaii, it is unnecessary to recapitulate what has been said in the special report.

From the New Hebrides we have the report of the Rev. R. M. Fraser, dated Epi, that "we have no cases of leprosy in this island. . . . One island of this group is sometimes called Leper's Island, but I believe it is from a false impression of the discoverer." From personal conversation with the medical officers and naturalists of H.M.S. "Egeria" and "Penguin," I gather that the disease is absent from the Solomon Islands and the Caroline Islands, and I believe also from the Marquesas Islands.

Now, taking only those groups of islands where we are sure there is no leprosy, if we ask whether, in the terms of

the question, they enjoy any "immunity," we can only answer, No. They do not differ in race, climate, geological structure, food, or habits, from islands that are leprous.

But they are free from the Chinese coolie, and this is the reason—and the only reason that can be pointed out—why they have not been tainted.

There seems but one way to prevent the whole of Oceania from becoming leprous, and that is the exclusion or the rigid control of all Chinese coolies. It may not be practicable to exclude the Chinese altogether ; but where the very existence of the native races is involved, surely steps should be taken, and that speedily, to ensure that the coolies are not sought for in Kwantung and Fokien, where, alas ! they are most easily procured, and where they are almost certain to be tainted. We have the certain case of North Borneo, and the almost equally certain case of Hawaii, together with Fiji and New Caledonia, as bitter warnings. If ever there was a case in which strong Governments should act strongly for the sake of the weak, it is this. A whole ocean is threatened. It has been crossed by leprosy already. Hawaii was the stepping-stone to California, and California is a new and dangerous centre for the distribution of the disease.

Dr. J. L. Meares, Health Officer of San Francisco Board of Health, writing in 1884, says, "We probably have more than 100,000 Mongolians on this coast, and even if the Restriction Act should be efficiently enforced, still you have staring you in the face the fact that leprosy will continue to develop as heretofore among the people."

I write with no class prejudice. I have lived in China for years, and in the most leprous part of it. I know the good qualities of the Chinaman, and respect him in many ways ; but when it comes to tainting the world—and this is what it amounts to in the end—one would be wanting in every spark of humanity if one did not speak in the most unmistakable terms upon the danger that is at our doors in the Far East and the Far West.

Hawaii.

The Hawaiian or Sandwich Islands lie in latitude 20° in the North Pacific, and consist of seven large inhabited islands and four rocky islets. The largest, Hawaii, is seventy miles across, and contains 3800 square miles, the entire group being about 7000 square miles in area.

Like all oceanic islands that attain any elevation, they are of volcanic origin, and in Mauna Kea and Mauna Koa we have two of the finest examples of volcanic mountains in the world. The seat of government and the largest population are on the island of Maui, as the larger island of Hawaii is rendered almost sterile and uninhabitable by its three active volcanoes and great sheets of rough lava.

Hawaii is isolated in mid-ocean, being 2350 miles from San Francisco, the nearest part of the American continent, and over 600 miles from the nearest coral islet.

The climate is mild and equable, and must be considered remarkably healthy.

The inhabitants when discovered were of the brown Polynesian type, now classed rather with the Indonesians than the Malay race. At present this population is steadily diminishing, and the fine race seems doomed to extinction. The foreign population consists of Americans and Europeans, with a very large contingent of Chinese and Japanese. The Board of Health expenditure for the year ending March 21st, 1894, was $337,300, the greater part being for the leper establishment—so dreadful is the scourge. No one can study the careful and accurate reports issued by the Government and withhold a meed of pity and a word of admiration, for the oldest European state could not have shown greater zeal, wisdom, and self-sacrifice than this small nation, so recently risen from the savage state.

How fearfully leprosy has seized on Hawaii is shown by the latest report, 1894, which gives the total number of lepers as 1152, made up as follows:

Native Hawaiians . . .	1011
Half-castes	91
Chinese	26
Americans	5
Germans	4
English	3
Irish	1
Portuguese	5
Spanish	2
Canadians	1
Russians	1
Negroes	1
South Sea Islanders . . .	1
	1152

To Dr. C. B. Wood, of Honolulu, and to Dr. R. Oliver, of Molokai, the leper settlement, my thanks are due for full reports, the former adding to my indebtedness by the gift of a complete set of the official reports, containing about 1000 pages of printed facts, every page of which is worthy of study, and has been carefully perused in preparing this report.

It is unnecessary to reiterate the sad history of lepers in Hawaii, or to dwell upon the labours of the noble men and women who have given themselves to the task of alleviating the sufferings of the lepers, and who have in some cases fallen victims to the disease. Nor is this the object of this report, which is to endeavour to elicit facts regarding the origin and spread of leprosy in the Pacific, and the alleged immunity of certain groups of islands.

Briefly, the results of local work tell us that no cure has been found; every scientific man, every empiricist, nay, every quack who has been willing to try his hand in Hawaii has been welcomed, and even paid for by the Government. Some have claimed cures, but in every case it has turned out to be alleviation only, and the patient has at length succumbed to the disease. Alleviation, often marked, and of immense value in mitigating suffering, is all that can be claimed; a cure never. One is almost driven to despair in

studying the long list of failures, but science hopes on, though the lepers are dying.

As to *heredity*, the fact stares us in the face that not one infant is ever born a leper. Some become leprous in after years, but this may be through long-continued intercourse with the leprous.

So with *contagion*; simple contact never seems harmful. Healthy wives and husbands live with their leprous partners for years—some over twenty years—and escape; but the majority succumb at last.

Vaccination, say both the reporters, in the old time when arm-to-arm vaccination was in vogue, "undoubtedly" helped to spread the disease. Neither syphilis nor tuberculosis is considered by my correspondents to have any connection with the disease.

Turning now to the immediate subject, the origin of the disease in these islands. Here we have a group of islands, completely isolated not only from continental lands, but with wide stretches of deep sea, over 2000 fathoms, from the nearest islands. How did leprosy get there? The natives have no name for it, and call it *Mai Pake*, Chinaman's disease—a significant fact, especially as the language is rich in medical terminology. The islands were first discovered by Captain Cook in 1777, but he and others thought they must have been previously visited by the Spaniards. He and the subsequent voyagers carefully describe the skin diseases of the natives, and never hint at leprosy, nor do the early American missionaries. All this evidence is fully set forth at the end of this report, together with a history of the rise and progress of the disease, abstracted from native sources. It was always spoken of at first as a new disease, and not till long after it had taken hold on Hawaii did anyone suggest it had lurked unseen from barbaric times. It is highly improbable that the medical authorities would have overlooked the disease, and the definite records made at the time point to the first uneasiness, followed by alarm and the adoption of vigorous measures for its restraint.

Soon after the discovery of Hawaii the islands became a favourite place of call for the South Sea whalers, and from this time constant intercourse was kept up with the outside world.

Between 1844 and 1846 there was a large influx of Americans into California, then belonging to Mexico, and in 1848 that country was ceded to the United States, and a larger number of immigrants than ever came to the Pacific coast. Trade with the Sandwich Islands sprung up, and has never since flagged. In 1848 came the great discovery of gold in California, and the gold rush is still remembered as a species of madness that affected the whole world. Then we hear of the Chinese; they came to California, and by the year 1856 Hawaii was in constant communication with California, Chili, and China.

Here, then, we have the incentive to the Chinese to visit Hawaii; it was the gold fever of California. By the year 1856 Hawaii was (I quote from contemporary writings) exporting sugar, molasses, coffee, salt, lime, beef, hides, tallow, goatskins, potatoes, and various fruits. Now almost all these things are foreign to Hawaii, and it is a strong proof of the rapidity with which the country was civilised and planted.

If now we turn to the register appended, we shall see that it was exactly at this period when leprosy is said to have appeared; it is 1850 that the Board of Health is established, and nothing said about leprosy; and it is not till 1863 that Dr. Hillebrand reports on "the rapid spread of that new disease, called by the natives Mai Pake." In 1864 it is reported by the President of the Board of Health as spreading to other islands; and from this time on, the story of Hawaii, and of its leper settlement at Molokai, is known to all.

The evidence seems complete. Leprosy was introduced into Hawaii by the Chinese, at, or soon after, the discovery of gold in California.

One other point claims attention. Throughout the whole of this long investigation it has been proved, over and over again, that the Chinese are not only the probable introducers of leprosy, but the chief victims. Here in Hawaii the case is reversed; *yet even here the Chinese form the largest proportion of lepers of other than Hawaiian blood.* Out of fifty lepers of non-Hawaiian blood, not less than twenty-six, or more than half, are Chinese.

This is the one solitary exception over all the great area, stretching over 113° of longitude and 60° of latitude, in which a native race is more leprous than the Chinese. With this exception, all over China, Indo-China, Malaya, the East Indian Archipelago, and the Pacific, it is the Chinaman who is the dominant leper ; the other races either escape, or are but slightly tainted. There is nothing in the climate or physical structure of Hawaii to account for this remarkable fact ; there must be something in the Hawaiian constitution different from that of the Malay, to whom he is allied, though remotely, in blood. We know that isolated communities are very liable to acquire disease from strangers, as in the well-known case of the people of St. Kilda ; and it is this which makes measles such a scourge in uncivilised places like Fiji. Now the Hawaiians were among the most isolated people in the world, and until a century ago never saw a creature except of their own race. They were quite suddenly brought within the influence of a higher civilisation, which they adopted with great heartiness and success. They also received into their midst a greater number of Chinese than any other place in the Pacific; and they are being swept off the face of the globe by the ravages of the fell disease the Chinese brought with them. This affords a rational and apparently sufficient explanation of all the anomalous facts respecting leprosy in Hawaii.

The very full and accurate reports (amounting to 992 pages of letterpress) published by the Hawaiian authorities, and the impartiality with which both friendly and adverse criticisms are recorded, enable us to trace the history and the growth of opinion concerning the spread of leprosy in these charming islands. The list of publications and the names of authorities having already been given in full, it is deemed unnecessary to burden the text with a multitude of cross references. Every report has been carefully sifted, and all facts and opinions of value have been noted.

Source and spread of the disease.—Considerable interest attaches to the question whether leprosy was introduced into these islands by Chinese, or whether it existed when the early navigators first visited the land. The evidence which is not cited in the Hawaiian reports has been col-

lected from contemporary travels and reports, and is as follows :

1777. Captain Cook discovers or rediscovers the group to which he gave the name of Sandwich Islands.

1779. Captain Cook again visits the islands, and, losing his life, the narrative is taken up by Captain King. The former, knowing some of his men to be suffering from venereal disease, gives stringent but ineffectual orders to prevent its introduction among the natives. Captain King afterwards states that "as there was not the slightest appearance of that disorder amongst them on our first arrival, I am afraid it is not to be denied that we were the authors of this irreparable mischief." Speaking of Mowhee (Maui), he says, "We found them to be of the same nation with the inhabitants of the islands more to leeward, which we had already visited, and if we did not mistake them, they knew of our having been there ; indeed, it appeared too evident, for these people had contracted the venereal disease, and as yet I knew not any other way of its reaching them but by an intercourse with their neighbours since our leaving them." He describes a priest as a "little old man, of an emaciated figure, his eyes exceedingly sore and red, and his body covered with a white leprous scurf, the effect of an immoderate use of ava." Again he says, "They are, in general, very subject to boils and ulcers, which are attributed to the great quantity of salt they eat with their flesh and fish. The erees (chiefs) are very free from these complaints ; but many of them suffer still more dreadful effects from the immoderate use of the ava. Those who are most affected by it had their bodies covered with a white scurf, their eyes red and inflamed, their limbs emaciated, the whole frame trembling and paralytic, accompanied with a disability to raise the head. . . . The young son of Terreeoboo, who was about twelve years old, used to boast of his being admitted to drink ava, and showed us with great triumph a small spot in his side that was growing scaly." The population of the islands was estimated at 400,000, and he says, "I am pretty confident that in this calculation I have not exceeded the truth in the total amount."

1786. The ill-fated La Perouse, writing of venereal disease in the islands, says, "Their features have no delicacy, and their dress discovered to me, among much the greater number, traces of the ravages committed by the venereal disease. As there were no women came to the ships in the canoes, I thought that they attributed to the Europeans those evils of which they bore the marks; but I soon perceived that this remembrance, supposing it real, had not left on their minds any kind of resentment." He then gives his reasons for doubting the European origin of this disease: his surgeon-major, a very enlightened man, treated several of the sufferers, whose disease he considered, judging from his experience in Europe, was from twelve to fifteen years old; he also saw children of seven or eight years of age labouring under it, who could only have been infected while yet in their mothers' wombs. He then cites Captain King's account of Maui, quoted above, which he thinks tells against the probability of the disease having been communicated sixty miles to leeward in so short a time.

In the same year Captain Pollock visited the islands, and describes the same priest as suffering from a leprous scurf, due to drinking ava.

1792. The celebrated Captain Vancouver is the next who describes the islands, and after quoting from Captain King, goes on to speak of the sad increase of immorality among the natives due to European intercourse. He also describes the white scaly disease due to ava drinking. By this time the natives had acquired firearms from unscrupulous European and American traders, the result being a marked and appalling diminution of the population.

1823. The story is now taken up by the missionaries of the American Board. In this year the Rev. C. S. Stewart landed in the islands, and kept almost a daily record of events. From these Dr. A. Mouritz, of Molokai, quotes, and they are the earliest references in the Hawaiian Reports. The extracts are as follows:

"Nor to mention the frequent and hideous mark of a scourge, which more clearly than any other proclaims the curse of a God of purity, and which while it annually consigns hundreds of this people to the tomb, converts

thousands while living into walking sepulchres. The inhabitants generally are subject to many disorders of the skin. The majority are more or less disfigured by eruptions and sores, and many are unsightly as *lepers*. The number of either sex, or of any age, who are free from blemishes of this kind is very small, so much so that a smooth and unbroken skin is far more uncommon here than the reverse is at home."

Again, "We seldom walk out without meeting many whose appearance of misery and disease is appalling, and some so remediless and disgusting that we are compelled to close our eyes against a sight that fills us with horror. Cases of ophthalmia, scrofula, and *elephantiasis* are very common."

These quotations, in the opinion of Dr. Mouritz, prove that true leprosy was then prevalent in the islands—an opinion in which probably few will follow him, as it is diametrically opposed to the subsequent history of the disease.

1840. Dr. Mouritz mentions a "Mr. Brickwood, a resident on these islands in the year 1840, who recognised the disease of a certain native in Honolulu to be leprosy. This gentleman had a previous knowledge of the disease in another country where it prevails, viz. Egypt."

1848. Leprosy said to have been introduced by the Chinese.

1850. The Board of Health organised, December 13th, King Kamehameha III. It authorises "everything . . . . that ought to be done or undone, removed or procured, for the preservation and cure of contagious, epidemic, and other diseases, and more especially of cholera." It does not mention leprosy by name, which it surely would have done had the disease been prevalent, as Dr. Mouritz argued it was from the American missionaries' reports in 1823.

1853. Dr. Mouritz quotes Dr. Hillebrand as having seen the first Hawaiian leper at this date.

1857. Mr. R. M. Meyer, the Board's agent at the leper settlement, Molokai, writing in 1886, states that he first heard of leprosy in this year.

1859. In the same report Mr. Meyer states that he saw the first case of leprosy "on this island" (? Maui) in 1859

or 1860. The patient was a young man who succumbed in less than three years. He further states that in 1850 very little, if anything, was heard of the disease, which he thinks was introduced by the mixed crews of the whale-ships, "which had negroes, black and white Portuguese, and men of other races, coming from countries where leprosy was, and still is, prevalent."

1863. In April Dr. Hillebrand, surgeon to the Queen's Hospital, reports on "the rapid spread of that new disease, called by the natives *Mai Pake*," *i. e.* Chinese disease.

In December the Board of Health discussed "Mai Pake as threatening to become more general."

1864. In February the President of the Board of Health learns that the disease is spreading at other islands. A leper census is ordered.

In May a letter to the 'Pacific Coast Advertiser,' dated Kona, Hawaii, May 12th, 1864, states that whereas "one year ago there was but one case of Mai Pake in the district, ... now within a distance of five miles from that house cases of this incurable disease may be counted by the dozen."

In August Dr. Hillebrand reports the disease as spreading, and recommends isolation as the only remedy.

1865. In January an "Act to prevent the Spread of Leprosy" was passed. Its preamble states that "whereas the disease of leprosy has spread to a considerable extent among the people," &c. It authorises the setting apart of Government lands for establishments for the isolation of lepers.

In February Dr. D. Baldwin, of Lahina, states that the disease is yet "only a mild form of leprosy," but fears it will assume "terrible features." "We are," he remarks, "beginning to have a crop of leprous young children."

In April $15,000 was appropriated especially for a hospital, &c., for lepers.

In July the *makai* (seaward) lot of Kalihi was purchased, and a leper hospital started.

In September Kalaupapa, on the island of Molokai, was purchased for a leper settlement.

1874. The President of the Board of Health, Mr. H. A Widerman, says, "Seclusion—and strict seclusion—has to

be maintained *if you want to save the balance of the Hawaiian race.*"

1873. The Hawaiian Evangelical Association fears "our Hawaiian people will become a nation of lepers."

1882. The President of the Board of Health, Mr. W. N. Armstrong, says, "There are probably 2000 lepers in the kingdom, or 5 per cent. of the whole native races."

Dr. G. L. Fitch, medical superintendent of the Kakaako Hospital, estimates the number of lepers at 1600. He states that during the last forty years or so, less than twenty cases have occurred among the whites.

1884. The President of the Board of Health, Mr. M. Gibson, estimates the number of lepers as at least 2 per cent. of the entire population.

1892. Dr. Arning, an expert who had spent two years in the islands studying the disease, writes from Europe, "Hawaii is decidedly not as recent a centre of leprosy as was accepted in 1883."

1894. The executive officer of the Board of Health, Mr. C. B. Reynolds, reports, "The gathering in of the lepers from Kalalau and Wainiha valleys, also from Niihau and Lanai, places that have been undisturbed strongholds of lepers for many years, has added over 60 to the number of those sent to Molokai this period, the total of which is 340, as against 333 for the period (two years) ending 1892, and 798 for the period ending 1890. These figures go to prove that impartial and thorough segregation will eventually rid the islands of this disease. He gives the following table :

				No. of Lepers.
April 1st,	1886,	to March 31st,	1887	612·7
,,	1887	,,	1888	618·8
,,	1888	,,	1889	921
,,	1889	,,	1890	1150
,,	1890	,,	1891	1168
,,	1891	,,	1892	1137
,,	1892	,,	1893	1105
,,	1893	,,	1894	1140·2

List of Hawaiian Authorities.

1876. 'Report of the Board of Health to the Legislative Assembly of 1876.' Honolulu, 1876, pp. 10.

1878. 'Biennial Report of the Board of Health to the Legislative Assembly of 1878.' Honolulu, 1878, pp. 13.

1885. 'Dedication of the Kapiolani Home for Girls, the Offspring of Leper Parents, at Kakaako, Oahu, by Their Majesties King Kalakaua and Queen Kapiolani. Description of the Leper Settlement on the Island of Molokai.' Honolulu, 1885, pp. 42.

1886. 'Leprosy in Hawaii. Extracts from Reports of Presidents of the Board of Health, Government Physicians, and others, and from Official Records, in Regard to Leprosy before and after the Passage of the "Act to prevent the Spread of Leprosy," approved January 3rd, 1865. The Laws and Regulations in Regard to Leprosy in the Hawaiian Kingdom.' Honolulu, 1886, by authority, pp. 192.

1886. 'Appendix to the Report on Leprosy of the President of the Board of Health to the Legislative Assembly of 1886.' Honolulu, 1886, pp. 156.

1886. 'Leprosy in Foreign Countries: Summary of Reports furnished by Foreign Governments to His Hawaiian Majesty's Authorities, as to the Prevalence of Leprosy in India and other Countries, and the Measures adopted for the Social and Medical Treatment of Persons afflicted with the Disease.' Honolulu, 1886, pp. 247.

1890. 'Biennial Report of the President of the Board of Health to the Legislature of the Hawaiian Kingdom, Session of 1890.' Honolulu, 1890, pp. 143.

1892. 'Biennial Report of the President of the Board of Health to the Legislature of the Hawaiian Kingdom, Session of 1892.' Honolulu, 1892, pp. 125.

1894. 'Report of the President of the Board of Health to the President and Members of the Executive and Advisory Councils, 1894.' Honolulu, 1894, pp. 64.

Total number of pages in the Official Reports, 992.

HONOLULU.

Letter from C. B. WOOD, M.D., Honolulu.

Physical features.—Given above.

Distribution.—There are no plains; the natives, except those living in the cities, live generally in the valleys; no special effect of elevation has ever been noted. The same is true of moisture or dryness.

Heredity.—The natives believe the disease to be hereditary to some extent, but it is a belief which they have gathered from the whites.

Contagion.—The natives believe leprosy to be contagious, but they have no fear of it. Lepers among them are not shunned, but on the contrary are harboured and hidden away by them to prevent their discovery and arrest (for segregation) by the Board of Health. They will fearlessly expose themselves to contagion by eating and sleeping, and smoking the same pipe with a leper relative or friend.

Leprosy is considered contagious by the physicians and the public generally.

Food.—Raw fish has been assigned by some as a cause, but is not generally credited. The natives are very fond of raw fish, and eat it constantly.

Segregation.—An almost inaccessible piece of land has been assigned by the Government on the north shore of the island of Molokai. This is set apart for a leper settlement. All persons suspected of leprosy are required to report at Kalibi, near Honolulu, on certain days for examination by a Board of five medical men. If pronounced lepers they are sent to Molokai; if suspected merely they are given their liberty, but are required to report themselves once a month to the Board of Health.

Tuberculosis, syphilis, and malaria.—There is no connection between leprosy and any of these. Any two or three may exist in the same person. It is not at all uncommon for leprosy and syphilis to co-exist. Tuberculosis is not very prevalent in this country.

Vaccination.—A number of years ago, when arm-to-arm

vaccination was practised, it undoubtedly helped to spread leprosy. All vaccine now used is imported, hermetically sealed.

Treatment.—Ichthyol, salol, salicylate of soda, creasote, and arsenic internally. Ichthyol, chrysophanic acid, pyrogallic acid, and hot sulphuret of potash baths externally. There is no native drug of any value. The natives consider Awa-root (Kawa-kawa) beneficial, but without warrant.

Extracts from report of RICHARD OLIVER, M.R.C.S., Molokai, Hawaiian Islands.

"Anything I might say in answer to the physical features and distribution of leprosy in these islands would be of no value to you. This settlement is merely the place of abode of lepers gathered from all parts of Hawaii."

Heredity.—The natives believe in the hereditary transmission of leprosy.

Contagion.—The natives consider leprosy to be contagious.

Food.—No kind of fish or other food is assigned as a cause of the disease by lepers here.

Segregation.—A portion of Molokai, one of the islands of the Hawaiian group, containing about 6000 acres, is set apart for lepers from all parts. Segregation is strictly observed, and is regulated by the Board of Health and the police.

Tuberculosis, syphilis, and malaria seem in no way connected with leprosy.

Vaccination.—In years gone by vaccination undoubtedly caused increase of leprosy, owing to the lymph being obtained indiscriminately and carelessly.

Treatment.—The natives have no drugs of any repute. At various times, and for lengthened periods, all drugs of any repute whatsoever in the treatment of leprosy have been tried in Molokai.

Creasote in large doses has been of decided benefit when it has been persevered in for months or years.

Hoan-Nan in the anæsthetic form of leprosy is valuable in relieving symptoms.

For general treatment, nothing has equalled the use of the hot-water bath daily. Profuse sweating produced by medicating the water with sulphuretted potash and other drugs seems to be the cause of the noted improvement. At the same time attention has to be paid to the food and general condition of the patient. Tonics, arsenic, Hoan Nan, creasote, with regular bathing, have in mild cases effected an apparent cure. In the more advanced cases this hot-water treatment is also of service ; but in all cases when it has been dropped, sooner or later the disease manifests itself.

The Japanese secret treatment is really nothing more than hot-water bathing with arsenic, iron, &c. With the Japanese, however, the bathing is pushed to extremes, the patients become anæmic and actually blue, and then, when they commence to fail, do so rapidly. Bathing in moderation, with the above-mentioned medicinal treatment, is the only method known by which the disease can be arrested.

Fiji.

(Leprosy prevalent.)

The Fiji group contains about a hundred islands, nearly all lofty and fertile, and, like all high Oceanic islands, are of volcanic origin.

Two communications have reached me from this distant Summer Isle of Eden, and these just before the last mail goes to Europe. Distances are so immense, and posts so few and far between, that I owe an especial debt to Drs. Barnes and Pound for answering so promptly. The former writes from the small island of Ovalau ; but as he mentions lepers coming to the hospital at Suva, I infer that this scourge has spread over the more populous islands. Happily he reports, " It is very rare in this island."

Segregation is seldom enforced, and there are no native specifics, and these facts point to the disease being an imported one. Indeed, it must have been, for there is not a particle of proof that the disease was known in the Pacific islands till well into the present century.

The connection between Fiji and China began early, for

this has been a favourite source of sandal-wood ; then came planting, and its concomitant diseases ; and though my evidence is too scanty to prove it, there is nothing against the suggestion that to China these beautiful isles are indebted for this blight.

Fiji is interesting as being the western limit of the Papuan or black race. They are a fine people, capable of high culture.

For other details see report on leprosy in the Pacific.

Report by Dr. J. M. Barnes, Leveika, Ovalau, Fiji, October, 1894.

(Leprosy rare.)

Physical features.—My district is a very small island (Ovalau), twelve by eight miles, rocky and mountainous (up to 2000 feet) ; soil poor and almost entirely cultivated by natives, and sparsely populated. Rainfall 140 inches per annum. The natives live in small villages scattered round the island shores, with one village in the valley in the interior.

Distribution.—No hill dwellers except in the village referred to.

Heredity is believed in.

Contagion.—The natives believe leprosy is contagious.

Food.—As far as I am aware, the natives find no connection between the diet and leprosy.

Segregation.—Not usually enforced by the natives, but when it is the leper is compelled to live on the very outskirts of the village, and not allowed to mingle with the community ; he is given a wide berth.

Tuberculosis, syphilis and malaria.—No connection observed.

Vaccination.—No connection between vaccination and leprosy observed.

Treatment.—No lepers come to me for treatment. Some are occasionally treated in the Suva (another island) Colonial Hospital. I know of no reputed native drugs.

Report by J. F. Pound, Esq., M.R.C.S., &c., Colonial Surgeon, Suva, Fiji, October 23rd, 1894.

Distribution.—Leprosy appears to be more common inland.

Heredity.—The natives believe leprosy to be hereditary.

Contagion.—The disease is held by the natives to be contagious.

Food.—No kind of food is considered to predispose to leprosy.

Segregation is practised in some districts, but neglected in others. Generally a native house is built for the leper just outside his village.

Tuberculosis and leprosy seemed to be in some way connected.

Vaccination.—I know of no evidence I could advance one way or the other.

Treatment.—The natives have a drug [not named] which they employ largely, but it seems powerless; all cases treated by natives going rapidly to the bad.

Extract from letter of Sir William des Vœux, G.C.M.G., formerly Governor of Fiji.

(Leprosy prevalent.)

Leprosy is undoubtedly very common in Fiji. One or two of the high chiefs died of it in my time.

There is no malaria in the smaller islands, or at least in many of them, but in the largest—Viti Levu—malaria is fairly common near the debouchure of the rivers; the evil is, however, trifling in comparison with most other tropical countries. In my time there were no Chinese coolies.

Fiji is the border-land between the light and dark coloured Polynesian races, the former probably of Malay, the latter of negro origin.

Borneo.

Report by S. B. J. Skertchly.

(Leprosy met with; confined almost exclusively to Chinese; when Chinese leave a district leprosy disappears.)

Borneo, the largest island in the world if we except Australia, is about 300,000 square miles in area, or three times the area of the United Kingdom, and it has a population of about 2,500,000. It is gathered round a mountain system, which culminates in the grand mountain of Kinabalu in North Borneo, from which long ranges are sent off like the fingers of the hand. These fingers stretch all over British North Borneo, save where they are broken by the many rivers; and the forefinger points south and reaches to near the coast, but leaving a wide stretch of lowlands between its tip and the sea. Other fingers point east and west; but no map the writer has seen conveys any adequate idea of the general aspect of the land. It must suffice us here to say that the greater part is under 500 feet of elevation, and that the lowlands are chiefly in the south.

Its geology is simple. Granite forms the core of North Borneo, but occupies little area. Then come schists of Archæan age, which occupies much of the interior; and over these lie a series of sandstones and limestones, with coal-seams, the oldest of which are probably of Oolitic, the newest certainly of Tertiary age.

The rivers are numerous, and many can be navigated by launches for several hundred miles. Borneo is in fact a small continent rather than a large island. It is practically one vast primeval forest, and the population is sparse.

The true natives may be classed under two headings, Dyaks and Buludupies. The Dyaks are generally classed as a branch of the Malay stock, but long and intimate intercourse with them has forced the writer to consider them as belonging to the Indonesians. The Buludupies of North Borneo are as certainly neither of Dyak nor Malay origin. They belong possibly to that curious relic of the

Caucasian race which has left another outlier in Cambodia, though I have not ventured to colour them so on the map. The Malays are not indigenes, and only occupy the littoral. Chinese, Klings from the Madras coast, Arabs, and Somalis are found, and save the first are few in number. The Chinese reached Borneo in the thirteenth century, and have left their impress on the people of the west coast of the island.

Owing to Dr. J. Walker, the principal medical officer of British North Borneo, having left the country, and to changes in the medical staff generally, no direct replies were received from this part of Borneo, but Mr. S. B. J. Skertchly and Mr. E. F. Skertchley, who have spent several years and travelled much in the country, have given me the following notes, but wish me to state that they did not have their attention specially directed to the subject while there. From other parts of Borneo no replies have yet come to hand, but the official report of the Netherlands authorities to the Hawaiian Government affords some useful information.

The years in which the Messrs. Skertchly were connected with Borneo were from 1888 to 1893 inclusive. In 1888 there were no lepers in North Borneo, but several cases among Chinese occurred within two or three years, when a great number of coolies from Kwantung and Fokien were brought into the country for the newly-opened tobacco estates. They came in hundreds by every ship, and soon a large contingent was shipped from Singapore, and latterly a number of Javanese from the tobacco estates of Sumatra.

In 1890 the first case of leprosy was noticed, and in this year the Government set apart an old kajang (palm-mat) hospital or shed for the reception of lepers on the island of Bahalla, near Sandakan. There were never more than ten inmates, and they have since been deported from the land. All of them were Chinese, and all from South China.

The only case of leprosy other than Chinese was that of a Portuguese about twenty-five years of age. He was a convict, and was believed to be syphilitic, but the disease proved to be leprosy. He was kept in a separate room in the jail, and when well enough to move about was not in

the least shunned by the other prisoners, who were Chinese, Malays, Philippine Islanders, and occasionally a European. He suffered from the tubercular form of the disease, and was the only case of the sort. He was still alive when my informants left Borneo.

The Chinese lepers on the island of Bahalla had the "dry" anæsthetic form of leprosy. They were provided with rice, salt, and so on by the Government, supplies being taken over to them once a month. They seemed quite happy, and were comparatively well off; for they made quite a good garden, and grew as many vegetables as they wanted. Their crops were water-melons, sweet potatoes, French beans, ochra, tapioca, and a little sugar-cane. The Government gave them tobacco and other little luxuries. A *kelung* or fish-trap was built for them, and afforded an ample supply of fish.

The station was quite isolated, being a little plain cut off from the rest of the island by impassable cliffs, and they were not allowed a boat.

A Chinese dresser, attached to the coolie barracoons on the same islands, paid very frequent visits, as did the principal medical officer, Dr. Walker; and Mr. E. F. Skertchly was very often there, and reported on their condition to the doctor.

He noticed that the lepers at work in the garden were anæsthetic in the fingers, which were crumbling away like white dust, and he has seen quite large patches detached and adhering to the *chungkols* or hoes, without the leper being conscious that he was crumbling away. They were quite happy, and not at all jubilant when in 1893 the edict went forth for their deportation.

Messrs. Skertchly were in constant connection with all classes of natives, both in the towns and far up into the interior, and never saw or heard of a native leper, though pityriasis and ringworm are very common diseases. North Borneo may be certainly pronounced free of leprosy, but this may not long be the case.

When the lepers were deported the country was in a state of stagnation, most of the estates had been shut up, and the greater part of the coolies had been sent back to their homes.

The Bajows, a roving tribe known as sea gipsies, came down from their haunt at Nunoyan Laut, and carried off the kajangs and floor planks of the hospital. This shows that they had no fear of contagion, and it will be curious to notice whether they acquire leprosy. Nunoyan Laut is a low sandy island, about a mile and a half from the mainland, from which it is separated by shallow water, and it is about five miles from Bahalla. The Bajows are quite isolated, living entirely by fishing and holding hardly any communication with the towns or even the other natives, and practically none whatever with the Chinese. If, therefore, these people should develop leprosy, it will be one of the finest examples of contagion. Hence it is as well to record the facts.

None of these lepers had any idea of any connection between leprosy and vaccination; and though the natives of Borneo now fully appreciate the value of vaccination, and will even travel miles to be vaccinated, Mr. Skertchly never heard a hint that they feared it might put the stamp of leprosy upon them. It should be stated that this gentleman never put the direct question to the natives; he had not had his attention specially directed to leprosy at the time; but he has often had long talks with the natives, and has especially inquired whether they ever observed any ill effects from vaccination. The answer has invariably been in the negative. The natives are very frightened of smallpox, which some years ago depopulated whole districts.

Mr. Skertchly tells me both the Dyaks and Malays are clean people, much more so than the peasantry of the west of Ireland, and that he has often, in the jungle, slept under the same mat with them, but that he would have to be in desperate straits before he would do so with a Chinaman.

A very strong proof that leprosy is not endemic in North Borneo is the fact that they have no native word for it. The Malays speak a dialect of Malay slightly differing from that of the Straits, and they certainly have no word for the disease, and always described it by the simple word *sakit*, sickness, with the expressive pantomime of slowly blowing the nose into the hand. Educated Malays of course knew

the word *kosta*, but were so unaccustomed to its use, and so identified the disease as a stranger, that they generally called it by the English name leprosy. A stronger proof of the foreign origin of leprosy could not be desired.

The official replies respecting leprosy in the Netherlands East Indies give some useful information, but it is noticeable that although so much of Borneo is under Dutch rule, leprosy is not mentioned as occurring there. Had it been even as common as in Java, where it is reported as rare, it is unlikely that it would have been passed over.

The result of this inquiry is only definite as regards North Borneo, where we know leprosy was unknown to the natives, and where it was introduced about 1888 by Chinese from South China.

In South Borneo the same is probably the case, but this can only be inferred from the omission of any notice of the disease in Dutch Borneo in three separate official reports, drawn up for the purpose of demonstrating the extent and character of the disease.

Borneo is, however, being affected, and as we know the source of the infection, it might be well for the planters to take steps to try and obtain their coolies from the untainted north of China.

For notes as to the thirteenth century incursion of Chinese to North Borneo, see Mr. Skertchly's 'Report on the Physical Conditions under which Leprosy occurs.'

Philippine Islands.

(Leprosy endemic.)

Physical features.—A group of large islands bounding the eastern side of the China Sea, and extending between 4° 40′ N. latitude and 20″ N. latitude, and together comprising an area about the size of the British Isles.

The geology and fauna have been but little studied, owing to the want of scientific investigation. The Spaniards, although they have occupied the country for well-nigh 300

years, have done little or nothing in the matter. Gneiss, chlorite slate, Eocene limestone, conglomerate sandstone, and modern volcanic rocks are met with in various parts. Mountainous ranges characterise every island, and the narrow valleys intervening afford passage to plentiful streams.

The islands are tropical throughout; the winter months are cool, the spring and summer hot, and the autumn rainy. The aborigines, now few in number, are Negritoes; they were driven inland by a Malay people who now form the main native population of the islands.

Chinese immigrants form a large section of the population in the town of Manila; alone they number well-nigh 40,000.

Letters from Dr. Donelan and Father Evaristo Forres, both dated from Manila.

(Leprosy prevalent.)

No European is reported to have contracted leprosy in the Philippines.

There is one hospital near Manila, "Hospital de San Lazaro," which was erected in the year 1577, and rebuilt in the year 1774. The hospital consists of 180 beds devoted exclusively to the treatment of lepers.

Dr. Donelan at one time collected a good deal of information on the subject of leprosy, but the record has not been published.

There seems no doubt, from the large size of the hospital accommodation, that leprosy is prevalent in and around Manila. It will be observed that here the Chinese are in enormous numbers; the chief recruiting ground, moreover, being the leprous Chinese provinces of Kwantung and Fokien.

New Guinea.

Letter from Sir William McGregor, K.C.M.G., M.D., Lt.-Governor British New Guinea, dated from Government House, Port Moresby, June 16th, 1895.

(Leprosy is met with; syphilis unknown; vaccination not introduced; no native word for the disease.)

New Guinea, a continental island to the north of Australia, lies between latitude 0° 5′ to 11° 5′ S. Practically all possible physical and geological features obtain,—swampy, hilly, and alluvial lands; land on limestone, lava, sandstone, slate, basalt, granite, &c.

Mountains rise to a height of 13,000 feet. The racial tribes are of the Melanesian (Papuan) type—"Oriental negroes."

Distribution.—Leprosy occurs sporadically anywhere.

Heredity.—The natives do not believe in heredity; they attach so little importance to the subject of leprosy, that in twenty-seven known dialects there is no specific name for the disease. Leprosy is known as a "sore."

Contagion.—Natives do not believe leprosy to be contagious.

Food.—No food is assigned as a cause of leprosy, unless sometimes "il mal occhio." Fish used largely.

Segregation.—Not in use.

Allied diseases.—*Tuberculosis* almost unknown. *Syphilis* unknown. *Malaria* is unknown in Fiji, but there is plenty of leprosy there.

Vaccination.—Not yet introduced.

Treatment.—No native Papuan remedy is in use. The roasting cure of Fiji is unknown here.

A note on the diseases of New Guinea in the 'Encyclopædia Britannica' reads as follows:—"The chief diseases are skin diseases, with which in some places one third of the population is affected,—amongst these a sort of leprosy, to which, as well as to a dropsy (beri-beri), Europeans are subject; catarrhs, boils, syphilis," &c. This may be called a scientifically loose statement. There are no "sorts of

leprosy ; " leprosy is a distinct disease. Sir William McGregor declares syphilis to be unknown, but this report includes syphilis in its list of diseases.

Extract from letter of Mr. H. M. Dauncey, Delena, New Guinea.

(Leprosy almost unknown. No native name for the disease.)

" I would answer your questions concerning leprosy if I could, but I am sorry to say I cannot for several reasons. Amongst them these :—though I have heard of a few (very few) cases in New Guinea, I have never seen a case of leprosy as far as I know. I do not think the natives know leprosy as distinct from sores, &c., for our senior missionary, the Rev. W. G. Lawes, has had to use an adaptation of the English word in translating the New Testament."

New Britain.

(No leprosy.)

Report by Rev. William Brown, Wesleyan Missionary.

New Britain, an island some 340 miles by 23, is one of the Polynesian group. Separated by a channel 20 miles wide lies an island of almost the same extent—New Ireland, and in this channel lie the Duke of York group from whence Mr. Brown dates his letter. They lie in a horseshoe-shaped group some 50 miles eastward from New Guinea, and between the fourth and sixth parallels of 4 S. and 6 S. lat. The islands are studded with active volcanoes on a very grand scale ; the vegetation is luxuriant and varied. The inhabitants belong to the Papuan section of the Melanesian race.

" Port Hunter, Duke of York,
" New Britain,
" *Sept.* 1*st*, 1894.

" Dear Sir,—I should be very pleased to answer your questions concerning leprosy, but as far as I know there are no cases of leprosy in this district. There are many

persons affected with scrofulous sores, which we missionaries have tried in vain to cure, but they are not leprous. Vaccination has never been introduced amongst the natives. I have never heard of any disease among them in this archipelago that might be looked upon as leprosy.—Yours faithfully, WILLIAM BROWN.

"No leprosy in this group of islands. Vaccination not practised."

NEW HEBRIDES.

(No leprosy.)

Report of Mr. OSCAR MICHELSON, dated October 22nd, 1894, Mission Station, Tongoa, New Hebrides.

"The reply to your question is short, viz. 'I do not believe there exists leprosy in the New Hebrides.' Of course it would be an interesting inquiry to try to find out in what way these lands differ from other countries, and by such means perhaps the cause of leprosy might be discovered; but that, I suppose, is not what you want at present. There is an island in this group called 'Lepers' Island,' but that I believe is founded on a mistake. Perhaps an unusual number of the people there may have had scrofulous sores, which have been mistaken for leprosy."

Physical features.—The New Hebrides extend for a distance of 700 miles in latitude 9° 45′ S., and 20° 16′ S., having the Solomon Isles some 200 miles to the north-west, and at a similar distance New Caledonia to the south-west. The whole group is volcanic, and the surface covered by dense woods and tropical vegetation. The inhabitants are of the Melanesian race, but Polynesian tribes are met with.

Mr. Michelson's report is very complete—"There is no leprosy." The reference to a "Lepers' Island" may not, however, bear the interpretation he puts upon it. There may have been no mistake in the name at one time, but as in the Friendly Islands leprosy has decreased, so it is possible that it has decreased and finally disappeared here. There has been no influx of immigrants to the New

Hebrides during recent times, and it may have been owing to this that they have escaped contamination.

Report of the Rev. R. M. Fraser, July 23rd, 1894, Api, New Hebrides.

"We have no cases of leprosy in this island. One of this group is sometimes called Leper Isle, but I believe it is from a false impression of the discoverer."

Friendly Islands.

(Leprosy disappearing.)

Report by H.B.M. Vice-Consul, Tonga, October 17th, 1894.

"I enclose my answers. There can be no doubt that the disease is not nearly so prevalent or so serious as it used to be when the population of these islands was much greater than it is now. I have not, for instance, seen a "bad" case since my advent nearly eight years ago.

Physical features.—The Friendly or Tonga group of islands lie in the South Pacific, extending from 18° 5′ S. to 22° 29′ S. latitude, to the eastward of the Fiji group. A Polynesian people inhabit them, distinguished by being the most advanced of that race in social order and intellectual power.

The geological formation is that of a coral limestone covered by a rich mould. Volcanic eruptions are frequent. The climate is enervating, owing to the dampness of the air and the plentiful and luxuriant vegetation.

Distribution.—No natives live more than about 300 feet above sea level.

Heredity.—According to the native idea leprosy is hereditary, running in families, more especially when the mother has been afflicted.

Contagion.—Leprosy is not held to be contagious; in former days leprous women married and had children. Some seventy years ago there was more leprosy than now, but then the population was three times what it is now.

Most of the children born of leprous parents died in infancy.

Food.—No food is accredited with being a cause of leprosy.

Segregation.—Until quite recently no legislation existed, but a law has within the last few years been passed commanding segregation, but it is not strictly observed or enforced.

Tuberculosis, syphilis, and malaria.—No connection has been observed between leprosy and any of these.

Vaccination.—Vaccination was practised in a portion only of two groups of islands some twenty years ago, but no increased prevalence of leprosy has been noticed in consequence.

Treatment.—No treatment is exercised with a view to cure, except cauterising the sores. The natives prescribe certain vegetable drugs.

Samoa.

(Leprosy introduced by Chinese ; not endemic ; not spreading.)

Letter from Dr. F. H. Davies, of the London Mission, dated from Tuarisi, Sawaii, Samoa, October 30th, 1894.

Samoa is the native name for a group of volcanic islands in the South Pacific Ocean, lying between latitude 13° 31′ and 14° 20′ S.

Sawaii is the most extensive, with mountains rising to the height of 4000 feet. Climate warm and humid, average for the year 80° F. The inhabitants dwell on the sea-shore.

Food consists of fish, taro, bread-fruit; but yams are the principal foods, with half-cooked pig and fowls for delicacies.

Diseases.—Elephantiasis and strumous diseases exceedingly common. I get scores of ulcers of the strumous œdematous type to treat. I have had fifty during the last five months. Some patients have two or three such ulcers. With a basis of iodide of potassium and a dressing of calomel, &c., I find they get well.

Leprosy.—I mentioned in my paper read at the Intercolonial Medical Congress held at Sydney, September, 1892, that we had in Samoa two cases of leprosy, both Chinese, and a suspected case in the person of an Hawaiian (Sandwich) Islander. One of the Chinamen died three years ago, the other was deported.

From evidence collected for an African-English resident, it would seem that at the present moment, in addition to the Hawaiian mentioned above, two half-caste Samoans and one pure Samoan are believed to have leprosy. I (Dr. Davies) have never seen a case of leprosy amongst my numerous patients.

Few, very few Chinamen are in Samoa, perhaps half a dozen at most. I do not think leprosy has ever been endemic in Samoa.

Extract from letter of H.M. Consul, T. B. C. Smith, Samoa, October 20th, 1894.

"The only two cases of leprosy (suspected) during the five years of my residence in Samoa occurred in the persons of Hawaiians, but the cases were both doubtful."

PART III.

ON THE
PHYSICAL AND ETHNOLOGICAL CONDITIONS
UNDER WHICH
LEPROSY OCCURS IN CHINA, THE EAST INDIAN ARCHIPELAGO, AND OCEANIA.

PREPARED FOR MR. CANTLIE'S REPORT ON LEPROSY

BY SYDNEY B. J. SKERTCHLY, F.G.S., F.A.I.;

LATE OF H.M. GEOLOGICAL SURVEY.

THE information embodied in this sketch has been derived from reading, from the study of the numerous reports sent to Mr. Cantlie, and from personal observation during eight years of residence and travel extending from the north of China to the south, to Borneo, Sulu, Celebes, the Moluccas, and the Philippines.

The scheme may be divided into three branches:—(1) Climatological; (2) Geological; and (3) Ethnological.

1. *Climatological.*

The vast area treated of in this report includes every type of climate except the arctic. It embraces temperate climate, as in Korea, Manchuria, and Japan; tropical, as in South China; and equatorial, as in Borneo and Java. It illustrates the extremes of continental climates, with burning summers and bitterly cold winters, as in North China, as well as typical insular climates, with an equable tempera-

ture all the year round, as in the Pacific islands. It includes every variety of humidity, from parched lands of semi-desert character, as in much of North China, to steaming jungle hotbeds, as in Borneo and the Malay States. The winds that are encountered vary from the zephyrs of the equatorial belt of calms, to the typhoon-swept China seas, and the blinding dust-storms of the north of that great empire. It includes some of the highest table-lands and some of the mightiest mountains, as well as extensive plains scarcely above sea level.

This being the case, one is driven at once to ask the question whether, if over such diverse regions leprosy is rife, climate can have anything to do with the disease.

The temperate region.—The temperate region in China may roughly be taken as the country north of the Yangtse River, having a mean annual temperature of about 60° F. It is continental in type, the summer temperature at Pekin, for example, averaging 79° F. for the three summer months, and as low as 27° for the three winter months. It is a dry region, even the coast of Shantung only receiving about 25 inches of rain annually; and as we go west the dryness increases, till west of Peking the country is semi-desert. This is owing to the steady desiccation which Central and Eastern Asia is undergoing from secular causes, and to the cutting off of the rain-bearing monsoons by the mountains which divide the basin of the Yangtse from that of the Hwang-ho.

Manchuria and Korea exhibit the same continental conditions, but the latter enjoys a heavier rainfall.

Leprosy is endemic in Shantung, but not in Chihli. It is not endemic in South Manchuria, but is again found in Southern Korea; but nowhere throughout this temperate region does it attain the virulence it assumes in the tropical provinces of Kwantung and Fokien.

If we ask what has determined the sporadic character of leprosy in this region, we are at once brought face to face with the fact that it occurs in two places having most marked contrasts. Shantung is a land of plains, for its mountains are either unpeopled, or the inhabitants are free from leprosy. Korea, on the other hand, is entirely moun-

tainous, and is quite free from leprosy in the north, where the plains occur. Again, Shantung is the driest, and Korea the wettest part of the region. Shantung has an evil reputation for malaria; but this is only in parts where the Hwang-ho has a habit of bursting its banks, and putting the country under water. Shantung as a whole is salubrious, and its evil reputation is rather emphasised in the native mind in consequence of the general healthiness of the province. Korea is quite as malarious as any part of Shantung.

We must look elsewhere than to climatic conditions to find a clue to the sporadic character of leprosy in the temperate region.

The tropical region.—I separate this from the equatorial because of its marked individuality. It includes all the area between the temperate region and, say, latitude 12° N.

It is marked by distinctly tropical summers, with the wet season during the hot weather, and by strongly marked seasons. The summers are not hotter than in the north, but are much moister; and the winters are cool, though frost is of rare occurrence. It is the region of typhoons.

This region includes all South China, Cochin China, and the Philippines, which latter have peculiarities of their own, rendering them more allied to the equatorial region. The rainfall is heavy, ranging from 60 inches to 160. It contains wide plains, high mountains, and the vegetation varies from almost desert, as on the coast of Kwantung, to dense tropical forest and jungle in Cochin.

Leprosy is endemic over most of it, and here again we see the disease sporadic. It is found in an isolated centre in the mountain province of Szechuen, and missing over the rest of the province. It is rare in all the other provinces except Kwantung and Fokien, where it swarms. It is found in less marked intensity through Cochin, and is endemic in the Philippines.

The great alluvial plain of the Si-kiang, with the vast population of Canton, and the hills and mountains, are alike the seat of leprosy in Kwantung and Fokien, and nowhere is it more rife. It occurs again, but in greatly diminished force, in the central plain of the Yangtse, but is absent from

the equally great and as densely peopled Yangtse plain of the east. Neither mountain nor plain affects it. The forest region of Cochin nurtures it, the forest region of Szechuen does not. The swampy rice-fields of Kwantung are a hot-bed of it, the swampy rice-fields of other places are not. Of this we may be certain, that Kwantung and Fokien, and the vicinity of their coasts especially, are the chief centre of leprosy in all the great empire of China. Yet it is not the sea which is the determining cause of leprosy, for long stretches of coast even in China are untainted. Climate, again, offers no solution of the question.

The equatorial region.—For a detailed account of this region see the introductory remarks to the article on the Straits Settlements. It is characterised by an almost complete absence of climatic contrasts. Air, soil, and water have a uniform temperature bordering on 80° F.; the day and night temperatures vary but a few degrees, and there is no appreciable difference of season. Everything reeks with moisture, and few storms stir the atmosphere. It is essentially the region of primeval forests. It includes all the land within twelve degrees of the equator.

Every variety of surface diversifies it, from high mountains to wide plains, but it is a region of islands, and not continental. The Malay Peninsula, the Archipelago, and many islands in the Pacific lie within it.

Over this vast and diversified area common opinion believes leprosy to have laid its foul hand, and even official reports contain such remarks as the following, from the pen of the Netherlands Minister for the Colonies:—"It may, however, be stated that the disease appears in all parts of the Indian Archipelago except the little Sunda Islands and the northern part of Celebes." But when we come to sift the evidence the picture is not so dark as has been painted. To stamp each island as leprous because a leper has been seen there is to raise needless alarm. On the same false principle we should have to speak of health resorts as the most unhealthy of places because there is most sickness there. Ventnor and Penzance would thus be called the death-traps of England, and the Consumption Hospital the incubating house of phthisis.

"Except the little Sunda Islands," says the Minister, but what an exception! They extend over fifteen degrees of longitude, or say a thousand miles, or the distance between London and Naples. Still it is only too true that the disease is very wide-spread, and the Straits Settlements, Java, Sumatra, the Moluccas, and most of Celebes are leprous, and Borneo also to a lesser extent.

Yet, again, we meet with the same independence of leprosy upon climate. If any part of the world could be selected in which all the conditions for the favourable cultivation of the leprosy bacillus were favourable, one would choose the equatorial region, with its continual moist heat and rank vegetation. Yet it is not the hotbed of the disease. Nowhere is it to be found so virulent as in Kwantung and Fokien, and even the unhappy Hawaiians belong not to this, but to the tropical region. Leprosy is rare in Java, not very prevalent in Sumatra, and its chief seat in the region seems to be in the Moluccas.

So far as climate is concerned this is the most uniform of regions, yet we do not find leprosy equally distributed over it, and long stretches are quite free from it. Again, it is found in South but not in North Celebes, a fact which we shall recur to further on. Nothing shows that elevation has any influence, for lepers are found alike on the hills and the plains.

It may confidently be affirmed that leprosy is not dependent upon, nor even influenced by, climate in any portion of the area dealt with in this report.

2. *Geology.*

It is unnecessary, even if it were possible, to describe the geological features of this great area in even a general sketch.

In China we have mountain and hill regions having a granitic core, over which are laid extensive beds of Archæan schists and limestones, slates, and sandstones. The greater part of the empire is covered with rocks of Carboniferous age, vast areas being composed of mountain limestone and coal-measures. Next in importance to these are the extensive post-Tertiary sands and loess which form the Great Plain.

Similar rocks (with the exception of loess) are found in the Malay Peninsula, Borneo, and Sumatra, and in the two latter thick beds of Tertiary sandstone abound.

Volcanic rocks are illustrated on the grandest scale in Java, the lesser Sunda Islands, the Moluccas, and the Philippines.

The Pacific is equally rich in volcanic rocks, and is, in fact, entirely composed of them or of coral. The continental island of New Caledonia is an exception.

We have thus every possible formation, or rather every kind of rock, amply illustrated. On the one hand are the deadly mangrove swamp, the bright coral strand, the alluvium of mighty rivers, and the loess, to illustrate modern formations. Granite, as in Kwantung, Fokien, and Shantung, are examples of plutonic rocks; the volcanic series is nowhere better developed, and ordinary sedimentary rocks take the ground over many thousands of square miles. Yet this variety bears no relation to the distribution of leprosy.

Decomposing granite has, in the East, many charges brought against it as a seed-bed of disease. I have never been able to see the faintest evidence in this direction. It is true that the coasts of Kwantung and Fokien are chiefly granitic, and that they are the most leprous of places. It is true that leprosy crops up again in Shantung, where granite is found. But leprosy in its intensest form is as rife on the Carboniferous rocks and on the modern alluvium of Kwantung as on the granite; and in Shantung the comparatively mild leprosy is spread over the modern loess and marine sands even more than over the small granite area.

North Celebes is free from leprosy, while South Celebes is tainted; and the former is volcanic, the latter is not. Here, if we only had limited knowledge, we might trace a connection between the rocks and the disease. But the Moluccas, where the severest form of leprosy in the Archipelago is said to occur, is entirely volcanic; and so are the Sandwich Islands. There is no practical geological difference between the geological structure of Sumatra and Java, where leprosy exists, and the lesser Sunda Islands, where it does not.

In fine, I have no hesitation in saying that geological structure does not exercise the slightest influence over the distribution of leprosy.

3. *Ethnology.*

The ethnology of the area here treated of is very interesting, and is illustrated by a sketch map. It embraces most of the chief races, the Caucasian, the Mongolic, the Negroid, and the Indonesian. The following table exhibits—

A. *Mongolic.*

(1) *Mongolian :*
Chinese.
Siamese.
Shans.
Laos.
Annamese.
Burmese.

(2) *Malay :*
Malay proper.
Tagalas and Bisayans of the Philippines.

B. *Caucasic.*

Natives of Cambodia and Champa.
Klings from Madras.

C. *Indonesian.*

Battaks, Kubus, and Passumahs of Sumatra.
Mantawi Islanders.
Most Dyak tribes.
Buludupies of North Borneo.
Indigenes of Celebes.
Galelas of Jilolo.
Many tribes in Buru, Ceram, Savu, Roti, &c.
Some tribes in the Philippines.
Red-haired tribe of East Timor.
Polynesians of Samoa, Tahiti, Hawaii, Tonga, &c.

D. *Negroid.*

(1) *Negritoes :*
Aetas of Philippines.
Sakais of Malay Peninsula.
Karons of New Guinea.
Badui and Kalongs of Java.

(2) *Papuans :*
Generally distributed from Flores to Fiji.

The waves of life which have passed over this part of the earth cannot yet be determined in detail, but the general facts are as follows :—Originally the entire area, except perhaps the Eastern Pacific, was peopled by the black race that has since diverged into two varieties, the Negritoes and the Papuans. Then the brown race, of whom the Malays are considered the type, appeared on the scene, but not as true Malays. The immigrants who have been styled pre-Malays, and are now spoken of as Indonesians, have strong affinities with the fair Caucasic stock, and are probably a fusion of Mongolic with Caucasic elements. Next, the true Malays spread from their birthplace, and about the second century B.C. a wave of Buddhism and Brahminism affected the Archipelago, leaving traces in Cambodia, Java, Borneo, and as far east as Moluccas. In the thirteenth century Islam began to spread, and at the same time the Chinese began to push southwards. Then followed the Portuguese, Spaniards, Dutch, and English.

The area is therefore a complex one to deal with ethnologically, yet if the appended ethnographic chart and that showing the distribution of leprosy be compared, certain broad facts become apparent.

The first point is that leprosy is absent from the area occupied by the Negroid races, with two exceptions. Thus it is absent from the lesser Sunda Islands, most of the New Guinea group (?), also from the Caroline Islands, the Solomons, and the New Hebrides. But it is present in part of New Caledonia and Fiji. In other words, it is absent from all the area in which plantations, or Chinese intercourse, is

also absent, and crops up where European or Chinese influence holds sway.

If we take the Indonesian area the same fact comes to light. Leprosy is practically absent from the whole of Borneo, save where the Chinese have settled. In Sumatra the Indonesian area, again, is free from leprosy so far as these people are concerned, though I have coloured the whole island as leprous because cases occur in most districts, though the aborigines are free from the disease. So, too, Timor, with its mixed Papuan and Malay population, and even with a small Indonesian element, is free.

It is not till we come to the Chinese and Malay localities that leprosy marks itself strongly on the land, and the universal testimony is that it is the Chinese who are the greatest sufferers, and that the Malays are little affected by it. Every hospital, whether in Borneo, Sumatra, or Java, tells the same tale ; the Malay patients are few, the Chinese form the bulk of the lepers. This I believe to be the case also in the Moluccas, though I have few data to go upon. I certainly never saw a native leper there.

If we turn to the Pacific Ocean we find three centres of leprosy—New Caledonia, where it is rare ; Fiji, where it is very rare ; and Hawaii, where it attains a virulence more intense than in Kwantung. Now what do these facts show ? They tell the same story that leprosy has spread with the incoming of foreign races. In the case of Hawaii, though much has been written to the contrary, I think no unprejudiced person can weigh the evidence which is given in detail in the report on those islands, and doubt for a moment that leprosy was brought by the Chinese. I have shown this to have been the case in North Borneo, it is the common belief in Sumatra and Java, and even in the Malay Peninsula we find most of the lepers are Chinese ; the Malays are affected but to a slight extent, and the aborigines not at all, with one doubtful but remarkable exception, the Sakais of Muar ; and Muar, be it remembered, is on the frontier of Malacca—the oldest European settlement in this part of the East.

Reviewing the evidence from an anthropological point of view, it seems to me that certain broad facts may be taken

as fairly well established, though it is highly desirable to obtain further information, especially in the Pacific.

The almost complete immunity of the region occupied by the Negroid races, and the almost equally marked immunity of the Indonesians, the two oldest races in the area, seem to show that leprosy is not indigenous to the Archipelago or the Pacific, but has been introduced recently.

Next, the fact that the Malays suffer so little in comparison with the Chinese, and, moreover, only where the Chinese have settled, shows that it is to the Chinese and not to the Malays that the spread of leprosy is due.

I would here make another suggestion. The Chinese have visited Borneo for the last six hundred years, and many settled permanently in the north and west, and have fused with the native tribes, yet leprosy is unknown there; and much the same thing has happened in other parts of the Archipelago, no evil results having been felt. If it be asked why this immunity, perhaps an answer may be found in this suggestion. There is a great difference between voluntary immigrants and forced immigration. The Chinese who in early days came to Borneo came to trade, and were by no means of the coolie class, and therefore were not likely to be lepers.

The coolie traffic, though better than it used to be, is still a disgraceful business, savouring far more of slave-dealing and the pressgang than of volunteering. I have seen much of it, and have travelled in coolie ships, and I know how they are obtained, and how treated. It is these poor wretches, picked up from the wasters of the Chinese poor, who form the bulk of the coolie class, and it was when they were introduced into Borneo that leprosy appeared.

The free emigrating Chinaman never went to a native island as a coolie; he went as a trader or planter,—as a master, and not as a slave. It was not till forced labour (called by a milder term) was introduced by the Portuguese, the Dutch, the Spaniards, and latterly by the English, that leprosy began to spread; and on this suggestion the peculiarities of its distribution receive a natural and sufficient explanation.

To sum up these remarks, I come to the following conclusions :

(1) Leprosy is not dependent upon climate.

(2) Leprosy is independent of geological structure.

(3) Leprosy shows a marked avoidance of the Negroid and Indonesian races.

(4) Leprosy is most common among the Chinese, and much less so among the Malays.

(5) Leprosy has only spread where European plantations or other industries have been started.

(6) The Europeans certainly did not introduce it; the Malays could hardly have done so; the Chinese coolie could easily have brought it.

(7) Kwantung and Fokien are the hotbeds of leprosy, and the chief recruiting ground for coolies.

Finally, I think Mr. Cantlie's suggestion that the Chinese have spread leprosy through the greater part of these regions might be stated much more strongly than he has seen fit to do.

NOTES ON LEPROSY IN HONG KONG.

Extract from a pamphlet published in 1890 *on "Leprosy in Hong Kong,"* by JAMES CANTLIE, M.B., F.R.C.S.

(Leprosy prevalent. Imported.)

THE island of Hong Kong is geographically part of the Province of Kwantung, and its meteorological conditions are identical with this region (see page 293).

It consists of lofty granite peaks rising in several instances over 1500 feet, with an abrupt fall to the sea. Until annexed to the British Crown in 1841, it was but sparsely inhabited, so that the endemicity of leprosy cannot be ascertained. Since that date, however, the port has been open to Chinese of all classes, and by no section of the community has this hospitality been more readily embraced than by the leprous from the mainland of China.

It was not possible, until the Alice Memorial Hospital was opened, for European doctors to study scientifically the diseases of the natives; therefore, it is only since the opening of that hospital in February, 1887, that any opportunity of ascertaining the prevalence of leprosy has been afforded.

From February, 1887, to August, 1889, *i. e.* two and a half years, 125 lepers presented themselves for treatment at the Alice Memorial Hospital.

It must be borne in mind that this cannot represent all the lepers present in Hong Kong during that period.

Up to fourteen years ago, leper families and communities settled on the hill-sides above the town of Victoria, Hong Kong, and obtained a livelihood as best they could. Three or four collections of huts occupied by lepers existed at this time, and there they had maintained themselves from the earliest days of the occupation of the island. About the date mentioned the lepers were disturbed in their

retreats, and expelled to the mainland. Since then no collection of lepers has been allowed in Hong Kong, and the orders concerning them are precise, viz. that whenever a suspected leper is reported the police shall arrest him; that he is to be detained until the Colonial Surgeon pronounces upon him, when, should he prove leprous, he is sent away to the mainland.

How the Chinese regard Leprosy.

A table of questions submitted to two Chinese doctors of the Tung Wa (native) Hospital. The answers were obtained for me by the kindness of the Acting Registrar General, The Hon. N. G. Mitchell-Innes, Esq.

I. What is the Chinese name for leprosy?—Ma Fung.

II. Do you recognise different varieties; if so, what names are assigned to them?—There are eight mild, curable varieties (of the nature of ringworm), viz.: 1. Hung Wan, red patches (local macular?); 2. Hak Wan, black patches. 3. Hung Tün, red rings. 4. Pàk Tün, white rings. 5. Tsz Wan, darker than No. 1. 6. Lau Tài, contraction of sinews of feet. 7. Tün Chi, contraction of sinews of fingers. 8. Kai Chàu Tung (tubercular?).

As with the Israelites of old, so with the Chinese, the name "false leprosy" was applied to most of the ringworm (tinea) diseases, so very common amongst both peoples. According to the Book of Leviticus it was only by the most careful and prolonged examination by the priest that leprosy and ringworm were distinguished, and during the process the person was segregated, until pronounced upon. The Chinese distinguished false leprosy as a "curable" variety, and it is in this way we hear of cures in this as in many other diseases by wonderful Chinese nostrums. But the Chinese know well the differences between the two, and are fully alive to the fact that leprosy is incurable.

III. Is leprosy considered contagious, infectious, and hereditary?—Both contagious and infectious, also hereditary, disappearing in the third or fourth generation.

The belief that leprosy disappears in the third or fourth generation is universal throughout China. It would seem as though the wording of the second commandment, "and visit the sins of the fathers upon the children unto the third and fourth generation," contained a threat with a possibility of finality; and this observation by the Chinese of the disappearance in the third or fourth generation is interesting in connection with the wording of the commandment.

IV. Do the Chinese "public" recognise leprosy as a contagious disease?—Yes! and as infectious also.

V. Are they afraid of people who have the disease living with them?—Yes! they would not permit a leper, even if the son of rich parents, to remain in their neighbourhood.

VI. Do cases of leprosy arise in Hong Kong?—Possibly. The majority of cases are, however, introduced from China.

VII. From what district on the mainland do most lepers come?—No district suffers more than another.

VIII. From what do the Chinese consider leprosy to arise?—An excess of moisture in the phlegm.

IX. Is leprosy considered curable?—No.

X. How do you treat leprosy?—Efforts are made to drive the leprous matter to one part of the body, so as to save the rest.

XI. When the doctors at the Tung Wa meet with a case, what do they do with it?—Refuse to receive it.

XII. Do many cases of leprosy present themselves at the Tung Wa?—Very few.

XIII. Do you take any steps to send the person back to the mainland?—No.

XIV. Is there any provision in Hong Kong for dealing with lepers?—Lepers are sent to Canton to be placed in the leper village there.

XV. What would you propose as the best method of dealing with lepers in Hong Kong?—Send them to the leper village in Canton, to which the authorities can, and do, compel all lepers to go.

XVI. Is it considered advisable for the Government of Hong Kong to deal with the question of segregation?—A leper home in Hong Kong would probably lead to an influx of lepers.

XVII. Does the Government of China provide officially for the segregation of lepers ?—Every district in China has its leper home, the inmates of which receive an allowance from the Government, and have land to till.

Sex.

The relative frequency as to the sex of lepers in the cases I have met with agrees with the reports all over the world, namely, that more males are attacked than females. Out of 125 cases only thirteen females, or 10·4 per cent., is amongst the lowest proportion of females to males recorded. All observers agree that there is no reason to believe that there are fewer women than men attacked, but the circumstance occurring time after time seems surely to establish the fact. From Norway, Barbadoes, British Guiana, &c., come the same accounts.

In Hong Kong the relative numbers are out of all proportion, and the fact is difficult to account for except on general principles, viz. the rooted aversion of Chinese women to see "foreign doctors," and the custom prevailing in China of keeping women in close confinement so as to be unseen by anyone. Still there is more in it than that, as the following analysis shows.

Out of 18,000 patients at the Alice Memorial Hospital, in round numbers, 15,000 were males and 3000 females—five males to one female, or one female in six. Taking this as our guide for the number of lepers which ought to have been met with on the footing of averages, we should have had one sixth of the 125 lepers, females ; in other words, about twenty cases, or 16·6 per cent. The actual number falls considerably short of this, however, giving 10·4 per cent. only.

The Age of Lepers.

The average age of lepers, as ascertained from 125 cases, was 36·3 years.

The youngest patient seen was six years old, the oldest seventy-five.

Leprosy is met with, according to other observers, at as early an age as three years. In leper asylums the children

of leper parents are reputed to develop the disease at still earlier periods.

The ages according to decades are as follows :

From 0—10.	From 10—20.	From 20—30.	From 30—40.	From 40—50.	From 50—60.	From 60—70.	From 70—80.
4	7	32	43	18	15	5	1
3·2 %	5·6 %	25·6 %	34·4 %	14·4 %	12 %	4 %	·8 %

Between the ages of twenty and forty, 60 per cent. of the cases occur.

Occupation of Lepers.

The occupation of the lepers met with was ascertained to be as follows :

Coolies	49
Hawkers	12
Cooks	8
Carpenters	7
House coolies	6
Masons	5
Schoolboys	5
Chair coolies	3
Sailors	3
Farmers	3
Silversmiths	3
Butchers	2
Shopkeepers	2
Teachers	2
Silk-weaver	1
Barber	1
Fishmonger	1
Shoemaker	1
Clerk	1
Watchman	1
Unemployed (beggars chiefly)	9
	125

From the perusal of this list, it is seen that leprosy is not confined to any one trade or employment, nor is it more prevalent among one class than another. The number of coolies attacked is explained by the fact that they form more than 50 per cent. of all patients presenting themselves at hospital. As regards hawkers also, lepers frequently take to selling their wares in the streets, owing to being driven out of house and home by their relations.

Leprosy, therefore, may attack persons engaged at any trade or occupation at any age beyond the third year.

Leprosy as it affects Hong Kong.

By far the most important fact in connection with leprosy in China is that the majority of coolie emigrants start from the British port of Hong Kong. In these pages one fact has stood out more prominently than any other, namely, that the coolie emigrants from the provinces of Kwantung and Fokien are the carriers of leprosy wherever they go. It follows, therefore, that as Hong Kong is the usual port of embarkation for these coolies, that it is the chief distributing centre of leprosy in these regions.

A great responsibility therefore rests upon the Government of Hong Kong. If not legally compelled to interfere, surely a moral duty is incumbent upon the ruling power under whose control is the cleansing of this foul region. Were the harbour authorities in Hong Kong fully alive to the importance of their trust, as regards the health of countries with whom they are in touch, there would be less leprosy in the Pacific.

The diagnosis of leprosy in the early stages is not easy ; and latent leprosy, unrecognisable at the port of embarkation, will no doubt appear with aggravated rapidity under the miserable hygienic conditions to which coolies, on plantations in countries on the Pacific littoral, are subjected. A closer inspection, however, would undoubtedly reveal many men in the initial stages of leprosy about to start as emigrants.

Were the European nations who trade in the Far East to combine in an effort to obtain a more thorough medical inspection of coolie-laden ships about to depart from the

ports of leprosy-stricken Kwantung and Fokien, a speedy diminution of lepers would be reported from the countries now infested by them.

Finally, as almost all vessels from Chinese ports pass through Hong Kong, the Government, through its harbour department, ought to insist on a careful medical inspection of all ships carrying coolies before they are allowed to leave British waters.

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