D E M E N T I A P A R A L Y T I C A

With special reference to the Races of the Tropical and Subtropical East and Far East.

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F O R E W O R D.

The investigations embodied in this thesis have been rendered possible by the unstinted cooperation of my Asiatic Colleagues in the Medical Services of the Straits Settlements and the Unfederated Malay States. Without their helpful criticisms,and above all their friendly guidance in the difficulties of Oriental Psychology,it would have been impossible to have attempted this study on the basis of racial differentiation.

To my Chief,Dr.E.R.Stone,for permission to carry out the investigations,for his advice on Asiatic problems,and for the use of hospital records and cases, I tender my sincere appreciation.

Lastly I have to record the encouragement afforded Research Work by the Government of the Straits Settlements,and the valuable assistance rendered by their Laboratories,more especially in the serological diagnosis of syphilis.

C O N T E N T S

PART I.

PART I.

INTRODUCTION.

As a very junior medical student, I was deeply impressed by the remarks of the Professor of Zoology in his Introductory Lecture on Evolution. Professor Grahame Kerr stated that the difference between the savage mind and the cultured intellect lay in the fact, that whereas the former was only able to appreciate differences, the latter was able to understand and to search for resemblances, even remote resemblances. Upon the results of this understanding and search was founded the Science of Comparative Anatomy with practical expression in the ordered classifications of the biologist, in generalisations useful in the approach to new biological problems and lastly in a facilitation of the study of the individual case when the latter can be viewed in relation to the general trend.

There is a parallel in the evolution of the practical study of mental disorders.

The Twentieth Century has witnessed a revolution in our attitude towards the mentally afflicted. In England the hospitalisation of asylums has done much to ensure that mental abnormality will be treated as a

disease process. This rational change has stimulated the study of mental disorder, and it may be said that the stimulus has expressed itself in the intensive study of the individual case.

However it is apt to be overlooked that our present day interest in the individual is facilitated by the generalisations made on large groups by our predecessors. The evolution of our attack on mental problems has been from the particular to the general and now it advances from the general to the particular.

In the Tropical Countries of the Far East we have not yet attained the recognition of the general facts of mental disorder although our hospitals are modern in equipment and outlook. We have not yet determined to what extent the descriptive classifications of Western clinicians are applicable to Oriental Races. We know but little of the modifications produced in mental diseases by those physical ailments endemic in tropical latitudes. We are but at the beginning of the recognition of the types of mental disorder, the classification of these types and the elucidation of their etiology. We march slowly for our physicians are without these basic generalisations necessary for diagnosis, and since the

practitioner in the Tropics is pre-occupied with the problems of endemic physical disease, the common-places of Western Psychiatry must perforce remain in a background, overshadowed by considerations of greater urgency.

It is in view of these facts that I would attempt to delineate the disease general paralysis in Eastern Races, in the hope that my generalisations may be of service to the practitioner of medicine in the Tropics, and my researches in the etiology of the condition of value to those specially interested in the subject of mental disorder.

SCHEME OF THESIS.

I propose to show, first of all, that general paralysis is found among the Races of the Tropical and Sub-Tropical East and Far East; secondly, to consider the facts which emerge from a clinical, racial, and statistical study of its incidence; and lastly to discuss my findings in the light of the various theories which have been put forward to explain the etiology of the disease.

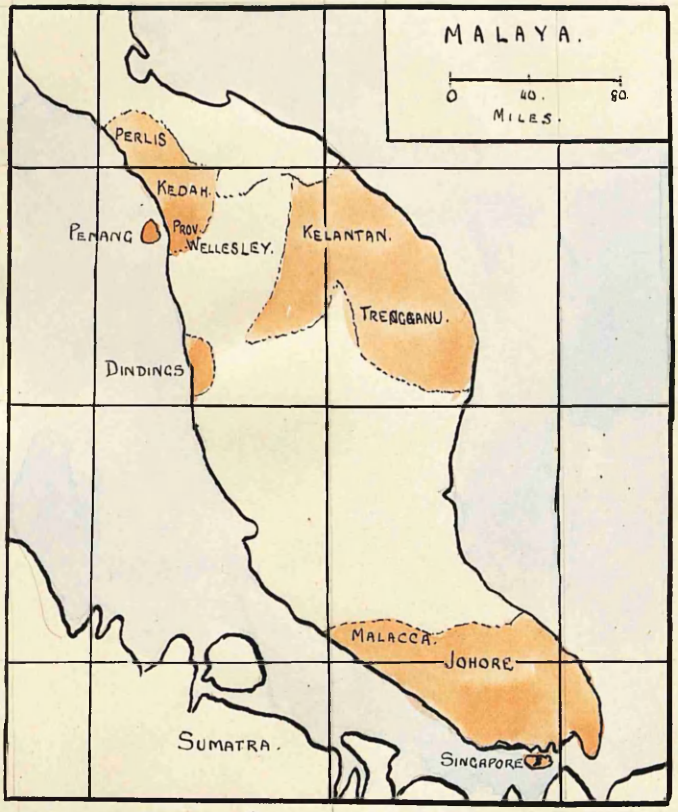
THE CLINICAL MATERIAL.

My study is principally based upon an examination of 1610 consecutive, male, Asiatic cases, mostly admissions to two mental hospitals (1550 and 370 beds) of which I had charge during my tenure of a government appointment in the Straits Settlements. Included in the series are cases examined on account of mental symptoms at the request of the Police or the Immigration Authority.

In order to anticipate criticism I have to stress the point that these are not the casual cases of a cosmopolitan seaport. In the Eastern Colonies of European nations, economic considerations demand that overcrowding in Mental Hospitals should be mitigated by a drastic system of repatriation of the alien insane. In practice

alien lunatics of the sea-faring classes are rarely admitted to the mental hospitals. The following diagram

5.a.



ADMINISTRATIVE AREA: ~~AND~~ UNFEDERATED MALAY STATES AND STRAITS SETTLEMENTS IN RED.


ASIA
English Miles
0 100 300 600 1000
ARCTIC OCEAN
ATLANTIC OCEAN
INDIAN OCEAN
PACIFIC OCEAN
ARABIAN SEA
BAY OF BENGAL
CHINA SEA
YELLOW SEA
SEA OF JAPAN
SEA OF OKHOTSK
BEHRING SEA
JAVA SEA
BANDA SEA
ARAFURA SEA
Celebes Sea
Sooloo Sea
Mediterranean Sea
Black Sea
Caspian Sea
Red Sea
Persian Gulf
Gulf of Aden
Gulf of Oman
Gulf of Siam
Behring Strait
Nova Zembla
Kara Sea
White Sea
Baltic Sea
RUSSIAN EMPIRE
SIBERIA
EUROPE
RUSSIA
NORWAY
SWEDEN
ENGLAND
FRANCE
ITALY
AUSTRIA
PRUSSIA
TURKEY
ASIA MINOR
SYRIA
ARABIA
PERSIA
AFGHANISTAN
BELOOCHISTAN
TURKESTAN
EAST TURKESTAN
CHINESE EMPIRE
MONGOLIA
MANCHOORIA
TIBET
CHINA
INDIA
BURMAH
SIAM
CEYLON
JAPAN ISLANDS
PHILIPPINE ISLANDS
BORNEO
PAPUA OR NEW GUINEA
AUSTRALIA
AFRICA
EGYPT
NUBIA
ABYSSINIA
KAMCHATKA
Formosa (to Japan)
Hadramaut
Nejd
St. Petersburg
Moscow
Archangel
Tobolsk
Tomsk
Irkutsk
Yakutsk
Okhotsk
Peking
Nanking
Shanghai
Canton
Hong Kong
Calcutta
Bombay
Madras
Delhi
Lucknow
Teheran
Ispahan
Herat
Candahar
Bokhara
Samarcand
Yarkand
Lassa
Mecca
Medina
Aden
Muscat
Jerusalem
Damascus
Bagdad
Constantinople
Smyrna
Tokio (Yeddo)
Yokohama
Vladivostok
Saigon
Bangkok
Singapore
Batavia
Colombo
Equator
Tropic of Cancer
Longitude East 80 of Greenwich

The Straits Settlements is a comparatively young and progressive Colony, but the native Malays do not take kindly to hard work, and as a result, labour, to work the tin mines, the rubber estates, and to serve the purposes of Public Works, has to be recruited from the neighbouring countries; each imported Race or Nationality being more adapted to one kind of work than another.

In consequence of this immigration, it is found that all the Races of the East and Far East are represented in the Colony. Of these peoples, few are of the settler type, and almost all have come here only for a short period (indentured labour), often leaving their wives and families in the homeland. Racial prejudices, religious considerations and the language barrier, result in the formation of communities where racial distinctions are maintained.

THE NATIONALITIES REPRESENTED.

The population of the country has increased enormously of recent years, but even now in a country the size of England the total is only about 3½ millions. Of this total about half are local born. At the last census the proportion was about 54 per cent as against 46 per cent immigrant. The immigrants were Chinese 1½ millions, Indians (mostly Southern) ½ million, the people of the Malay

Archipelago, a few Japanese and Europeans, roughly 15,000.

For the purposes of mental research on Eastern Races, the Straits Settlements together with the State of Johore afford an opportunity which is unique. There is a substantial sample representation of the Races of the East congregated in this comparatively small area.

A somewhat similar opportunity for studying racial stocks and the influence of disease thereon obtains in the United States of America, but the two countries are not strictly comparable, for in the New World strains tend to die out as the result of intermarriage, whereas in Malaya the communal life and the homing tendency of the immigrants ensures that the stocks will remain pure.

Now although it is a comparatively easy matter to sort out these races when they are living in their communities, difficulties arise when nationalities have to be determined in the mixed populations of mental hospitals. Patients with intellects clouded often to a degree of deep dementia, provide a complex problem in the matter of referring them to their nationalities.

A classification on the simple basis of race is not altogether satisfactory, as all the peoples mentioned are found to be subdivided into innumerable sects and clans

differing in language, customs and culture and probably in derivation from parent stocks. Among the Chinese patients there are some 15 to 20 sub-divisions, none of which understands the others' language; whilst among the Indians there are Tamils and Malabaris from the South of India, and Bengalis, Sihks, and Bombayans from the North; amongst the Malays are to be found the Javanese, the Boyanese, the Bugis, and the Banjars.

Now the various peoples of Malaya, India and China, present definite and characteristic differences not only from each other but amongst themselves, and I must emphasise that it is essential to heed these differences when considering the incidence of a mental disorder such as general paralysis. Incidentally it will have occurred to my reader that racial customs determine to a large extent the incidence of luetic infection.

The general notes on Eastern peoples will give the reader some idea of the difficulties encountered in the classification of Eastern Races. I have thought it more satisfactory to introduce these notes at the points where the explanations they afford will be the more enlightening rather than to collect the information into one chapter. At the same time I hope to show by them that a study of

the physical conformation of the peoples is very helpful in these problems. For some races Biometric and Craniometric data are already available from the work of Professor Harrower of Singapore (1) and I have to acknowledge much useful information from his papers and personal suggestions.

The investigation of the mental symptomatology in the smaller racial groups often presented a problem in the elucidation of the finer details....evidence of dissociated thought, etc. Some Chinese dialects had to be interpreted into Hokkien; the people of the Archipaelago were investigated in terms of Malay; while a knowledge of Tamil was essential for the investigation of the races of Southern India. The three main languages, Malay, Hokkien, and Tamil, formed a satisfactory basis for the investigation.

GENERAL CONSIDERATIONS regarding the diagnosis of mental disorder in Eastern Races.

(1) An essential in the diagnosis of mental disease among the alien races of tropical countries is a knowledge of the native tongues. In the Straits Settlements where there are many races, one can only learn the more important dialects, so that the investigator is debarred in a large

number of cases from direct access and the unsatisfactory and irritating medium, the interpreter, has to be substituted.

(2) In forming an opinion as to the significance of any one mental symptom, it is necessary to have an intimate knowledge of religious beliefs and native superstitions, and a sympathy with the historical and geographical background of the race.

The mental make-up of the Oriental differs from that of Caucasian people, and this difference is expressed in the occurrence of mental disorders not met with in Western nations.

(3) Mental disturbance due to toxins other than syphilis is common....malaria, Indian hemp, lead, etc., and a chronic toxaemia with dementia from such causes may have to be distinguished from general paralysis. Frequently these conditions are superimposed and especially is this the case with syphilis and malaria.

(4) In the tropics the span of life is short. Early maturity and early decay are universal. This fact has to be constantly borne in mind in the consideration of symptoms.

(5) Lastly with regard to the clinical signs of

involvement of the nervous system, due regard must be paid to the operation of such additional factors as beri-beri, lathyrism and pellagra.

GENERAL PARALYSIS.

According to Professor G.M. Robertson (45), the first recorded case of general paralysis is believed to be one reported by John Haslam who in 1789 published the first edition of his "Observations on Insanity."

The classical description of the disease we owe to the French observer A.J.L.Bayle.

General paralysis as originally described by Bayle (2) has been recognised as a definite disease by Western clinicians for more than a hundred years. As a mental disorder it has almost always attracted more attention and perhaps more speculation than any other form of derangement of the mind, and therefore it is not surprising to find that even early in its history its symptomatology was classified, its progress from onset to death carefully noted, statistics as to its incidence compiled, and hypotheses propounded as to its cause.

Nevertheless the main etiological factor in general paralysis remained for long unknown, and it is only within

recent years that the conception that the disease was constantly and primarily dependent upon antecedent syphilis has received general recognition.

Schaudinn and Hoffmann in 1903, two years before Wassermann published his test for the serological diagnosis of syphilis had isolated the causal organism, the spirochaeta pallida from the body lesions in the subjects of the disease. In 1913 Nougouchi and Moore (3) found a morphologically similar organism in the brains of those dead of general paralysis. Thus within a comparatively short time of the discovery of the spirochaete of syphilis, the main factor in the etiology of general paralysis seemed to be definitely established.

Despite this great advance in our knowledge of the pathological basis of the disease, additional and associated factors such as sexual excess, alcoholism, plumbism, and "civilisation", are still considered necessary to explain the peculiarly limited, and yet varying vulnerability, of the human nervous system to the ravages of the spirochaete pallida.

WHAT IS GENERAL PARALYSIS?

There are many definitions of general paralysis, the

majority so wide and so amended that they fail to convey a clearly defined clinical picture of the disease. To establish convincing data on an unexplored racial and geographical area, the term general paralysis warrants careful definition.

The two following descriptions have been adopted in their entirety in defining the bounds of the disease.

Clouston. (4)

> "An organic disease of the cortical part of the brain, characterised by progression, by the combined presence of mental and motor symptoms, the former always including mental enfeeblement and mental facility, and often delusions of grandeur and ideas of morbid expansion or self-satisfaction; the motor deficiences always including a peculiar defective articulation of words, and always passing through the stages of fibrillar convulsions, incoordination, paresis and paralysis; the diseased process spreading to the whole of the nerve tissues in the body; being as yet incurable and fatal in a few years."

Henderson and Gillespie. (5)

> "An organic disease of an inflammatory and degenerative nature, manifesting itself in progressive mental deterioration, and accompanied by definite clinical signs and serological findings."

It will be noted from a comparison of these two definitions that that of Clouston was enunciated before the days of serological tests, particularly the reaction for the diagnosis of syphilis introduced by Wassermann.

In actual mental hospital practice, especially where there is a large influx of admissions, the Wassermann reaction is not only a confirmatory reaction for the diagnosis of syphilis, but of real value in its routine application to recent admissions. A positive result is a pointer in diagnosis. It is important to observe that such a result does not imply a diagnosis of general paralysis. Such unwarranted interpretations have given rise to much confusion. An apparent widening of the bounds of the disease general paralysis has become evident; and statistics as to its incidence, its course, and the results of its treatment have become unreliable. (Vide Journal Mental Science. Discussion under Auspices of General Paralysis Sub-Committee, Nov.1928 and Feb.1929.)

In view of these latter considerations I propose to confine myself strictly to the definitions which I have given, using the serological reactions as guides in sorting out the cases. In this way I hope to exclude borderline cases and to prevent the personal equation from being criticised in my interpretation of results. Further, while primary syphilis is comparatively rare in admissions to English Mental Hospitals, the condition is very common in tropical practice.

Before proceeding to the account of the clinical findings, I would quote from the literature dealing with the subject of general paralysis amongst Eastern and Tropical races.

It is remarkable that the writers of the standard text-books on Tropical Diseases and on Mental Disorders all regard general paralysis as a rarity amongst tropical races. The following extracts are typical:

> Castellani and Fletcher (6 and 7) are of the opinion that though syphilis is widespread in most tropical countries, the parenchymatous affections of the Central Nervous System, tabes and general paralysis, are rarely met with, at any rate among the native population.
>
> Stoddart (8) "similarly syphilis is rife in China, Japan, and Mohammedan countries, while general paralysis of the insane is comparatively rare."

C.H. Daniels (9) expressed the view that the diseases in England believed to be remotely due to syphilis, tabes and general paralysis, are practically unknown in the Tropics among the natives.

Stewart (10) commenting on the absence of general paralysis among certain races, notably those of Persia and China, suggests that these races might owe their freedom from neurosyphilis to the protective value of malarial infection.

The general impression that one gets from reading the published papers on general paralysis, and the accounts of the discussions on the treatment of syphilis is that many theories regarding the etiology of the disease general paralysis, are erected upon the alleged absence of the disease in Tropical and Eastern Races.

However the following writings are instructive.

Samuels, 1916 (11) stated that he had found 33 cases of general paralysis amongst the admissions to the Central Mental Hospital, Tanjong Rambutan, F.M.S., during the years 1912 to 1914. He gives a clinical description of 3 such cases, all Chinese, and the post-mortem findings in one case. There are no references to serological investigations.

van Brero (12) commenting on the statement that dementia paralytica is seldom found in uncivilised races, states that from 1902 to 1909 in the cases admitted to the asylum at Lawang, Java, 5.3 per cent were paralytics.

G.M. Robertson (13), 1913, quotes Peterson's remark that whereas the Japanese were formerly believed to be singularly free from general paralysis but not from syphilis, yet 15.8 per cent were admitted to the Tokyo Asylum during the quinquennium from 1887 to 1901.

> Caldwell (14) commenting on the theory that there is a neurotropic form of spirochaete continues "one important piece of evidence was that in Tropical and Sub-tropical countries where syphilis was rife....China was the one most often quoted.... general paralysis was almost unknown."

The last writer cautiously adds that this "evidence might be refuted by the fact that no-one with specific purpose had gone to look for cases of general paralysis in these countries....they had been aliens in a strange land not knowing the native tongue and knowing little of the psychology of the people. Hence it was likely that no real search had been made for cases of general paralysis."

METHOD OF PRELIMINARY INVESTIGATION.

The incidence of serological syphilis was determined in 1610 consecutive cases by the Wassermann reaction.

Fallacies in the serological findings.

The Wassermann reaction is not specific for syphilis. In England a positive result is usually accepted as evidence of syphilis, although we state that the test is valuable but not infallible.

In the Tropics there are diseases during the progress of which a positive Wassermann reaction frequently occurs. These diseases are arranged in two tables, the first showing

the order of frequency of positive Wassermann reactions, the second showing the order of frequency of the disease in this area, each table ranging fro(1)(2) high to a low incidence.

(1) Yaws.	(1) Yaws.
(2) Rat-bite fever.	(2) Febrile malaria.
(3) Relapsing fever.	(3) Leprosy.
(4) Leprosy.	(4) Relapsing fever.
(5) Febrile malaria.	(5) Rat-bite fever.
(6) Pellagra.	(6) Pellagra.
(7) Noma.	(7) Noma.

These endemic diseases have to be carefully excluded in interpreting a positive result as being due to syphilis.

Fallacies in the Clinical Findings.

Yaws.

In the differential diagnosis of syphilis the exclusion of yaws (or framboesia) warrants special consideration, especially in the Malayans and the Polynesians.

Yaws is essentially a tropical disease and one which shows a predeliction for certain races...it is rife among the Polynesians, less so among the Malayans, and is rare among the Indians and the Chinese. (Manson)

The virus of the disease, the treponema pallidulum, is morphologically practically identical with the treponema pallidum.

In many ways clinical yaws is characteristically different from clinical syphilis. (vide table).

	Yaws.	Syphilis.
Primary	(a) Typical yaw, pathognomonic; furfuraceous desquamation and plantar lesions characteristic.	(a) seldom imitates yaws.
Secondary	(a) Mucous membranes not affected. (b) Itching common. (c) Alopecia unknown. (d) Eyes unaffected. (e) Does not respond to Mercury.	(a) mucous membranes affected. (b) Itching rare. (c) Alopecia frequent. (d) Iritis common. (e) Responds to Mercury.

From Manson's "Tropical Medicine" (modified) 9th Edition.

Both diseases however, are liable to show a large number of atypical cases in the tertiary stages, and in such cases in the Tropics the diagnosis of syphilis from Yaws is extremely difficult.

The tertiary lesions common to both include:

multiple dactylitis.
onychia.
par-onychia.
destructive ulcerative pharyngitis.
leontiasis ossium.
synovitis.
periostitis.
osteitis.

The Wassermann reaction in yaws is always positive and the disease responds well to salvarsan and bismuth.

Apparently saturation with yaws produces a relative immunity to syphilis. On these grounds may be explained the apparently well authenticated fact that syphilis is absent among the Polynesians. (Manson)

A further difficulty in excluding yaws is that in its later stages symptoms are absent but the Wassermann reaction remains positive in the untreated case.

In the atypical cases, the leucodermic patches, plantar infection, the history and the alteration in the Wassermann reaction following the administration of mercury, are helpful points in the differential diagnosis from syphilis.

(Polynesians are heavily infected with yaws. 100 per cent of admissions to the mental hospitals gave positive Wassermann reactions. Strangely enough, two Polynesians suffered from 'general paralysis' and there was a definite history of untreated yaws. I have met with the same combination in Malays. These cases are not included in the present series.)

RESULTS OF PRELIMINARY SURVEY.

Blood samples from 1610 consecutive, male, Asiatic cases were examined. Of these 600 gave a positive reaction, which in conjunction with the clinical findings and the careful exclusion of the conditions mentioned, could be taken as evidence of syphilis, latent or manifest.

It can be stated that 37 per cent of the cases examined are syphilitic.

The racial distribution of these cases is given in the tables (page 46a) and will be considered later.

Search for cases of general paralysis.

The cases giving positive Wassermann reactions were carefully scrutinised for evidence of general paralysis, corroboration being afforded by a parallel routine examination of cerebrospinal fluids. The latter comprised the following tests:

(a) The Wassermann reaction.

(b) The Nonne-Apelt reaction for globulin.

(c) The Boltz Acetic anhydride reaction.

(d) Cell count.

Several attempts were made to examine the cerebrospinal fluids by the Colloidal Gold Reaction of Lange. Tropical conditions were found to be unsatisfactory for the preparation and maintenance of gold-sol, and this part of the examination had to be abandoned.

Physical examinations.

The main points requiring scrutiny comprise:

Alterations in the pupillary reactions.

Alterations in the deep reflexes...knee, ankle and plantar.

Alterations in the superficial abdominal reflexes.

Examination for the typical slurring articulation; lingual and labial tremors.

ILLUSTRATIVE CASE NOTES.

Case (1), Hokkien, aged 35.

History of onset.

For about one week before his arrest and admission to hospital he was strange in his manner; he laughed and chattered to himself and did no work. He complained of confusion and headache. He went into the village and created a disturbance and was arrested by the police. In the Police Station he became noisy, abusive, and threatening, and an order for his removal to the Mental Hospital was obtained.

Personal history.

His wife describes him as a very steady fellow, he does not drink or smoke opium. He has been ill with "fever" frequently during the past six months, and his wife thinks that he is now suffering from malarial insanity (deman kura gila). She has had two children, both died at four and six months respectively, from wasting fever. She has had several miscarriages and still-births.

Condition on admission.

He is restless,noisy and excited. His talk is rambling and incoherent. His habits are faulty. Six attendants are required to remove him to the ward.

Course of illness.

On examination the day following admission he is quiet and amenable. He engages readily in conversation. He has no recollection of his arrest or of his removal to hospital. He complains of pain in the left side.

Physical examination.

Spleen enlarged and palpable. Blood films show subtertian malarial parasites. There is no fever.

Nervous system.

There is no alteration in the deep or superficial reflexes. The pupils are equal and react briskly to light and accommodation. There are no tremors and sensation is apparently normal. There is no defect of articulation.

Serological examination.

Blood Wassermann reaction positive.

Cerebrospinal fluid.

Wassermann reaction positive.

Marked pleocytosis.

Globulin increased.

Further progress.

For a month he showed no further mental symptoms; he was well conducted and usefully employed.

Note one month after admission:

> "He has become sulky and unreasonable. He refuses to go back to his ward in the evening, and asks to be admitted to the Infirmary as he feels ill. During the night he had been restless and sleepless. He states that he has no throat and that his stomach is dead."

A week later (5 weeks after admission) he is definitely grandiose. "His uncle's estate is now his own and instead of being ten acres it has grown to thousands."

Physical examination:

> Pupils unequal, right larger than left, both eccentric in position. Light reaction lost in both. Articulation is slurring. Tongue tremulous.

For a month he maintained his grandiose ideas and during this period there seemed to be some improvement in his physical condition. He put on weight. He suddenly became noisy, restless and sleepless. His habits were faulty; he picked at his skin and destroyed his clothing. He was quite incapable of giving any account of himself. His condition deteriorated rapidly. and he died following a succession of congestive seizures.

Discussion of Case.

The onset in this patient is suggestive of an attack of acute mania in a syphilitic subject. Probably there is some predisposition to mania in the recent malaria. Superficial improvement in general paralytics is not uncommon following their admission to the ordered routine of an institution. In this case the improvement was so striking as almost to confirm the provisional diagnosis of acute mania, and the discharge of the patient was contemplated.

It will be noted that he presented none of the physical signs of general paralysis until the expiry of the first month. Following admission he received specific treatment for his syphilis.

I do not think that the manifestation of classical general paralysis was accelerated by sensitisation of the patient by specific treatment, though this is a point of importance in relation to this particular case.

The course of the illness and its termination were those of classical general paralysis. The period elapsing from admission to death was ten weeks.

It is of interest to note that while the patient suffered from sub-tertian fever, an attempt to inoculate him with benign tertian malaria (and later with quartan) proved unsuccessful.

Case (2), Cantonese, aged 38.

History of onset.

Three weeks before his admission to the Mental Hospital, his friends noticed that he was becoming inattentive to his business as a watchmaker and jeweller; he often wandered away during the day. At night he was restless and sleepless. He was often soiled.

Personal history.

He has always been healthy except for occasional attacks of "fever". He smokes opium in moderation. His families are healthy and there is no history of miscarriages, still-births, or deaths in the marital account.

Condition on admission.

He is dull and confused, he gazes about vacantly. He takes little notice of remarks addressed to him. He does not know where he is and has no idea of time. He has no recollection of having been brought here. His habits are faulty and he is blindly resistive to physical examination.

Physical examination.

Pupils unequal and irregular in outline. The right pupil is dilated and the left contracted. Both pupils react to accommodation but very sluggishly to light. Articulation is hesitant and typically slurring. Both knee-jerks are exaggerated as are

the superficial abdominal reflexes. Plantar reflexes flexor. Tongue and naso-labial tremors present.

Serological reactions.

Blood Wassermann reaction positive.

Cerebrospinal fluid.

Wassermann reaction positive.

Pleocytosis.

Globulin increased.

Course of illness.

Following admission he became very violent while being bathed and he continued in a noisy sleepless condition for three weeks. With the subsidence of this acute maniacal phase, he appeared weak-minded and facile; was childish in his talk and conduct. He expressed fleeting delusions of grandeur. However he occupied himself in an aimless way and gave no trouble. This tranquil phase persisted for two months and there was a steady improvement in his physical condition.

During the fourth month his right arm and leg became paralysed, his general health deteriorated rapidly and he died suddenly following a succession of congestive seizures.

Commentary.

This case presents the mental, physical and serological findings of classical general paralysis. The successive stages are well demarcated, but they are of very short duration.

Case (3), Kheh, aged 45.

History of onset.

About one month previous to admission he was noticed to be very boisterous and was always laughing. He left the house one morning and did not return for a few days. After his return he used to hire a rickshaw in the morning and drive about all day. He could not settle the hire. At night he entertained prostitutes in his house and ordered his wife to leave. He contracted gonorrhoea but refused to have treatment. He struck his wife and children; he was mischievous and made holes in the mosquito nets.

Personal history.

He is described by his brother as a very quiet man, who rarely interested himself in anything beyond his tailor's business. He never had any serious illness to his knowledge. The wife was healthy and there was no history of miscarriages.

On admission.

He is garrulous and argumentative. He orders the nurses about their duties, and is exalted and expansive in his ideas.

Physical examination.

Pupils equal, contracted to pin-point and do not react to light. Articulation slurring and hesitant.

Naso-labial and tongue tremors present. Knee-jerks present but difficult to elicit. Ankle jerks absent. Romberg's sign present. Gait unsteady. No anaesthesia of feet. Plantar reflexes ? extensor.

Serological reactions.

Blood Wassermann reaction positive.

Cerebrospinal fluid.

Wassermann reaction positive.

Pleocytosis.

Globulin increased.

Course of illness.

He gradually became more exalted and grandiose in his ideas. He refused to dine with the other patients as they were his servants, and he refused to wear institution clothes as they did not distinguish his rank. He demanded special soaps and always bathed apart. He ordered me to leave my house as he was now the "Tuan Bezar". He asserted that all the female patients were his wives and he wanted individual houses built for each. He continued in this state for two months.

During the third and fourth months he expressed his delusions less and less, and became more amenable. His physical condition, however, showed no change.

During the fifth month he contracted malaria (sub-tertian and benign) and was ill for a month. A few days after his recovery he had a very severe seizure lasting twelve hours. He died two days later without regaining consciousness.

Commentary.

A case of general paralysis of the exalted type. Total duration probably six months.

Case (4), Javanese, aged 39.

History of onset.

Two days before his admission he lost his way while he was driving his master to the office, and was promptly discharged. He then invited his friends to a bathing party but did not himself appear. He was found sitting on the sea-shore about two miles away and explained that he was turning the sand into gold. His friends brought him to the Mental Hospital.

Personal history.

He is described as a generous fellow. He used to work for two or three months as a car driver, draw his

salary and entertain his friends until the money was spent. He had had five wives but had divorced them all. All his children were dead.

Condition on admission.

He went to sleep while being interviewed. When roused he said 'It will wait until tomorrow.' He states that he is the fastest car driver in Malaya; that he is the Governor's sais (driver) and that he is the centre forward for the Malay football team.

Physical examination.

Pupils unequal and react very sluggishly to light. Accommodation average. Knee-jerks exaggerated. Superficial abdominal reflexes increased. Articulation slurring.

Serological reactions.

Blood Wassermann reaction positive.

Cerebrospinal fluid.

Wassermann reaction positive.

Lymphocytosis.

Globulin increased.

Course of illness.

He continued unchanged for two months during which time he did a little work in my garden.

During the third month he became one day depressed and said that he had been slighted. He was sent back to his ward. The following day he became violent and homicidal for half an hour, and the next day he was suffering from stupor and quartan malaria. In the intervals between rigors he was noisy and restless. He was confused in mind, his habits were faulty and he refused food. He was allowed to have six rigors before treatment for the malaria was instituted. Following this he contracted acute bacillary dysentry and in his debilitated state he quickly succumbed.

Commentary.

This is a case of general paralysis. It shows how readily the symptomatology may be obscured by synchronous malarial infection. The sequence...suspicion, violence, stupor, in association with quartan malaria, suggests intercurrent Amok, (a condition of homicidal excitement of sudden onset,peculiar to the Malays and the Javanese.)

Case (5), Malay, aged 34.

History of onset.

One month before admission he was reduced from a Grade II to a Grade III clerk because he was becoming very careless. His writing had deteriorated and he could not be trusted to do simple additions. He began to express grandiose ideas and was very exalted in his manner.

Personal history.

He is a widower. No children. No other particulars obtained.

Condition on admission.

He is restless, exalted and grandiose in his ideas. He states that he is the Rajah Muda, that he has built a mosque, and that he is the Captain of the River Pirates.

Physical examination.

Pupils unequal. Left dilated and reacts to light and accommodation. Right contracted and reacts very sluggishly to light. Articulation slurring and retarded. Knee jerks exaggerated.

Serological reactions.

Blood Wassermann reaction positive.

Cerebrospinal fluid.

Wassermann reaction positive.

Lymphocytosis and increased globulin.

Course of illness.

He quickly settled down to the routine of the hospital. He gave no trouble and occupied himself usefully during the day.

At the end of two months he was partially demented and rarely expressed grandiose delusions. His physical condition improved considerably.

About five months after admission he was frequently wet and soiled. Following this the deterioration was rapid and he died following a succession of seizures.

Commentary.

This is a case of general paralysis showing a combination of the expansive and the dementing forms. On admission sub-tertian parasites were found in the blood smears from this patient, and his spleen was found to be enlarged. He suffered from repeated attacks of fever, during which 'crescent forms' were noticed in the blood films. Attempts to produce reactions with vaccines always resulted in malarial relapses.

Case (6), Tamil, aged 32.

History of onset.

Patient's own statement: "For some weeks he had been suffering from 'fever' and had wandered away from his friends. He was set upon by rogues who beat him. He was then arrested by the Police."

Personal history.

(Patient is friendless...no personal history).

Condition on admission.

He is dull, stupid and confused in his ideas. His spleen is enlarged, easily palpable, and hard. Blood films show the crescent forms of malignant malaria.

Day following admission.

Physical condition.

Impaired. Knee jerks - both increased, the right more than the left. Ankle jerks brisk, the right being exaggerated. Plantar reflexes flexor. Superficial abdominal reflexes increased. Fine fibrillary tremor of the protruded tongue. Naso-labial tremors. Articulation characteristic. When asked his name (vicerrina) he repeats v i c - c - er - er-in-na. Pupils unequal (right larger than left), irregular in outline and very sluggish in reaction to light.

Serological Reactions.

Blood Wassermann reaction positive.

Cerebrospinal fluid under pressure.

Wassermann reaction positive.

Globulin increased.

Pleocytosis.

Course of illness.

He continued confused, but there were periods when he suffered from ~~marked~~ restlessness and excitement. He gradually became more feeble and died one month 26 days after admission following a series of congestive seizures.

Post mortem (Cranial contents only)

Dura mater thickened and adherent to the skull cap. No evidence of pachymeningitis. Pia-arachnoid thickened and opalescent, appears oedematous. Cerebrospinal fluid greatly increased. Cerebrum much decreased in weight relatively and absolutely. Convolutions of the frontal and temporal lobes are wasted and on section the grey matter of the cortex appears reduced in these areas. The ventricles are dilated. Very slight granularity of the ependyma in the lateral recesses of the IVth Ventricle. There are small foci of softening in the optic thalamus. White matter injected.

Commentary. A case of general paralysis of the demented type.

PATHOLOGY AND MORBID ANATOMY.

Racial prejudices and religious considerations make it very difficult to obtain permission from relatives for the performance of necropsies. A further sanction must be obtained by special application to the Coroner.

In the East a value is placed upon the body after death, and there is a native belief that the spirit escapes with any mutilation and that re-incarnation is impossible thereafter.

In the Tropics ~~where~~ putrefactive changes set in so rapidly that an examination, to be of any value, must be performed within an hour or so after death.

PRECIS OF THE INTRACRANIAL MORBID CHANGES IN 10 CASES.

Dura mater:- adherent to the skull-cap and thickened; sub-dural haemorrhages in cases dying of seizures.

Pia-arachnoid:- opalescent, stripping readily from the cerebral convolutions, but with de-cortication in the temporal convolutions.

Cerebro-spinal fluid:- increased in amount, over the tentorium cerebelli in all cases.

Cerebrum:- weight greatly decreased, absolutely and cpmparatively. Wasting of the convolutions in the frontal and temporal lobes.

Ventricles:- Lateral ventricles dilated. Ependyma agranular. Slight granularity of the floor of the fourth ventricle. No case presented the granularity so typical of the disease in Europeans.

Cortex:- atrophied in the pre-frontal and temporal regions. Petechial haemorrhages on section in cases dying of seizures.

Vessels:- thickening and degenerative changes in the basal vessels.

It will be noted that except in the matter of granularity, the morbid anatomy corresponds with that found in Europeans.

No microscopic examinations were made, but it is of interest to note that van Loon and Kirschner have demonstrated the spirochaeta pallida in the cortex of Chinese general paralytics. (Transactions of the Far Eastern Congress of Tropical Medicine, 1923).

Before proceeding to the analysis of the results of the clinical survey it is convenient to consider the conditions which give rise to difficulties in the differential diagnosis. The following merit particular attention in the order named.

(1) Cerebrospinal syphilis.
(2) Malarial insanity.
(3) Haschisch.
(4) Senile dementia.
(5) Lead encephalopathy.
(6) Beri-beri.
(7) Pellagra.
(8) Lathyrism.

CEREBRO-SPINAL SYPHILIS.

Cerebrospinal syphilis is common in the Chinese and has a higher incidence than general paralysis in that race. (For instance, Mon Fah Chung of Peking (15) puts the incidence of syphilitic myelitis at 39 per cent of all cases of spinal disease. (In England Williamson (16) records only 32 cases as compared with 118 cases of tabes seen during the same period, (21 per cent).) The disease usually takes the form of a basal meningitis, though the cerebral vessels are often attacked.

The occurrence of ocular palsies, of convulsive seizures indistinguishable from epilepsy, the "Chattering delirium", the course of the disease and the amelioration produced by specific treatment, distinguish this condition from general paralysis.

MALARIAL INSANITY.

It is recognised that malaria can give rise to three forms of post-febrile insanity.

(1) mania.

(2) melancholia.

(3) late stupor.

In my experience, this simple classification is inadequate. In the Straits Settlements, where all forms of malarial infestation are prevalent, the mental symptomatology seems to depend on two factors:

(a) the type of infection,

(b) the race infected.

This point can best be illustrated by reference to quartan fever, the dominating type of fever in the Malay States.

> The Malayans are especially subject to the condition AMOK and it would appear that their attacks of frenzy are invariably associated with quartan fever. (Fitzgerald (17)).

> In the Tamils quartan malaria gives rise to a condition of restless confusion, whilst in the Chinese the mental symptoms closely approximate to those of classical expansive general paralysis. In the later stages of the disease the Chinese lapse into a condition of restless confusion, again with a superficial resemblance to the dementing process of general paralysis.

The diagnosis of general paralysis when the clinical picture is obscured by superimposed malaria is undoubtedly difficult. Attention to physical signs and the examination of the cerebrospinal fluid may be helpful. The persistence of symptoms following treatment may arouse suspicion.

Lastly I would draw special attention to case (4) of my series, a consideration of which shows how easy it might be to attribute to Amok the physical signs of a pre-existing general paralysis. (See page 32)

HASCHISCH (Ganju, Bhang).

Cannabis indica is the universal intoxicant in Mohammedan countries where wine is forbidden. The drug may be smoked or partaken in various concoctions mixed with spices. However taken, indulgence over a period may give rise to mental symptoms.

Cannabis indica has an effect on the Oriental which is not obvious in the European. I believe that the response to the drug is due to the ease with which the Oriental can produce dissociation... a state of absent-mindedness or amnesia. For instance, I have seen Malay attendants, apparently supervising patients, being totally unaware of my approach, although their eyes were wide open. On several occasions the patients have returned to their ward leaving the attendant sub-consciously directing them.

In view of this ease of dissociation and the tendency of the drug to produce "alluring dreams which transport the Oriental to a paradise endowed with Mohammedan ideals" (Poulsson), it is not surprising that the mental symptoms presented by the ~~habitué~~ addict, are of a restless, excited, grandiose, variety very similar to classical expansive general paralysis.

The diagnosis depends upon a consideration of the physical signs. Generally, Ewen's sign is diagnostic of Haschisch.... marked conjunctival congestion in the horizontal vessels of both eyes. (In recent cases the congestion is acute, in chronic cases the acute congestion is replaced by a well marked line of blood pigments.)

The mental symptoms of Haschisch quickly subside on admission to hospital, and deprivation of the drug.

SENILE DEMENTIA.

In the tropics, puberty occurs at an earlier age than in the temperate zones and involution is correspondingly quickened. Senile insanity with its weakening of the intellect, emotional deterioration, alterations in the character, and the frequent occurrence of expansive ideas, has to be considered in the differential diagnosis. The main points are the pupillary anomalies, the typical articulation of general paralysis, and the serological findings.

LEAD ENCEPHALOPATHY.

According to Stoddart (19) "the mental phenomena induced by lead poisoning are those of uraemia and are directly dependent upon chronic renal disease simultaneously induced by the poison".

Aub (20) states that the cerebral symptoms of lead poisoning are meningeal. He quotes

(1) Hassin who found a marked proliferative meningitis and relatively slight changes in the brain.

(2) Other observers who have found an increased pressure in the cerebrospinal fluid and a slight lymphocytosis

(3) Camus who produced excitability and convulsions in dogs following the injection of lead into the cisterna magna. No such symptoms followed injection into the brain.

In the East, lead poisoning is common. In the females the lead is introduced in the basis for face creams, in the males the disease appears to be occupational.

The mental symptoms, hallucinations, mental exaltation and progressive dementia, in association with tremor particularly of the lips and tongue, impairment of vision due to optic atrophy, paresis and epileptiform seizures, constitute a clinical picture which closely resembles general paralysis.

In the differentiation, a study of the history, the blue line on the gums, the blood picture of a secondary anaemia with punctate basophilia, are the main points of distinction.

BERI-BERI, PELLAGRA, and LATHYRISM.

These three disorders of nutrition may be conveniently considered together.

Beri-Beri.

The form of this disease commonly met with in the Straits Settlements is the dry, atrophic, or paralytic type with peripheral neuritis; the oedematous and cardiac forms of the disease are rare.

Pellagra.

Is most likely to cause confusion in those cases in which the pathognomonic skin lesions are in abeyance. It is not unusual to find pellagrins

with altered reflexes and dementia and little evidence of skin involvement.

Lathyrism.

In my experience a spastic paraplegia from lathyrism has occurred in Indians only, particularly Dravidians.

Conclusion.

These disorders are of importance in the differential diagnosis of general paralysis because each is characterised by alterations in the reflexes; each may present symptoms of mental exaltation with dementia, and further the mental symptomatology may be further obscured by coincident malaria or haschisch intoxication.

GENERAL RESULTS.

In my clinical survey I found that 133 cases came within the bounds of the definitions of general paralysis which I have quoted; each case presented mental, physical and serological evidence of the disease.

The general results of my research may be expressed in the following terms.

(1) In a survey of 1610 consecutive male, Asiatic cases (excluding Polynesians) examined on account of mental abnormality, 133 or 8 per cent are found to be general paralytic.

(2) 37 per cent of all cases are syphilitic.

(3) 22 per cent of the known syphilitic are general paralytic.

(4) 32 per cent of the non-paralytic are syphilitic.

The racial incidence of syphilis and general paralysis is given in the following table.

T A B L E OF RESULTS OF INVESTIGATION.

R A C E.	TOTAL CASES.	SYPHILIS.	GENERAL PARALYSIS.	PERCENTAGE OF CASES SYPHILITIC.	PERCENTAGE OF CASES PARALYTIC.	Percentage of known syphilitic who are paralytic.	Percentage of syphilis in the non-paralytic.
MALAYANS.	127	68	12	53.54	9.44	17.64	48.68
Malays	98	54	10				
Javanese	22	9	-				
Boyanese	3	3	1				
Banjars	2	1	1				
Bugis	2	1	-				
CHINESE.	1088	421	111	38.7	10.11	26.36	31.74
Hakka	118	46	12	38.98	10.17	26.08	32.07
Cantonese	184	81	27	44.02	14.68	33.34	34.41
Hamans	148	48	12	28.05	8.11	25.00	26.46
Hokien.	338	150	37	44.38	10.95	24.67	37.54
Teochow	193	67	17	34.71	8.82	25.37	28.41
Hochkia	61	15	2	25.00	3.29	13.33	22.03
Shuntong	1	-	-				
Hunan	1	1	-				
Chekiang	1	-	-				
Shanghainese	14	6	2				
Unknown	29	7	2				
DRAVIDIAN.	315	82	5	26.04	1.59	6.10	24.80
Tamils and Malabaris	309	81	5				
Telgus	6	1	-				
VARIOUS.							
Bengalis	16	8	-				
Sikhs	2	1	-				
Bombayans	2	2	-				
Formosans	28	8	2				
Portuguese	16	6	1				
Malay American-Siamese	2	1	1				
Japanese	1	1	1				
Arab	7	2	-				
Jew	1	-	-				
Assamese	1	-	-				
Korean	4	-	-				
	1610	600	133	37,40	8.26	22.50	31.80

THE AGE OF ONSET OF GENERAL PARALYSIS.

The following percentages are calculated on the 133 cases of general paralysis.

20-30 years	5.20 per cent
30-40 "	40.83
40-50 "	37.95
50-60 "	1.55

However it is important to note that the age group 35-45 contained 48 per cent of the total cases.

The average age of onset is 39.9 years.

AVERAGE AGE OF ONSET IN THE RACES.

Sub-Tropical

Hakka	41.09 years.
Cantonese	44.00 "
Hokkien	39.37 "
Teochow	43.00 "

Tropical

Malays	35.5 "
Dravidian	35.0 "
Hainans	32.6 "

It will be noticed that in the Tropical groups the age of onset is slightly earlier, than in the sub-tropical races. It is to be remembered that early maturity is the rule with the tropical races, and this may result in earlier exposure to syphilitic infection.

THE MENTAL SYMPTOMS OF GENERAL PARALYSIS IN THE ORIENTAL.

The mental condition in the 133 cases is tabulated

thus:

Expansive type	60
Demented	47
Depressed	21
Tabeto-paretic	5

There are no juvenile cases in the series.

The disease in all these groups is very acute. In the cases which run a classical course the three stages of the condition, the restless excited, grandiose onset; the fat, fitty and fatuous stage, and the bedridden, vegetative termination with emaciation occur as in Europeans, but the stages are short, and there are no remissions.

Expansive Type.

In considering the delusions presented by these people it is necessary to make allowance for the culture of the people.

Chinese.

The exalted stage in the Chinese is characteristic of the Celestial. He is an Emperor or a Towkay (man of wealth); an owner of tonkangs (river-junks). As he becomes the more expansive the number of his houses increases. His delusions become definitely sexual in nature. Often he is the world's mah-jong champion. (The Chinese are inveterate gamblers and it seems natural that their expansive delusions should reflect this topic.)

Malayans.

The delusions of the Malayan paralytic reflect the fantasies of a simple pleasure-loving people whose day dreams are of a world where there is no toil. He is a rajah with many large palaces, jewels, and bags of gold. He is so rich that he does not now need to work; he is contemplating a pilgrimage to Mecca; he is a Hadji (a man who has made the pilgrimage, works no more and is supported by his friends) or Mahommet. He has the finest studded kris (dagger). He will give a Durbah.

THE DIAGNOSIS.

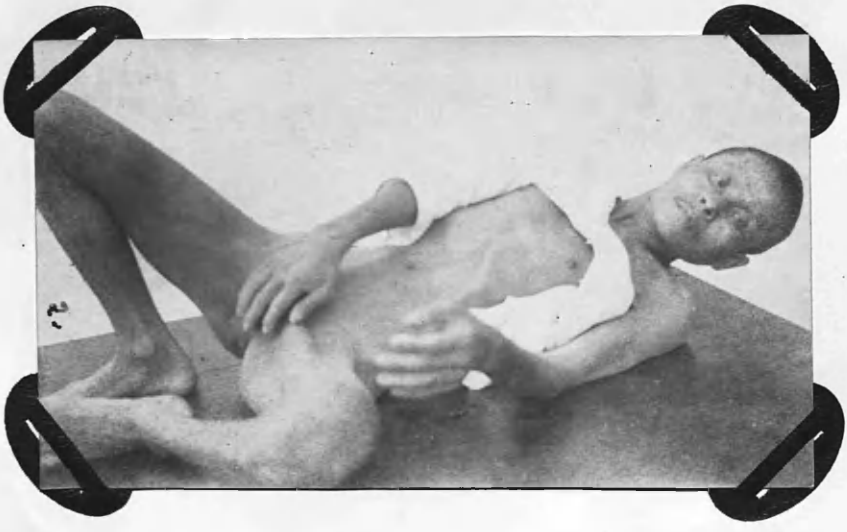
The following photographs provide some points of interest in the diagnosis.

No. 1. Malay, aged 43. Died two months after admission. The photograph shows the lack of control over the lower facial muscles, the pouting of the lips suggesting the extreme tremulousness which was present.

No. 2. Hokkien, aged 39. Duration two months. Patient in the terminal bed-ridden condition. Very emaciated.. He is very demented and is constantly plucking at his scrotum.

No. 3. Three Chinese paralytics in the secondary stages. The patients are aged 41, 33 and 41. Note the blank expressionless faces, case 3 particularly illustrates the dull heaviness characteristic of this stage.

- Nº 1 -



- Nº 2 -

1. 2. 3.

- N°. 3 -

a. b. c d e.

N° 4.

- N°5 -

- Nº 6 -

No. 4. Group of paralytics.

a. Late second stage.
b. Late first stage.
c. Early second stage.
d. Very early in the first stage.
e. Second stage.

Note particularly the boyish freshness of case d., although this patient is 37. This boyishness is very characteristic of the early stages of general paralysis in the Oriental, and is in marked contrast with the rapid senescence which occurs as the disease progresses. This typical senescence is well shown by the other cases in the photograph.

No. 5. Hylam, aged 38.
Late first stage. Again note the particularly youthful physiognomy of the period of onset.

No. 6. Tamil (Dravidian), aged 40.
In a condition of mild dementia. The photograph shows the expression of bien-être characteristic of classical expansive general paralysis. This Tamil had an unusually light skin. His brothers were very dark. All the Tamil paralytics of the series tended to show this lightness of the skin.

PROGNOSIS.

The prognosis is very grave and death usually occurs within a few months of admission to hospital; usually as the result of congestive seizures which form such a prominent feature of the terminal stage of the disease.

The certified cause of death in 105 general paralytics is given in the following table:

Dementia paralytica	90
Acute bacillary dysentery..	3
Pulmonary tuberculosis.....	2
Heart disease.....	1
Cholera	1
Lobar pneumonia	1
Sub-tertian malaria	2
Typhoid fever	1
Chronic bacillary dysentery	4

Of the remaining 28 cases, 5 have been repatriated and 23 remain in hospital. Of these latter, I regard 5 as chronic (duration over six months) and thirteen are recent admissions.

In the 90 cases certified as dying from dementia paralytica, the average duration of the condition was three months twenty-four days. This rapid march from onset to a fatal termination is specially noticeable amongst the Chinese races(the Chinese in this series living but three months and sixteen days from the onset of the general paralysis) and is probably associated with lack of adaptation to the Tropical climate.

CONSIDERATIONS REGARDING TREATMENT.

In a hospital such as this, serving a population of about three and a half millions, the admission rate is extremely high. Despite this, overcrowding from the normal influx of patients or from re-admissions is prevented by a drastic system of repatriation to China, to Java, and to India

Thus while the admission rate provides a wealth of clinical material it is practicable to retain general paralytics for treatment and to give the recognised methods an extended trial.

I have already drawn attention to the fact that remissions do not occur in Oriental paralytics, a view supported by van Brero (21). I can recall but one case in which there was any suspicion of remission. This was in a male admitted as a case of acute mania. He settled down and then he escaped. He returned two months later and by then he was easily recognised as a case of classical general paralysis.

The occurrence of spontaneous remissions has always been a difficulty in assessing the value of any particular line of treatment in European paralytics. The absence of spontaneous remissions in Orientals adds interest to my results.

TRYPARSAMIDE.

Tryparsamide seems to be unable to stay the progress of general paralysis as found among the Orientals. The Chinese could not tolerate the drug. It was found to produce sickness, epigastric pain and headache, usually within four hours of administration, and these symptoms were aggravated when any

attempt was made to increase the dosage, although tryparsamide from the same batch of ampoules failed to produce these symptoms when administered to Europeans. (A possible explanation of this lies in the peculiar drug idiosyncrasies of the Chinese, commonly encountered in prescribing; for example, diarrhoea and excitement are produced by small doses of strychnine, while in contrast the tolerance of the Chinese to Opium and to cerebral sedatives generally is well-known.)

In other races I did not attempt to administer the large doses advocated by some workers in Europe and more particularly in America. This I justified from my experience of the sequel (blindness due to optic atrophy) which occurred in 3 of 17 cases to whom I administered tryparsamide while in Europe. My previous impression that there is a tendency to fatal convulsions following the withdrawal of tryparsamide received further confirmation.

MALARIAL THERAPY

That frequently patients suffering from mental disorder are much improved by a severe pyrexial illness has long been known. Upon this fact is based the use of malaria as a therapeutic agent.

The pyrexial diseases, especially malaria (benign,

quartan, and sub-tertian) being rife throughout the Straits Settlements, few people escape attacks during residence here. Many patients have a relapse of malaria, or a recrudescence, or a re-infection following admission to hospital. In such cases, provided the patient was not too debilitated (and amongst those who have much experience of tropical malaria this disease is recognised as the cause par excellence of debility, a fact which makes one sceptical of its choice as an agent likely to benefit the patient), the malaria was allowed to continue therapeutically.

In other cases the patient was inoculated (whole blood inoculation) with various strains and types of malaria. Some patients were immune to all strains of malaria. Others to one and not another.

It was quite obvious that malarial therapy did not stay the rapid course of general paralysis in the Oriental paralytic.

PROTEIN SHOCK.

The administration of protein subcutaneously is known to occasion a rise of temperature, and the pyrexia is credited with a beneficial effect.

Injections of a polyvalent vaccine of typhoid and para-typhoid organisms (so-called T.A.B.) produced pyrexia without

any lasting benefit, when used alone or in combination with tryparsamide. Frequently administration of vaccine appeared to cause a recrudescence of malaria.

CONCLUSION REGARDING TREATMENT

No form of treatment benefits the disease general paralysis in the Oriental. It is not even possible to produce short remissions.

PRELIMINARY CONCLUSIONS REGARDING GENERAL PARALYSIS.

The disease general paralysis is found to have a general distribution among the races of the Tropical and Sub-Tropical East and Far East.

Grandiose, depressed, and dementing types of the disease are found.

The physical signs and serological findings are precisely those described by Western clinicians.

The disease in the Oriental is characterised by its very rapid course, usually a few months, and the entire absence of remissions.

As in Europeans the disease is chiefly one of middle life, the average age of onset being about 39 years.

The morbid anatomy corresponds with the classical descriptions, but the reaction of the ventricular ependyma is not so intense.

In my experience the Oriental paralytic does not respond to any known form of treatment, tryparsamide, malaria, protein shock, and combinations of these methods of treatment, being inadequate to produce even temporary remissions.

THE INCIDENCE OF GENERAL PARALYSIS IN INDIA.

Over-Beck Wright (22) thinks that the smaller incidence of general paralysis is due to a species of partial immunity which exists among the Indians and Persians to syphilis; this being due to the fact that syphilis has been widespread among these races for centuries.

It is generally asserted that general paralysis is a rare disease in India, while syphilis is common. Dhunjibhoy (23) states that he has not seen a case of general paralysis in a Indian who has not been abroad, but has seen two undoubted cases in Indians who had been to Europe and had a history of exposure to infection. Some observers in India, he continues, claim that they had seen and treated cases of general paralysis in Indians who had never left the country. Various theories had been propounded to explain the infrequency of general paralysis in India, but none were so far convincing and much remained to be done in the way of research.

I have not been able to find many references to cases of general paralysis in Indians.

Shaw (24) notes 3 cases of general paresis in a series of 94 Parsi admissions to the Central Mental Hospital, Poona. Colonel Nelson (25) at the Imperial Social Hygiene Congress, London 1931, remarked that during the twelve years he had been in Lahore, he had only seen two cases of tabes, and one of these was in a man partly of European descent; he had only seen one case of general paralysis and that was in an Anglo-Indian.

I think that the term "Indian" is somewhat misleading. In discussing the peoples of India, Sir Wm. T. Holderness (26) remarks:- "nowhere else in the world do we find the population of a large Continent broken up into an infinite number of mutually exclusive aggregates....there is no national type and no nation in the ordinary sense of the word."

In view of these facts I think that it would contribute to the elucidation of the etiology of general paralysis, if cases occurring in natives were described in terms of the race affected. Alternatively, Holderness suggests that it is possible to sort out the various groups by a classification based upon physical characteristics. By this means it has been possible to distinguish seven clinical types.

The following notes based on Holderness's descriptions apply to the type in which my cases of general paralysis occur.

Dravidian. Originally the term Dravidian was applied to the group of languages spoken in Southern India, and was then employed to describe the races speaking these languages. These Races are fundamentally of the same stock and are found not only in the South but in the centre of India.

> "They are short, dark men with long dark hair tending to curl, and with a very broad nose depressed at the root.
>
> "Labour is the birthright of the pure Dravidian" wrote Sir Henry Risley, "and as a coolie, he is in great demand wherever one meets him, whether hoeing tea in Assam, cutting rice in the swamps of Eastern Bengal, or doing sundry work in the streets of Calcutta, he is recognised at a glance by his swarthy figure and the negro-like proportions of his nose."

The principal branches of the Dravidian group are the Tamils, the Telegus, and the Canerese.

Reference to my table of results shows that there ia a small group of "20 patients comprising sixteen Bengalis, two Sikhs, and two Bombayans. Eleven of these returned positive Wassermann reactions, but there was no case of general paralysis among them. The group is too small to warrant any general conclusions regarding syphilis.

In the Dravidian group there are 315 patients of whom there are eighty-two the subjects of syphilis and of these, five suffer from general paralysis.

These figures give an incidence of syphilis in the non-paralytic patients of 24.8 per cent, and an incidence of general paralysis (calculated on the total 315 cases) of 1.58 per cent. This is undoubtedly a very low incidence.

Regarding the probable source of infection it is important to note that three of the five paralytics had a residence in Malaya of less than two years, and it is to be presumed that they contracted syphilis while in India.

THE INCIDENCE OF GENERAL PARALYSIS IN CHINA:

It is generally accepted that general paralysis is rare or absent among the Chinese.

> Lennox (27) remarks that though syphilis is three times more common in China than in the United States, meuro-syphilis is extremely rare the incidence being only one seventh or one eighth of that in the States; and that moreover the few patients who do occasionally come into hospital with this disease are found to be usually steamship employees who derive their infection from European sources.
>
> Bercovitz (28) stated that 90 per cent of the 3 million people in a certain district of China have attacks of malaria during the course of a year, and that probably all carry parasites in their system. Syphilis affects from 50 to 60 per cent of the population, but that during eight year's residence he had not seen a single case of general paralysis and only two or three cases of neuro-syphilis.

On the other hand I have already quoted the fact that van Loon and Kirschner have demonstrated the spirocheate pallida in the cortex of Chinese paralytics (29) and Samuels (30) has reported cases in Chinese at the Central Mental

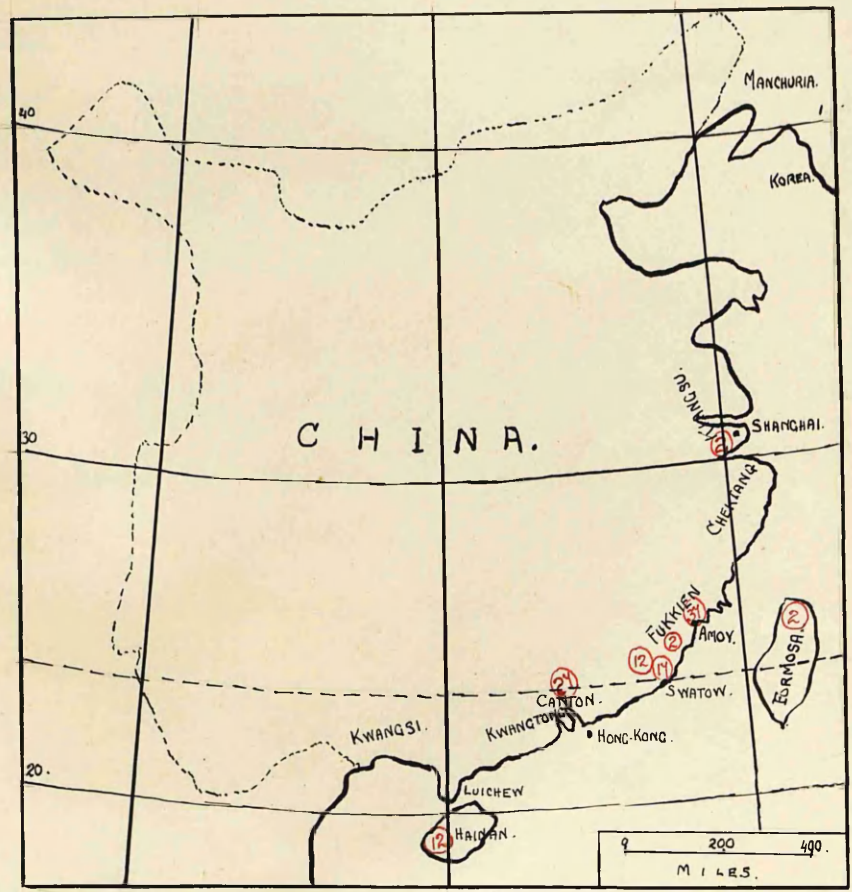
Hospital, Tanjong Rambutan, F.M.S.

In determining the incidence of general paralysis among the Chinese difficulties similar to those obtaining in the Indian problem prevail.

It has to be remembered that the country of China has an estimated population of some 400 millions distributed in the temperate, sub-tropical and tropical zones and it is divided into 18 Provinces. It is therefore not surprising to find that the inhabitants of this great country, of which so little is known are characteristically different not only in the different zones, but also in the same Province.

For instance in the Fukkien Province we find the Hokkiens situated in and around Amoy. In the Province there are three other clans, the Hengwa, the Hochew and the Hochkia; these three are very much alike in language customs and cultur but are totally different in these respects from the Hokkien, who is a vastly superior individual and corresponds more with the Teochow who lives near Swatow in the adjoining Province of Kwangtong.

These territorial anomalies may be due to the fact that the Southern Chinese originally occupied the whole of China. With great hordes of Manchus invading from the North the original people were pushed further South and settled there, but still retained their customs, culture and language.



To show the geographical distribution of the Chinese cases of the series.

(12) represents 12 cases.etc.

The results of my investigations will be considered.

In a series of 1,088 Chinese patients examined on account of mental disorder, the incidence of syphilis is 38.69 per cent, the incidence of general paralysis is 10 per cent, and the percentage of syphilis in the non-paralytic is 31.65 per cent.

The cases of general paralysis total 111 and the racial distribution is as follows.

Sub-tropical

Hakka	Kwangtong Prov. inland from Swatow.	12
Cantonese	Kwangtong Prov.	27
Hokkien	Fukien Prov. round Amoy	37
Teochow	Kwangtong Prov. round Swatow.	17
Hochkia	Fukkien	2
Shanghai	Kiangsu Prov.	2

Tropical

Hylams	Island of HAinan and Luichew the mainland opposite.	12

These cases are plotted on the following map.

Conclusion.

It is to be deduced that general paralysis is to be found in the sea-port towns and maritime provinces of China.

THE INCIDENCE OF GENERAL PARALYSIS AMONG THE MALAYS:

The locally born people of Malaya, excluding a few Siamese in the North may be divided into two groups, the forest people and the village people.

The former are few in number, totalling only two to three thousand, and are probably derived from that fast-disappearing and primitive jungle tribe, the Sakais. They are swarthy pigmies with thick frizzy hair. They are nomadic. They are rarely seen in the villages and they are of low culture.

The village people are the true Malays. They constitute about four-fifths of the locally born population. Originally they were Sumatran but they have been in the Peninsula for a good many centuries. In some ways they resemble the Dravidians of Southern India; they have a swarthy figure, a squat nose, and coarse dark hair. They differ in the shape of the skull and the fact that the skin is brown. Culturally they are above jungle peoples. They have been described by Blagden as people who work only at what happens to interest them. They are without energy. In this group may be included all the peoples of the Peninsula and the

Archipelago....the village Malays, the Javanese, the Bugis and the Banjars.

This affinity with the Javanese makes possible some comparison with the investigations of van Brero (31) who states that "in the Asylum at Lawang, Java, from 1902 to 1909, 5.3 per cent of the inmates were paralytics, positive evidence of lues being obtained in 21 cases out of 33." It is probable that the term "inmates" included racial stocks other than Javanese.

Van Loon and Kirschner, Batavia, Java (32) although they do not give convincing statistics ~~as to its~~ of the incidence, discuss the results of induced malaria ~~among~~ in the native paralytics.

Harper (33) working in the Fiji has described cases of general paralysis or a disease closely resembling it among Polynesians.

My results show that in a series of 127 cases 53.54 per cent are syphilitic and 9.44 are paralytic, the incidence of syphilis in the non-paralytic being 31.65 per cent.

DISCUSSION OF RESULTS OF INVESTIGATION.

The first fact which emerges from this study is that general paralysis has a universal though not necessarily, a uniform distribution throughout the Races met with in the Straits Settlements, and if these Races be taken as representative samples, throughout the Races of the Tropical and Subtropical East and Far East.

This statement naturally suggests the questions (a) why is general paralysis not diagnosed more often, and (b) are any reasons to be found to explain the frequent statement of the alleged absence of the disease among these races.

The symptoms of incipient general paralysis are usually mental and not physical. A native is more likely to consult a European physician for something tangible, for instance a wen or a lipoma, than for some obscure symptoms, for example those referable to something which he cannot see.... a gastric carcinoma. Most certainly he will not complain of small barely recognisable defects of memory, nor will we hear anything of those trifling but significant alterations in the personality which stamp early paresis. Once the disease becomes established its course is extremely rapid, and it is of necessity more rapid in the absence of its recognition and appropriate nursing. The patient soon will die of some intercurrent infection or of the complications of the disease (pressure sores, bladder troubles, choking, etc.). ~~Nor~~ It is a fact that the diagnosis of incipient general paralysis outside mental hospitals is one of great difficulty. In European mental hospitals the bulk of general paralytics have been treated prior to admission for "nervous debility, nerves, or neurasthenia", though in many such cases the Medical Officer

diagnoses general paralysis with very cursory examination at the time of admission to hospital. The diagnosis is largely a matter of the personal experience of the examining physician. Under tropical conditions the diagnosis is not a case of excluding "neurasthenia", but of excluding the whole gamut of endemic diseases, and it is probable that the possibility of general paralysis is not considered.

Further, is the fact that students in the native medical colleges use European text-books. A casual statement in a text-book that general paralysis is absent in a certain country may mean little to a European student, to the student in that particular country it means his entire knowledge of the disease. He argues that if the disease is absent there is no need for his troubling about it as he is not going to meet it, and there his interest in the disease ends.

In circumstances such as these everything militates against the diagnosis of general paralysis.

THE FACTS EMERGING FROM A STATISTICAL STUDY OF THE RACIAL DISTRIBUTION OF THE DISEASE.

The most striking feature of the racial survey is the very low incidence (1.59 per cent) of general paralysis among the Dravidian races of Southern India. This low incidence has no apparent relation to the fact that they are a tropical

more

race, for the Malayans who are definitely tropical show an incidence of 9.44 per cent, and the tropical Chinese, the Hainans, an incidence of 8.1 per cent.

If the Dravidian race has been considered separately it might have been argued that the low incidence is more apparent than real for there is a considerable dilution of admissions to Eastern Mental hospitals, of any one form of mental disorder, due to the fact that the total number of admissions is relatively increased by cases of insanity due to malaria and other endemic conditions. However if this were the main factor operating in producing the apparently low incidence it would also mean that the figures which I have determined for the Malayans and the Chinese were also very much below the real incidence when compared with European statistics. From my clinical experience I would be prepared to say that general paralysis is neither more common nor less common among the Chinese than among the Europeans. In view of these differences I propose to consider the etiology of general paralysis in some detail.

PART II.

CONSIDERATIONS ON THE ETIOLOGY.

HEREDITY.

It is impossible to obtain figures regarding the inheritance of insanity in Eastern Races. The Chinese custom of ancestor worship obviously forbids the disclosure of any information regarding peculiarities in a patient's progenitors. In other races, native superstitions and fear of offending evil spirits results in a certain reluctance to disclose any facts about the patient at all, a lunatic being looked upon as one accursed.

In view of these difficulties I find that I am not in a position to examine the thesis of Bolton (32), (dependent in large measure upon the scrutiny of the hereditary history of the patient) "that general paralysis is a branch of mental disease, and that the subjects of this form of mental disease would, if they had not been syphilised, have suffered from one or other of the forms of primarily neuronic dementia." Bolton is "further of the opinion that the ordinary sane individual, and the ordinary psychopath or potential lunatic, if possessed of cortical neurones of average durability, may suffer from syphilis with impunity as regards the future onset of general paralysis."

MALARIAL INFESTATION AS A PROPHYLACTIC.

Malaria is one of the great problems of tropical life, and as knowledge of the disease increases its study becomes the more perplexing and complicated. The problems still unsolved in relation to immunity, resistance, tolerance, relapse and recrudescence, show the need of caution in expressing an opinion regarding the therapeutic efficacy of malaria in general paralysis.

The spleen and parasitic indices in a series of 29 consecutive admissions of general paralysis were 16.8 and 17.8 respectively. This is typical of the incidence of malarial infection in peoples coming from a more salubrious country to the Straits Settlements. They suffer from malaria of a severe type (quartan, sub-tertian) and often a mixed infection is found.

It is to be noted that it is in this group (Chinese races) especially that the disease general paralysis is the most prevalent.

However I am not prepared to state that previous malaria has not modified the course of general paralysis. The rapid fulmination of general paralysis in the Oriental is comparable with the fulminating condition met with in Europeans after a prolonged remission. Previous malaria may have stayed the onset of the disease.

On the other hand the fulmination may be due to the operation of such factors as the following:-

(1) Previous debility from

(a) malarial cachexia
(b) dysenteric cachexia
(c) hook-worm infestation.

(2) The appalling tissue waste which occurs in states of excitement in the tropics. Even a Malay, inured to the climate, if restless and sleepless, loses weight rapidly.

(3) The difficulty of achieving a good standard of nursing. Life and death mean little to tropical peoples.

(4) Intercurrent infections: malaria, tuberculosis, pneumonia and dysentery.

Pandemic pyrexial disease confronts one at every turn, and its overwhelming prevalence belittles any theorising as to whether any one pyrexial disease, malaria for instance, so stimulates the body defences as to stay the onset of general paralysis.

ALCOHOL.

The part played by alcohol in the etiology of general paralysis is difficult to assess. It may be conceded that a person under the influence of drink is more likely to expose himself to syphilitic infection than one not so influenced. The argument that the nervous system of the confirmed alcoholic is specially susceptible to the attack of the spirochaete and

to the changes which constitute general paralysis warrants further consideration.

The Southern Indians (Dravidian) are heavy spirit drinkers, the Malayans being Mohammedans do not take spirits from religious considerations, the Chinese races prefer opium smoking, (this still remains true of the poorer classes).

The lowest incidence of general paralysis is found in the most alcoholic race, the Southern Indian (Dravidian), the only one in which I have found cases of alcoholic insanity.

Conclusion. It would appear that alcohol is a factor of little importance in the etiology of general paralysis.

THE HISTORY OF SYPHILITIC INFECTION.

To the casual observer it would appear that syphilis is more virulent in the East than in the West and more so in the Far East.

> The initial chancre ulcerates deeply and rapidly, leaving a definite and characteristic scar; the lymphatic glands painlessly enlarge to about the size of a walnut, and become indurated. At this stage the patient is feverish, he feels ill and is unable to work. He has troublesome headache and complains of vague pains which keep him from sleeping. With the progress of these symptoms anaemia becomes pronounced. When the secondary stage approaches, the skin and mucous membranes are heavily infected, rupia and alopecia are frequent complications.

From the above description it will be gathered that the

primary and secondary stages of syphilis are severe, so severe that they are not likely to be forgotten by the patient.

Further the Oriental does not have a feeling of shame in contracting the disease, and his general attitude towards the infection compares with the Europeans to chicken-pox or measles. The patient does not hesitate to state where and when he became infected.

Nevertheless in the Oriental general paralytic a history of infection is rare, and residual scars from skin lesions are uncommon and hard to find.

These considerations suggest that in the Oriental syphilitic who is to develop general paralysis, the primary and secondary manifestations of the infection have been so slight as to pass unnoticed by him.

NOTE on the virulence of the initial infection.

> I believe that the apparent heightened intensity of virulence is due to two factors, secondary infection and impaired health. With local non-specific treatment and cleanliness alone there is considerable amelioration in the acute symptoms. At the time of syphilitic infection many patients are already suffering from malaria, dysentery, or hook-worm infestation. (The latter amounted to over 70 per cent in admissions to my hospitals.)

THE THEORY OF NEUROTROPY

Nogouchi (35) in 1912, to explain the inconstancy of involvement of the nervous parenchyma in cases of syphilis, ventured the hypothesis that there were two strains of the spirochaete pallida, a dermotropic and a neurotropic. The arguments of the proponents of this theory are summed up in a paper by Stewart (36) and may be tabulated thus:-

(1) The citation of cases of infection from a common source, with constant later involvement of the nervous system.

(2) The alleged absence of tabes and general paralysis in certain races, particularly the Chinese and the Persians.

(3) Experimental work on the spirochaete pallida particularly the work of Levaditi and Marie,(1919). This has been adversely criticised on the ground that the spirochaete pallida had been confused with the morphologically similar spirochaete cuniculi, a common parasite in the rabbit, the subject of the experiment.

Brunell Hawes (37) criticises the theory as an "extraordinary conception, truly extra-ordinary, since impotence being the rule in the large majority of cases (neuropathic), the neurotropic strain must perforce be one with a suicidal tendency.

From my results it might be argued that if a neurotropic strain exists it were rare in India, somewhat more common in Malaya, and most common in China.

However, since the source of infection here in the Straits Settlements is the same, whether Oriental or European - native women, there does not seem to be any evidence in favour of the theory.

THE WASTE OF NERVOUS ENERGY.

I have already pointed out that amongst the Chinese divisions a great variation in mental development is found, and this variation is also evident in the other races of my study.

The following abstract shows the Racial Incidence of general paralysis and of syphilis.

Race.	Incidence of general paralysis	Known syphilitic paralytic.	Incidence of syphilis in non-paralytic.
Cantonese	14.68	33.34	31.74
Hakka	10.17	26.08	32.07
Teochow	8.82	25.37	28.41
Hannan	8.10	25.00	24.46
Hokkien	10.95	24.67	37.54
Hochkia	3.29	13.33	22.03
Malays	9.44	17.64	48.68
Dravidians	1.59	6.10	24.80

Among the Chinese, the Cantonman is the most highly skilled; as a craftsman he is the most capable and original. It is amongst the Cantonese that the highest incidence of general paralysis is found...14.68 per cent calculated on the total Cantonese in the series and 33.34 per cent calculated on the number of cases of general paralysis among the syphilitic Cantonese. The latter figure is probably least subject to fallacy in making these racial comparisons. On the other hand the Cantonese are highly infected with syphilis, 34.41 per cent, for it may be assumed that the incidence of syphilis amongst the non-paralytic is a good index of the incidence of syphilis among the population generally.

Now to consider the other Chinese races. The Hokkien in a slight degree lacks some of the brilliance of the Cantonese. The Hakka and the Teochow form an intermediate group. The Hannan is a good housebôy but he lacks the initiative and the ambition of the other Chinese groups.

On the other hand the Hochkia stands very low in any scheme of intellectual grading. He is dull, stupid and ignorant. His occupation is in drawing rickshaws, and even in this simple, though admittedly very strenuous life, he shows little aptitude and never seems to learn the simple traffic laws. It will be noted that the Hochkia as compared

with the Cantonese show a very low incidence of general paralysis, the two factors for comparison being 3.29 per cent as against 14.68 per cent, and 13.33 per cent as against 33.34 per cent.

The Malayans are on a somewhat higher plane than the Hochkia. They certainly have one ambition in life ... to make a pilgrimage to Mecca ... but they dislike work intensely, perhaps an adaptation to the excessive heat and humidity.

The Dravidian races of Southern India are from the point of view of intelligence on the same level as the Hochkia. The Tamil is a good manual worker, but at one task only, and his efforts are mechanical. For instance the Tamil makes miles and miles of straight concrete drains by the roadside but the Chinese coolies are required to put in the curves.

The figures for the Dravidian races are certainly very low, much lower than those of the Hochkia, the factors being 1.59 and 6.10.

From these considerations it might be argued that it was of significance that the highest incidence of general paralysis was in the most intelligent and cultured race, and that the incidence among the other races decreased in the same order as the decreasing order of the intellectual

grading, an argument which would be wholly in favour of the factor of the waste of nervous energy being of importance in the etiology of general paralysis.

However there remains the fact that the Hochkia are the bearers of the East. The expectation of life of the rickshaw coolie is probably about 10 years at the most, I have shown that the greatest incidence of general paralysis amongst Oriental races is in the age group 35 to 45. It is conceivable that most of the syphilised Hochkia die before they reach the age of the manifestations of general paralysis, and this fact may account for the low incidence of general paralysis in that race.

The discrepancy between the Hochkia and the Dravidian still requires explanation, and it would appear that is not to be sought in the probability of early death but in some factor which is common to all races but which varies in magnitude from race to race.

THE CLINICAL CHARACTERISTICS OF SYPHILIS.

THE DIFFERENCE BETWEEN THE CHINESE AND THE DRAVIDIANS.

The reader will recall that I was tempted into the discussion of the etiology of general paralysis, in order to explain the difference in the incidence of the disease in the Dravidians of Southern India as compared with the other races of my study; the Chinese in particular.

The general trend of my findings has been to show that the factor which determines the onset of general paralysis is in the reaction of the patient during the early stages of his infection with syphilis, and that accessory factors such as alcohol, the waste of nervous energy, and the presumption of a prophylactic value in previous malarial infection are to be discredited.

The importance of this cannot be over-estimated, because not only does it appear to be a prime consideration in relation to that manifestation of syphilis which we call general paralysis, but it also demands a very searching criticism of the methods which we adopt in the treatment of syphilis in all its stages.

Having established the hypothesis that the incidence of general paralysis in the Dravidian differs from that in the Chinese, it is now necessary to establish the corollary

that there are differences in the clinical manifestations of syphilis in these two races.

The following table has been drawn up in order to make these differences clear.

As will be seen the facts are derived from two sources:

(a) The findings of other workers. (Some unpublished).

(b) The writer's own observations based upon an extensive series of cases comprising

(1) Cases of syphilis met with in private and mental hospital practice.

(2) Cases examined at the great pauper hospital at Tang Tock Seng.

(3) Children under my care at the Poh-lim-khoh Welfare Institution for the Protection of Chinese Children.

*(4) Several hundred prostitutes examined primarily for mental defect during the period of eradication of the brothels.

(For the enlightenment of the European reader it may be explained that while the Institutes for the Protection of children are established for orphan children, their economic value is in preventing such children, especially mental defectives, from drifting into a life of prostitution. This has its corollary in the series of cases *(4) in that defective adolescents are much sought after by the procurers for the native brothels.)

Clinical condition	CHINESE	DRAVIDIAN
PRIMARY		
Initial chancre	Not always definite	Definite.
SECONDARY		
Rash	Variable in intensity	Florid
Wassermann reaction in cerebrospinal fluid.	10 to 15 per cent positive	1 per cent positive
Clinical signs of involvement of the nervous system	Common	Rare
Syphilitic myelitis	Common (39 per cent of all cases of spinal disease) Mon Fah Chong.(38)	Infrequent
Cerebrospinal syphilis	Common	Infrequent
Syphilitic Cirrhosis	High incidence	Low
Aortitis	Common (McKenna Tan Tock Seng)(39)	Rare
Aneurism	Common (McKenna)	Rare
Tertiary ulceration of the skin	Infrequent	Very common
Congenital Mental Defect (Syphilitic)	Common (Poh-Lim Khoh)	Rare
General paralysis	Common	Rare

CONCLUSIONS FROM THE FOREGOING TABLE.

Syphilis in the Dravidian is characterised by the intensity of the skin lesions in all the stages of the disease. Visceral manifestations are uncommon.

Syphilis in the Chinese closely corresponds with syphilis in the white races. It is important to note the mildness of the skin manifestations, the higher incidence of early involvement of the nervous system, and the frequency of visceral and vascular lesions.

With reference to the source of infection I have been given histories ~~of~~ from Chinese with positive cerebro-spinal fluids, ~~becoming infected~~ of infection from Tamil (Dravidian) women.

Lastly it is of interest to note that Tamils in their native medicine endeavour to hasten the appearance of the syphilitic rash by giving the patient hot spiced drinks.* The staple article of Tamil diet is highly spiced curries.

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* It is of course impossible to obtain scientific proof of the theory that it is so possible to modify early syphilis, in such a way as to convert the disease into a skin condition (laboratory experimental work will be quoted later), but it occurs to me that in the domestic treatment of measles in some districts of Scotland, a somewhat similar attempt is made to hasten the appearance of the rash by the use of hot baths in the belief that it is thus possible to produce an intense rash and by so doing to modify the intensity of the disease. I anticipate the criticism that any benefit which might occur, might well be attributed to stimulation of the skin as an excretory organ. I have not had any extensive experience of the treatment of measles, and I do not wish to stress this

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EARLY INVOLVEMENT OF THE NERVOUS SYSTEM.

This aspect of syphilis has been investigated by Moore (40) (inter alia) whose findings based upon an examination of the cerebrospinal fluids in 480 cases are as follows:

(a) The percentage of patients who are found to have early spinal fluid abnormalities approximates to the incidence of late clinical neuro-syphilis.

(b) The incidence of abnormal fluids increases steadily during the first year reaching its peak at the end of that time and thereafter remaining at that level.

Moore argues that if infection of the nervous system takes place at any time, the curve of incidence should be a constantly increasing one, and his findings are therefore in favour of the opposite contention that late neurological manifestations are determined by early involvement of the nervous system.

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tentative comparison. However one frequently comes across instances in native and domestic medicine where practice and racial experience have long awaited what we may call scientific substantiation, (in this connection one thinks of Cinchona bark, the widespread use of mercury, small-pox vaccination, and the Jewish interdiction of pork presumably on account of tape-worm infestation.)

He classifies the abnormalities in the fluids -

(i) fluids showing slight pleocytosis, and slight increase of globulin,

(ii) fluids showing a higher cell count, more globulin, and a negative or a faintly positive Wassermann reaction,

(iii) fluids with a high cell count, a strongly positive Wassermann reaction, and a gold curve of the paretic type.

He found that whereas groups (i) and (ii) responded to treatment, the cases in group (iii) showed no response. Of eight patients in this last group who were kept under observation, two had developed general paralysis at the end of five years, and one neuro-syphilis, while the others continued to show no symptoms.

Now while it is to be admitted that the foregoing is based upon the reaction of the nervous tissues to invasion, and absence of reaction does not necessarily connote absence of invasion, I think that my results afford some clinical proof in support of Moore's contentions.

The Chinese who show the greatest incidence of early involvement of the nervous system, show a large incidence of syphilitic myelitis, of cerebrospinal syphilis, of congenital mental defect associated with syphilis, and of General Paralysis in contrast with the Dravidians, a race in which I have found early involvement of the nervous system to be uncommon.

THE SKIN REACTIONS OF SYPHILIS AS AN IMMUNITY MECHANISM.

Turning again to the comparative table on page 80, we observe that the Chinese also show a very high incidence of visceral and vascular lesions (syphilitic cirrhosis, aortitis, and aneurism) as compared with the Dravidian, and again the question suggests itself, are these lesions in any way related to the comparative mildness of the skin manifestations in the Chinese in all stages of the disease?

Brown and Pearce (41) have published their findings on the modifications which may be produced in the disease syphilis in the rabbit following experimental inoculation. They have shown

(1) that the disease tends to become active in the tissues according to a more or less regular order of sequence,

(2) that the successive phases are influenced in their locality and degree, by the degree of severity of their predecessors,

(3) that the interference with the primary lesion either by excision, or by the administration of remedies in sub-curative doses, tended towards the development of generalised lesions,

(4) the locality of metatastic lesions can be determined, by interference with the primary sore at given stages of its development.

The applications of these conclusions in relation to general paralysis have been discussed at length by Stewart (42) and

by Power.(43), Harrison (44), basing his arguments on these experiments states

> "If we allow the disease to take its natural course, we should expect in most cases a widespread eruption on the skin and mucous membranes. I suggest that the effect of this eruption would be to confer a strong degree of resistance on the tissues generally, including those of the Central nervous system, and this idea is certainly favoured by the fact that in cases of late neuro-syphilis, such as tabes and general paralysis one rarely finds a history of secondary symptoms."..... ..."If we interfere with the disease in the skin and mucous membranes, we interfere with the development of a resistance to the activity of the parasite in other parts of the body, which would tend to save him (the patient) from the severe late effects of the disease."

Since these conclusions have a bearing on the treatment of syphilis and the obvious deduction would be to withhold treatment until the secondary stage was well over. Harrison sums up his arguments against this course as follows:-

(a) the danger to other people,

(b) the greater opportunity given to the spirochaete to become protected in foci of fibrosed tissue,

(c) the possibility that after all the skin reaction might not take place.

So far my investigations show that the race with the lowest incidence of general paralysis is the race with the most severe manifestations of skin reaction to the disease.

THE TREATMENT WITH MERCURY AND INSUFFICIENT TREATMENT OF PRIMARY SYPHILIS IN RELATIONSHIP TO THE LATER DEVELOPMENT OF GENERAL PARALYSIS.

In my remarks upon the history of syphilitic infection I have shewn that in the Oriental Syphilitic who is to develop General Paralysis, the primary and secondary manifestations of the infection have been so slight as to pass unnoticed by him. One may conclude from this that he does not receive treatment for his syphilis and yet he developes general paralysis of the insane. The Chinese in their native medicine apply a dressing of red oxide to the chancre; the Southern Indians take Mercury internally; the Malays use herbs locally and internally. It seems that whether or not the primary syphilis has been treated with mercury the patient may yet become general paralytic; or even if he be left altogether without treatment.

The foregoing conclusions are of interest with regard to the conception of a "masterly inactivity" in the treatment of syphilis, particularly in relation to work carried out in Norway. The Late CAESAR BOECK, Professor of Dermatology in the University of Christiania (Oslo) taught that the so-called specifics, potassium iodide and mercury are symptomatic remedies which not only fail to eradicate the disease, but also paralyse the bodies natural defences, with the result that the disease runs an atypical course, and inflicts serious injuries on certain internal organs particularly the central nervous system.

The Lancet, 1929.i, 135, and 195 quotes the research of BRUUSGAARD and DAHLSTROM on the personal examination of the survivors of the syphilitic patients who had attended Boeck's clinic between 1891 and 1910. These patients I may repeat, had not received specific treatment.

Of a total of 473 ex-patients, alive or dead, there were 13 who suffered from general paralysis and 6 from tabes. As practically all the cases of general paralysis in Oslo and the neighbourhood are recognised as such, and are included in the returns, only a negligible number being lost sight of, it may be argued that the 13 patients developing general paralysis represented almost the sum-total developing this disease out of 2181 patients whom Boeck refused to treat. In other words only 0.6% of all these patients developed general paralysis.

It is of importance to note "that Bruusgaard did not commit himself to a definite opinion on the wisdom of his predecessor's attitude of "masterly inactivity" but he did conclude from his researches that the body can by its natural defences arrest the progress of the disease (syphilisis) and even eradicate it.

DAHLSTROM states that for 18 years he had been on the look-out for general paralytics amongst Boeck's old cases. In 320 general paralytics treated by him during that period only 2 had been treated for syphilis on Boeck's principles.

His conclusions tend to support the thesis of "masterly inactivity," but in confirmation he cites as a fact that general paralysis is rare in the coloured races in their native haunts, although not so in negroes living in large towns where specific remedies are available.

Conclusion.

My results are diametrically opposed to this contention. Whether or not the primary syphilis has been treated, the patient may yet become a general paralytic.

SYPHILISATION OF THE RACE IN THE PROPHYLAXIS OF GENERAL PARALYSIS.

The reader will have gathered from my discussion of the incidence of general paralysis in India that physicians practising in that country have tentatively referred to the infrequency of the disease to syphilisation of the race. Similar statements have been made with regard to Persia and other Asiatic Countries.

In view of these statements I have been on the look-out for figures which would give some indication as to what is meant by the term "syphilisation."

I have not been able to find any statistics which I consider reliable. Most of the published statistics have to be rejected on a variety of grounds, the most important of which is the extra-ordinarily high figure of the incidence usually quoted....for some countries figures as high as 60 to 70 per cent of the population.

In the earlier part of this dissertation I have stressed the fallacies inherent in the clinical and serological diagnosis of syphilis in tropical countries. It is my opinion that where an incidence of syphilis of over 50 per cent is given, precautions have not been taken to exclude the fallacies which I have enumerated. I am also of the opinion that a racial incidence of over 40 per cent must be very unusual, and where such an incidence is found we must be dealing with a very decadent race (such as the Malays).

Another argument against the probable correctness of high figures is the fact that syphilis in the Asiatic remains untreated (according to Western notions of treatment at any rate); untreated syphilis in the Asiatic has a very potent effect on the procreative powers and we would expect this to result in a very low birth-rate, and a progeny the majority of whom would be unhealthy. In my experience the birth-rate is not low and although cases of congenital syphilis are common, the infants so affected are in a minority.

A further difficulty in obtaining comparative statistics is well illustrated by the following.

> "From the polyclinic records of the Civil Hospital, Weltreveden, Dutch East Indies, 1902 to 1912, 6.5 per cent of the European, 5.47 per cent of the native, and 13.11 per cent of the Chinese patients appear to have been treated on account of syphilis. When we consider moreover that the natives are applying for medical assistance only on account of serious and far advanced stages of the disease, their number gets an entirely different significance."

> "Van Loon and Kirschner state that extensive statistics on the frequency of syphilis among the population of the Dutch East Indies do not exist. The army statistics cannot in every respect be used for comparison for different reasons. In these statistics the Chinese are not included who according to reports from different sides and to our investigations are infected to a high percentage with syphilis. In the statistical reports of the asylums on the other hand, Malay and Chinese are thrown together into the rubric Asiatic.

My objections to the statistics to which I have had access may be summarised as follows.

(1) Many series give an incidence which is too high

because the fallacies inherent in clinical and serological diagnosis have not been excluded.

(2) Civil hospital statistics tend to be too low because the patients treated are not a representative sample of the race, being sufferers from the more serious manifestations of the disease.

(3) Other series of statistics are useless for comparative purposes because the races are slumped together.

In the Police statistics for Penang, MacGregor gives the incidence of syphilis in Asiatic populations as 28 per cent. (These figures are based on the examination of prisoners and are therefore representative.)

Reference to the tables which I have drawn up for the 1610 cases of this survey shows that the incidence of syphilis in the non-paralytic is 31.8 per cent. Various writers have shown that the incidence of syphilis among the non-paralytic insane is no greater than it is among the population at large (Candler (46) and Mann); in other words, syphilis is not more common among the sane. (47)

Study of the incidence of syphilis among a typical working class community of mixed races in Malaya.

In a staff of 141 males the incidence of syphilis as judged by partly manifest syphilis, partly serologically diagnosed syphilis, is 42 per cent.

Among a female married staff of 39, the incidence of syphilis is 32 per cent judged on a period of regular healthy fertility, followed by one of miscarriages, still-births and unhealthy progeny, or sterility which disappears on the treatment of some other syphilitic condition.

Similarly the incidence among the total 90 families on the estate is 35 per cent.

I think that I am justified in taking the figures which I have determined for the non-paralytic cases of my series as being representative of the incidence of infection in the different races.

On this basis, the Malayans are heavily infected, 48.6 per cent, the Chinese show an incidence of 31.74 per cent, and the Dravidians of Southern India 24.8 per cent.

The most syphilised race is the Malayan, a tropical race showing a fairly high incidence of general paralysis (9.44 calculated on the total cases in the series). The least syphilised race is the Dravidian and they show the lowest incidence of general paralysis.

Conclusion.

I am unable to find any evidence in support of the theory that a low incidence of general paralysis is to be found in races which are heavily syphilised.

SUMMARY OF INVESTIGATION.

(1) The difficulties inherent in the investigation of of mental disorders among the Races of the Far East, and among native races generally have been described.

(2) The statement that the disease general paralysis is absent or rare among Tropical and Sub-tropical peoples prompted research to determine its real incidence.

(3) Cases of the disease conforming with the definitions of Clouston, and of Henderson and Gillespie, have been sought among the Races of Malaya.

(4) Advantage has been taken of the fact that the immigrant races of that country are established in communities which are to be regarded as sample representations of the Races of the Orient.

(5) The methods adopted to refer demented patients to their racial group in doubtful cases have been described, and consideration of these methods has shown the necessity for such grouping and the determination of the incidence of general paralysis on the basis of racial group.

(6) The problem has been approached in the first instance by a series of systematic serological observations attention having been drawn to the fallacies inherent in this method of approach.

(7) Corroboration of serological diagnosis has been sought in careful physical examinations and mental investigations, the latter as far as possible in the native tongues without the intermediary of an interpreter. The part played by endemic disease in obscuring the physical signs and the mental symptomatology has been accorded due regard.

(8) All cases which did not present mental, physical, and serological evidence of general paralysis have been rejected.

(9) The 1610 male Asiatic cases examined on account of mental symptoms were found to present 133 cases of general paralysis, details of the histories and the clinical findings in six cases have been given, and a precis made of the post-mortem appearances in the ten cases where the examination was sanctioned.

(10) The types of the disease have been described and attention drawn to the features of its symptomatology, its age of onset, its rapid course, the absence of remissions, and the disappointing results of its treatment.

(11) The analysis of the results of the racial survey has resulted in the compilation of two sets of figures which are believed to have an original value in that they have not been determined by any other worker for Eastern Races. The incidence of general paralysis in the representative races of the survey has been determined, and figures have been established of the incidence of syphilis in the non-paretic

insane of these races. The latter figures, if not homologous with the incidence of syphilis in the sane population at large, at least provide the only true index at present available of the comparative degree of syphilisation in the individual native races.

(12) The clinical facts emerging from my study have been cofrelated with the various hypothesis regarding the etiology of general paralysis.

Conclusions.

(1) General paralysis is a disease from which no race can claim absolute immunity.

(2) There is a variability in the incidence of general paralysis from race to race.

(3) The factor governing this variation seems to be related to the frequency of infections of the cerebrospinal fluid during the early stages of syphilis

(4) In all races general paralysis has its greatest incidence in the age group 35 to 45.

(5) That the significance of such factors as alcoholism, and waste of nervous energy is very much over-estimated.

(6) That previous malarial infection does not act as a prophylactic.

(7) A history of the primary infection is rare in Oriental paralytics.

(8) The disease in the Oriental is characterised by its

very rapid coufse and the complete absence of remissions.

(9) Races showing an intense reaction of the skin to syphilitic infection show a very low incidence of general paralysis, and early and late changes in the cerebrospinal fluid are uncommon.

(10) Malarial therapy, tryparsamide, vaccine therapy, and combinations of these remedies are unable to stay the progress of general paralysis, and no known method of treatment will produce remissions in the Oriental paralytic.

(11) That "syphilisation of the rafe" does not confer any immunity on the nervous tissues to syphilis.

(12) The disease general paralysis is neither more common nor less common among the Chinese Races of the Maritime Provinces, than it is among Europeans.

(13) General paralysis is frequently found in the Races of Malaya, in the Javanese, and the peoples of the Archipelago; all these peoples are definitely tropical.

(14) The incidence of general paralysis ~~is~~ in India presents difficulties. The suggestion is made that since we are but at the beginning of this problem in India, cases should be reported in terms of the race affected, or alternatively in accordance with a scheme of classification of Indian races based on physical characteristics.

The Dravidian race of India shows a very low incidence of general paralysis and this low incidence is related not to the factor of syphilisation of the race, but to the intensity of the skin manifestations of the ~~primary~~ syphilis.

REFERENCES.

1. Harrower, G.: "A Study of the Hokkien and Tamil Skulls" Transactions of the Royal Society of Edinburgh. 1926. Vol. LIV, pp. 573 - 597.
   Harrower, G: "A Study of the Hylam Skull." Biometrika. 1928, XX.B. p. 245.
2. Bayle, A.L.J., These de Paris, Nov., 1822.
3. Nogouchi, Journ. Exp. Med. Feb. 1913.
4. Clouston: "Mental Diseases." 1898. p.380.
5. Henderson and Gillespie: "A Textbook of Psychiatry." 2nd. Edition, 1930.
6. Castellani: "Tropical Medicine." 1913, p. 1449.
7. Fletcher: "Practice of Medicine in the Tropics."
8. Stoddart: "Mind and its Disorders." 1919, p.423.
9. Daniels: "Tropical Medicine and Hygiene." 1913, 213.
10. Stewart: Discussion on general paralysis, Journ. Ment. Sci., Jan. 1929, 12.
11. Samuels: Journ. Ment. Sci., 1916, 411.
12. Van Brero, Allg. Zeitschr. f. Psych., vol.lxix, No. 5.
13. Robertson, G. M. Morison Lectures, 1913. Journ. Ment. Sci., 1913, April, 206.
14. Caldwell, (same reference as Stewart page 16 of this thesis.) Journ. Mental Sci., Jan. 1929, p.5.
15. Mon Fah Chung, Arch. Dermat. and Syph., Aug. 1926.
16. Williamson: "Diseases of the Spinal Cord." 1911, 397.
17. Fitzgerald: Transactions of Far Eastern Congress of Tropical Medicine (1923).
18. Poulsson: "Pharmacology and Therapeutics." 1923. p.90.

19. Stoddart: (previously quoted in this thesis on page 16).
"Mind and its Disorders." 1921, p.418

20. Aub, Fairhall, Minot and Reznikoff: Medicine, 1925, iv, 179.

21. Van Brero (previously quoted on page 16).
Allg. Zeitschr. f. Psych., Vol. lxix, No 5.

22. Over-Beck Wright: "Lunacy in India", 1921.

23. Dhunjibhoy, Journ. Ment. Sci., April, 1930, 257.

24. Shaw, Journ. Ment. Sci., July 1930, p. 508.

25. Nelson: Discussion, Imperial Social Hygiene Congress, London, 1931, Brit. Med. Journ. 1931, ii. 158.

26. Holdnerness: Peoples and Problems of India. Home University Library, 1910 pp. 68.

27. Lennox: Arch. of Neurol. and Psychiat., 1923, ix, p.26.

28. Bercovitz: Journ. Amer. Med. Assoc., lxxxii, May 24, 1924, 174.

29. Van Loon and Kirschner: Transactions of Far Eastern Congress Tropical Medicine (1923).

30. Samuels: (previously quoted on page 16).
Journ. Ment. Sci., 1916, 411.

31. Van Brero (Previously quoted on page 16).
Allg. Zeitschr. f. Psych., Vol. lxix, N°5.

32. Van Loon (previously quoted on page 59).
Transactions of Far Eastern Congress Tropical Medicine (1923)

33. Harper quoted by Manson: Tropical Medicine, 9th. Edition.

34. Bolton: The Brain in Health and Disease. 1914. p.441.

35. Nogouchi: Journ. Exp. Med., 1912, xv. p.81.

36. Stewart: Journ. Ment. Sci., 1924, 40.

37. Hawes: British Medical Journal 1930, ii, 729.

38. Mon Fah Chung: Arch. Dermat. and Syph. Aug. 1926.

39. McKenna (unpublished) privately communicated.

40. Moore, Bull. Johns. Hop. Hosp. 1922. xxxiii, p.231.

41. Brown and Pearce. Arch. of Dermat. and Syph., 1921, iii. p.254.

42. Stewart: Journ. Ment. Sci., 1924, 45.

43. Power. Journ. Ment. Sci., 1930. 527.

44. Harrison. Lancet, 1930. i. 763.

45. Robertson, G.M.: Journ. Ment. Sci., Jan., 1923.

46. Candler, J.P., and Mann, S.A., (Arch. Neurol., 1914, vi, p 59. Report of the Royal Commission on Venereal Disease; Appendix.) Quoted by Poynder, F.G.T: Journ. Ment. Sci., Jan., 1930 p. 110.

47. Quoted by Henderson and Gillespie: Text-book of Psychiatry 1927, p 47.