"Leprosy."

With especial reference to its outbreak in Australia.

Thesis for degree of Doctor of Medicine by Andrew Watson Munro, Bachelor of Medicine & Master in Surgery, Edinburgh University (1883.)

Sydney, Australia, 1892.

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HYDE PARK
SYDNEY

Feb. 22. 1892

Sir,

I have the honour to forward by this mail a Thesis on the subject of "Leprosy," with especial reference to its outbreak in New South Wales, and at the same time to apply for the degree of Doctor of Medicine. I graduated as Bachelor of Medicine & Master in Surgery in 1883

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SYDNEY

1883.

Having been called to
Australia suddenly I found
myself in the position of
not having passed the pre-
liminary optional subject of
"French or German" necessary
for the degree of Doctor. I
accordingly applied (about
four years ago) to you for
permission to pass in German
at the Matriculation exam-
ination of the University of
Sydney; & you were good enough

to reply that this examination would be accepted as sufficient. I passed in 1891, & beg to enclose, herewith, a certificate to that effect from the Professor of Modern Literature.

As I am shortly leaving for Europe it is my intention to be personally present at the Graduation ceremony, if at all possible.

I certify that the Thesis submitted is entirely my own work. The photographs were taken by another hand, however, under my direction.

My London adress will

be as follows:

A. W. Munro, M.D.,
(of Sydney),
Messrs McArthur & Co,
19 Leek St.
Cripplegate,
London. E.

& I shall be glad to receive any reply there.

I enclose herewith draft on the Commercial Bank of Australia for £17.5.0 ——————,

being fee for degree together with necessary costs (which kindly acknowledge.

I am, Sir,
Your obedient Servant
A Watson Munro M.D.

J. R. Fraser Esq
M.D. F.C.P.
Dean of the Faculty of Medicine
University of Edinburgh.

Liverpool St
Sydney Feb. 20 1892

This is to certify that I have personally known Dr Andrew Watson Munro, M.B., & C.M. (Edin) to have been engaged in the practice of his profession as a Medical man in this city for the last seven years.

James Graham
M.A. M.D. (Edin)
Examiner in the Faculty of Medicine
Sydney University.

University of Sydney,

March 25. 18 91.

We hereby certify the Mr. Andrew Watson Munro has passed a satisfactory examination in the German of the ordinary Matriculation Examination in this University.

H. Bayly
Registrar.

K. L. MacCallum

Professor of Modern Literature.

Books consulted in writing this Thesis:

New South Wales Medical Gazette of 1872, 1874, 1875, & later dates.

New South Wales Government Reports on Leprosy:

Cohnheim's Pathology (Sydenham Soc.)

British Med: Journal re Indian Commission. 1891.

Report on Leprosy by Royal College of Physicians. 1867. London.

"Leprosy" by George Thin. M.D. London 1891.

"Traite Pratique & Theorique de la Lepre" Leloir. Paris 1886

"Leprosy", Robson Roose. London 1890

Flügge "Microorganisms" Sydenham Soc 1890.

Hirsch "Geographical Historical Pathology. Sydenham Society.

Simpson, Sir J. Y, Collected works.

Liveing "Elephantiasis Graecorum"

Hutchinson "Archives of Surgery 1890." &c

Wilson, Sir Erasmus: Article on Leprosy in Quain's Dictionary of Medicine.

Cruickshank's work on Bacteriology

Ehlers, Kaurin & Hansen, as quoted by the above authors.

I shall commence my Thesis by giving a sketch, historical and geographical, of the progress of Leprosy since its appearance among the human race and of its distribution at the present day.

I shall then discuss its Etiology, its anatomical characters, its clinical history and phenomena, and the methods of treatment that have been adopted to combat it.

Throughout the Thesis I shall always keep in view the disease as affecting Australia, and finally append a special account of it as it exists on that continent.

The word leprosy is derived from the Greek word "lepros" signifying rough on account of the rough appearance of the skin in this affection.

Ancient names denoting leprosy, however, were not confined to this affection alone but were usually generic designations for almost any skin affection imparting a rough or scaly appearance to the integument.

Leprosy is also known as Elephantiasis of which three varities are described, viz E. tuberosa, E. anaesthetica and

and E. mutilans.

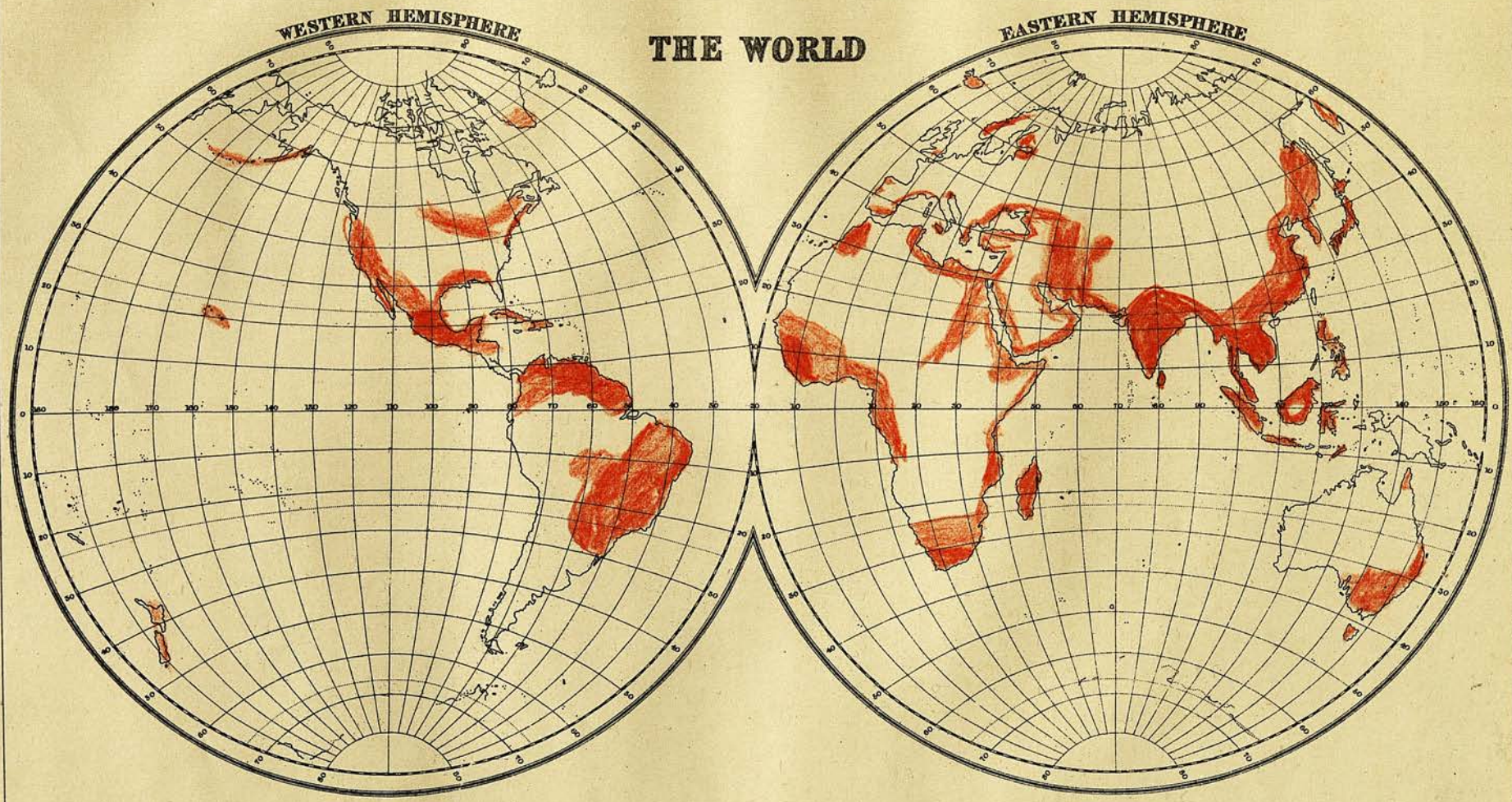
History.

It is clear that the earliest and chief Centres of the disease were in Asia and Africa. The first authentic records are to be found in the writings of Moses, from whom we learn that it infested the Israelitish Camp during the emigration from Egypt into Palestine. The name given is Sâraat, a generic one for skin diseases of considerable variety, but also including that which we now call Leprosy; and very searching regulations appear to have been in force with a view to prevent its spread. Leprosy can claim a venerable antiquity in India and China, countries affected even to the present day. To the older Greek physicians it was apparently unknown, and appeared in the Roman Empire only in the last century B.C.

In the Middle Ages we find, as early as the 7th Century, legislative enactments having reference to the suppression of Leprosy, which was then held to be infectious; and the

the existence of these statutes affords presumptive evidence of its occurrence to a considerable degree before that time. Its prevalence at later dates may be judged from the fact that there existed, in the 13th century, as many as two thousand lazarets in France alone. Here, however, let us not forget the confusion that existed in the minds of physicians, and more especially of the laity (who often had the duty of selection for the lazaret), as to the differential diagnosis of the disease: as it is well known that cases of syphilitic and other skin affections were often included with true Leprosy under one and the same designation. So that we must take these figures, in arriving at an estimate of the frequency of the disease, as only approximate to the truth. Notwithstanding, it is clear that the disease prevailed in Europe in the Middle Ages much more extensively than it has done in later years, and that there has been a steady diminution towards the conditions in existence at the present day, viz, a few centres of an endemic

THE WORLD



Shewing the distribution of Leprosy over the known world.

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endemic affection, a series of isolated plague spots on the Map of Europe.

In the Western Hemisphere we find the aboriginal tribes to be exceedingly free from it; and its introduction so far as I can gather, has occurred at three separate periods of immigration, the French into Canada, the Negro races from Africa, and the Chinese in recent times.

Geographical Distribution of Leprosy at the Present Time.

The malady is found in almost all parts of Africa and Asia, and of the latter Continent the Indian Peninsula, with the adjacent sea coast and islands, are the parts most affected.

In India most cases occur in the Bombay Presidency. It is very common in China, where its incidence is most marked on the southern and eastern coasts; also in Japan. Indeed, in these two countries it is as rife as it was in the Middle Ages in Europe. On the European con-
-tinent it is not generally distributed,

distributed, but occurs endemically in small and definitely circumscribed areas. In proportion to the whole population it is in the majority of cases very small, and even in Norway, the most noted European Centre, under the influence of segregation, a marked decrease has taken place of late years; E.g the number has diminished about fifty per cent in thirty years. The numbers of lepers in Norway in 1856 was 2.847 (Hirsch). In Sweden a few years ago there were about one hundred cases, and the same number in Iceland. In the Caucasus (Russia) Turkey, Greece, Italy, France and Spain, it is also to be found, but the cases are few, and, as above observed confined to circumscribed areas. There are supposed to be from 200 to 300 cases in the United States of America. It is pretty common in Central America, very common in Mexico, Brazil, and the West Indian Islands.

Its history and distribution in Australia will be considered later on.

Etiology

Etiology.

On the Etiology of Leprosy the most varied and divergent opinions exist. I proceed to discuss them in detail.

1. Influence of Climate.

After examination one is forced to the conclusion that if unfavourable climatic conditions such as excessive moistness, or excessive fluctuations of temperature, are operative at all, it is only as a predisposing and not as a specific cause. To give an example: it has been sought to identify an important causal relationship between coastal positions having a damp soil and the occurrence of leprosy; and doubtless the malady is very common on the coasts of Norway, Spain, the Adriatic, India and elsewhere; but on the contrary we find it associated, in other regions with conditions of a diametrically opposite character, e.g. at the Cape of Good Hope among Hottentots living "away from the sea in open valleys, high and dry," (Elder) and in India where its chief centres Exist at great elevations (2000 to 5000 feet) in

in Bengal & Bombay.

Insanitary conditions. One must admit that Leprosy is a disease of the poor more than of the rich. Yet it in many cases overlooks insanitary conditions, so to speak, in selecting its victims: thus, it will affect a particular community or village, letting another such, in the same vicinity, and to all appearance under exactly similar sanitary, or insanitary conditions, escape.

2. Malaria: The theory of Malaria is, I think, strongly controverted by the foregoing remarks on climate, yet a good deal can be brought forward in support of it. Thus Sir Erasmus Wilson, after citing several cases, concludes: "The writer could multiply cases of this kind considerably, and has had the conviction forcibly borne in upon him that the cause of Leprosy is Miasma. No other cause is of such general distribution, suiting every climate and every part of the world, unless it be such countries as have been relieved of the cause by land culture and

and improvement.

3. Diet. The use of fish in excessive quantity as an article of diet, more particularly of salt or putrid fish, has been held by many writers to be an important cause; thus, it is the theory of such a high authority as Hutchinson, who writes, "The sum of our conjectures, then, appears to amount to this: that Leprosy is far too specific and peculiar in its symptoms to allow of our supposing it due to the influence of general poverty; that the cases in which Europeans are attacked all indicate the power of endemic influences; that of endemic influences, food is the one which has the most of probability as to its being the true cause; and, lastly, as the disease is only met with near the sea, we may plausibly guess that it is in some way connected with the fish diet." Similar opinions are advanced by this writer in the "Archives of Surgery" April 1890.

But the evidence on the other side appears to outweigh that in favour of the fish theory. For instance

instance the dietetic conditions Hutchinson lays down as associated with Leprosy are not present in New South Wales. Then take the fact that leprosy is by no means rare among the Brahmins of India, a caste who summarily ostracise any member partaking of fish. It is also notorious that the disease is absent in parts of North America where the diet is chiefly made up of fish; thus the English and Indians in New Brunswyck escape leprosy, while the French section of the population are affected by it, the dietary as regards fish being the same in both cases. The locality of the disease, in India moreover is a fact contrary to the theory under discussion (see above). Excessive consumption of Pork is advanced as a cause: the arguments against the fish theory are applicable here also.

From what has been said on Etiology, we are forced to the conclusion that unsatisfactory conditions of nutrition are of importance, (if they have any influence) only

only as predisposing causes.
4. A Special Virus. For the last twenty years observers have professed to have discovered the special bacillus of Leprosy, and the fact of its existence may now be regarded as settled for it has been identified by several observers. (I shall describe it under the heading of Morbid Anatomy).

Most of these observers hold the opinion that the disease is a contagious one. On this point observers are again divided, and I will summarise the arguments as succinctly as possible. In favor of this theory are the following facts:

1. It was unknown in the Sandwich Islands till the commencement of Chinese immigration in 1840: at present about $\frac{1}{15}$th of the population are affected.
2. The conclusions of Lelour are as given below.
3. In Trinidad similar events to those in the Sandwich Islands have occurred.
4. Instances have occurred of

of persons from non-leprous countries contracting the malady when placed among an infected population. Thus Father Damien a European, who died recently in Molokai, contracted it from his leprous flock in that island after residing among them for 10 years.

5. A remarkable case occurred in the Sandwich Islands where a man condemned to death accepted the alternative of being inoculated with leprous matter: in 3 years the disease was distinctly developed.

6. Isolation, where thoroughly carried out, arrests the disease (See remarks on Norway above).

Against the theory of Contagion or Infection we have the high authority of Hirsch, who advances the following arguments:

1. A common case is as follows: one village in a district is affected, but the disease is limited to that centre, and does not spread to the others, although there is free intercommunication and the hygienic conditions are the same exactly in both cases.

(2) In a mixed population one race escapes; the others are heavily afflicted. This occurs in the East Indian Archipelago.
(3) It is notoriously frequent that one member of a family is affected, all the others escaping.
(4) Physicians and nurses have never been known to contract the disease, even while dressing wounds with cut fingers.
(5) Leper houses do not prove centres of infection.
(6) Europeans who have contracted the disease in a leprous centre and then lived among their own people have never spread it.

I think the information on which some of these propositions are based not sufficiently exhaustive to warrant them, and others are controverted by known facts of an opposite character. For instance it is quite likely that all information on the second of Hirsch's arguments against, is not exhaustive or reliable. At any rate in New South Wales Leprosy though introduced by the Chinese is not

not confined to that race and must have spread from them to the Europeans, who in all the cases but one have been Natives of the Colony and of European extraction.

No 3 may be a frequent, but to my personal knowledge is not a universal occurrence and therefore as proof it falls to the ground.

A man G.R. aet: 28, attended to by C.K. Mackellar. M.B. (Glas:) of Sydney during life, and seen by me immediately after death was an aggravated case of Elephantiasis Mutilans; I saw his Sister who had attended to his wants for at least two years, and she was the subject of tubercular leprosy. She is now an inmate of the New South Wales Government Leper Hospital.

No 4 is upset by the case of Father Damien, and of nurses and attendants in the island of Molokai. Syphilis does not often spread to Attendants.

(5) proves nothing, but leads one to infer contagiousness of Leprosy. There is a quarantine station on the North Head of the entrance to Port Jackson.

It

It has frequently been in use for the seclusion of ships crews suffering from Smallpox and has never spread infection but on the contrary abolished it — the purpose which Segregation is intended to accomplish.
(6) is a bold assertion and difficult of verification. In any case a leper is socially quarantined in non-leprous society, and his chances of acting as a centre thus reduced to a minimum. My own case GR cited above, is little in harmony with with this statement.

Hirsch remarks that the outbreak of leprosy in an apparently healthy individual after contact with the afflicted is not to be considered sound evidence in a diseased centre or area. This is true, but what can be said in the case of new South Wales, where individuals of a healthy and non-leprous European extraction have become affected? What also as to the introduction of the malady among the Sandwich Islanders?

Nevertheless, the chain of evidence for the contagion theory is weak at

at some points. For instance although the unsuccessful result of inoculations with leprous matter is valueless as evidence, the case, cited above, in which it was followed by an outbreak in a Sandwich Islander might as well be "post hoc" as "propter hoc" – indeed according to the whole evidence, much more probably a case of the former than the latter.

The negative result of inoculation in animals means nothing, the question having never been settled whether these animals are at all susceptible to the virus. Further the virus, or Bacillus, may not always be present in the matter used for inoculation.

Cases of the Father Damien type may have come, not by contagion, but through endemic influences prevalent in a particular locality (in other words the Bacillus) without being directly the result of contagion.

It has been further urged that if contagion is present, areas of country like the United States with its

its negro-population would not resist the disease as they do: but as a matter of experience one observes the same peculiarity in the working of other known contagious diseases as Syphilis.

5 I will now dance at the subject of Hereditary transmission.

In favour of Heredity as a cause Hirsch is very positive, and the preponderance of evidence is with him. There seems little doubt the disease runs in particular families, and is spread largely by intermarriage: this assertion is strongly supported by enquiries in parts of Europe where family histories of patients are capable of being well authenticated.

Simpson's view is also very decided:

"Few facts in the history of tubercular leprosy seem to be more universally admitted by all writers on the disease, both ancient and modern than the transmission of the predisposition to it from parents to offspring."

A Contrary view, however, is held by Hansen, and by Dr Ed: Kaurin of

of Norway. In new South Wales it is impossible to rely on this point in the history of the disease where the Chinese are concerned (the statements being unworthy of credence), and among Europeans the disease has been in existence for too short a time to be of any service in settling the question.

6. Racial peculiarities &c. a special liability exists among certain races of men, as Negroes and the Chinese; and in Countries with a mixed population these are singled out for attack. By accepting the doctrine of heredity one would be assisted to an explanation of this peculiarity.

7. Lastly, the disease is acquired by Europeans, not only when residing in leprous districts, but also in localities where it has not manifested itself for centuries. This, on account of present lack of evidence, cannot be explained.

With reference to the foregoing divisions of my subject the conclusions of Zeloir are well worth quoting. He writes: On voit donc que la lèpre peut se developper dans

dans les climats les plus opposés, au Groënland, en Islande, en Norwège d'une part; aux Antilles, au Bengal, à Madagascar d'autre part, etc

Elle se montre aussi bien dans les regions hyperboréennes que dans les régions tropicales, sur le bord de la mer, que dans les hauts-plateaux de l'Himalaya, du Caucase, du Mexique; elle existe aussi bien dans les pays de montagne, dans les endroits secs et dérés, que dans les endroits bas, marecageux et humides. Il est donc difficile de dire si les conditions climatériques ont une influence sur elle. (Je ne dis pas sur sa création, ce serait absurde; mais sur sa propagation plus ou moins rapide.)

Nous voyons aussi que tous les races humaines peuvent etre et sont atteintes par la lepre; et que les races infectées semblent pouvoir se classer dans l'ordre suivant, d'apres leur degré d'infection: la race jaune et la race noire, la race blanche, la race rouge (race indienne de l'Amérique qui en bien des endroits est encore vierge de

de la lèpre, là où elle a évité les lépreux et les races infectées). La forme tuberculeuse s'importe en Norwège, à la Trinidad, en Espagne, à Madère, aux îles Sandwich. La forme systematisée nerveuse est la plus fréquente en Hindoustan, dans les îles de la Sonde et aux Philippines, en Guyane. La forme mixte (ou complète) parait se rencontrer un peu partout avec la même fréquence".

L'Etude géographique et historique précédente montre donc que: 1. La lèpre a eu un foyer primitif (peut être deux), d'où elle s'est répandre dans l'univers. 2. La lèpre ne se jamais montré dans un pays, sans y avoir été apporté par des hommes malade de la lèpre. Elle a suivi les grands courants humains (militaires et commerciaux). 3. Chaque fois qu'une nation souillé par la lèpre a été mise en contact avec un peuple vierge de lèpre jusque-là, ce peuple a été infecté, à quelque race qu'il appartînt. Et réciproquement chaque fois qu'un peuple a évité le contact avec la nation envahissante ou

ou immigrante infectée, il a échappé à la lèpre. 4. L'influence du climat, de l'hygiène, etc, semble être absolument nulle sur la production de la lèpre (Je ne dis pas sa propagation). 5. Dans nombre de cas l'envahissement d'un pays par la lèpre a été tellement rapide, que l'heredité seule est impuissante pour expliquer une pareille multiplication. Si la lèpre était hereditaire seulement, elle n'aurait pas si vite parcouru le monde. 6. La propagation et le développement de la lèpre semble avoir été en raison inverse des mesures d'isolement prises par les peuples infectés. La maladie a disparu le plus vite des pays où les mesures d'isolement le plus rigoreuses ont été prises.

Les faits précédents suffiraient à eux seul démontrer que la lèpre fut et est encore une <u>maladie contagieuse</u>."

Morbid Anatomy.

The presence of granulation tissue in the diseased parts is the characteristic change; and Virchow states

States that there is no essential difference between the pathological deposit of leprosy, the gummata of Syphilis and the diseased tissues of lupus and glanders. These tubers of granulation tissue are found in the skin, mucous membrane, sub-cutaneous tissue, connective tissue of nerves, and in some internal organs. Under the microscope they are seen to consist of cells, small, and resembling leucocytes at first, but afterwards growing very large; and these large cells are the distinguishing point in the histology of the disease.

In the nerves these deposits destroy, by pressure, the true nervous tissue, this process being intensified by surrounding inflammation.

In recent years the Bacillary theory has established its claims to belief, and is now pretty generally accepted. Characteristic bacteria have been found in leprous tissue, being present in cases occurring in all countries, and in all varieties of leprosy. They occur in the tubercles and in the affected nerves, in the cornea, cartilage,

Cartilage, testicle, lymphatic glands, spleen, liver and also in the blood.

Leprous tissue is "infiltrated with numerous small, round or oval cells, which are more or less completely filled with Bacilli, the latter often lying in a thick mass in various directions; they often appear arranged in a more or less ray-like form radiating from the centre of the cell; at times they form parallel bundles. In the older tumours the so-called lepra cells are present in large numbers, these cells being large multi-nucleated, and similar to giant-cells, and also containing very numerous bacilli in their interior. In part however, the bacilli lie outside the cells, in the lymphatic spaces." (Klügge).

They are also found in the hair follicles and Sebaceous glands of the hair — an important point in the study of the transmission of the disease. (The bacilli would seem to be unable to penetrate epidermis). The bacilli resemble those of tubercle being 4 to 5 μ

5 μ long and 1 μ broad. Spores are usually present.

Lepra cells containing bacilli, × 700

"They (the bacilli) can be stained in the same manner as tubercle bacilli; like these the leprosy bacilli alone hold an alkaline aniline stain . . . . so energetically that it is not removed on treatment with strong acids." (Flügge).
Thus a method of double staining can be used with both these forms of life. By known microscopic methods the distinction between the two can be made.

The cultivation of leprosy bacilli has not yet been accomplished.

Inoculation of leprous matter into animals has yielded only negative results (see Etiology), though in several cases a local generation of the peculiar bacillus-cells has been

been noticed, for instance after injection into the eye of the rabbit and the peritoneum of the cat.

To sum up, "in spite of the great blanks in our knowledge with regard to the leprosy bacilli, we must look on these organisms as undoubtedly the cause of the disease, because they occur constantly and exclusively in this affection, and because also they are present in enormous numbers and practically form the greater part of the affected tissue in the leprous organs" (Bligge)

Symptoms. There is a period of incubation, the duration of which is uncertain, being stated variously at from two to fourteen years. (Leloir & Norwegian reports.); and at this stage some indefinite premonitory symptoms are observed, varying in intensity in different cases, and sometimes, (as in a proportion of the New South Wales cases) being absent. They comprise anorexia, debility, chills, and lassitude, which may be intermittent in their incidence, and often extend over a number of years previous

previous to the appearance of more decisive symptoms.

Next follows a stage of hyper-aemia with puffiness of the in-tegument of the face hands and feet, and in one of my own cases the patient stated that a crop of "watery blisters" broke out on the backs of both hands, passing away before the tubercular eruption appeared. A purplish red colour is seen on the hands and feet, and this, together with the oedematous aspect of the same parts, is a considerable help in early diagnosis.

Next come raised circumscribed patches of skin, in the same regions, varying in size from that of a three-penny piece to a shilling, or larger, irregularly rounded in shape, of a dusky purplish-red colour, firmer to the touch than the surrounding healthy skin and distinctly anaesthetic.

For the subsequent course I think it best to describe the condition of one of my own cases, which I had under observation at the Sydney Hos-pital, (of which I am an honorary physician) in February 1891. E. W

E.W. aet. 73, Male: patient was well nourished, muscular, and but for the integumentary appearances, healthy, the physical examination revealing nothing abnormal. The face was generally swollen, purplish-red, with thickening of the skin, so that the expression was deformed. On the forehead these appearances ceased abruptly about half an inch below the hair. Lips thickened, nose thickened and widened at the alae, presenting the commencement of the leonine aspect — <u>elephantiasis leontina</u>); lower half of external ears also thickened, and looking bluish and livid.

These phenomena were confined to the face, and did not affect the cervical region. Hands and wrists dull-red and swollen, fingers looking sausage-like; some oedema of both feet, especially over outer left malleolus. (This last swelling while it lasted was the most distinctly anaesthetic spot of the integument: it soon disappeared.) Over the limbs was a general eruption of macular patches, of a pale bronze colour, with slight thickening, more marked and larger

larger on the lower extremities. Several spots on the legs and trunk had acquired the appearance of a bronze-coloured ring with a white cicatrix-like centre, which was anæsthetic but not very hard. In all the pigmented areas sensibility to touch and pain was dull, but especially on the face, where patient could not feel a needle driven in; healthy skin also less sensitive than normal.

Temperature was normal; urine acid, 1020, no albumen, no sugar.

The subsequent course of such a case would be: tubercles become more prominent, (first on the lobule of the ear as a rule,); then mature, soften & break down leaving ulcers all over the affected parts; these discharging for a while, healing, and being followed by a fresh crop. Similar changes, hyper-æmia, tubers, ulceration, occur also in the mucous membranes of the nostrils, pharynx and larynx, causing alterations in phonation, a harsh or whispering voice, stop-page of and discharge from the nostrils and sometimes destruction of

of the nasal septum. The eyelids, conjunctivae and corneae may be successively affected, and the resulting scars give a corpse-like appearance to the mask. The ulceration is occasionally very deep: in one case (GR art 28), which I saw immediately after death, half of the upper lip was destroyed leaving the teeth exposed, and in this case also, the fingers and thumbs had spontaneously amput-ated as far as the distal of their proximal phalanges: an example of that variety of Elephantiasis to which the term "mutilans" has been applied.

It is quite common for the tuber-cular form of leprosy, of which the case of E.W. is a good example, to become complicated by <u>Elephantiasis anaesthetica</u>, before the "last scene of all" is ushered in. The later circumstances are: attacks of fever periodically recurring, frequently resembling a regular ague in intensity. These weaken the patient and result in more active ulcerative progress, until finally complete debility paralysis

paralysis and it may be the merciful epilogue of mental insanity bring the Scene to a close.

Elephantiasis Anaesthetica is the name given to the second of the two main types of leprosy. Its course is as follows. There may be indefinite prodromata, as in the tubercular variety and sometimes neuralgic pains. Then follow disorders of sensation: affected limb painful, red in patches, swollen and hot, with neuralgic pains; these signs of irritation are followed by anaesthesia, which deepens until even injuries and mutilation of the parts are unfelt. Trophic disorders also occur: often an eruption resembling pemphigus, the bullae of which, after bursting, may heal or result in ulceration and subsequently, in a depressed cicatrix.

Another symptom is increase of pigment with darkening of parts of the skin; or a decrease of it, giving a condition simulating leucoderma. Atrophy of the muscles follows leading in the hand to a condition resembling "main-en-griffe," (this is seen in one of

continued p. 30

Speaking of Nerve - Leprosy, Thin says "The complete suppression of sweat from the surface of the spots is a striking symptom & important as a diagnostic point." Hypodermic injections of Pilocarpine fail to cause perspiration of these spots.

of the Europeans in this Colony. A.G. act 14: E. (anaesthetica,) and in the face to alterations in contour, dribbling of saliva, and a fatuous expression. The bones also are involved; in situations such as the hand they are exposed by the ulceration, become necrosed and detached; and then the soft tissues heal. In the fingers, phalanx after phalanx will thus drop off, a stoppage commonly occurring at the proximal phalanges which seem to have a high vitality.

Finally, we have total absence of expression in face, mutilation of anaesthic regions, often leaving stumps at the wrists and ankles, ulcers on the surface, deepening Stupor, and death.

Prognosis.

The prognosis is always unfavourable in an extreme degree. One or two recoveries have been recorded as following the destructive processes in E. mutilans, but these, if genuine cases are very rare exceptions. The duration of a case varies, and is different in the

the different forms, the tubercular variety lasting eight to twelve years, and the anaesthetic longer as many as eighteen or twenty and even (Leloir) 44 years.

Treatment.

Although cure is beyond hope, yet great benefit is produced by attending to the following lines of treatment.

I. General. (Compare remarks on Treatment in N.S.Wales)

1. Segregation. The patient should be removed from the district where he became affected, and also separated from his friends.

2. A Nutritive and liberal dietary should be allowed.

3. Exercise, as in New South Wales where the lepers are allowed to cultivate land inside the lazaret.

4. Tonic remedies should be given, to improve the general health.

II. Local.

Cleanliness should be observed, and local sores dressed. Hot air baths prove beneficial.

A variety of remedies have been tried, but with little success. It

It is difficult to judge correctly of their usefulness, as spontaneous improvement in the condition of cases frequently occurs. Iodine, Arsenic and chaulmoogra oil have all been praised. In more recent times the Balsam of Gurjun, an oleo-resin derived from the dipterocarpus tree of India has seemed to be beneficial.

An emulsion of it is made with an equal quantity of lime water and of this two to four drachms are given for a dose. Local friction with this oil is also recommended.

Injection of Koch's tuberculin has been tried, without curative effect.

Leprosy in New South Wales.

History. The first authentic reports of Leprosy in Australian medical literature shew that it has been present among the native born population of European descent in New South Wales since the year 1868. The Chinese first appeared

appeared in numbers in Australia during the "gold rush" of the 5th decade of this century. Since their arrival they have chiefly followed the occupations of vegetable gardeners and storekeepers, in the former case hawking their goods from door to door, and selling them in the market places — methods which allow of their coming into pretty close contact with the the white population.

No case of leprosy appeared prior to the Chinese immigration.

It was unknown among the aboriginal tribes. Since the year 1883, when a Government Lazaret was established, no less than nineteen out of a total of thirty one cases admitted have been Chinamen.

As regards the interval of between the dates mentioned, there is no information to hand, but it is highly probable the disease existed. There was no provision for making Government reports, and the difficulty in the diagnosis of a disease which is but little

little familiar to the medical profession even at the present day together with the painful circumstances of these cases explains the absence of private or literary records.

In 1888, the Centennial year of the foundation of the first Colony, a case was reported in a European, T. G., a native of New South Wales, which strongly attracted public attention, and subsequent cases, as they arise, have been placed in quarantine — a procedure without any other legal warrant than that expressed in the saying, "Salus populi, suprema lex."

T. G. was a resident of Sydney, aet 28, male. He had lived in the country for the first eleven years of his life, partly at Penrith, a healthy district at the foot of the Blue Mountains, partly at the towns of Goulburn and Bathurst, large inland towns at ~~600~~ elevations of over 2000 feet.

Etiology.

Do the investigations in New South Wales throw any light on this

this subject? The cases have been most carefully examined, their parentage, previous history, habits and surroundings, & contact with the Chinese, but no striking fact concerning any of these points has been adduced. The only reasonable deduction from the Board of Health reports, and my personal observation of lepers, seems to me to be that the contagion theory of the disease receives confirmation, possibly also that the belief in heredity as a cause is strengthened. On this latter point, however, a positive opinion cannot be formed, as the clinical histories supplied by Chinamen are unreliable.

To illustrate what I mean two of the cases in the second table (p. 39) were in contact with lepers; five occurred in districts where a Chinese leper lived for some years before his detection; other cases, though widely separated geographically are often on close examination found to be comprised in a district where there is constant interchange of station hands. Contagion seems

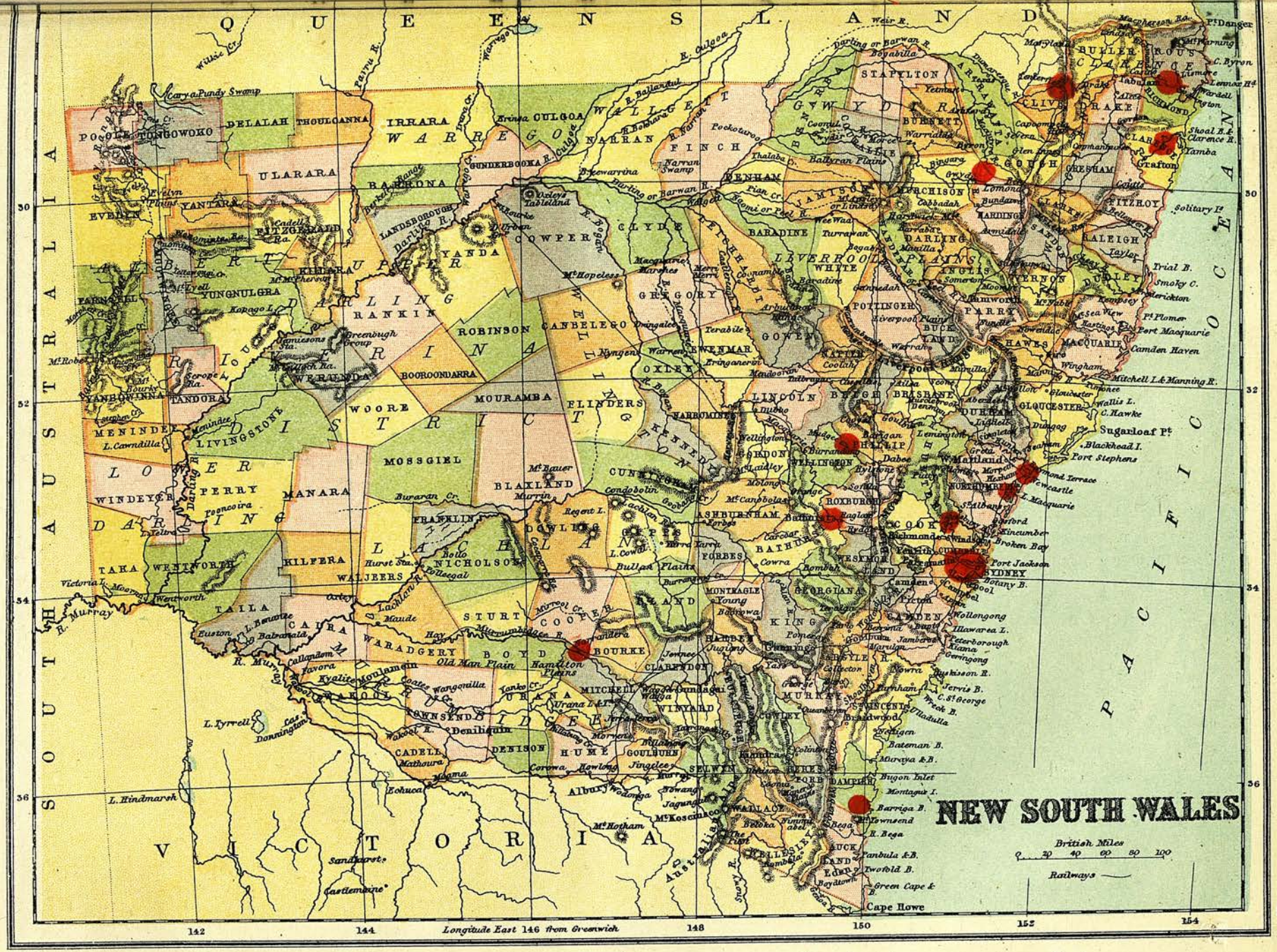
seems distinctly indicated in the case I quoted above (see page 13, GR) and less so in case of H.R., who came in contact with a leper (now deceased) in the same district during life, and after death assisted in placing the body in a coffin.

Climate.

In this regard nothing can be added to the general remarks made in the first part of my Thesis. In this colony the climatic conditions under which Leprosy appears are as various as the localities in which it occurs. We find it in the plains of the interior, in the farming districts of the Richmond River, and at great elevations such as Bathurst and New England.

Malarial conditions. These do not affect New South Wales in any special way.

Diet. This can have little influence either with Europeans or foreigners. Careful enquiries fail to discover any special predilection for a fish dietary. Indeed in the interior fish are exceedingly



The red marks indicate localities in which cases of Leprosy occurred. The larger marks indicate (according to size), 2 or more cases in one place.


VICTORIA
British Miles
0 20 40 60 80
Railways
NEW SOUTH WALES
SOUTH AUSTRALIA
BASS STRAIT
M'LLEWA
KARKAROOC
WEEAH
WIMMERA
TATCHERA
LOWAN
BORUNG
KARA-KARA
GLADSTONE
BENDIGO
LODDON DISTRICT
GUNBOWER
RODNEY
MOIRA
MURRAY DISTRICT
BOGONG
BENAMBRA
DELATITE
DALHOUSIE
TALBOT
ANGLESEY
WONANGATTA
DARGO
TAMBO
CROAJINGOLONG
TANJIL
BULN BULN
MORNINGTON
BOURKE
GRANT
GRENVILLE
RIPON
HAMPDEN
DUNDAS
FOLLETT
NORMANBY
VILLIERS
HEYTESBURY
POLWARTH
Port Phillip
Western Port
Melbourne
Geelong
Ballarat
Portland
Cape Otway
Wilson Promontory
King I.
Flinders I.
Kent Group
C. Howe
Longitude East 146 from Greenwich

exceedingly difficult to procure, and tinned fish not much in use.

As an appendix to my remarks on the distribution of leprosy in New South Wales. I copy a return of cases detained at the lazaret by the Government since the year 1883. I also mark out on a map, (by means of red spots) the localities where the cases have occurred.

The tubercular and anaesthetic variatues of the disease are equally common.

Cases of Leprosy reported by James C. Cox M.D. Honorary Physician to Sydney Infirmary. they are taken from the New South Wales Medical Gazette of the years 1872-4-5.

See next page

Names of Dr Cox's Cases.	Birthplace	Age on Arrival in New South Wales	Probable date of Attack.	Age at date of Attack.	Locality.	References to cases of the present series* connected with the localities mentioned in the preceding column
M.K.	Campbelltown	Birth.	1868-9.	34-5	Campbelltown.	Compare VII G.K. deceased
J.W.	England.	17	1869.	27.	Sydney.	I, IV, VI, IX and compare VII
C.D.	Windsor.	Birth	1870.	24.	Windsor	Compare VI and VIII.
A.B.	Sydney.	"	1871	18.	Sydney.	I, IV, VI, IX and compare VII
J.H.	Germany.	29	1872	46.	Petersham (Sydney).	as above.
W.a.	Holland	11	1873-4	52-3	?	

* i.e. those cases now present in the Lazaret. Cf. p. 35 also.

(38)

Return of particulars of Lepers detained at Little Bay since the year 1883.

Name.	Nationality.	Admission: Age on	Admission: Date of	Where from.	Discharged.	Died.
A.A.	Chinese.	42.	19 apl 83	Parramatta Asylum.		15 May 1886.
J.A.	do	32.	do.	do.		29 June 1886.
A.A.	do	34.	12 June 83	do.		20 april 1886.
A.W.	do	32.	28 Oct 83	Tenterfield.		
A.P.	do	27.	do	Willow Creek		
G.A.	do	37.	27 Nov: 84	Sydney.	To Reception House for Insane 2 april 1885.	24 Dec: 1886
K.K.	do	44.	21 Dec 84	Bathurst.		28 april 1885.
J.B.	West Indian	51.	22 sep 85	Bermagui.	29th Dec 1885.	
A.Y.	Chinese.	29.	23 Dec 85	Sydney.		6 Feb. 1890
C.B.	do	32.	29 Jan 86	Alexandria.		
A.S.	do	42.	20 Feb 86	Cooper's Creek		12 nov: 1890.
C.T.	Javanese.	24.	14 Aug 86	Castle Hill Parramatta		
A.L.	Chinese	44.	20 May 87	Bathurst.		12 april 1891.
Y.S.	do.	31.	20 apl 88	Sydney.		
F.G.	N.S.W.	28.	21 Aug 88	do.		
A.Y.	Chinese	46.	30 Sep 88	Inverell.		
L.P.	do.	18.	22 Dec 88	Sydney.		

(39)

Return of particulars of Lepers detained at Little Bay since the year 1883 (Continued.)

	Name.	Nationality.	Admission age at	Admission Date of	Where from.	Discharged.	Died.
	H.R	Chinese	28.	13 Mar: 89	Enfield.		
*	H.B.	N. S. W.	17.	17 Dec 89	Rhudgee.		
*	H.R.	do	28.	8 Aug 90	Richmond River.		
*	A.G.	do	14.	18 do.	Balmain.		
*	E.U.	do	23.	16 Jan 91	Sydney.		
*	H.S.	do.	41.	23 do.	Newtown.		4 Feb 1891.
	A.L.	Chinese	30.	26 Feb 91	Newcastle.		
*	W.R.	N. S. W.	33.	11 Mar 91	Surry Hills.		
	T.W.	Chinese	29.	6 Aug 91	Narrandera.		
	W.C.	do	40.	27 do.	Sydney.		
	A.H.	do	33.	18 Sep 91	Rhudgee.		
	J.L.	S.S. Islander	25.	8 Dec 91	Clarence River.		
*	R.W.	N. S. W.	47.	24 do.	Narrabri.		
*	J.L.	do	53	† 18 Dec 91	Waverley.		

* These are all natives of N.S. Wales of European Parentage.
† Date of report. This patient was removed to Little Bay on 12 Jan 1892.

Note. The only additional cases of leprosy in New South Wales which have been reported to the Board of Health are. G.R. aet. 28, whose death certified by his medical attendants, was reported to the City Coroner on 18 July 89; and P.D. aet. 38 died in the Richmond River District in March 87. Both of these persons were of European Parentage.

(40)

Treatment in New South Wales.

The medical treatment differs in no respect from that pursued in other parts of the world, being mainly directed to the relief of urgent symptoms.

The State regulations, however, are stringent, and based upon the theory of the contagiousness of leprosy, and the conclusion that our most reliable means of combating the disease is to isolate the lepers regardless of the "liberty of the subject," keeping them in comfort while they live, and thus to let the disease gradually become extinct.

Since the year 1883 all cases coming under the notice of the Government have been segregated in this manner.

The spot selected lies at a lonely part of the shore of the Pacific Ocean, 10 miles from Sydney, and is superintended by the resident medical officers of the adjoining Little Bay Hospital (Government) for infectious diseases, under the direction of the Medical Adviser to the Government. In 1890 the lazaret was removed a short distance to a

a much improved situation.

The enclosure occupies an area of about two acres, stretching for an equal distance on each side of a central creek which is now dry and utilized for drainage.

It is fenced with galvanized iron and, at the side where the creek ends in a little inlet of the ocean, walled with stone. There are two wardsmen for the males, living outside the gate, and more recently two nurses for the females.

At the end of 1891 there were 21 inmates, dwelling in clean and well constructed weather board houses, plentifully supplied with cooking apparatus, baths &c.

Facilities are allowed also for cultivation of vegetables: in fact the unfortunate inmates are liberally treated in every way.

They quietly welcome the visitor, and at my visits to the lazaret exhibited no great sign of longing or desire to get away from their seclusion.

Watch is kept over them, however, some escapes having been made in the past. Medical men are

are at all times admitted and given every reasonable opportunity of studying the disease; under precaution also their friends are allowed to visit the patients.

In the year 1890 a Leprosy Act was passed. It provides for the notification of cases of Leprosy, (by the medical attendant, and by the head of the house in which the case occurs,) for the establishment of lazarets, and for the detention or isolation of lepers by the Board of Health either at a lazaret, their own homes, or elsewhere.

It is hoped that the carrying out of the provisions of this act will result in the stamping out of Leprosy in the Colony in a few years.

Leprosy in the other Colonies.

On this subject reports of an authentic character are scanty and I cannot do better than copy the information received by the Government of New South Wales, in reply to enquiries on the subject, from the other Australasian Colonies. (N. S. W. Govt. Report March 1890)

"The following information has

has been obtained from the Boards of Health, and other authorities, as to the prevalence of Leprosy in Australasia. The total numbers of lepers under official cognisance at the close of 1889 was 30 and the following return shows the number in each colony & the nationality.—

Colony	number.	Nationality.								
		New South Wales.	China.	Java.	Fiji.	New Hebrides	Solomon Islands.	Malacca.	Arab Settlements.
New South Wales	12.	2.	9.	1.					
Victoria.	4.		4.						
South Australia.	2.		2.						
Queensland.	6.		4.					1.	1.
Tasmania.									
Western Australia.	1.		1.						
New Zealand.									
Fiji.	5				2.	2.	1.		
Total.	30.	2.	20.	1.	2.	2.	1.	1.	1

"The tuberculated or nodulated, and the anaesthetic or macular forms of Leprosy are represented in about equal proportions." "Besides the persons under direct enumeration it would appear that in some of the colonies there are others of whom no account is taken".

"In a report from the Chief Medical officer of Fiji it is stated that, in addition to the five under Government care, "there are cases - almost all of the anaesthetic or macular type - among the aboriginal race of Fiji, who are to a limited extent segregated by the order of the native district chiefs", and the Under Secretary of the Colonial Secretary's Office, New Zealand, in reporting that there are no hospitals for the special treatment of leprous patients and no lepers under treatment in any hospital, states that "the disease is not absolutely unknown in Newzealand."

"There is indeed reason to believe that it exists in several districts among the native race, the sufferers being kept somewhat apart from their fellows within the boundaries of the native pahs. In Tasmania alone does the disease appear to be

be unknown, the Secretary of the Central Board of Health reporting that "no case has been known, though inquiry has been made at all the centres of Chinese population on the Island." It is also stated that there is a comparatively large Chinese population, and incoming Chinese are all examined under the Chinese Immigration Act.

"In New South Wales the patients are kept in a separate portion of the grounds of the Coast Hospital, which is 10 miles from Sydney, and receives infectious diseases, as Scarlet fever, diptheria, measles, erysipelas, &c, as well as typhoid fever and general hospital cases. (cf. page 41 et seq.)

"In Victoria they are detained in weatherboard huts in a separate enclosure within the limits of the general quarantine station at Point Nepean, but in a secluded situation.

"In Queensland the leper station is on Dayman Island near Thursday Island.

"In South Australia the disease is confined to the northern territory, and the patients occupy bark huts isolated on the proclaimed leper station

Station at Middle Point, and in Western Australia the single patient is kept in a hut erected for his accomodation outside the Quarantine Ground at Woodman's Point, a neck of land projecting into the sea, about 6 miles from Freemantle.

In ~~New South Wales~~, New Zealand, Queensland & Fiji there are no laws or regulations in force dealing with lepers. ~~In the first named colony the want of some legal enactment for the segregation and care of these cases had been greatly felt and a Bill has been drafted under the direction of the Board of Health.~~

"In Fiji the question is under consideration, but it is "not intended to submit any measure to the Council until the inspection of lepers, and investigation of the subject as it affects the Colony at present being carried out by the Chief medical officer's Department is completed."

"In South Australia steps are taken for the segregation of the cases under the provisions of the Public Health Act; and "should any case occur in Tasmania it would

would be dealt with under the Public Health Acts of 1885 and 1887.

"In Western Australia the sole patient is now isolated "under regulations made pursuant to an order of the Governor in Council, dated August 17th, 1889 under the provisions of the Public Health Act.

"In Victoria, leprosy is specially dealt with under Section 8 of the Public Health Law Amendment act of 1888, and the patients are sent to the Quarantine Station, or other appointed place, by order of the Board of Health, on the certificate of the Health Officer of the Board, and two legally-qualified medical practitioners. In the report ~~of the~~ of the Board of Health for the years 1888-9 a full description is given of the four cases under care. Three of these have been in the colony for periods of eighteen, twenty, and thirty years respectively, and the disease has existed in the first for sixteen years, in the second nearly twenty years, and twenty-two or twenty-three years in the third of these cases. The fourth patient has been in the Colony three years.

years only, and the disease made its appearance soon after his arrival.

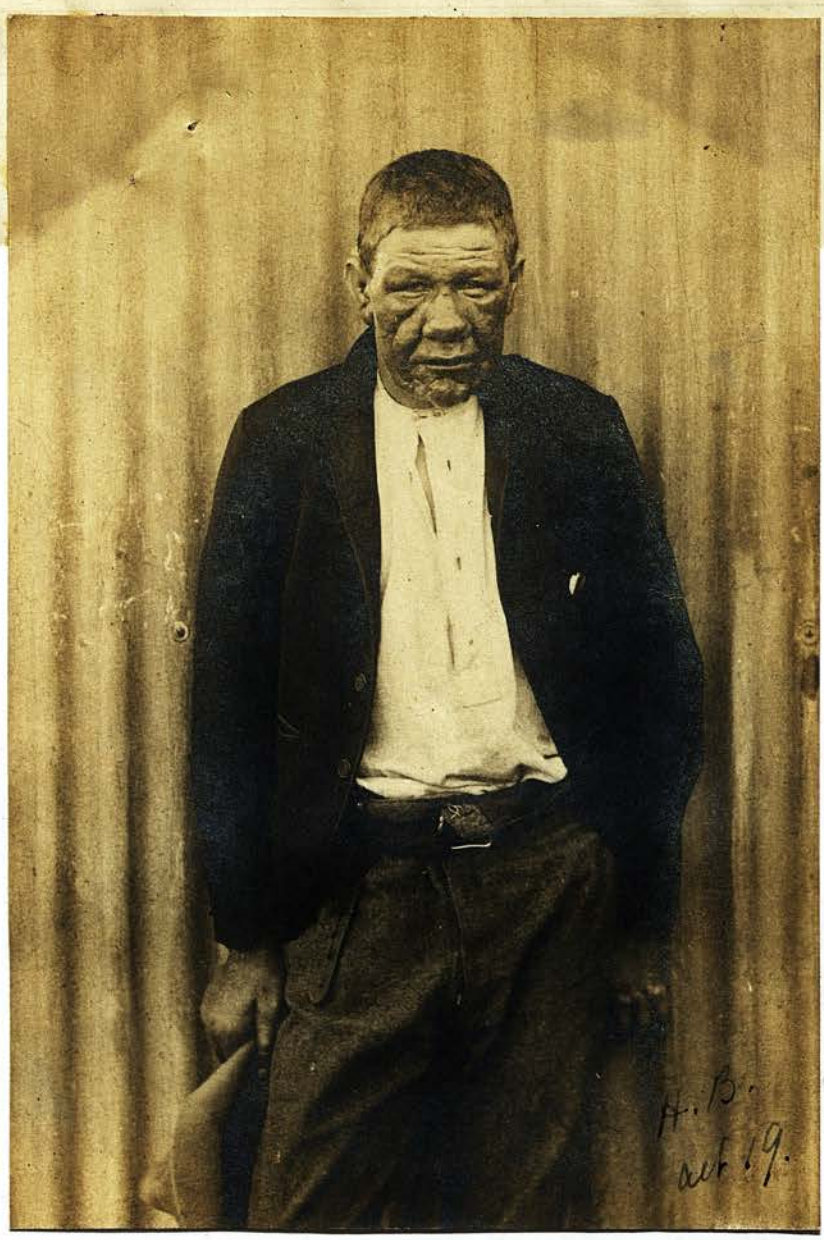
"Of the cases under care in New South Wales, two were admitted in 1883, one in 1885, three in 1886, one in 1887, four in 1888, and two in 1889, and of the Asiatics, the majority developed the disease in periods varying from six month to four years after arriving in the Colony.

"In one case, however, six years, in another seven years, and in a third ten years elapsed between the time of arrival and the appearance of leprosy."

The only known European lepers in Australasia therefore, are the nine cases in New South Wales, the remainder being Chinese, Javanese or South Sea Islanders.

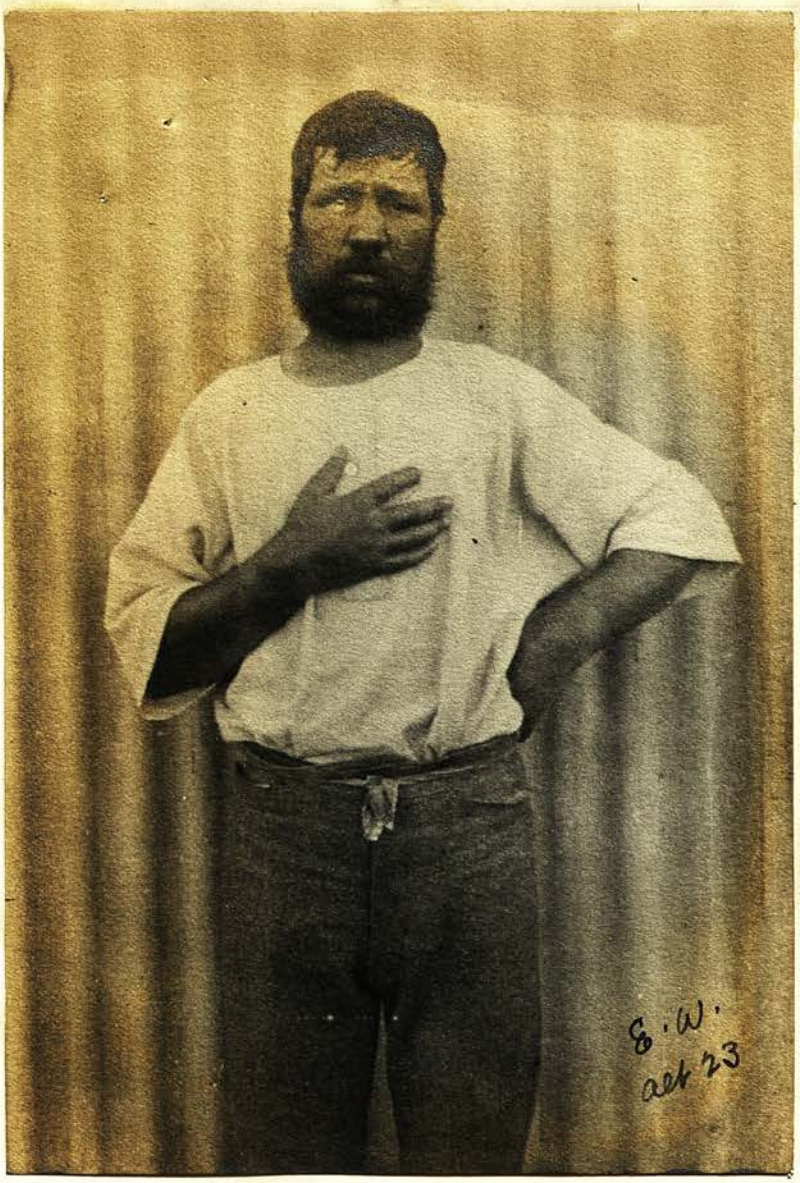
Appended (pp. 50–53) are photographs of European (native Australian) lepers, illustrating both forms of the disease, taken at Coast Hospital, Sydney.

(50)



H. B. act ~~17~~ 19 native of Mudgee. N.S.W.
a good example of Tubercular form.
Face much distorted giving him
an "old man" appearance; tubercles
large prominent ~~+ red~~ bright red, redness stopping
at hair; hair dry, eyebrows nearly
disappeared, eyelashes broken. Hands
also swollen; maculae all over body.
General paraesthesia of affected parts.

(51)



E. W. aet 23. (see Thesis p. 26.)

(52)

A. G., aet 14, male, adm. Aug 1890. Born ~~in~~ lived all his life in Sydney. No specially close contact with Asiatics. Fond of fishing & of fish. Water blisks appeared on left hand in 1888 resulting in ulcers, which healed. No prodromata before these. Left shoulder lips, & arm on outer side, shews discoloured patch not raised, runs on to & covers nearly whole of l. forearm, brownish & reddish mottled, margins definite. All fingers l. hand contracted, wasted & incapable of extension; nail of index lost; the thumb wasted; shallow ulceration covers fingers, thumb, palm & part of dorsum;

no

no pain or tenderness. Two definite symmetrical maculae on the nates; numerous maculae on left leg.

Affected integument paraesthetic, esp on l. arm.

On June 1891 (a late date) I saw him. He then was well nourished healthy-looking & cheerful; eruption on l. shoulder almost disappeared, but still distinct on arm extending down on outer & posterior surface of forearm & hand; ulceration of hand now healed; fingers flexed on palm (as in Photograph) capable of being extended by assistance. Macula on l. buttock disappeared; that on right supplemented by patches down back of thigh & a few small ones on front; oedema of rt foot.

On Dec 4, 1891 I am informed that macula on l. shoulder was gone; that on rt. buttock becoming darker (brown instead of red). General health very good.