Leprosy in Trinidad:
A Study.

By W.V.M. Koch.

I purpose in this Thesis giving an account of Leprosy, as it occurs in the island of Trinidad, West Indies, and summarising the results of observations and researches conducted in the Leper Asylum, while I had temporary charge of it. In essaying this I shall, for the sake of condensation, omit description of the disease as it occurs in other countries, save when it may be necessary for instituting comparisons.

Its Definition

Leprosy may be defined as a chronic, parasitic disease, due to a specific bacillus — the bacillus leprae: it manifests itself in three principal varieties — characterised, the first by the appearance of tubercles and sometimes general infiltration and hypertrophy of the skin; the second by anaesthesia of the extremities and limited or extensive anaesthesia of the body; the third by a combination of these two varieties of hypertrophy and anaesthesia: it is slow but progressive in its course: is contagious and infectious

infection, and terminates by in death by exhaustion a intercurrent disease.

Some of the points I have stated dogmatically have not yet been determined with precision, but in the course of this Thesis I intend Elaborating them, and stating the grounds upon which I have arrived at my conclusions.

1st Varieties

Leprosy manifests itself in Trinidad as elsewhere in three forms, named respectively

a. Tuberculated
b. Anæsthetic
c. Mixed.

These three forms exists in all countries where the disease is prevalent, but local usage and local fancy may modify them names. The disease however is identical throughout the world, and the division above stated is generally accepted. Carter however distinguishes another form which he names Lepra Leprosa. This however he considers as the initial stage of the disease which may pass into the more pronounced Tuberculated or Anæsthetic variety. Daily Observation among an average residence of two hundred and sixteen lepers in

Trinidad

Trinidad lead me to adopt a certain modification of the three varieties Hansen mentioned which I shall mention in detail further on, but will only indicate at present. The Lepra Lepromatosa of Carter, which term he uses to indicate that characteristic Eruption, is scarcely worthy the dignity of a variety. It is simply the premonitory symptom, the Early Stage of the disease and might not therefore be classed as a variety. But Hansen noticed that such an Eruption as he describes, with this important reservation that it is not anæsthetic, occurs in the Anæsthetic variety of the disease, and persists during the life time of the patient. Thus the Anæsthetic variety may be divided into two subvarieties: — (α) without Eruption
(β) with Eruption.

Then again Hansen noticed the Tuberculated form to occur in three different and distinct varieties: —

(α) In the first there is diffuse hypertrophy of the affected part.

(β) In the second, small shot like papules (about the size of No 6 shot) are implanted on an hypertrophied base.

(γ) Thirdly, in Hansen the genuine tuberculated form in which large lumps and nodosities stand out prominently.

Of course these subvarieties may be mixed up with one another, and in addition there may be implanted on each a varying amount of Anæsthesia - But from my observations I am convinced that Each Exists independently, even in ill standing cases.

The Mixed Variety exists when we have Anæsthesia occurring in a case of Tuberculated leprosy, or when we have tubercles implanted on an anæsthetic case. It is nearly always the case that this variety, viz Mixed leprosy, does not Exist as a separate Entity from the very beginning - It usually commences as Tuberculated or Anæsthetic leprosy, and in Course of time the other variety appears, and is implanted on, or superadded to, it. An Error must however be avoided — in some tuberculated cases, owing to the involvement of the superficial cutaneous nerves, there is anæsthesia in the affected area, i.e. in the skin over the tubercles: this is not characteristic of the anæsthetic variety.

Description of the Varieties.

A. Tuberculated leprosy.

In accordance with the division of this variety of the disease into subvarieties, I will take up each of them in turn - The premonitory symptoms or Prodromata being however common to them may be described generally.

The Prodromata

The Prodromata.

As a rule the most of these symptoms occurs at such a distance of time anterior to the manifestation of the more pronounced and diagnostic signs that it is only with the greatest difficulty that anything reliable can be extracted from the statements of most of our patients here – In addition to this difficulty we have another one to make allowance for, namely the obtuseness of the patients, and a tendency to answer according as they think the questioner wants.

Pyrexia is a common premonitory symptom, as also a sense of undue fatigue and weariness out of all proportion to its cause. With these there may occur vomiting and drowsiness, and pains and aches about the limbs, and sometimes distinct hyperæsthesia. Boeck mentions a persistent feeling of cold; and he has seen a smart epistaxis and an impetiginous eruption immediately precede the disease. The patient is very low-spirited and depressed, takes no interest in his surroundings, hates his work, has attacks of dyspepsia, on the subsidence of which an Erythematous or urticaria like eruption may follow. In the best studies it may be that subjective symptoms may follow on some acute debilitating disease, such as yellow fever, dysentery, small pox etc. A puffy, flushed appearance has been noted

Diffuse Hypertrophy and Infiltration of Skin of Face with slight nodulation over Right cheek, Left cheek, over lower part of left jaw and lobe of left ear. The Skin is everywhere thickened, and greasy. A very good illustration of this subvariety.

noted by Carter to indicate the onset of Tubercular thickening has Bidenkap notes "local tubercous eruptions confined to a very small part of the skin" to appear as the first symptom. In white races a dirty discolouration of the sclera is also considered pathognomonic, but such discolouration is very common among dark skinned races and cannot be accepted as a sign here.

A longer or shorter interval now elapses before signs set in which quickly put the question of diagnosis to rest. Either localised tubercles of small size appear; or small localised patches of anaesthesia (in the Anaesthetic variety) which the patient accidentally discovers, or else macules of varying size.

Coming to a description of the Tuberculated form I intend describing the subvarieties, and then taking up certain general questions connected with the Variety.

(α) Diffuse Hypertrophy & Infiltration of Skin.

In this subvariety there is a general thickening of the skin over the face, forearms, hands and legs most generally. The skin is thickened, rough and hard to the touch, and cannot be pinched up by the fingers. Its surface is generally glossy and the sudoriparous and sebaceous glands are active. On the affected skin small dilated capillaries are seen running sometimes, and the circulation can readily be arrested

Case of diffuse tuberculation of skin over face: the occurrence of small papular tuberculation over chin and lips well shewn.

arrested in these vessels. The infiltration and hypertrophy is general, spreading widely over large areas, and shading off into the softer healthy skin without any abrupt demarcation. The surface is not anaesthetic, and sensation is normal. When pricked with a pin pain is felt, and blood easily oozes out. Generally there is no increase of pigmentation in these areas. It oftentimes affects the ears, the lobes being hardened & the feet and hanging pendulous, and it may affect the forehead and neck. The trunk otherwise seems usually unaffected. The fingers generally are all enlarged, the skin over the dorsum of the hand is thickened and the patient experiences a difficulty in making a fist. The pulps of the fingers are shiny, glossy, bright in colour and display dilated capillaries. The feet are also similarly affected, being enlarged, with skin tense and thickened. With such a condition anaesthesia may be involved in a subsequent and more advanced stage of the disease, and the following illustrative case shews this: —

Case I <u>A case of diffuse tuberculation with hypertrophy of skin: anaesthesia subsequently ensuing.</u>

Mary Ann Culpepper - aged 18. Born in Demerara - Ill 4 years - Cause of Disease unknown. Family history said to be good. Persons personal history good. History of present illness stated as follows — First appeared

appeared in little lumps in chin, and then spread to face. At the same time little fingers of both hands commenced to swell, later on the other fingers and finally the hands. The left leg then swelled, and afterwards the right.

On admission into the Lepers Asylum Suva the condition, under date 27 Oct 1888. Skin of forehead thickened, and tubercles on left ala nasi. Ears swollen, and form tubercles on left Ear. Small tubercle on Elbow. little and ring fingers of each hand thickened - Small tubercles in front of knee. Skin thickened on both sides of legs. Left big toe and inner side of foot thickened.

Present Condition (a detailed Examination on 27 April 1891). A diffused thickening of cheeks and forehead, Skin is darker hued than Elsewhere, and tending to be reddish (Patient is a white girl). Capillaries dilated in cheeks. Hair of Eye brows almost entirely lost. Lobes of both Ears Enlarged, Capillaries enormously dilated, helices normal. Chin tuberous, and lips thickened, with dilated capillaries in both situations. Hands — fingers all enlarged, Skin thickened and shining, glossy - presenting a highly glazed appearance, and tense, Especially the pulps. Capillaries dilated all over - In the Right Hand there is anæsthesia in ring and little finger (parts supplied by the ulnar nerve), and the nails are splitting

up

up and falling away - Left Hand - anæsthesia on ulnar side of little finger and on dorsum of first phalanx of Ring and Index fingers. Both Median nerves are Enlarged, and the left Ulnar also, but to a less degree. Forearms — skin hypertrophied on Extensor surface. Tâches on upper arms. Tendency to tuberculation at Elbows. Legs — large Coppery blotches over skin of thighs, and hypertrophy of skin over Knees. Anæsthesia total in left foot and leg as high as knee - Right Heel is anæsthetic, and there is a band of anæsthesia three inches wide above ankle.

Points of Interest in case. It shews the commencement of the disease in small tubercles over the skin, discrete at first, and progressing to diffuse hypertrophy and tuberculation of the skin by slow degrees - in 2 years. Then Anæsthesia appears in three years, limited it is true to the area of supply of the Ulnar and Median nerves, and also the cutaneous branches of the posterior tibial. We also note the Coexistence of the Sloughy, Enlarged fingers with the anæsthesia, and also that in some of the fingers thus affected there is no anæsthesia - We may also note another point of interest, viz. the appearance of tubercles on points of pressure as on the Elbows + Knees - There is implication

implication of the schneiderian mucous membrane, and the voice also is harsh and rough. The anæsthesia in the left foot & the right heel is also interesting as illustrative of the implication of the nerves, and not due to pressure of the infiltrated skin - The case finally resolves itself into one of the Mixed variety.

There is another form of Tuberculated leprosy in which this diffuse infiltration and hypertrophy of the skin is seen, where the skin instead of feeling stiff and heavy and conveying a feeling of constriction becomes loose and baggy and hangs down in folds and wrinkles - This appearance is most commonly and to greatest advantage observed on the face - The skin of the whole face is affected, it is thickened and hypertrophied, and seems as if it has become quite loosened from its attachments. In consequence the natural lines of the face are deepened, and the skin hangs over in folds and wrinkles are prominent. In this form the well known leonine face is to be seen. The features are square and heavy, the wrinkles marked, skin hanging down in folds, Eyebrows hanging over the eyes, upper eye-lids generally infiltrated and thickened and thus producing an inability to open the eyes widely (patients suffering from this variety have the appearance of having their eyes always half-closed). The lips are considerably thickened, and the power of approximating

them

them, in consequence of this thickening, is lost to a great extent; the lower lip hanging down, the pronunciation of labials and sibilants is considerably interfered with. The lobes of the ears are also partakers in this general hypertrophy of the features, hanging down to the extent of 5 cm or more. When to all this is added that the skin of the forehead is in heavy folds transversely, with generally two vertical folds, deep in extent, from the bridge of the nose upwards; and that the parts which are normally covered with hair are destitute of it, a picture of hideous repulsiveness is presented which is characteristic of the Facies leonina. The young are much disfigured when they are affected with this form – they have the appearance of being considerably aged, a boy of 12 years looking like a diminutive man of 30 or 40 years.
Together with this affection of the face other parts are affected. The skin over the extensor surface of the arms and legs may be hypertrophied, thickened to the feel and rough, with the sweat glands blocked up and comedones or black spots to be seen, and the hair covering the part defective. The skin in these positions may become dry and cracked like patches of ichthyosis. The lymphatic glands in the area of supply of the affected skin are generally Enlarged – sometimes to the size of a hen's Egg. No anaesthesia usually exists but sometimes there may

may be diminution in the sensibility of the skin owing to the involvement of the cutaneous nerves by the tissue infiltration -

Case II. Illustrating an extensive and general tuberculated condition of skin.

Serge Shipley Stewart, aged 17. Negro. Born in Trinidad - Personal history good. Family history — after his admission a younger sister developed Tubercular leprosy and died - Has been ill 6 years. No cause assigned.

It commenced by 'stains' (Tâches) one in left thigh, one above left knee and one in right thigh. They were light coloured and painless. Then a long time afterwards lumps appeared in them. He was treated with Chaulmoogra oil and the lumps went away. Then he stopped the oil, was sent into the Asylum and the disease spread over his face and ears after admission, (about 15 to 16 months after disease shewed itself).

On Admission :- Three small tubercles over root of nose and very small tubercles on alae, size of pin's heads. Few tubercles (small) in cheeks and discoloration. Helix, of Right Ear Especially, slightly thickened - slight slight thickening and pallor - Sight good - Arms - no tubercles, no anaesthesia

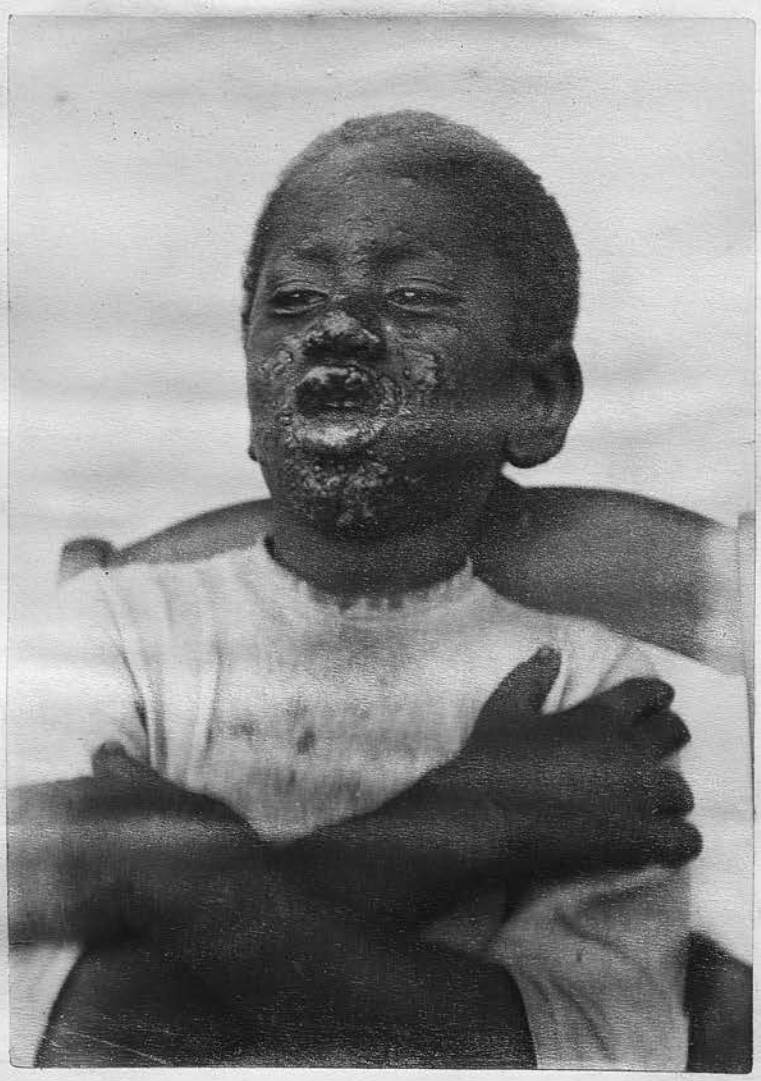
Slight

slight scaly Eruption on forearm - Legs - thick scaly Eruption in front ; no anæsthesia.

Present condition (24 April 1891) :— Face is typically leonine, has the expression of an old man. The whole extent of skin is hypertrophied and hangs down in folds over cheeks with a deep furrow running from angle of nose downwards and outwards. Perpendicular ridging of forehead over eyes and nose - Lobes of ears hanging down like Ear drops - Lips thickened and prominent - In the furrows of the skin the infiltration is greater - In lobes of ears hard lumps are to be felt - Lower eye-lids are thickened, upper lids normal. Ears Enlarged - Sclerotics injected - Sight good. Eyebrows and eyelashes are lost - a fine lanugo remaining over ridges of Eyebrows.

Skin over both arms and legs - the extensor surfaces, is dry, harsh and slightly thickened. Right Hand — Commencing contracture of little and ring fingers, first phalanx is swollen and both fingers numb. (Says he has much pain preceding this, then swelling commences, and numbness ensues). Ulnar nerves on both sides Enlarged and painful. Femoral glands Enlarged. Circinate Erythema (a patch) on nape of neck.

Fingers



Tuberculated Leprosy.

Small papular tuberculations on chin, and around mouth well shown. The enlargement of forearms and fingers also well seen.

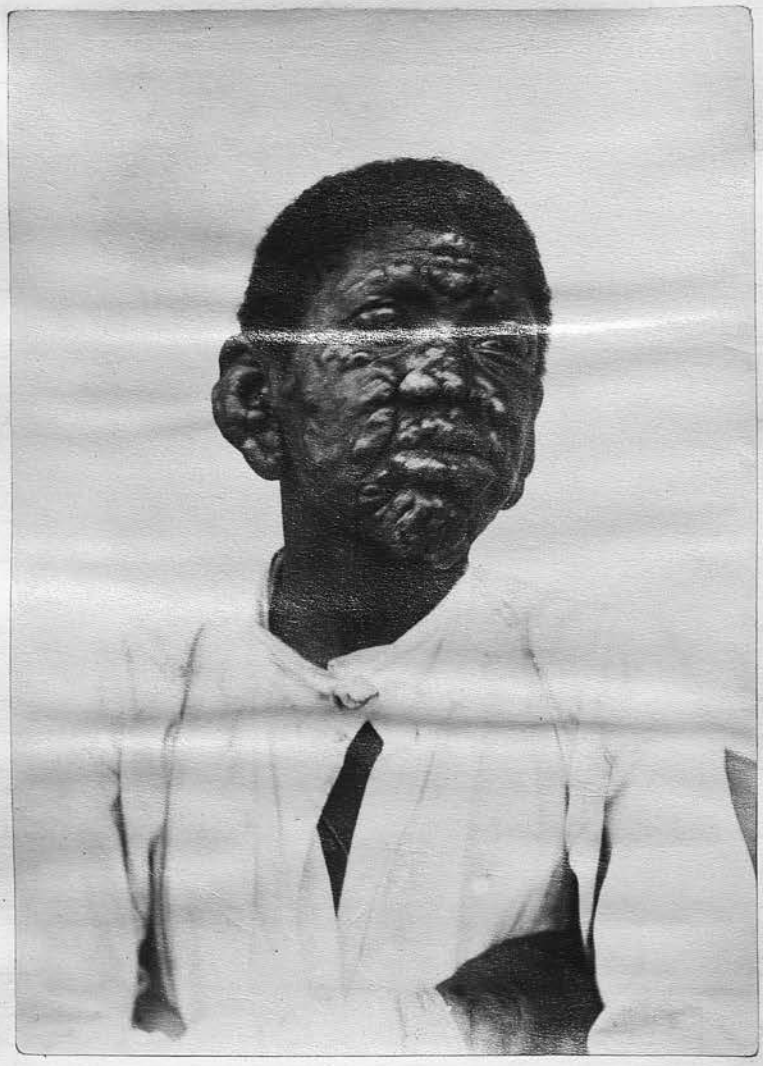
Finger nails normal. Says he sweats a deal all over body. Can remember no prodromal signs.

Remarks:— A typical case of the tuberculated variety with the leonine face. Its development was in about 18 mos as far as can be made out. Six years after onset he began to develop the mucous and probably the case is going to turn out one of the Mixed variety. The anaesthesia at present is very limited, and certainly does not depend upon pressure exerted by the tubercles, because there are none in that position. Treatment with Chaulmoogra oil seems to have effected no good as present. Physically he is robust, very active & intelligent.

(β) Subvariety. Small Papular Form.

In this subvariety we observe small papules about the size of No 6 shot, sometimes slightly larger, implanted on an infiltrated and hypertrophied base. It is in reality a more developed form of the previous subvariety, and not so far advanced a form as that to be described next. It may however be accepted as a distinct type, because numerous cases remain unchanged. The papules are most frequently to be met with on the cheeks, lobes of Ears, back of neck, chin, and extensor surfaces of Extremities. Apart from the type of these papules there is nothing characteristic of this subvariety of the

disease



Tuberculated Leprosy.

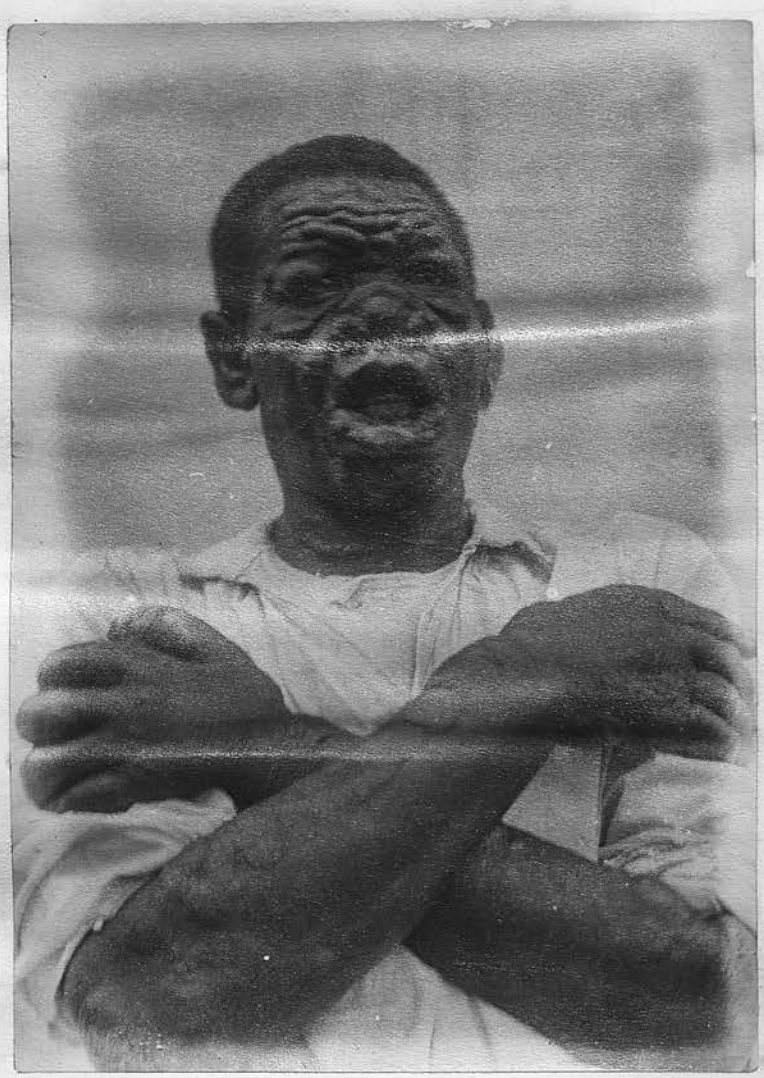
Large flattened tubercles on face, chin, lips, nose, forehead, ears shown very distinctly.
Patient is a boy of 14: disease not advanced.

disease, and further on I shall discuss the more prominent symptoms of Tuberculated Leprosy.

(γ) Subvariety – True Tubercular.

In this form from the outset the disease shews itself in distinct nodules – hence the term "tubercular". These tubercles or nodules, at first of small size, in course of time during the progress of the disease develop to enormous size. They are generally at first isolated but sometimes are grouped near Each other: in the latter case they present the appearance of clusters like grapes in a bunch as they grow, but they seldom run into Each other, remaining distinct all the time. They can be taken up between the fingers and be made to roll under the skin. They are usually placed under the dermis, involving of course the epidermis, but not extending into the layer of fat underneath. The skin over the tubercles may be roughened, and the sweat ducts are Enlarged and opened or sometimes often blocked, as also are the sebaceous ducts which present the appearance of a number of black pin-points on the surface. When these shew a tendency to ulcerate they generally become more glossy and glazed in appearance and tender to the touch – Their situation varies: they appear in the cheeks, chin, lips, Ears, forehead, nose and extensor surface of arms and legs.

Sometimes



An advanced case of Tuberculated Leprosy in which the face is markedly affected: the arms hands & fingers also are affected. Patient is unable to close his mouth owing to the lips being infiltrated. The large lumps on forehead are noticeable.

Sometimes in any of these subvarieties we may observe a hyperesthetic condition of the tubercles and skin generally - Thus in one patient covered with tubercles the least touch of the skin made him wince, or firm pressure he writhed.

Having now described shortly the three subvarieties with their leading characteristics I must point out that there is no hard and fast distinction between them - in many cases they coexist. Thus in one case the nodular form may be present in the face but in the arms general infiltration may be seen: so perhaps general infiltration may be noticed on the face, with the papular form in the Extremities, and so on. In many cases then these varieties may coexist, but in others Each form may Exist in its simplicity - Easily definable and characteristic.

Parts attacked in the Tuberculated variety

Generally speaking the more exposed parts of the body are those which are affected - as the Eye brows, nostrils, cheeks, chin and Ears and the arms. From them as the disease progresses steadily other parts are involved gradually. The parts affected in order of frequency are the chin, cheeks, Ears, nose, forehead. Then the lips, arms and legs. And finally they may appear on the hard palate and the sclerotic. I have never seen the palms of the hands or the soles of the

feet

Tuberculated Leprosy: showing clearly the size of some tubercles: that on the Right cheek is a characteristic example of one.

feet affected - It is noticeable, as Carter points out, that the parts most early and most frequently affected are those which are situated farthest from the trunk and which are habitually most exposed to External injurious influences: variations of atmospheric temperature, movement and moisture. They, the tubercles, seem to appear where nerves emerge from bony canals on to the surface - on the face: on the ulnar sides of the limbs - most generally the Extensor aspect; and on the posterior surface of the trunk. They generally come out symetrically but I have noticed cases also where asymmetry is common in advanced cases, while in Early leprosy asymmetry is the rule.

The SKIN is the part involved in this variety of the disease - below the dermis the nodulation or infiltration never seems to extend, and thus it is Easy for the knife to separate out nodules or patches of affected skin completely by a little dissection, leaving the subdermal fat and connective tissue free of the disease. In many of the operations I have performed for the removal of isolated tubercles I have been able to sweep round the affected part completely, leaving only healthy substance.

Course of Tuberculated leprosy: — It is generally slow and progressive in its course, but cases occur where tuberculation occurs rapidly - For a time the bodily health may not suffer - the tubercles may develop slowly

Tuberculated Leprosy: showing the cheeks, lips, nose, chin & ears affected. The enlarged and tapering condition of the fingers also shown.

slowly and almost imperceptibly without causing any disturbance of the general health, while in other cases a febrile attack may be the precursor of a crop of tubercles. But after the first onset of tubercles, as the disease progresses fresh tubercles appear or new infiltration of the skin - The tubercles become Enlarged, may cluster together, or over the infiltrated skin small papular growths may be observed - This condition may continue until some intercurrent disease seizes the patient - And now if the intercurrent disease becomes severe and likely to prove fatal or intractable, the swelling diminishes or the tubercles become absorbed and the thinned skin hangs down loosely. Spontaneous absorption is known to occur - In such cases after a time the tubercles are absorbed altogether or the infiltrated skin seems to become thinner. Temporary arrest of the disease may sometimes be caused by ulceration of the tubercles. This is a slow and gradual process. The tubercles first become tender to the touch, sometimes hot and prominent - A small focus of pus appears at the apex or some prominent part, the skin becomes thinned and breaks down, and then the tubercle discharges pus steadily and undergoes a progressive diminution of size - When a number of tubercles exist they may all take up this ulcerative action, and after a more or less lengthy period when the Entire mass of the tubercle

has

Tuberculated Leprosy - shewing the tubercles very clearly & distinctly.

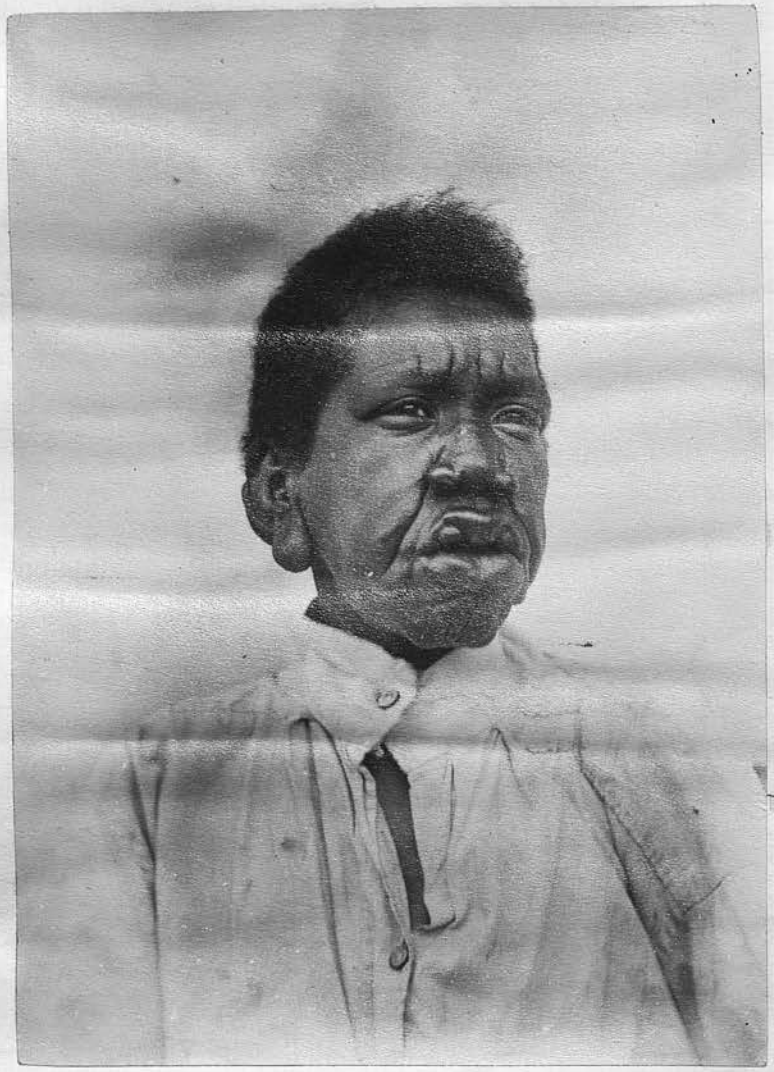
has been discharged, the ulcer takes on healing action and closes in from the circumference - in consequence a whitened cicatrix is left - When a wide expanse of skin has been affected, and resolution by ulceration has occurred, if on the face, the features present a characteristic appearance — a number of puckerings on the cheeks, striated in parts, quite smooth and free from deposits or papular enlargements. The cicatricial tissue can be lifted up by the fingers as it is free. This cicatricial tissue is pale & white and fibrous looking in dark skinned persons. Round the lips and mouth small tubercles may break down and ulcerate, and when healed completely the mouth is puckered up to small dimensions.

Case III. To illustrate the slow spread of the Disease, and the mild nature of the Tuberculation:

Joseph Rogers - 14 years. Negro. Born in Trinidad. Previous personal history good; but one brother died of Anesthetic Leprosy. Ill 2 - 3 years.

First appearance, small papules about size of sago grains on chin. Then it spread to face and nose. Then skin of legs became dry and mottled. Disease said to have come on after exposure to cold.

Present State. Skin on cheeks, upper lip and chin irregularly hypertrophied and resembling morocco leather: ala and cartilaginous portion of nose



Tuberculated leprosy – the general infiltration of the skin; its bagginess, and the manner in which it hangs down, giving an old toped appearance to the boy of 16 years, in with shows –

nose also in same condition - Lobes of both Ears and outer part also thickened. Skin over whole surface of both arms is thickened and patches of discolouration of varying size are present. No anæsthesia in these. Skin on both legs in lower part is dry, shining and thickened, having improved under the use of Chaulmoogra oil, before which it was fissured, cracked & ichthyotic - Femoral glands Enlarged. Voice slightly nasal. Hair growing normally - No anæsthesia - Nails flattened.

Case IV. To illustrate an extensive and general tuberculated condition of the skin.

George Shipley Stewart, 17, a Negro, Born in Trinidad - Personal history good — but as regards his family history, since his admission a younger sister developed Tubercular disease and died. Æt 6 years. No cause assigned.

Disease commenced by stains - one on the left thigh and one above the left knee, and one on the Right thigh - They were light coloured and painless. Then after a long time lumps appeared on his chin. He was treated with Chaulmoogra oil, and the lumps disappeared. Then the oil was stopped, he was sent into the

the hyphema, and the disease spread over his face and ears after his admission (which was about fifteen to sixteen months after the disease shewed itself).

Condition on Admission:— Three small tubercles over root of nose, and very small tubercles on ala, size of pin head. Few small tubercles on cheeks and discolouration of skin. Helix of Right Ear slightly thickened, also the lips which were pale. Slight scaly Eruption on forearms, and thick scaly eruption on ~~face~~ legs on anterior surface. No anæsthesia

—— This case has progressed steadily. His condition ~~years~~ after being as follows. Face typically bovine, has the expression & appearance of an old man. All the skin of the face is thickened, baggy and hangs in folds, wrinkles and creases. Lobes of ears hang like huge ear drops. Lips thickened and prominent. The skin is irregularly hyperthrophied, & this is Especially marked in those parts where it hangs over. In lobes of ears small pea sized lumps can be felt. Lower eye lid thickened: upper normal. Ears generally Enlarged. Sclerotics injected.

Sight good - Hair of eyebrows and eyelashes have fallen off, and only a fine lanugo remains.

Skin over extensor surfaces of both arms and legs is dry, harsh and slightly thickened.

Right hand - Commencing contraction of little and ring fingers, first phalanx is swollen, and both fingers numb. Ulnar nerve on both sides enlarged and painful. Finger nails normal.

Femoral glands enlarged - An eruption like ringworm on nape of neck.

Perspires a good deal over the whole body.

Remarks: — This is a typical case of the Tuberculated variety with the leonine face. Its development was in about Eighteen months - Last year (being five years after onset) he began to develop the nodulations, and probably the case is going to turn out one of the mixed variety. The Anaesthesia at present is very limited, and certainly does not depend upon pressure exerted by the tubercles, because there have never been any in that position. Treatment with Chaulmugra oil has not been beneficial so far. Physically in good condition: active and intelligent.

Tuberculated Leprosy – the large flattened tubercles and ridged appearance of forehead & thereon.

Analysis of the Affections of Organs etc.

The Larynx.

The Larynx is most frequently involved — A tubercular Laryngitis exists. The mucous membrane is first congested, then it becomes thickened and oedematous; and this condition involves the vocal cords as well, so that the voice becomes typically affected. It becomes weak ultimately and the patient is unable to speak above a whisper, though in the earlier stages it is hoarse and raucous and most discordant. The tumefaction of the mucous membrane may proceed to such an extent as to impede respiration, and death may occur by suffocation unless tracheotomy is performed, or laryngotomy, to relieve the patient. Pain in the region of the larynx is often first complained of and may be the earliest symptom of involvement of the larynx. The proportion of cases in which the larynx is involved is small.

The Nose.

The mucous membrane of the nose is affected in some cases by this tubercular infiltration. The first signs is usually some catarrh and "stuffiness" in the nose, there is some breaking down of the tubercles, and the nostril becomes clogged with discharge. Gradually the sense of smell is lost and respiration through the nose rendered more and

more difficult, necessitating the patient's breathing through the mouth in a most characteristic manner.

The Nose becomes involved in another way in this variety of the disease — and this is a somewhat common symptom if the disease has lasted for any length of time - There is gradual and steady absorption of the septum nasi, and the bridge of the nose falls in until ultimately only two small orifices above the mouth indicate the nostrils - Caries and necrosis of the nasal and other bones may assist in the demolition of the nose.

The Eye.

The Eye may be affected in various ways in Tuberculated leprosy.

1. Tubercle of the Eye - This is the typical tubercle which occurs in other positions - It begins as a small nodule below the conjunctiva, usually at the outer segment of, and abutting on, the Cornea. This is covered by the conjunctiva and rests on the Sclerotic; is of a peculiar pearly glistening appearance; with numerous capillaries crossing over it having come across from the conjunctiva. In its growth it invades the clear corneal tissue, and occupies more or less of the cornea — sometimes indeed its whole extent — standing out like a red fleshy mass, and presenting

the appearance of a miniature cluster of grapes. At the same time it may spread outwardly and assume a considerable size, even as large as an almond. Its surface is still glistening but is irregular and nodulated - The tubercle, a cluster of tubercles, occupying the site it does at first obscures vision and finally destroys it. In its earliest appearance the attendant symptoms are those of irritation — pain in the eye, also an movement of the lids, burning, lachrymation, slight photophobia &c.

2. Another common affection of the eye seen in this variety of the disease is what is called Obscuratio Corneæ. At first this reminds one of the arcus senilis, but it differs in many particulars. It is a gradually progressive opacity of the cornea - It usually starts at the upper segment of the cornea, involving only perhaps the upper quarter circle, by a whitish mother-of-pearl appearance. This seemingly is throughout the entire thickness of the cornea - Accompanying this there is, in some cases, Sclerotitis as Evidenced by a pink, salmon patch in the segment of cornea adjacent to it, together with pain, lachrymation, photophobia, headache, etc. The affection gradually progresses until perhaps the whole of the cornea is involved, though sometimes it may not

be quite so extensive - Vision which is diminished at first, is ultimately lost - I have noticed this Obscuration to begin in the lower corneal quadrant, though it more frequently begins in the upper.

3. Ectropium. This is generally caused by tubercles being present on the lower lids, and then by their weight turning outwards the edges of the lids; or, in another variety, by tubercular infiltration of the lower lid which becomes absorbed and so leaves the tissues thin and wasted and then causes a condition of Ectropium.

4. Anterior Staphyloma - may arise from ulceration of the cornea, or thinning of the Sclerotic.

5. Shrinking of the Eye ball; most probably due to tubercular deposits within the eye and their ultimate absorption leading to the shrinking, until only a small movable stump is left.

6. Pannus:

7 Ulceration of Cornea

both due to the Ectropion.

The Nails:

are frequently involved in Tuberculated Leprosy: most certainly so in cases where there is excessive tuberculation, or where the disease is far advanced. The earliest sign is a loss of the shiny

and glossy appearance of the nail, it assumes a dull white and opaque look. Then it gradually becomes flattened out on the phalanx. At this time ulceration may occur under the nail in the bed of it, and in consequence, as this progresses, the scabs or the discharges dry up under the free border of the nail, and generally accumulates until the nail is completely loosened by the ulceration spreading, and the discharge accumulating. Finally the nail may have to be removed, if it does not happen to be knocked off accidentally.

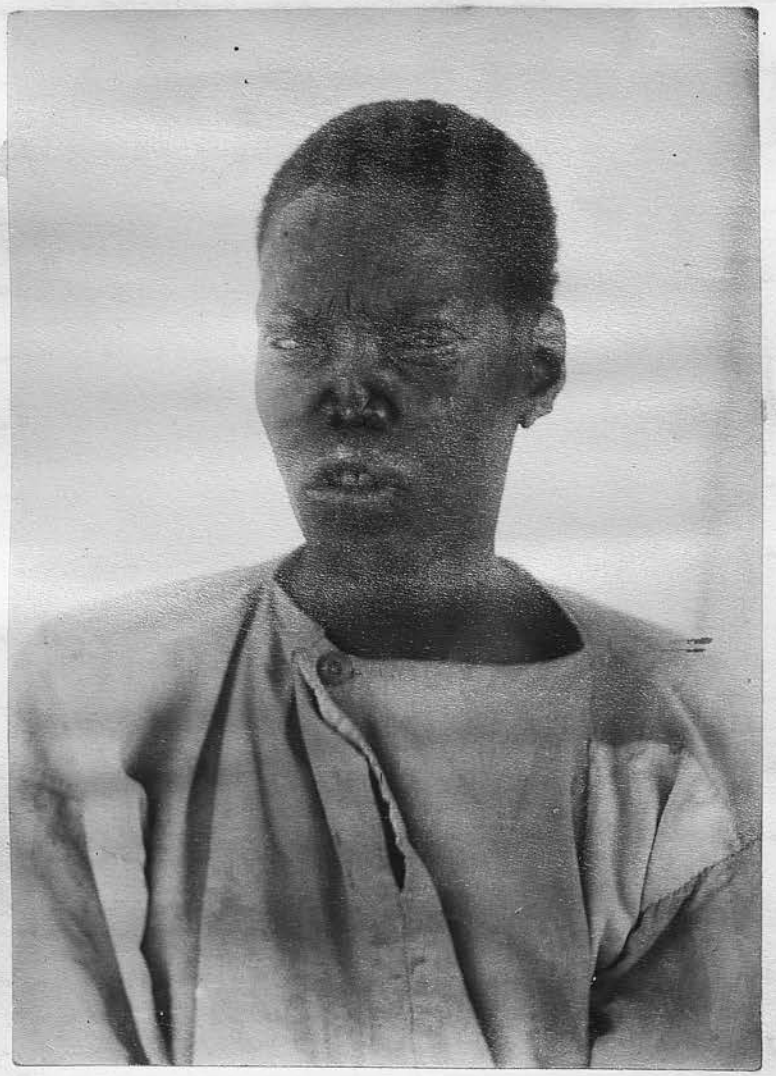
Another change may often be noticed. After the loss of lustre and the flattening have taken place there commences a longitudinal ridging of the nail. There are generally three ridges, one in the centre of the nail and one on each side of this. This ridging gradually becomes elevated, until it splits; and then the nail becomes broken up into longitudinal fragments frequently incurving, and becoming gradually loosened from their bed. The next stage is that these pieces drop off, and leave the matrix thickened, bare and irregular. In course of time this matrix contracts greatly and is quite painless — and resembles a split pea placed on the dorsal surface of the ungual phalanx.

The Hair.

In Tuberculated leprosy the hair is generally much affected over all parts of the body, Except the head, where strangely enough it always Escapes. I have never seen a leper suffering from the tuberculated variety of leprosy with anything but a luxuriant crop of strong, coarse hair. In other parts of the body the hair bulbs atrophy and the hair drops off — the eyebrows, eye-lashes, moustache, beard, and the fine lanugo all over the body, drop off, and the features of the patient assume a peculiar and a characteristic appearance. Generally this dropping off occurs when the skin of the part is involved by the tubercular infiltration. It would appear as if the deposit of new material surrounds and compresses the hair bulbs and thus leads to their atrophy and falling off. The loss of hair is sometimes curiously one sided, a tuft remaining at the outer end of the brows for example. The hair on the pubes is not affected to any extent in my Experience, but Carter states that it is apt to fall out.

The Mouth.

Masses of Tubercle are not infrequently seen in the hard palate, extending as far back as the soft palate. They have the same appear-



An advanced case of Tuberculated Leprosy: the tubercles have all become absorbed: the cheeks drawn in and contracted, the nose flattened, and the eyes disorganised.

-ance as tubercles elsewhere, except that they are not subject to much pressure and are covered by a more vascular membrane - In spite of the rich supply of blood however the tubercles in these situations do not attain large size - They run from before backwards in the centre of the roof of the mouth, and attain the size of an almond - The surface is irregular and undulated and the tubercle is flattened - I have never seen them on the soft palate or the fauces. On the dorsum of the tongue tubercles may sometimes be seen - The sense of taste is never diminished or lost.

The Mammary Gland.

Bakewell speaks of enlargement of the Nipple in the male patient as being so common and frequent that he gave it the name of the "feminine nipple". My own experience however has not led me to the same conclusion, for of the lepers I have examined only a few have the true "feminine nipple." When it does exist the condition is as follows — there is enlargement and hypertrophy of the nipple to more than four or five times its normal size, most aptly comparable to the state of the nipple which is present in multipara who have suckled their children. The areola is not affected, but evidently the true nipple tissue alone, and it preserves its usual erectile pro-

-perties. This is the condition in males. In the female there does not appear to be any such enlargement as I have described. In a few males there occurs abnormal development of the mamma, but in all probability this does not depend upon the disease. I have not seen any cases in which the female mamma has been affected in its glandular substance – in some instances tubercles may develope in the skin covering the gland, or may encroach on this skin from the outside.

In one case under my care – a case of advanced Tuberculated Leprosy – the Mamma resembled that of a young girl: – it is firm and prominent and conical, with a wide dark areola, and a large flaccid nipple like that of a multipara.

The Organs of Generation.

In the Male tubercles may develope on the Scrotum, and be of varying size.

On the body of the Penis some tubercles may appear, but not to any extent, and only infrequently.

The Testicles – small round-celled infiltration of the fibrous inter-glandular tissue takes place, leading to compression and ultimate atrophy of gland.

In the Female the Labia Majora are sometimes affected with tubercles.

Ulceration occurring in Tuberculated Leprosy.

Ulcers are of common occurrence in this variety, and are of different forms:—

(α) Ulceration of Tubercle. When a Tubercle increases to a certain size, it may ulcerate — this being one method by means of which it disappears. Generally the ulceration commences in a sebaceous cyst in the tubercle owing to some irritation or to accumulation of secretion, a small pustule forms looking like a sago-grain, and this in a short time increases in size involving the tubercle more deeply and extensively until the whole of the tubercular substance is thrown off, and a sulcus remains varying in size and depth with the original size of the tubercle. The pecular progress of such ulcers is, that they take on reparative action, fill up with granulation tissue, and form generally a smooth cicatrix. It may be interesting to note here that in all these healing ulcers which I examined I have not found bacilli, while they are most frequently to be seen while the process of destruction was going on.

Sometimes this ulcerative process may begin by some injury to the tubercle. Its progress however is as described.

(β) Ulcers which occur on the limbs in skin unaffected; or in cases of diffuse infiltration of the skin

Skin - Here generally some injury locally, such as a cut, a bruise, or some other slight thing may cause a steady progressive ulceration. The ulcer may be irregularly circular in outline, sometimes serpiginous, and of varying size from about the size of a Florin to even as much as half the limb in extent. It has a flat reddened, shining and glazed in appearance: which secretes a slight thin ichorous discharge. Its Edges are sometimes thickened and whitish, scarcely Ever undermined but standing out prominently like a lip. At other times the Edges are almost flush with the floor of the ulcer, thinned and reddened. There is, as a rule, very little discharge from them — and generally it is thin and bloody. They tend to spread steadily in a serpiginous manner, and may take on healing action in one part while spreading in another. When they heal the cicatrix is generally thin, translucent and not firm, and there is much tendency to the re-currence of the ulcers on the site of the cicatrix. Some-times luxuriant granulations spring up, highly vas-cular and tending to bleed on the slightest touch but flabby and indolent, and then cicatricial action is scarcely Ever set up. When the ulcers are extensive they may give rise to nocturnal Elevations of temper-ature, and though they are generally painless they sometimes cause a great deal of suffering.

Ulceration of this kind may also arise spontaneously, and spread extensively. As an example in a case of Tuberculated Leprosy in a boy there was diffuse hypertrophic infiltration in both legs, and without any assignable cause small ulcers appeared on them, about the size of a sixpenny piece, and the skin around was thickened and tender. The process rapidly spread, the ulcers running into each other, and in fact a condition of superficial gangrene arose with much pain, until the whole of the anterior surface of the leg was one large ulcer from the tibial tubercle to the ankle. No wound or injury could be traced as causing it. This condition frequently occurs.

(γ) A <u>superficial ulceration of the mucous membrane of the lips</u> I have noticed to occur with certain frequency in tuberculated Leprosy. This seems to arise spontaneously, affecting only the superficial part. It spreads all round the mouth and causes a deal of pain and tenderness, rendering it difficult to open the mouth or to speak clearly on this account. It may sometimes extend to the skin of the face, but even then it does not lose its superficial character. It readily heals, without leaving any mark, except when it affects the face when the resulting cicatrix

is

is almost black, and in coloured people it shews up like a fringe of hair around the mouth.

(δ) Ulcers which start in the bed of the nail under the matrix: these have been already described as leading to the shedding of the nail.

Affections of the SKIN.

Although in other places where leprosy is prevalent we have mentioned a great variety of skin diseases as commonly occurring in Tuberculated Leprosy, in Trinidad skin affections are not so numerous, and may be classified under a few headings.

1. Most generally we meet with a hard, dry fissured condition of the skin: the fissures occur in such manner as to form sides of square or oblong areas of skin. In point of fact this is simply Ichthyosis. It also occurs in a modified form in places where pressure is applied, as for example along margins of the soles of the feet, when the corium becomes hypertrophied, and is dry, horny and papillated.

2. Eczema, or a condition which is not quite so far advanced, which generally occurs on the inside of the thighs. The crusts are small and firm. It is accompanied by much itching.

3. Scabies, is a frequent concomitant, but in all probability bears no causal relation to leprosy.

4. Yaws often is coexistent.

5 Psoriasis is frequently seen.

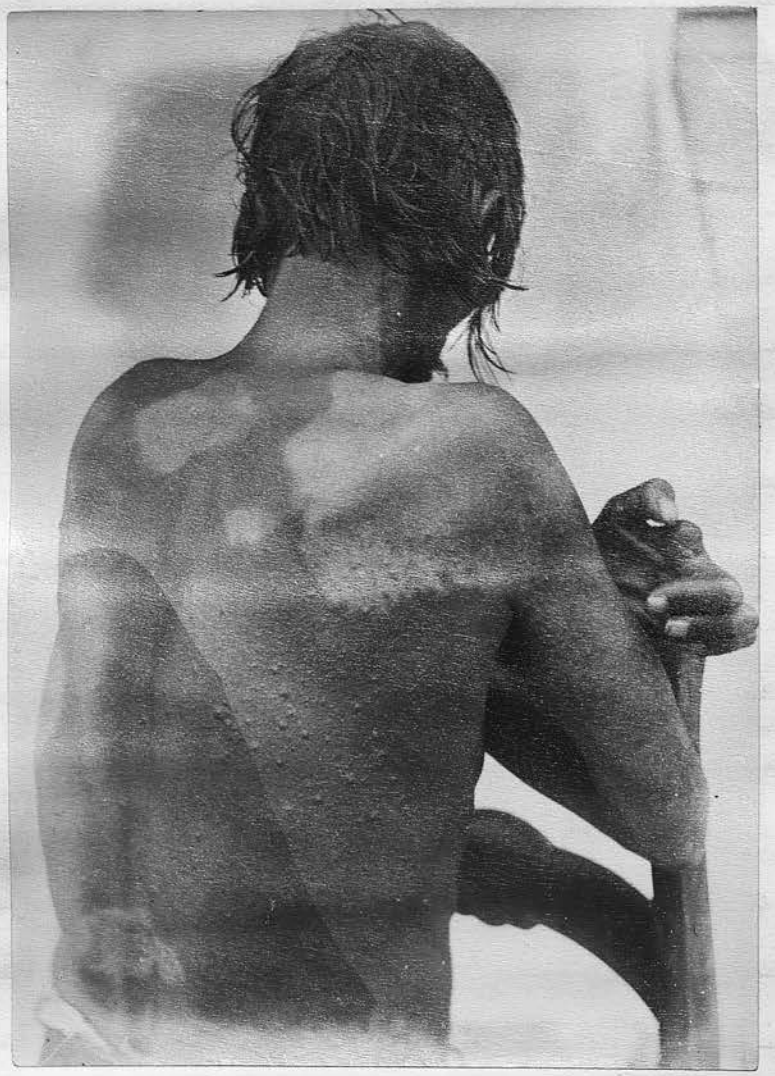
6. Syphilides

7. A small papular eruption, like lichen — seen mostly on the anterior part of forearms and on chest and back.

Leprotic Fever.

This is the name applied to those specific attacks of pyrexia which precede and are followed by an outbreak of an eruption of tubercles. It generally appears in only a small percentage of cases. Some authorities state that this always precedes the development of new tubercles, but in my experience this is only true in those cases where crops of tubercles come on, and not when they originate singly and slowly. It is generally preceded by malaise, headache, and a sense of weariness, and sometimes by vomiting. A sharp attack of fever then sets in, the temperature sometimes reaching 104° to 105°, with pains in the joints accompanying it (without any swelling however), and pains in the back: lachrymation and photo-phobia, and the patient takes to bed. Immediately

succeeding this the existing tubercles enlarge, become reddened and painful, tender to the touch and hot to the feel: and then near the old ones new tubercles gradually appear in clusters — small in size at first, but rapidly enlarging; and they too are tender and painful. In about two to four days the fever, which is accompanied with much perspiration, a foul tongue, and constipation, subsides. The pain in the tubercles becomes less, but the tubercles persist. Generally the fever recurs in the same patient frequently. The skin around the tubercles may become timid, hot and tender, but this subsides with the subsidence of the fever. The fever is usually of the continued type, sometimes remittent in character. Sometimes the fever may be the precursor or the sign of a leprotic deposit in one of the internal organs. In one of my cases I noticed that the leprotic fever was induced always by gastro-intestinal derangement — the patient overate, became very dyspeptic, suffered from diarrhoea, pain over the liver, vomiting etc. When this irritable condition of the stomach subsided, fever set in, followed by an Eruption of tubercles over the face, shoulders and upper arms and back. These tubercles were copper coloured, shotten, firm and hard, intensely tender, and hot to the feel.



Anaesthetic Leprosy: two large leucodermic areas of anaesthesia shown — over R. shoulder blades, and a smaller one over left. The darkened portion running diagonally from left to right is due to a fold in the photograph — Small lichenous spots also seen — not tuberculated

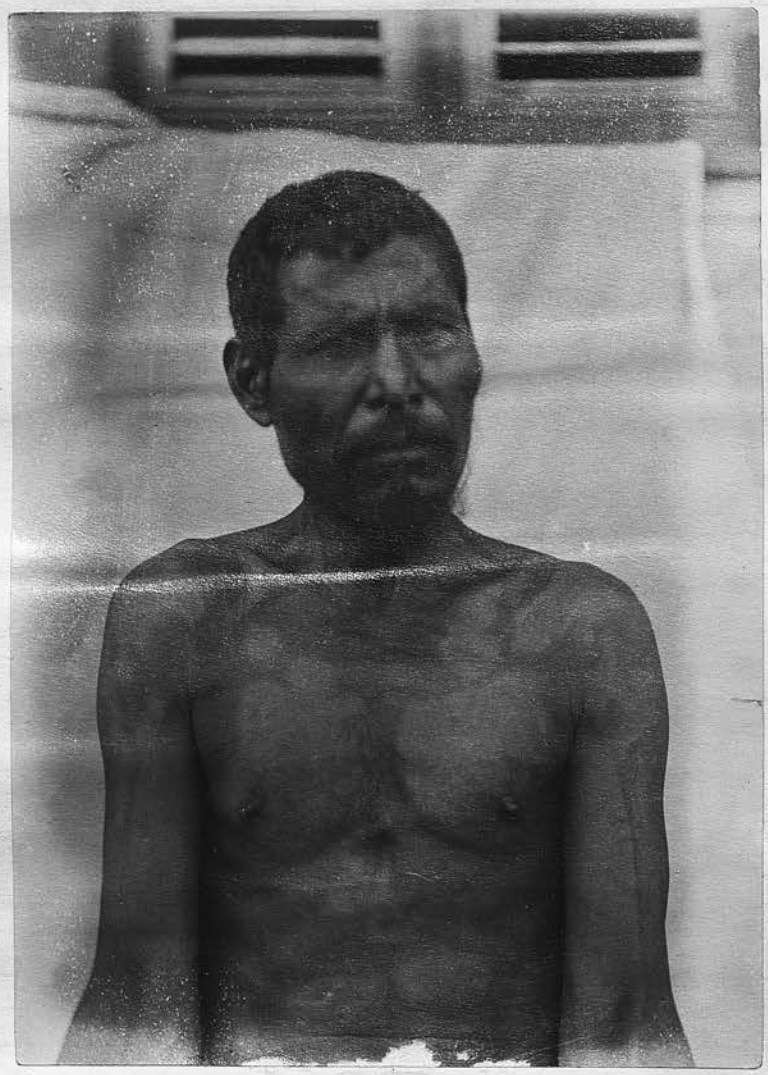
Anæsthetic Leprosy.

I have at the beginning of this Thesis divided this variety of Leprosy into two sub-divisions, namely, (1) that form which is purely An-æsthetic; and (2) that form in which Macular Tâches occur in addition. In doing so I feel that I should be making the description somewhat diffuse, but the clear marking out of the two varieties warrants me in adopting it. At the outset I must draw attention to the fact that sometimes an eruption does occur in the purely anæsthetic variety. It then generally does not last for more than a few months, and disappears.

1. Anæsthetic Leprosy (pure variety)

In this variety the skin shews no outward change but on examination total anæsthesia of areas of varying size is found to exist. The patient in the earlier stages is so slightly affected that it is generally only by accident that he notices a small patch of anæsthesia and seeks advice for it. Or, perhaps, a small tâche may appear which he finds insensible to the prick of a pin.

The Premonitory Symptoms are slight and few, and as they occur a long period antecedent to the time when advice is sought it is difficult to obtain a correct account. As far as can



Anesthetic leprosy – patches of anesthesia lighter than surrounding skin will seen.

be made out certain subjective phenomena may pre-
-cede the development of the disease — such as pain along
the course of a nerve, the ulnar or the median most
generally, which may be of a shooting or darting nature,
or of a burning character. Or there may be a sensation
of pins and needles, or formication - There may also be
a sensation of pins and needles, of cold and chilliness.
These sensations may be felt in the finger tips, in some
area of the back or chest. They may recur often and
then may disappear, the patient naturally not paying
much attention to them. Then perhaps in the most acci-
-dental way he may discover the fact of the existence of
anaesthesia — in lighting a pipe he may burn his fingers,
or raise blisters without feeling any pain; or, he may
run a prickle into his hands or feet and this may
set up inflammation without pain; or, he may dis-
-cover an ulcer on the sole of his foot caused probably
by a nail in his boot which he never felt. Hence he is
led to seek advice, and naturally enough on questioning
patients with a view of ascertaining the cause of the
Leprosy we often get as causes, that a thorn pricked
them, or a nail ran into the foot, or the hand was
burnt. Pemphigus solitarius is sometimes a very
early sign - It may appear on the Elbows, knees, hands,
or feet. But this is a sign consecutive to impaired

Anesthetic leprosy - lighter patches (of anesthesia) over back: irregular distribution.

nervous influence. Sometimes pyrexia may attend the outbreak of blebs. Hyperaesthesia is sometimes looked upon as a prodromal sign, and this is seen in the fingers and toes and varies extremely in degree from "a mere disagreeable sensation excited by pressure to very acute suffering: one may witness tears falling down their cheeks when they move about only a few steps" (Boeck). Constitutional disturbances of a pyrexial character may also precede this variety accompanied by digestive troubles. In the later premonitory stage a fall of temperature and a sensation of cold; albuminuria; irregular menstruation; and diminution of Erotic desires are sometimes to be noted.

Course of the Disease. Following upon these premonitory symptoms we come to the disease fully established, with anaesthesia as the great and constant sign. The anaesthesia varies in extent; sometimes it may be in the course of the median nerve, and its area of distribution in the fingers may be affected: or, perhaps, it may affect that portion of the fingers which is under the influence of the Radial or of the Ulnar nerve. It then gradually spreads upwards involving a larger extent of the skin, creeping upwards so slowly as scarcely to be detected, until it involves perhaps the whole extent of the arm. The anaesthesia spreads upwards

from the toes and feet in a similar slow manner until until it reaches and involves the thighs. Coincidently with this, patches of absolute anaesthesia may be present in the back and chest in areas which are irregular and under the influence of no particular single nerve. The forehead, face and ears are not unfrequently involved.

Sometimes the attention of the patient is first attracted to a patch of discolouration of the skin: in lighter coloured skins this patch may be reddish brown, in the darker skin it may be slightly lighter – standing out in relief: it may occur in any part of the body. This patch is found to be anaesthetic, and as the disease spreads by extension of anaesthesia it may disappear gradually.

While this anaesthesia is becoming established there occur various changes, of new origin, which are characteristic. I refer to trophic changes. Among the earliest noticed is the wasting of muscles – and as the anaesthesia generally appears earliest in the fingers, so the muscles of the ball of the thumb, and those of the hypothenar eminence slowly waste and atrophy. A little later on the interossei and the lumbricals also waste and atrophy, and as a consequence the tendons of the flexor Brevis and Sublimis stand out prominently like cords. The appearance of the hand now is like that of an Elongated Spade – a narrow blade. When the hand

and fingers are extended the palm is hollowed owing to the atrophy of muscles, and two prominent ridges — the flexor tendons — are observed traversing it, the fleshy prominences on the radial and ulnar side are flattened out by atrophy, the first phalanges are generally extended and the second and third are flexed over on the hand - The hand is now characteristic of the early stage of Anaesthetic Leprosy — a sort of "Main en Griffe" which is noticed in Progressive Muscular Atrophy. Later on there may be thickening and clubbing of the nails. In some cases the hand is affected differently — the fingers assume a conical shape tapering towards the extremities; a typical fleshy finger may be present — the fingers being swollen, oedematous and tense, very shiny, anaesthetic, and highly vascular. In a subsequent stage necrosis of the phalanges occurs, preceded by pains referred to the bones, swelling of the fingers, and abscess formation - This bursts outwardly and extension of the bones occurs. The swelling and necrosis may extend upwards into the palm of the hand, and I have met with many cases where suppuration has extended into the palm from the finger along the plane of the deep extensor tendons — there to form a localised abscess. The nails split up sometimes, or may be incurved side to side, or longitudinally.

About this time on careful examination hypertrophy or thickening of the ulnar nerve may be detected about the inner condyle of the humerus: and a similar thickening of the median nerve just above the wrist. This has to be sought for carefully among the numerous tendons with which it may be easily confounded. This thickening of the nerves spreads in a fusiform manner for some distance along their length, though only of course the more superficial portion can be detected.

Patches of anaesthesia may occur in other situations as well: they may vary in extent; may be perhaps irregularly distributed, though in the main they correspond with the distribution of the superficial cutaneous nerves. Thus, large regions on the back may be affected, between the shoulder blades and over them: in the small of the back: on the chest &c. Generally the face and forehead may be free from anaesthesia.

Later on in the course of the disease slight paralyses running into paralysis of greater degree later may occur. Among the earliest to be noted is paralysis of the orbicularis oculi — the patient is unable to close his eye: when asked to do so, to shut his eye, the eyeball is rotated upwards leaving the sclerotic visible through a chink between the lids. As a consequence of this paralysis, and perhaps also the weight of the

lid having some effect, there is drooping of the lower eyelid and Ectropion results together with congestion of the Conjunctiva.

A more advanced stage is reached, sometimes, when we meet with complete facial paralysis

There is general wasting of the muscles of the body — Few purely anæsthetic lepers are of full habit: they are usually thin and Emaciated - This atrophy occurs invariably in the muscles which are supplied by the Enlarged and thickened nerves, and is at first confined to them — thus the supinators of the forearm may be atrophied, or the flexors: or the muscles of the leg or of the calf.

The Anæsthesia is at first purely superficial, as is well seen in Early cases of the disease — the prick of a pin may be felt when the pin is run deep into the substance of the tissues, and the impression of pain is delayed. But later on even this is abolished as the deeper nerve branches become affected, so that on plunging a pin deep into the tissues no sensation of pain is felt. However the sensation of pain and the sense of feeling is not altogether abolished when we reach the innermost and deepest tissues. This I have proved repeatedly in operations — thus, in the process of Excising a bone perhaps, the patient has no feeling as the knife is thrust into the tissues, but when

the

Anæsthetic leprosy. Affection of the Fingers. On the left the fingers are swollen, conical and glossy: the nails of the left hand are affected. The two hands on the Right are more advanced: the flexion of the fingers, the deformity, and the change in position of the nails are well shewn - in the left hand the prominence of the flexor tendons is marked.

the bone is being separated the pain is felt acutely. Again in a case where I had to perform Laryngotomy – there being total anæsthesia of the skin over the neck – during the superficial incision the patient made no complaint, but when I reached to the deeper tissues he could scarcely be got to keep still, owing to the pain.

The flexion of the fingers is not due to the sustained nervous influence upon the superficial and deep flexors of the forearm, but rather to its effect upon the lumbricals, which I have proved repeatedly by performing tenotomy of the affected flexor tendons and then attempting to extend the phalanges; which, however invariably relapsed into the flexed condition when the force which kept them extended was removed. In the early stage though the phalanges be flexed they can by slight force be extended: but as soon as the force is relaxed the flexion recurs. Later on this extension cannot by any amount of force be produced – the phalanges are fixed in the new position.

In consequence of the phalanges being fixed in this flexed position changes of a trophic kind occur – some degenerative change in the ends of the bones appeared in this unnatural position: or perhaps it might be an irritative change due to the

Anaesthetic Leprosy - an advanced case in which the hands are markedly affected. The fingers of the Right hand are entirely lost: those of the left not to so great an extent - the nails of the little fingers, the ring & the fore fingers are all displaced

the same cause. In consequence there occurs pain in, and thickening of the joints; or there may be an effusion of serum into them: and this leads to absorption of the ends of the bones in some instances, and to carious degeneration, ulceration and exfoliation in others. Where absorption occurs, which may be common in an early stage, the phalanx becomes slowly absorbed and shortened as it progresses — the distal end becomes approximated to the proximal end, and the wasted and atrophied finger nail is carried over to, and apparently implanted on, the end of the proximal phalanx. This may also occur in the proximal end of the last phalanx, which, remaining flexed, becomes gradually shortened by absorption, and the nail is carried over. So it progresses. The second phalanx undergoes the same absorption and the nail is implanted on the terminal portion of the first phalanx, and finally it is carried over to the distal part of the metacarpal bones. Here the process ceases. I have seen a hand wholly bereft of fingers, but the remains of nails implanted on the ends of the metacarpal bones. The metacarpal bones however I have never seen absorbed.

In the other case there is swelling and inflammation of the periosteum, together with caries of the bones. In its progress it sets up degeneration changes of the

tissues

tissues surrounding, and in consequence of this a small abscess or ulcer forms, and the bone is cast away piecemeal. During this process sensation is generally acute – the least touch causes the most exquisite pain. The tissues surrounding the bone take on an inflammatory action, become hard, tense, and throbbing and hot to the feel. If now an incision be not made to relieve the tension, an abscess forms and bursts outwardly, and pieces of carious bone are extended. The accompanying pain is great even though the part be anæsthetic.

The Occurrence of Ulceration and Gangrene.

Ulceration is of common occurrence in this variety of the disease, and may partaking of the chief characteristic be benumbed superficially, but on probing them deeper down are found to be very sensitive.

These common ulcers found on the sides and arising spontaneously, are generally connected with a diseased bone or joint. They are cured with difficulty and remain open during the whole life of the patient: sometimes narrowing and secreting but a small quantity of their peculiar humor, at other times enlarging and pouring forth a great quantity of ichor. "So long as the ulcers

extend

extend and plentifully secrete, so long the malady seems at least to be arrested, and the health of the patient is good; but if on the contrary they close up and their secretion becomes scanty or suppressed, there soon arises a general disturbance of the System: in fact, the disease makes Evident progress amid febrile reaction and other signs of general suffering: nay, even death may Ensue with brain symptoms." (Danielsen).
Although I have not seen this myself I can vouch for its correctness (except the final paragraph) on the testimony of the experience of the more intelligent patients under my care, who objected to have chronic ulcers operated on with a view to cure, for the reasons mentioned above, and who have repeatedly assured me of the disastrous results following the suppression of the discharge of these chronic sores.

Ulceration and Gangrene often rapidly occur. Large dirty ulcers form on the legs, generally the anterior surface of the Tibia. They present all the characters of ordinary chronic ulcers — thickened white borders with some degree of brawny hardness around, and sometimes having the edges undermined. The surface is sometimes Quite clean, irregular and reddened, sometimes it may be dirty and exuding an ichorous pus. The Edges generally are anaesthetic.

Gangrene.

Gangrene and rapid slonghing of the tissues I have often noted: Especially does it come on when any small bone is necrosed and not attended to in time. One patient presented the peculiarity that whenever an incision was made into any part the surrounding tissues used to slough very rapidly, and this action used to spread upwards.

These changes are doubtless due to the abstraction of nerve influence, or its diminution: aided in their origin by some local injury.

The Perforating Ulcer is of common occurrence in this variety, and is looked upon as diagnostic by some authorities. It generally is the result of some injury — the action of a nail in the boot, or a splinter running into the flesh, or treading upon a cinder, or some similar injury. In a tropical country where the majority of those affected with leprosy belong to the lower classes who habitually go about shoeless, these ulcers are very common. Due as it is to some injury to an exposed anæsthetic part. I fail to see how the perforating ulcer can be looked upon as diagnostic per se. If it were to arise in cases where no injury could possibly have been inflicted on the part, and quite spontaneously, then it might be taken as such: but under the circumstances if any other

anæsthetic

an esthetic part were to be subject to the same irritant we should have similar ulcers, Especially if the injury be of long and intermittent application, as in the hands &c. To me it appears that the perforating ulcer is simply the result of an accident: it presence is not constant: its position dependent upon altogether fortuitous circumstances. And inasmuch as it does not arise spontaneously in a part which is free from the causative influence we can scarcely I think compare it with the perforating ulcer of Locomotor Ataxy. The perforating ulcer is Generally situated in the Sole of the foot: under the great toe in the metatarso phalangeal joint, under the little toe in a similar position, under the heel, or Elsewhere in the Sole of the foot. It first begins as a very Small ulcer with slight discharge; it gradually deepens, and has a roughly conical shape, and ultimately it deepens to such an extent that the apex of the cone touches bare bone. The discharge from it is thin and ichorous sometimes. The bone when Encroached upon soon undergoes degenerative changes, becomes carious, and is thrown off in fragments. There is generally much pain associated with it, deep-seated and continuous boring or aching pains. Very frequently the ulcer extends in the interspace between two metatarsals.

In

In this stage the disease may become stationary for a long time: various small ulcers appearing in different parts, the result of injury, and healing very rapidly. Thus, in the hands old cicatrices, thinned whitish and anæsthetic, are always to be seen — probably caused by a burn from a match, or in cooking operations, or by a splinter running in etc.

But in the earlier stages one characteristic symptom does arise, which, although it is classed by the Norwegian physicians as among the "very earliest signs" of Anæsthetic Leprosy, cannot in my opinion be reckoned as diagnostic for quite the same reason as I cannot accept the perforating ulcer as diagnostic. What I refer to is a large solitary bulla, appearing, sometimes spontaneously and sometimes traceable to some accidental injury, on the dorsum of the foot. It varies in size from a sixpenny piece to perhaps a florin or a crown. It develops quite suddenly, enlarges rapidly, is filled with serum at first, which may be reddish and turbid, and may become purulent. This fluid may be absorbed, or the bulla may open discharging it without ulceration, or ulceration may ensue. If ulceration ensues after the pus is let out, the ulcer is quite superficial, with a reddened base, and sides only slightly elevated, but not angry looking or inflammatory, and heals very quickly.

On

On healing there results a stellate cicatrix, very fine and anesthetic, puckered with radii, and glandless. This pemphigus bulla is sometimes looked upon as diagnostic, although in the still earlier stages a number of small bullae is said to occur in various situations.

In the stationary period a patient may remain free from all active manifestation of the disease except for ulcers accidentally present as a result of some injury. He may put on flesh, and be in apparently very fair condition, and may so on in their way for years. But then, after a longer or shorter period, or perhaps without any interval at all the disease progresses. He emaciates rapidly: the anesthetic areas spread and involve larger tracts of sound skin. Then occur the same degenerative changes in other bones, owing to which piece by piece the long bones of the hands and feet come away and are thrown off, and persistent pain is present; and septicaemia, owing to the active absorption of the purulent products soon ends the scene, unless some intercurrent disease steps in to effect a fatal result.

The Nervous System.

Naturally we have to consider the signs presented by the nervous apparatus most clearly, as this is the system principally involved, and most deeply involved. In the earliest stage of the disease there may be

paraesthesiae

paraesthesiæ — variations in the normal sensibility - Generally there is, first of all, a change in the direction of hyperæsthesia. The sensory parts of the cutaneous branches are involved: there may be burning pains in the extremities, along the course of a nerve: there may be pain on pressure of the nerve: "pins and needles" and formication are common derangements, as well as alternations of heat and cold. After this there ensues steadily anæsthesia of the areas supplied by the nerve. This anæsthesia is at first sharply limited to the area of nervous supply — when the radial or ulnar nerve is affected we notice that the areas supplied by these nerves respectively are affected — namely in the former case, the thumb, index, middle & radial side of ring finger: in the latter both surfaces of the ulnar side of the ring finger and both sides of little finger. In other cases the situation of the distribution of anæsthesia as in the back or chest, for example, seems irregular, and does not correspond to the nerve-distribution — but perhaps this may be due to the existence of sensory twigs in the cutaneous branches unknown to anatomists, and demonstrated here by pathological Experiment.

Following these sensory disturbances we come to the next stage, in which the trophic filaments of the nerve become involved, and manifest their implication by a train of characteristic symptoms. Thus there is

wasting

wasting of muscles. Generally we suppose that in a bundle of nerves in which fibres of the three varieties are present, sensory, trophic and motor, that they are involved in the order stated, Even though they be enveloped in one common sheath - Whether the subsequent implication of fibres of different function is merely due to the spread of the neuritis, or is a later manifestation of a simultaneous and contemporaneous affection is not known. At any rate the fact remains that in the sequence of symptoms the sensory disturbances come first, next the trophic, and finally the motor. As I have remarked before, generally the same situations where are present sensory disturbances shew ~~motor~~ trophic disturbances — the thenar and hypo-thenar Eminences disappear, wasting away most notably. Next, there is wasting of the lumbricals and absorption of the fat, whereby the flexor tendons of the hands stand out prominently. Then it later spreads to the muscles of the forearm and upper arm — which all degenerate, waste, and become flaccid and flabby. The affected nerves however stand out prominently, swelled up owing to deposition of embryonic tissue in the nerve sheaths, and can be rolled under the finger quite easily at the elbow and above the wrist. The same course is followed in the lower extremities when the nerves are affected: the affection spreading from the periphery towards the centre. Next

in

in the skin we have Evidence of this trophic disturbance in the presence of glossy shining fingers, when the circulation is obstructed and sluggish and the part is Enlarged. Then again we have the spontaneous formation of pemphigoid bullæ over the dorsum of the foot, and sometimes in the arms. Other skin affections — the perspiring ulcer, the appearance of eczema on the slightest cause, the presence of Herpes, etc, all point to the trophic disturbances. The muscles of the face are sometimes affected — wasting away to a great extent, even simulating paralysis. This is Especially seen in the case of the orbicular muscle of the eye, when owing to this wasting there is Ectropion, and ultimately Even paralysis secondarily. Carter Even mentions that absorption of the nasal bones in some advanced cases is due to implication of the 5th cranial nerve — No doubt it is accessory and adjuvant to the local cause which produces it. Owing to exposure of the eye ball in the Ectropion Keratitis may occur, but Carter says it is rare to see ulceration of the cornea or deep seated inflammation of the globe.

Paralysis may finally supervene — This is due to two causes: it may be due to the atrophy, or it may be initial. When it commences without any apparent cause it affects the facial muscles — those of expression first: and all the symptoms of Bell's paralysis are

are seen superadded sometimes to anæsthesia. Thus, there may be dropping of one cheek and side of mouth – more generally the left – The eye may be dilated widely and the patient in closing it has to turn the ball upwards – He is unable to whistle, to purse his lips etc. I have seen a case in which sudden and rapid Keratitis set in, owing to the irritation allowed by the paralysis.

After the nervous system has been deeply involved the patient adopts a curious gait – he walking he raises his foot very high from the ground, the flexion of the thigh on the pelvis being pronounced. This the typical equine gait. This often seen, and invariably involves both extremities – This is in my opinion so characteristic a sign that when such a gait is observed in a country where leprosy is prevalent it may safely be regarded as diagnostic – Whether this is due to the anæsthesia of the soles giving the patient inadequate knowledge of how he steps, and so causing him to step high for safety's sake; or whether it is due to nerve implication centrally I cannot say. This must be differentiated from the stumbling in the gait caused by mutilation of the feet, and partly from the bones becoming too heavy for the atrophied muscles. But apart from this I have assured there is a certain amount of Ataxia varying in degree and primarily due to

nervous

Anæsthetic Leprosy - Joint affection in left ankle joint well seen. Joint enlarged, there bones became absorbed, there is subluxation and foot is useless. The flexion of the fingers is well seen, as also the wasting of the hand.

nerves origin -

The Reflexes are involved early - the knee-jerk is lost, so is ankle clonus; and other reflexes, except the organic, are lost. The organic reflexes seem never to be involved. On the loss of the knee reflex, in advanced cases it occurs, the gait as I have said becomes typically Equine, and patients have expressed it to me that they have no sensation, their legs are not under their control, they cannot estimate the correct height to which to raise them, and consequently they jerk them out in walking.

Charcot's Disease. I have noticed several cases in which typical instances of this disease have been seen. Eruptive outbreaks preceding implication of both Knees attended with slight swelling of the joint, and considerable pain and tenderness, especially on pressing the patella against the condyles of the Femur. The joint subsequently becomes swollen, disorganised, painless - the ends of the bone become absorbed, and the extremity becomes flail like and useless.

Special sense. The nerves of special sense are markedly involved. The sense of Smell is first perverted and then lost. That of Taste is also lost Early and quickly, so that the patient has absolutely no idea what he may be eating. Sight may be involved

secondarily

Anaesthetic leprosy - the toes are entirely absorbed, & the little & great toe dislocated. The foot is narrowed and useless. The white patch indicates a cicatrix — remains of an ulcer.

Secondarily, owing to the effect of the paralysis of the muscles of the lid. I have never seen a case in which the sight has been involved primarily, i.e. owing to a lesion in the optic tract. In one case of Mixed leprosy in which a tubercle was developing in the sclerotic the patient complained of various subjective sensations, among others, of dimness of vision - In him I discovered anaemia of the disc but no organic change. Hearing is not generally involved - I have never met a case yet.

From all this it would appear that the Central nervous system, the Brain and the Spinal Cord, are not at all - or only to the very slightest Extent - involved in the anaesthetic variety - But Brain & Marrow disease may coexist with leprosy.

Among the clinical notes I have made are those of a condition which simulate Charcots disease. In page 56 I have made a short note which I will now amplify. In the disease as seen in leprosy the joints of the upper extremities are affected - most generally the wrists and sometimes the elbows - The joints of the fingers are affected much less frequently. There occurs a rapid infiltration of serum into the joints, which are swollen, but painless and not reddened. After the lapse of a certain time this organises into a sort of fibrinous pad. But degenerative changes occur in the

the ends of the Radius and ulna, and the carpal bones. The cartilages become absorbed, and distinct grating can be made out, and the hand drops uselessly, and is unable to be moved. Sometimes it is dislocated being drawn up and retained in its abnormal position by the tendons of flexors or supinators. The remarkable point is that the effusion into the joint is not sudden, but is gradual; and the changes take some time to develop. The hand may be dislocated also to the radial or ulnar side, or on to the flexor or extensor surface of the forearm. Sensibility is lost. No pain is felt on moving the roughened ends of the bones on each other. In the elbow we have the same effusion, disorganization, and dislocation of the bones, attended by the painlessness, swelling, and loss of sensation of the skin. This is undoubtedly a trophic change

The loss of pigment in Anæsthetic Leprosy may also be regarded as a trophic lesion, dependent upon altered nerve supply: because most of these tâches especially noticeable in the black skin are of much lighter colour than the surrounding skin though they are so sharply marked out: and on microscopical examination the loss of pigment is most distinctly seen. Now these tâches are not always anæsthetic, nor as the disease progresses do they tend to become so.

In

In some advanced cases than noticed, Especially when there is some paralysis of the muscles of the face, such as the orbicularis of the eye, a tremulousness, a fibrikary twitching of the muscles around the mouth or around the eye, often than the affected ones.

Then the disease after a long stationary period makes some progress at last: and generally some intercurrent disease sets in to end the life of the patient. This is a subject which will be considered later on.

Anaesthetic Leprosy (with tâches).

This subvariety may in all practical purposes be considered the same as the subvariety I have just described at length, and most frequently it coexists with it. In point of fact in the vast majority of the cases we have tâches implanted on the purely anaesthetic variety. The tâches are of very varying size, perhaps from the size of a pea to patches larger than one's fist, and even attaining the size of the back of an adult, occupying the whole of the back. The tâches are generally paler than the surrounding skin, and palest in the centre. They are irregularly circular in shape; Edges may be wavy and raised above the level of the skin, and sometimes sunk. Anaesthesia is greatest at the centre of the patch and diminishes towards the circumference. They appear

most

most frequently on the trunk ; then on the upper limbs and face : the buttocks : and least frequently on the lower limbs. The other features of the subvariety need not be gone into - they are the same as in the pure anaesthetic, and in the illustrative cases certain characteristic points will be brought out.

Case V. Anaesthetic Leprosy. No tâches : no deformity of fingers. Evidence of Syphilis coexistent.

Chowdan. male. aged 63. Born in India.

History - Started with a pemphigoid bleb on external surface of left forearm - This broke, discharging matter. Then later came on small blebs and small vesicles. One large one appeared about the outer surface of left upper arm. Large open ulcers came out on shins, along their whole length - This was followed by anaesthesia

Present condition :- Anaesthesia in both forearms and hands = but in upper part of forearm and upper part of upper arm sensibility normal. Anaesthesia to a slight degree in upper part of back. In legs very slight anaesthesia in some parts through Sherrington sensation is normal. White cicatrices along both shins and on knees - Irregular nodular swellings, hard and bony and painless along both shins - strongly suggestive of Syphilis though patient denies it - Slight anaesthesia of face.

Sensation

Sensation in fingers normal. No change in their shape. Nails quite intact. Sensibility in feet quite normal.

This case illustrates a slight degree of the disease, but how much the leprosy may be mixed up with Syphilis is difficult to say. The nodes on the shins are highly characteristic of Syphilis.

Case VI Lepra Anaesthetica: General diminution of sensibility with complete anaesthesia of hands and feet.

Gungaram. Male, aged 62. Admitted 6.viij.91 A decrepit, worn out old Coolie, who gives a very contradictory account of himself. Says he contracted the disease only four years ago: before that he had an ulcer on the left leg which was intractable, and the leg had to be amputated below the knee. The ulcer was caused by some weeds cutting the leg in the high woods. Spots first appeared on the body, and then anaesthesia on fingers. Both family history and personal history cannot be satisfactorily made out.

This case is remarkable for the diminution of sensibility which exists over the whole body, in addition to more pronounced anaesthesia

anæsthesia, localised. Over the face he knows when he is touched, also over the head, but feels no pain when a pin is stuck into him. The left ear is completely anæsthetic, but not the Right. Over the body are one or two large discoloured tâches, only slightly lighter than the surrounding skin. The sensibility is diminished. Arms down to a little above the wrists are much wasted and shew diminished sensation. He feels a pin which is inserted to the depth of an inch, but has no pain: in his hands when the pin is run through he has no sensation. The hands are typical. The wasting of the muscles, spatulate like condition of the palm, flexure of fingers, & anæsthesia complete the picture. Only the skin is smooth, there is no ulceration & no cicatrices; nails are intact except that of the left thumb & middle finger. In lower extremity a similar condition exists on both sides — the diminution of sensibility above, and absolute loss of it in the leg and foot. Muscles in front of Right leg are much wasted, and the skin is covered by large squares of detachable epithelium like ichthyosis: this is also to be seen on the outside of both arms, and around the

armpits

occipito. Eyes are both bad. Vision lost.

Right Eye - Pannus in lower part (half) of Cornea: upper part of Cornea hazy and ground glass. Vascular injection. Much lachrymation.

Left Eye - Cornea also ground glass: but a large reddish, mulberry like mass in lower part, reddened and looking like granulation tissue. Pain in both Eyes.

The left eye came on before the other: no history of a blow. A long interval elapsed before the right was affected. They seem to be the result of inflammation and irritation owing to paralysis of the orbicularis, which however has now passed away.

The interesting points are (1) that it is only of four years duration and its mode and general spread is remarkable: (2) the difficulty of making out what relation, if any, the ulcer of leg had to the disease, (3) the condition of the eyes.

Further illustrative cases will give at the end of this Thesis.

Mixed Leprosy.

I think we may safely say that no case of Mixed leprosy ever arises as such at initio. Either Anæsthesia sets in where the tuberculation is already

Existent

existent; or tuberculation is superadded to the anæsthetic variety. We must be careful however not to mix up with the true Mixed leprosy those cases of Tuberculated leprosy where show some anæsthesia over the tubercles, in which the anæsthesia is due to the implication of the peripheral nerves in the new growth. The period which elapses before the one form is superadded to the other is variable - in some cases the mixed variety is developed about a year after the onset of the one variety, in others at a much later period. When the anæsthesia is superadded to the tuberculated variety its characteristic onset is by a feeling of numbness in the little finger generally - as one patient expressed it, "it does not feel natural to him." This anæsthesia spreads gradually to the other fingers: very seldom do the tâches develop; but the fingers become swollen and glistening and glossy, with an oily appearance of the skin, and the nails partake of the general changes due to the loss of trophic influence.

Hillis says "Cases of the mixed form have a closer affinity to chronic syphilis than any disease I am acquainted with. In the mixed form destruction of the cartilages of the nose takes place, the cartilaginous septum entirely destroyed, and the nose appears flattened. The velum has also been destroyed by ulceration thus increasing the resemblance to chronic syphilis."

The mixed variety is a connecting link between

the

the two forms of leprosy - The development of cutaneous tubercles in a case of pure anæsthetic Leprosy is seldomer seen than the converse condition. Recent dissections by Gerlach (Untersuchungen über die Unabhängigkeit der Bildung anästhetischen Hautflecke von der Erkrankung zugehörigen Nerven bei der lepra anästhetica - Dorpat - 1890) shew that in Anæsthetic Leprosy the primary growths take place in the skin around the peripheral ends of the nerves, extending afterwards up the branches to the main trunks. These observations, if confirmed, will bring the two forms of leprosy much closer together, for the mode of onset will then become the same in both. A possible explanation of the more frequent transition of a tuberculated than of an anæsthetic into a mixed case is also afforded by Gerlach's researches. In Tuberculated Leprosy large tracts of skin are infiltrated with new growth containing quantities of bacilli, whereas in Anæsthetic leprosy the new growth occurs in limited areas around the peripheral nerve endings, and soon travels up the ~~skin~~ nerves, leaving the skin practically free from bacilli, for it is well known that these are never found, or only seldom, in the skin in advanced cases of Anæsthetic leprosy. Now it is obvious that the risk which the nerves passing through the infiltrated areas in tuberculated ~~leprosy~~ run of becoming secondarily involved by extension from these areas is much greater than the risk which is incurred in anæsthetic

leprosy

leprosy, of the skin becoming infiltrated by a growth which, after the first onset, is practically confined to the nerves. Meanwhile it may be accepted as a fairly accurate statement that cases of tuberculated leprosy are those which have not lived long enough to become mixed.

I merely note the following <u>case as one illustrating the implantation of Anaesthesia in Tuberculated Leprosy: a typical Case of the mixed variety</u>

Case <u>VII</u>. Fred Taylor. 21. M. born in Barbados.

History:— 11 or 12 years — Cause unknown. No family taint. It came on with a stain on back of left-hand, about size of a florin; yellow: irregularly circular. The hand felt heavy. Another spot came on outside of left leg, much larger but of the same colour. A third spot appeared on the outside of Right leg with the same characteristics. And the last came out on Right shoulder. There was no anaesthesia in any of them. But a short interval elapsed between the appearance of each: and they remained for a little time. Then when them appeared on inside of R. leg. Hands and feet swelled. Small isolated tubercles now appeared on face, back of legs and ears — 3 years ago. At the beginning of this year, he noticed anaesthesia of left little finger, complete

on

on dorsum except over terminal phalanx and progressive over the rest of the same finger. This "does not feel natural" to him like the others. Sets occasional attacks of leprotic fever -

Points of interest are :— (1) The early manifestation by three tâches which were not anæsthetic. (2) the definite account of the sequence of the tâches: (3) the appearance of tubercles a year after: (4) the onset of anæsthesia, three years after, in its favourite site: (5) the attacks of leprotic fever.

Unity of the Disease.

Most of those who have made a study of leprosy agree in considering the different varieties as manifestation of one disease only — a disease the cause of which — the bacillus leprae — attacks in one form the dermal or integumentary system, in the other the nervous. Some authorities indeed so far as to maintain that the different phases of the eruption, tubercles and numbness are simply so many stages of the same complaint. But whether this can correctly be so regarded is uncertain, because I have seen cases purely tuberculated, or purely nervous begin and persist as such till the end. Many of those cases where anæsthesia is superadded to the tuberculated variety are not quite the

same

same in their pathological aspects as these cases of pure anæsthetic leprosy. Also, very seldom one form of the disease may pass into the other — may change into the other, leaving only a trace of the first or primal variety: the most frequent change is the tuberculated variety into the anæsthetic, the reverse is not so common. It is to be noted that the same external agencies operate to produce in one person the tuberculated, in another the anæsthetic variety: that parents attacked with one variety may beget children attacked with the other, and that the grandchildren may be attacked with the same variety as the grandparents. The one variety is not a development of the other, but both are quite distinct and independent morbid forms, which have a separate course, and tend to the premature death of the subject attacked

Change of Character of the Disease.

I have mentioned above that though for all practical purposes the different varieties may be looked upon as distinct, a change may sometimes, though not frequently, take place, whereby the character may be altogether altered. The most frequent is the change from the tuberculated into the anæsthetic variety — the reverse change only seldom takes place — and indeed I have never seen a case of it myself.

The

tubercles may persist for some time : febrile disturbance then set in accompanied by much constitutional de-rangement, and excessive sensibility of the limbs. The tubercles gradually subside, leaving the hyperæsthesia which gradually ceases and passes into a condition of anæsthesia - And finally we find the cicatrices marking the site of the absorbed tubercles, and anæsthesia well and characteristically developed. The change from the Anæsthetic variety to the Tuberculated also occurs early in the history of that variety, and is ushered in by febrile symptoms and general constitutional disturbances, followed by an outbreak of tubercles which, when they become established, soon become added to and predominate, while in the meantime the anæsthetic areas have tubercles implanted on them

Case VIII. To illustrate the change of character which may occur - From Tuberculated to Anæsthetic

Sarah Jane Lewis - F. aged 45. Born in Tobago.

Cause unknown - Family history practically unknown.

Note of Condition on admission - 15th July 1886.

Slight thickening over eye brows, of alæ of nose, large flat masses of tubercle over cheeks, lobes of ears thickened - Sensation over arms and hands and fingers normal - slight thickening on 4th left finger due to a burn - Skin over both legs

legs is normal as regards sensation, but 2nd right toe is anæsthetic.

Her condition on examination by me in July 1891 is as follows — (there seems to have been nothing of importance recorded in the interval).

Face — Skin coarse and dark except where large patches of discolouration are present, on left side of face, and on right side passing down to neck.

Arms — Large patches running down its length.

Fingers — Left little and ring anæsthetic & shiny. Nails normal. Tâches present. R. forefinger numb.

Legs — Large patches of anæsthesia

Right Foot — bones are affected: some have dropped off.

The hair is growing luxuriantly.

The patches mentioned above are light brown or creamy, sharply defined from surrounding skin, irregular in shape, anæsthetic — Other parts seem to retain sensibility — Has subjective feeling in the patches, as if they were itching, or the skin over them were pulled up.

The interesting points to be noticed are — (1) the complete disappearance of the tubercles: (2) the occurrence of tâches, and (3) the occurrence of anæsthesia

Diagnosis of the Disease.

Tuberculated Variety

In places where leprosy is not prevalent and is practically unknown to practitioners we can easily understand how the very Early stages may be mistaken for Lupus; for Acne, where there are isolated nodules rapidly growing; for Molluscum fibrosum on account of the large isolated nodules; for Sclerodermia where we have thickenings of the skin; and lastly for Elephantiasis (arabum) because of the tumefaction of the foot and leg. From Syphilis in its early stage it has to be carefully distinguished for there are many points of resemblance — the eruptive fever, the nature of the eruption, bright red (in the white skin) changing to dull red or brownish grey tint: Syphilitic macula commonly resemble local prominences or papillary swelling. The permanent leper spot acquires with age a far deeper brown or yellow tint than a syphilitic spot of that age would present. The leper spots come mostly on the face, the syphilitic patches on trunk. The hair of the scalp is unaffected in Early Stages of leprosy: Lastly Syphilitic Erythems of the mucous membranes and of genitals are wanting in leprosy. The manner in which the face becomes affected is peculiar: Eyebrow (inner side), ala of nose, forehead and cheek and lip

of ear are first affected. Loss of cilia on brow or lid give to the eye a distinctive aspect: the smooth and oily character of the leprous skin thickening, with its reddish tint. In tubercular syphilis the hair does not fall off nor is sensation lost. Although in both exalted sensibility may be present at first, in leprosy loss of feeling may follow and there is thickening of nose, ears and face. When the bones and soft structures of the nose have been destroyed it resembles syphilis. The tubercles of leprosa exist for a very long time, seldom become openly disorganised, and if softening does occur it is of all the tubercles at the same time.

When the disease is developed the picture presented by it cannot be mistaken. The occurrence of the tubercles: the characteristic leonine face – heavy dull expression, skin of face thickened and having in folds, deep wrinkles; eye sometimes closed almost by the deposit of tubercles in the upper lids causing swelling; ears pendulous with deposit of tubercle; mouth contracted by cicatrices making speech indistinct; voice affected, rauceus and hoarse; the affection of the fingers, which are conical and tapering and glossy: large flat deposits of tubercle on forearms and legs; and general enlargement of the lymphatic glands.

Anæsthetic

Anaesthetic Leprosy.

In this, the early nerve symptoms should put us on our guard in countries where the disease is prevalent. - The premonitory subjective sensations, pain and tingling along the course of some nerve running along the forearm or the leg: and later on the confinement of these signs to fingers or toes - Then we have as an early sign the development of the pemphigoid bulla, solitary, on an anaesthetic base: Gradual onset of anaesthesia, and ulcers and sores developing. Sometimes the ecrime gait first calls attention to the presence of the disease, sometimes the perforating ulcer. In the earlier stages the tache or macule may cause some difficulty. It is most commonly confounded with Leucoderma, in which however there is no suspicion of anaesthesia: and in Trinidad with a variety of leucoderma called "Lota" consisting of small circular white or light coloured patches about the size of a threepenny piece appearing most usually on the face, and sometimes on the trunk — here too there is no anaesthesia. A scaly condition of the skin suggests Pityriasis versicolor, but other signs coexist to prevent difficulty in diagnosis. Polymorphous Erythema may sometimes in lighter coloured skins be confounded with it — but in

in leprosy the spots are more persistent and there is the diminution of sensibility - from Psoriasis the principal distinction is the anaesthesia - the scales are much thinner - The contraction and paralysis due to lead poisoning need - it is reported by some authorities - to be distinguished from Leprosy : but the history and progress of the case will cause no difficulty. Arthritic deformans in the later stages may have to be differentiated, the coexistent symptoms will easily enable us to do so. In the early stages of this variety, local peripheral paralysis of sensation due to peripheral neuritis may be confounded with it : here also the history and progress of the case will enable us to come to a conclusion. Finally, diseases of the brain and Spinal Marrow may simulate leprosy : such as Locomotor Ataxy -

A fully developed case of Lepra anaesthetica is most characteristic and admits of no difficulty in diagnosis. The patient is generally of spare habit and emaciated - the presents general shrinking of the muscles of the body. Paralysis of one side of the face may exist, together with Ectropion and Lachrymation - There may be large irregular tâches over the back, neck, chest, and on arms, which are generally anaesthetic - Patient has a characteristic deformity

of

of the fingers, many of which may be lost, and wasting of the hands. The gait is also marked – he picks his way carefully, raises his foot high and places it deliberately on the ground. The foot is also deformed, narrowed and shortened, and there are cicatrices and open ulcers to be seen. The main-en-griffe when it exists is also most characteristic

Age of Onset.

I have prepared a table based on the examination of one hundred and fifty three cases, chosen at random, shewing the age in quinquennial periods at which the different varieties of the disease begin.

Table to shew in Quinquennial Periods the age of Onset of Leprosy (in years).

Variety	1–5	6–10	11–15	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75
Tuberculated	2	10	7	3	1	–	2	2	4	1	1	2	–	–	–
Anaesthetic	–	5	3	8	5	6	10	17	10	13	4	6	1	1	1
Mixed	–	8	6	4	1	3	1	2	1	1	1	–	–	–	–
Total	2	23	16	15	7	9	13	21	15	15	6	8	1	1	1

Total Number examined —

Tuberculated	35	153
Anaesthetic	90	
Mixed	28	

The average age at attack, calculated on another series of cases is as follows: —

Tuberculated	— Males	21½	Females	21½
Anaesthetic	— "	25½	"	35½
Mixed	— "	23½	"	27
Giving a Mean average of	"	23½	"	28.

It will thus be seen that cases of Anaesthetic Leprosy begin later than those of the Tuberculated variety and that the mixed variety occupies an intermediate position. This can be understood when we reflect on the systems principally affected in the varieties. The greatest number of anaesthetic cases appears between the ages of 31 and 50: and the tuberculated between the ages of 6 and 20. There is an apparent discrepancy between the tables — the first was compiled from the more recent admissions, the second from the earlier records. I have had cases under my care of Tuberculated Leprosy in Children under five years of age, and also under the age of ten. Tuberculated Leprosy is essentially a disease of early life: Anaesthetic of later life. I have however seen cases of the latter occurring in children between the ages of five and ten. When the disease, in any of its varieties, commences early it greatly checks the growth of the body, and may run a very rapid course.

Relative Frequency.

The number of patients suffering from the Anæsthetic form of Leprosy is greater in Trinidad than those suffering from the Tuberculated form. From an examination of patients in the Leper Asylum I give the following figures,

Tuberculated	36	per cent.
Anæsthetic	44	" "
Mixed	20	" "

This contrasts with other countries where Leprosy is prevalent :—

	Demerara (Hillis)	India (Carter)	Norway (Danielssen)
Tuberculated	21.	9·1.	51·6
Anæsthetic —	62	69·4	33·3
Mixed ——	17	21·5	15·1

Trinidad occupies an intermediate position between Demerara and Norway in respect to the number of cases of Anæsthetic Leprosy. In India they seem to attain a maximum percentage. The percentage is high in this island owing, as I shall point out later, to the large number of East-Indian immigrants who contract that form and are admitted into the Asylum.

Influence of Sex.

I have prepared a table from the admissions into the Asylum during the past seven years to shew clearly

the relative affection of the Sexes in each variety of the disease, and also the age on admission in decennial periods of these cases.

Table to shew the Relative Affection of the Sexes; and Ages on Admission.

Years in Decennial Periods	Tuberculated		Anæsthetic		Mixed	
	M	F	M	F	M	F
5 to 10	13	5	6	5	2	2
11 to 20	24	18	8	7	3	6
21 to 30	6	14	9	9	8	2
31 to 40	5	7	23	10	5	2
41 to 50	8	6	49	8	7	1
51 to 60	3	2	30	8	4	0
61 to 70	0	0	6	0	0	1
71 to 80	"	"	"	"	"	"
Total	59	52	131	47	29	14

	M	F
Tuberculated	59	52
Anæsthetic	131	47
Mixed	29	14
Total cases	219	113
Grand Total	332.	

From this it will be seen that in the Tuberculated variety in Trinidad the Sexes are affected in almost equal proportion: that in the Anæsthetic Males are

affected

affected predominantly, in the proportion almost of three to one: while in the Mixed Males are affected in the proportion of two to one.

In this table also is clearly seen the following facts: — that the vast majority of tuberculated males are admitted from the 5th to 20th year, of females from the 11th to 30th year. This contrasts markedly with the admission of the Anaesthetic cases, the majority of males being admitted between their 31th and 60th year, and the proportion of females remaining fairly constant during the decennial periods. In Mixed leprosy the admission of males is fairly constant in the decennial periods 21 - 30, 31 - 40, 41 - 50.: the number of females admitted is highest between 11 - 20 years.

Table to shew the Average Duration of the Disease on Admission (in years).

Variety of Disease	Average Duration M	Average Duration F	Average Duration T	Number examined M	Number examined F	Number examined T
Tuberculated	3½	2½	3	65	25	90
Anaesthetic	5½	6½	6	83	28	111
Mixed.	4½	6	5¼	38	13	51

Mean average Males 4½. Females 5.

Table of Averages (calculated on Asylum records) - shewing Ages at Attack : Admission to Asylum : and Death : & Total Duration of Disease.

	Tuberculated			Anæsthetic			Mixed			Mean Average		
	M	F	T	M	F	T	M	F	T	M	F	T
Average Age at Attack	21½	21½	21½	25½	35½	30½	23½	27	25¼	23½	28	25¾
Average Duration on Admission	3½	2½	3	5½	6½	6	4½	6	5¼	4½	5	4¾
Average Age on Admission	25	24	24½	31	42	36½	28	33	30½	28	33	30½
Average Stay in Asylum	4	3	3½	5	3	4	4	4	4	4⅓	3⅓	4
Av'ge Age at Death.	29	27	28	36	45	40½	32	37	34½	32⅓	36⅓	34⅓
Average Total Duration of Disease	7½	5½	6½	10½	9½	10	8½	10	9¾	9	8⅓	8½

From this table we see at a glance the average duration of each variety of the disease: the anæsthetic variety lasting the longest time — an average duration of ten years; and those suffering from the tuberculated variety succumbing soonest — in about six and a half years, the mixed variety here as elsewhere occupying an intermediate position. As compared with the disease as it exists in the neighbouring Colony of Demerara we find that the Tuberculated and Anæsthetic varieties run a much more rapid course, and the Mixed a longer course. The average duration of the disease in Demerara is: —

Tuberculated . 8.5
Anæsthetic 15. } years.
Mixed 6.

Table to shew Age at Death in Trinidad Asylum (during 18 years, 1868 - 1885).

Age	Number			Percentage		
	M	F	Total	M	F	Total
- 10	3	-	3	1·24	·00	·92
11 - 20	45	17	62	18·54	20·73	19·19
21 - 30	49	18	67	20·33	21·95	20·74
31 - 40	57	16	73	23·65	19·51	22·60
41 - 50	59	10	69	24·48	12·19	21·36
51 - 60	21	15	36	8·71	18·29	11·14
61 - 70	7	3	10	2·87	3·65	3·09
71 - 80	-	3	3	·00	3·65	·92
~~Total~~	241	82	323			

By this table we see that the greatest number of deaths occurs between the ages of 21 and 50, that is to say in, adult life.

Influence of Race.

The Liability of Different Races to the Disease.

Composed, as the population of Trinidad is, of a large collection of different nationalities it is interesting to note the proportion in which each contributes to the leper population - I append a statistical table analysing the birthplaces of those admitted during

Eighteen

Eighteen years into the Leper Asylum, together with per-centages calculated on the total admissions during that time. From this it will be seen that the largest percentage of the leper population is made up of natives of Trinidad viz, 43·55 per cent: while natives of India, who come out here as indentured labourers to the plantations also form a large percentage, namely 38·28. These two constitute together 81·83 per cent of the total admissions — while those from other countries are comparatively unimportant, except perhaps the 8·22 per cent of pure blooded Africans admitted, and the 6·72 per cent of natives of other West Indian islands. The other nationalities contribute so little to the total that they may be disregarded. The East Indian immigrants contribute the most reliable Race percentage, being a homogeneous race. According to the Census returns they form 30% of the total population of Trinidad. The natives of Trinidad comprising the percentage are made up of various Elements — as have Creoles of English, Scotch, Irish, Spanish and French extraction: Creoles, Coloures, Cookie & black. We cannot arrive at, or deduce, any trustworthy conclusions as to the proportion in which the various Sections of Creoles are affected. We can only state that people born in, and residing in, the island, are most susceptible to the disease, and contract it more readily than those races

which

Which, though living in the island are not born in it.

Table to shew Birthplaces of patients admitted into the Asylum during 18 years (1868-1885).

Birthplace	Number Admitted	Percentage.
Trinidad	297	43·55
India (East Indies)	261	38·28
Africa	56	8·22
West Indian Islands:		6·72
Barbados	12	
St Vincent	6	
St Kitts	5	
Martinique	4	
Antigua	3	
Dominica	3	
Grenada	3	
Montserrat	2	
Tobago	2	
Guadeloupe	1	
Jamaica	1	
Nevis	1.	
Demerara	3	
Margarita	1	
Venezuela	4	·74
China	10	1·46
Madeira	3	·45
France	2	·28
Cape Verde	1	·15
Germany	1	·15
Total	682	100·00.

Map OF TRINIDAD.

Longitude from the Meridian of Port of Spain 61° 30 36" W of Greenwich.

Scale 1 Inch to 4 Miles

APRIL, 1883.

JME.

CARIBBEAN SEA

ATLANTIC OCEAN

GULF OF PARIA

SERPENT'S MOUTH

BOCA GRANDE

MAIN LAND

Punta d'Hierro
Palmar Point
Megillones Point
Punta de la Pena
Celeste Bay
Celeste Point
Los Frayles
Curiquita Bay
Point Morocos
Goose Id.

Boca De Navios
Boca Huevos
Boca Monos
Huevos
Monos
Chacachacare
Gaspar Grande
Point Gourde
Diego Islands
Five Islands

Macaripe Bay
Saut d'Eau Id.
Maracas Bay
Las Cuevas
Point Fillette
R. Varry
Blanchisseuse
Mary Ann R.
Pt Parra
R. Madamas
Pt Grand Matelot
Sharks R.
Rio Grande
Grande River
Pt Sans Souci
R. Sans Souci
Toco Bay
Pt Rocks Pt
Pt Galera
Pt Foresta
Gimmana Bay
R. Guimana
Pt Playas
Pt Balandra
Balandra Bay
Saline Bay
Matura Pt
Matura Bay

ST GEORGE
CHAGUANAS
CARENAGE
DIEGO MARTIN
SANTA CRUZ
MARAVAL
St ANNS
CAURA
ARIMA
NARANJO
GUANAPO
CERRO OF ARIPO
CERRO OF OROPOUCHE
ST DAVID
BALANDRA
MATURA
TUREE
River Guanapo
River Caura
River Arima
River Turuba
River Oropuche
River Guaico
River Matura
VALENCIA
TURURE
OROPUCHE
Oropuche
PORT OF SPAIN
ST JOHNS
ST JOSEPH
TACARIGUA
Caroni
Arima
Arouca
Guanapo River
Mamo River
Aripo Savanna
Aripo
Sangre Grande R.
Sangre Grande Road R.
Pt Paloma
Point Noir
Point Manzanilla
R. L'Ebranche
MANZANILLA
MOUNT CALABISH
MANZANILLA BEACH
Manzanilla Bay
CARONI
SAVANNA
Blue R.
Pt Aripo
R. Chaguanas
Pt Chaguanas
CHAGUANAS
Caparo River
CARAPICHAIMA
COUVA
R. Couva
Couva River
Pt Casenjal
Pt Cangrejos
SAVONETTA
Savonetta River
Pt Savonetta
Pt Lisas
LA PIERRE
Point-à-Pierre
Springs of Petroleum
Guapo River
Guaracaro
Guaracaro R.
Guapo R.
VICTORIA
CIPERO
SAVANA GRANDE
MONKEY TOWN
NAPARIMA HILL
NAPARIMA
San Fernando
R. Cipero
Asphaltum & Asphaltic Oil
DUNMORE HILL
NARIVA
SWAMP
Ecrivat Salee
Cocos
Point Mayaro
MAYARO
TRACE
Ortoire River
Ampa River
Guayaguayare River
Mayaro Bay
Salee Lagoon Beau
Guayaguayare Bay
Pt Galeota
Pt Gran Calle
Pt Tablas
Pt Canary
Pt Casa Cruz
Pt Alcatras
Pt Moruga
Asphaltic Zones
Moruga R.
Rock R.
Guapo Bay
Point Guapo
Point La Brea
Point d'Or
Submarine Spring of Petroleum
Asphaltum & Asphaltic Oil
Liquid Asphaltum
LA BREA
OROPUCHE LAGOON
Oropuche R.
Point Rouge
Point Cedros
Cedros Bay
Los Gallos
Point Galfat
Point Icacos
Irois Bay
Irois R.
IROIS
ERIN
ERIN LAGOON
Point Islote
Erin Bay
Erin R.
Point Erin
Pt Taparo
Pt Chagonary
Pt Rosa
Pt Siparia
Pt Negro
Pt Curao
Pt Luna
SIPARIA
TRICK
MORUGA
THREE SISTERS

The Prevalence of Leprosy in Trinidad.

The question as to the increase of Leprosy in Trinidad is interesting and merits more than a passing notice, especially as the subject of its absolute increase in the different countries of the British Empire has been so recently a question of discussion. There has been only three official enumerations of lepers since the island was ceded to the English - In 1813 when the question of establishing a leper Asylum was considered, an official enquiry was made and the number of lepers was found to be 73. In 1815 another official enquiry was made and the number found to be 77. The next official enquiry was in 1890 and as complete a return was made as was possible; the District Medical Officers and Wardens of Districts being ordered by the Government to help in the enumeration. There were found to be 414 lepers. Calculating percentages we find that in 1815 lepers formed ·242 per cent of the population, in 1891 they formed ·206 per cent. I append a table shewing the number of lepers and the parts of the island where they are resident. This would seem to be as accurate an estimate as we can possibly have. The conclusion we would draw is that Leprosy has not increased in this island in proportion with the population, in spite of the increase of population by immigration from the East Indies.

Table to shew the distribution of Leprosy in Trinidad : a Leper Census. (1891).

Name of Place	Male	Female	Total
Leper Asylum	166	44	210
Diego Martin	13	18	31
Port of Spain	13	8	21
Laventille	11	3	14
San Fernando	5	7	12
Tacarigua	9	3	12
Naparima	8	2	10
Indian Walk	3	4	7
Arima	5	2	7
Savanna Grande	1	4	5
Chaguanas	4	1	5
Couva	5	0	5
Cedros	2	2	4
Oropuche	1	0	1
Guaracara	1	0	1
Mayaro	1	0	1
Gran Couva	1	0	1
Erin	1	0	1
Toco	0	1	1
	250	99	349

Table shewing Residence of Patients admitted into the Asylum during twenty five years (1869-93)

Locality	Nos	Locality	Nos
Port-of-Spain	367	Carried up.	890
Naparima	66	Santa Cruz.	3
Tacarigua	60	La Brea	4
Mucurapo	69	Maraccas	2
St Joseph	31	Mayaro.	1
San Fernando	39	Blanchisseuse	1
Couva	35	Carapichaima	3
Arima	28	Cumupia	7
Diego Martin	23	Princes Town	1
Belmont	24	San Juan	1
Laventille	20	Tunapuna	8
Cedros	18	Williamsville	1
Branca	15	Chaca chacare	2
Carenage	11	Oropouche	4
Chaguanas	20	Clayton's Bay	2
St Ann's	9	Caura	1
Savanna Grande	14	Cocorite	1
Aricagua	3	Toco	2
Cimaronero	3	Turure	1
Maraval	6	Vagrants	12
Savonetta	9		
Caroni	6		
Chaguaramas	2		
Montserrat	6		
Pointe-a-Pierre	6		
	890	Total	947

From this Table it will be seen that there is no district, town or village, which is practically free from the disease. As a rule patients do not seek admission on the onset of the disease but only when it is advanced, so that they reside for some length of time in the place, and it may I think be assumed that the disease is developed, if not contracted there. There is an obvious fallacy in such a deduction, but in a small island like this it loses its force. Analysing the figures, the large number of admissions from Port-of-Spain, the capital of the island, is apparent; whereas the number admitted from the other towns, viz San Fernando, Arima and Couva, is much smaller, while from the healthiest town in the island, Princes Town, there has been only one. The reason of the large number from Port of Spain is probably because of its large population, about 35,000, and because, being the Capital, sick people and paupers migrate there in the hope of support in some of the Charitable institutions. Assuming that the disease is contracted in the locality I do not think that the geological formation has any causal relation to it. The island is too small to draw general conclusions of that nature, and the geological formation of the different localities named does not differ in any great respect or degree. And judging the figures and comparing them with the population in each place, we find, stated briefly

briefly, that the number of lepers is in proportion to the density of the population — except in Prince Town.

Terminations of Leprosy.

The different varieties may terminate in three ways — namely (a) Resolution; (b) Subsidence; (c) Death.

(a) Resolution —

This is the rarest termination of the disease. When the skin affection subsides, and no, or only an inconsiderable degree of anæsthesia, is developed we may consider the patient cured. Sometimes a little anæsthesia appears very early, afterwards wholly or partly vanishing, with the subsidence of a skin eruption: this however cannot be regarded as wholly or partly cured. When the disease exists up to such a stage that new leprous material is no longer produced, and the signs gradually disappear, so that on careful examination there is no trace of leprosy remaining, we may assume it to be spontaneously cured: this in the same sense as Phthisis Pulmonalis may be cured or arrested. Only those cases in which there is a very mild eruption of tubercles have any prospect of healing thus; where a copious eruption exists, or where there occur frequent crops of copious eruptions the prognosis is bad. Sometimes spontaneous healing may occur when

acute

acute softening of the tubercles takes place leaving ulcers by which a means of elimination is provided.

(b) Subsidence.

This mode of termination is frequently seen, and occurs in all three varieties but more especially the anæsthetic.

(α) In Tuberculated Leprosy — After the disease has lasted a certain length of time, either by spontaneous ~~absorption~~ absorption or ulceration, which may or may not follow disease of an internal viscera or some acute constitutional disease, the tubercles disappear leaving the skin cicatrized and puckered up. On examination of the affected areas no nodulation can be felt beneath the skin or the cicatrix — it is quite smooth, supple, of normal temperature, & may be lifted up from the underlying tissues

(β) In Anæsthetic variety — When the disease subsides after a certain length of time the signs and symptoms have been so pronounced that a certain amount of mutilation of the hands and feet will be left, together with a degree of anæsthesia which is non-progressive. The patient picks up in bodily condition & no fresh signs develop.

(γ) In Mixed — Least frequently do we see subsidence in this variety: generally the skin & the nerve affection is progressive, even though one of them may tend

to

to subside.

Case IX To illustrate condition after Spontaneous Subsidence of Tubercles.

Lydia Henry. F. 22. M in Asylum 12 years: One brother has Anæsthetic Leprosy.

She had tubercles of large size over face, but about 7 years ago they all ulcerated spontaneously. Now the whole face is a mass of cicatricial tissue, in some places drawn up and almost contracted, but there is no nodular or shot-like feeling underneath. She suffers no pain. Cicatrices are tense and shiny. They are also present on extensor surface of forearm.

Patient was the subject of Tuberculated Leprosy.

Case X Anæsthetic Leprosy: illustrating stationary stage occurring shortly after onset.

Chaman. M. 52. Born in India. Contracted disease about 5 years previous to examination. No family history. No cause assigned.

Patient of average build. Is anæmic.
Face, Neck & no anæsthesia. Trunk — large light coloured patches over Right Shoulder and Breast and Collar bone: over Left Collar bone: about Epigastrium: both loins: between shoulder-blades and back of shoulder joints. Arms — these patches over

Shoulders

Shoulders extend some arms, over Triceps.

Patches — are of irregular shape and size: some as large as a walnut, others size of palm of hand. Sharply defined but sinuously outlined & indented and are not anæsthetic.

Anæsthesia — generally present in both hands, Except in small patches in palm, extending up two inches above wrist. Also in front of legs and in feet, except the dorsum. For the most part anæsthesia is superficial for when a needle is plunged deeply in tissues he feels it, except in one or two places where it is absolute.

Hands: Right — wasting generally, more especially of ulnar edge and muscles of thumb. At the first phalanges can be extended normally. 2nd phalanx flexed. Third phalanx — of little finger normal; of ring, hyper-extended; of middle, absorbed; of index, absorbed.

Left — wasting not so marked, slighter in ulnar edge and thumb muscles. Second phalanx — of ring, flexed; of little, flexed. Third phalanx — of index, absorbed; of middle, absorbed (old cicatrice under tip conical); of ring, absorbed; of little, anchylosed.

Nails are all present: some in normal condition, others shrivelled up, clubbed, or transposed to upper phalanx — A healing ulcer on middle finger.

Ulnar

Ulnar nerve enlarged. Femoral glands enlarged. Skin over buttocks roughened (? Psoriasis). Perspire freely. Gait characteristically equine.

Noteworthy points — The disease is stationary. There is no evidence of recent exacerbation. Anaesthesia not extensive, only in hands and feet. Patches are more leucodermic in nature, not anaesthetic. Is onset by anaesthesia followed by contraction of fingers.

(c) Death.

The very large majority of cases of Leprosy end in Death. On reference to the Table on p the average duration of the disease in each of its varieties will be seen: individual cases however may last much longer — there are case in the Asylum now, an Anaesthetic leper, in whom the disease has been arrested, has been an inmate for 20 years. When the disease is extensive death in all probability occurs much earlier in the course of it. Death seldom ensues from Leprosy pure and simple, except we include Exhaustion from the disease and Gangrene, but some intercurrent affection usually brings about death. It would seem as if the material peccans in tuberculated Leprosy, Evidenced by extensive crops of eruption of tubercles, becoming absorbed causes greater debility Exhaustion and thus brings about an earlier death.

The Etiology of Leprosy.

A disease which has existed almost from prehistoric times, there is nothing definite regarding the Etiology of Leprosy by attention to which we can diminish markedly its prevalence: in Trinidad it seems to occur, for the most part, among the labouring population, though very frequently we see cases in the higher class creole families. Hard working roadside and estate labourers are principally affected - The nature of the soil here does not, in my opinion, have much effect. It prevails in low lying, marshy, parts of the island, where Malarial fever is rife; as well as in hilly and chalky districts, which are notoriously healthy. People inland are affected to quite an equal extent with dwellers by the seashore. The eating of salt fish or putrid fish, so frequently advocated as a cause by some authorities, does not, I fear, hold here - for the East Indian population never eat anything but rice and peas, and, as we have seen, the percentage of them attacked is high - nearly half our leper population. The sanitary condition, however, in which the class which is principally affected, live is such as would certainly predispose, if nothing else, to such a disease. The huts or houses are small, crowded together, ill ventilated (they stop up all chinks and crevices in the doors - windows are a superfluous luxury - and trust to a porous roof for all

the

the ventilation required) : one small room, a few square feet, empires a family of five or six or more people, who live in it, cook in it, and put it to any use necessary. The personal habits too of the lower class are almost anything but clean — bathing is a luxury very seldom indulged in : their clothing is scarcely ever taken off the body until perhaps it rots off and has to be removed — and it is of the most scanty description - The clothing of the Coolies consists of a loin cloth principally ; as an adornment they may wear a thin calico jacket - Exposed to all weathers, rain and fierce sunshine ; Extreme warmth in the middle of the day to an almost temperate chilliness at night, without changing their clothes we can understand how susceptible they are rendered to disease - Eating irregularly (their food consisting for the most part of vegetables and some poor beef) and leading a hard laborious life we can see how the black coolies render themselves susceptible to leprosy amidst the frightfully insanitary conditions in which they live Especially when we consider that they are much addicted to Excesses both alcoholic and sexual. But there is another class of patients affected — those of respectable parentage, well-to-do and comfortably brought up. Here I believe we have hereditary predisposition stepping in as a causative factor, to be considered undoubtedly with that peculiar genius loci which makes Leprosy so widespread here —

In connection with the Etiology I purpose discussing briefly two points, namely (1) Heredity; (2) Contagion.

Heredity

No new facts of any importance have been adduced either in support or in disproof of the theory of Heredity and I shall therefore only examine what Evidence I have and state my own experience. Some authorities deny that Heredity is a factor in the disease. Hansen, in a paper in the Archiv. f. Dermat. und Syphil. Heft 3, 1889 mentions a visit he paid to the United States in order to examine the lepers who had originally left Norway, and their descendants born in the States. He found of 160 lepers who had emigrated to America the offspring had remained free to the third generation, and he concludes therefore that the disease is not hereditary.

The United States Consul in Venezuela states that in the island of Maracaibo, which serves as a Leper Colony, marriages are permitted among lepers. During the last fourteen or fifteen years only two births occurred, both healthy children. One child has grown up and after a careful examination by a Medical Board, who certified him to be healthy, has been allowed to enter society. The number of patients here is 125.

Lastly Dr Fitch of Hawaii mentions in his Report on Leprosy the fact that of 2864 lepers consigned

to

to a Settlement, only twenty six children begotten of them were alive. Of these only two developed Leprosy up to the year 1884.

Thus we see that in this disease there is a much diminished fecundity, and probably also a high rate of mortality among infants. Instances in which leprosy is manifest at birth — Congenital Leprosy — are very rare. But in the Revista Medica de Bogota, November 1, 1890, Dr. R. Navarro reports two cases of Congenital Leprosy. In 1847 he delivered a woman of a "remarkably weakly and wasted" male child, which was "covered with leprous spots over the whole surface of the skin." "In two months leprous tubercles became developed over the face, Elbows and knees." Soon after, the mother became affected, and another child, a girl aged eight years, contracted the disease. They all died of Leprosy. In 1848 he also attended another woman who was suffering from Elephantiasis in its last stage. She gave birth to "a well formed female child the whole of whose skin was covered with leprous spots, and had a well developed tubercle on the upper part of the concha of the left ear."

I have had the opportunity of examining some children recently who are the offspring of leprous parents. Four girls were born of leprous mothers, and one girl of a leprous father — the other parents having been

been healthy. These children are apparently quite healthy and robust, with clear skins and free from any suspicious marks. In fact there is nothing to point to the taint in their origin. I have also under observation at present two young children, one nine months of age, whose mother is suffering from leprosy of the anaesthetic variety, and the other three months old, both of whose parents are lepers, the father having the anaesthetic variety and the mother the tuberculated. The former child seemed some months ago to be insensibly dwindling away and wasting, but under a nourishing regimen is regaining plumpness. The latter child is a plump, apparently quite healthy little one, and up to the present shews no sign of the disease.

I have also carefully examined the family history of 158 lepers in the Asylum with a view to ascertain the proportion of them who have any members of their family diseased, and the degree of relationship. I subjoin the result: —

In Tuberculated Leprosy.

Males 22, Females 18, Examined.

Males.— In 17 cases no member of family is affected

In 1 case no history can be got

In 1 case father was a leper, and the disease shewed itself in the patient at the age of 3 years.

In 1 case a brother died of Leprosy.
In 1 case the second child has the disease; the first being free.
In 1 case Maternal Grandmother is a tubercular Leper.

Females :— In 13 cases no member of family affected.
In 1 case an uncle has tuberculated Leprosy; another uncle died of it.
In 1 case Grandson has tuberculated Leprosy.
In 1 case son died of tuberculated Leprosy.
In 1 case brother is a tuberculated leper; sister died of anaesthetic variety.
In 1 case father has tuberculated Leprosy.

Anæsthetic Leprosy.

79 Males : 10 Females examined.

Males :— In 69 cases no member of family attacked.
In 5 cases no history to be got.
In 1 case a cousin (on mother's side) had Anæsth: Lep.
In 1 case a sister and an uncle died of Leprosy.
In 1 case suspicious blotches on brother.
In 1 case two sisters are lepers.
In 1 case a brother has the anæsthetic and the father the tuberculated form.

Females:— In 6 cases no member of family affected.

In 1 case a paternal cousin has the anæsthetic variety; an aunt died of it — variety unknown.
In 1 case a brother had a suspicious skin disease.
In 1 case an aunt died of the tuberculated variety.
In 1 case cousin on father's side has anæsthetic variety

Mixed Leprosy.

24 Males : 5 Females Examined.

Males :— In 21 cases no member of family affected.
In 1 case no history to be obtained.
In 1 case a sister is affected.
In 1 case a sister has suspicious yellow spots on skin.

Females :— In 3 cases no member of family affected
In 1 case brother died of tuberculated Leprosy.
In 1 case Uncle " " " "

Thus I find of these 158 Cases relatives were affected in 23 instances.

	Male	Female	Total
Tuberculated	5	5	10
Anæsthetic	5	4	9
Mixed	2	2	4
Total.	12	11	23.

If now we were to deduct that case in which there is only a suspicious condition without declared disease we find that of 158 Cases 22 had relatives of some degree affected.

We may tabulate the percentages as follows —

Variety	No. examined	Relatives affected	Percentage
Tuberculated ..	40	10	25%
Anæsthetic ..	89	7	about 8%
Mixed	29	4	- 14%

Generally the nearer degree of relationship is involved more frequently than the remote. On reference to the Table shewing the ages of leprosy at onset it will be noted that the onset is much earlier in the tuberculated and mixed varieties than in the anæsthetic variety, in which the majority of cases occur in advanced life. It is worth observation that the hereditary element is more marked in the former two varieties in which the disease sets in earlier in life.

Summarising up my observations on the subject of Heredity I lay down the following conclusions :—

1° The Fecundity of Lepers is much diminished.

2°. Instances of Congenital Leprosy are most rare.

3°. Lepers may beget children who shew no sign of disease up to adolescence.

4°. Heredity as manifested in the direct and collateral branches plays a part in the causation of leprosy.

5°. This is most to be observed in the tuberculated variety, then in the mixed, and least in the anæsthetic

6° The nearer degrees of relationship are more involved than the distant.

7° It seems more readily transmissible in the female line.

Contagion

This is still as it has been for years the quæstio vexatio of leprosy. In spite of the now famous opinion put forward by the Royal College of Physicians of London, and of the qualified opinion expressed by the recent leprosy Commission, the question of the contagiousness of leprosy still remains an open one, and during the past two years several medical men have given their adhesion to the view that it is contagious. The subject is undoubtedly a difficult one to decide, for the proofs of contagion are not many. But one or two cases have been published, the reasoning and the scientific evidence of which are so clear and convincing that we must allow that in some cases contagion undoubtedly occurs. The often quoted and celebrated case of Dr. Hawtrey Benson is one in point. Dr Benson in 1872 shewed to the Medical Society of Dublin an Irishman who had contracted Leprosy in India, where he had lived twenty two years. This man's brother, who had never left Ireland, except for a short stay in England forty six years before, slept during a year and a half in the same bed and wore his

his brother's clothes. He became a leper. There was no leprosy in the family, and the disease has for ages been unknown in the British Isles. Professor Cayley mentions two cases. One, an Englishman who went out to India after he was grown up, contracted anaesthetic leprosy from his native valet. The other case occurred in the leper ward of the jail at Mirzapur, which contained thirty criminal lepers; two healthy prisoners who had been put in charge of this leper ward were attacked with leprosy. Sir Wm Moore also quotes a case in which the disease was contracted. Patients suffering from itch attended his dispensary and were supplied with ointment, which was rubbed in while they sat in the morning sun in the yard. One of the persons employed to rub in the ointment injured her hand. Among the patients were several lepers. The person referred to developed leprosy, the family being quite free from the malady, and no history of other association with lepers being obtainable. (Communications to the Journal of the leprosy Investigation Committee). Almost all the alleged instances of communication of leprosy from one person to another have occurred in countries where the disease is Endemic, and are therefore open to obvious fallacy. Of the cases mentioned that of Dr Benson, and the first one of Dr Cayley seem strong evidence in favour of contagion — the other cases contain one or two obvious fallacies.

Kaurin, of the Reknaes leper Hospital, Molde, Norway,

writes

writes: "For my part I am convinced that it is very seldom that we can find a leprous patient whom we cannot trace to have had intercourse with other lepers." (Notes on the Etiology of Leprosy); and he quotes several cases in which investigation has shewn that the disease had originated in patients who have been in prolonged contact and resident among the lepers. Many more authorities might be quoted who have declared themselves contagionists. In Trinidad we have not many cases in which contagion has played an important part. I only recall one or two cases in which the patients were lepers after association and marriage or intercourse with pronounced lepers.

On the other hand negative evidence of very important character exists in Trinidad. The Dominican Sisters have been connected with the Leper Asylum for seven and twenty years: one Sister has been there all that time, another for twenty six years, and others for lesser periods. Their work consists in nursing the lepers, washing and dressing ulcers and sanguenous parts, and in point of fact they are continually in the closest contact with the lepers, and always have their hands in leprous discharges. Yet there never has been a Sister who has developed the disease. This is in contrast with the case of Father Damien at Molokai, but in the Sandwich Islands the disease being endemic and

spreading

spreading so rapidly it may be presumed that he derived the disease from an outside source, and not by contagion. This same objection holds good in the case in which Dr Arning inoculated the convict Keanu with leprous nodule in the Oahu jail on 30 September 1884. A small piece of leprous nodule was introduced beneath the skin of the left forearm, and a month later the patient suffered from pain in the left shoulder, elbow and wrist, accompanied by painful swelling of the ulnar and median nerves. There was no fever, and only very slight constitutional disturbance. During the next six months the neuritis decreased gradually, and a small leprous nodule formed at the seat of inoculation. Leprosy bacilli could be detected here sixteen months afterwards. In September 1887 distinct symptoms of leprosy developed, and in another year the disease was fully established. The fallacies in this experiment were that there was a family predisposition to the disease (discovered afterwards) in addition to the strong racial ~~disease~~ predisposition. This was not a crucial test and cannot be accepted in favour of inoculation.

Many of the leper population of the village of Coconut in which the Asylum is situated, who have owing to their misconduct been discharged from the Asylum, cohabit with healthy females. I have never seen a woman contract the disease in this way, although I know of a case or

two

two in which a leprous woman has infected a healthy man. Among the natives of the island there does not seem to be much fear of contagion, whatever the popular belief may be. People mingle freely with lepers – healthy people harbour them in their houses – and among the well-to-do classes I know that leprous members are quite en famille. There evidently must be an inherited predisposition to the disease in some people, and an immunity in others. Of course the word contagion must be used in a very wide sense and be made to include infection as well. In all disease caused by a particulate organism the method of entrance into the system of that organism may be often undefined and difficult to be made out, as is the case in leprosy – assuming of course that the bacillus leprae stands in a causal relation to the disease. The entrance of the germ into the system will take place if it is brought into contact with an absorbing surface — any abrasion of skin or mucous membrance being sufficient for this purpose. One great objection taken to this in connection with leprosy is the fact that there is no local lesion to indicate the site of entrance of the contagium, no local sore or other change, as occurs in other contagious diseases such as syphilis. But the fact of the earliest manifestation of the disease being in some one or other of the exposed parts of the body, such as the ears, the cheeks, the

Chin

chin, nose, forehead, hands and feet, seems to indicate that the germ has gained its entrance there.

The question, why when there is so much exposure to it the disease does not attack a greater number of people; and why so many people escape who are brought into daily contact with it, are difficult to answer. There is much difference in the individual susceptibility to disease — for example, it has been proved that inoculations with pure cultures of tubercle bacillus in some people produce no effect; in others only a local effect; and in others again a rapid destruction of tissue. So it is with leprosy. Under the same conditions of exposure, diet, climate, and, so on, one person may develop the disease and another may escape it. It seems to select its victims from all ranks of life, at all ages, and under the most varying conditions of climate. Under such diversified conditions it is indeed difficult to pick out one cause which is equally potent and effective in all cases. We know that residence in a land where the disease is endemic may generate it in a person in whom there is not any hereditary taint, as well as we know that persons born and bred in that land may escape it. We know that the disease may occur in people who have never seen it before, and also that it may occur in people who have been in intimate and prolonged contact with it; and we also know that people so situated may

escape

Escape it. And we further know that it occurs in people who are equally careful about their diet and habits of cleanliness, and in those who are not so. The problem is to reconcile these striking differences, and to bring them into one harmonious whole. To me the fact appears clear enough that under certain conditions, about which we at present know little, the disease may be transmitted by Contagion. Although the positive evidence we have in support of this is very little, still it must be conceded that one clear undoubted case of transmission by Contagion in the evidence of which there is no kind of fault or flaw, is more of worth than a host of negative Evidence - In every country in which Leprosy is endemic we do meet with undoubted cases of Contagion, although in discussing the evidence we have to make allowance for fallacies. Still they are cases of Contagion, and they only shew that Contagion is not so active and aggressive as in many diseases - Eg. Syphilis. They shew that prolonged contact is necessary with perhaps actually diseased parts of the body, such as occurs in sexual intercourse when there are lesions or ulcerations about the labia

The Bacillus Leprae.

Its Cultivation and Distribution

Flugge in his work on "Microorganisms in their relation to Infective Diseases", says: "In spite of the great blanks in our knowledge with regard to the Leprosy bacilli, we must look on these organisms as undoubtedly the cause of the disease, because they occur constantly and exclusively in this affection, and because also they are present in enormous numbers, and practically form the greater part of the affected tissue in the leprous organs." Hansen in 1874 discovered the microorganism which later was termed the bacillus leprae, and Observers in all parts of the world have been working at it since. But in spite of all Experiments the four conditions laid down by Koch as necessary to prove that a particular disease is due to a particular microorganism have never been satisfactorily carried out.

The Bacillus leprae is very much like the bacillus tuberculosis in shape, but is somewhat smaller and pointed at both ends. It stained easily by the common aniline dyes, as well as by Gram's method - there differing from the bacillus tuberculosis.

It is well known the bacillus leprae is most difficult of cultivation. Up to the present day no suitable medium has been discovered where in it can be grown satisfactorily. Blood serum seems to answer in a

slight

slight degree - I detail the results of some Experiments. The medium used was ascitic fluid which had been sterilised for four hours at a temperature of 60° C. I inoculated one tube (A) with a portion of tubercle of cheek which I had Excised : tube (B) with tubercle of right ala of nose : tube (C) with tubercle of left ala of nose : tube (D) with lymph from the site of an old excision of tubercle. Two tubes were left free as control tubes. Twenty four hours after inoculation (B) shewed slight flakiness, other tubes unchanged. Forty eight hours after, commencing opacity. Third day after, tubes (A)(B)(C) quite opaque, with whitish pellicle on surface, (D) more transparent, lower two thirds darker in colour. Control tubes transparent & clear. The change in the first four tubes progressed gradually and steadily — coagulation being set up. Later on they shewed a tendency to liquefaction, and then putrefaction of all the tubes occurred. On microscopic examination cocci, single and grouped, occurred in tubes (A) & (B) - In tube (C) there were a few rod shaped bodies in addition, but exhibiting no characteristic of the bacillus leprae. In tube (D) also cocci were present. In both control tubes cocci were found. Inoculation was then made into gelatine peptone tubes from tubes (B) and (D) - In six days a delicate white discoloration was noticeable in the needle track, and from ten to fourteen days after a small shiny glistening opaque white

white spot appeared on the surface and gradually spread in a thin enamelled-like layer on the surface of the gelatine, puckered in parts. On examination numerous cocci were found. It is to be noted that the control tubes remained unchanged until long after the examination was made. In another series of cultivations from a part which was gangrenous, in order to ascertain whether the bacillus leprae was present in the gangrenous substance I obtained a growth in gelatine-peptone of a waxy disc, circular in outline, with raised radiating lines. The growth was a variety of staphylococcus, and no rod shaped bodies were present. In the examination of surfaces which were covered with healthy granulations (in leper subjects) I did not succeed in isolating any characteristic bacilli. Other cultivations yielded similar negative results — only cocci, large and small rods being present, and in some the bacillus leprae. The experiments therefore confirm the results obtained by other observers, and we conclude that the growth of the bacillus does not take place in the media we use at present, and under the ordinary conditions in which other microorganisms are grown.

The Distribution of the Leprosy Bacillus —

The Bacillus leprae is found present in leper tissues. Thus in tubercle of skin they are found most frequently, in 75 per cents of the cases

Examined

Examined - They are also present in the Larynx and in the Femoral glands; in the liver, Spleen and the Median nerve, in the Testis, Lung and Kidney. Very seldom were they found in the Sciatic and Ulnar ~~nerves~~ nerves, in the superior Cervical ganglion, in the Intestines and in the lumbar and mesenteric glands. Other viscera and tissues were examined with negative results. But in every case of leprosy during a part or the whole of its course bacilli are to be found.

Inoculation of Animals —

I have performed inoculation on guinea pigs principally with leprous material such as tubercles, pieces of leprous tissue - of glands, of nerves and of lungs; but the results have never been successful in any case. I detail a couple of cases as samples :—

(1) A female guinea pig inoculated with a piece of femoral gland from an Anesthetic Leper. An incision was made over the nape of neck and a small piece of gland introduced - The pig sickened the next day, and died the day after. On Examination the portion of gland was unaltered in size; the tissues round incision putrefactive - Lungs were congested and in part congested — two tubes of gelatine-peptone were inoculated from them, and yielded only a streptococcus. The Liver and Spleen were very congested — one tube was

inoculated

inoculated from the Splenic pulp, but yielded no bacilli. The other organs seemed normal. A tube was also inoculated with matter from the tissues around part where tubercle was placed, but on cultivation yielded no bacilli - The cause of death was Septic intoxication.

In another case I inoculated a guinea pig with a piece of miliary tubercle got from the lungs of an anæsthetic leper - The pig died of septic intoxication also within forty eight hours. Cultures from tissues around wound, the lungs and the Spleen yielded negative results.

Two sucking boars were also inoculated with leprous tubercles and fed on leprous tissues, but throve and reached a good old age. On death no leprous bacilli were found, nor any signs of leprosy.

Other Observers have also made various attempts to inoculate different animals with the disease but have never met with success.

Inoculation in Human Beings —

Patients suffering from anæsthetic Leprosy have been inoculated with cutaneous leprous tubercle, and with cultures, and in no case have they developed the tuberculated form - The case of the convict Keanu I have dealt with Elsewhere. Other Observers have inoculated healthy persons with leprous material, but without producing any effect.

Vaccination and Leprosy.

Great prominence was given to the possible spread of leprosy by vaccination by a case related by Prof Saisbury in the British Medical Journal of 11 June 1887. It seems a doctor in a tropical island vaccinated his own child from a native child who afterwards became leprous. Another white child was vaccinated from the doctor's child, and both these children also developed leprosy. The details of the case are few, and insufficient to establish any conclusion; the disease was endemic in the island, so that possible outside sources of contagion were present.

I have vaccinated lepers with calf lymph, on skin free from disease, and on tubercles. Good vaccine vesicles have risen in some cases in both situations, and only scabs at other times. But under the microscope I have never been able to identify any leprous bacilli - only a few large cocci were present. Over anæsthetic patches also good sized vesicles were produced but no bacilli were present. With lymph from them I have vaccinated other lepers - the results were not always successful - the vesicles when present are small and shrunken and no bacilli were present either.

The conclusion I would draw is that leprosy does not spread by vaccination, and that there is in all probability no likelihood of its so spreading. In Trinidad

where

where vaccination is carried out very carefully, about 85 to 89 per cent of children born being vaccinated there is no case, although leprosy is endemic and the chances of acquiring it great, to shew the leprosy has ever been spread by vaccination.

Morbid Anatomy of Leprosy.

Virchow has placed the leprous produced among the granulomata, and explains the leprous process as "a cell-proliferation with rapid nuclear and cellular division starting from the connective tissue corpuscles and succeeded by a purpose infiltration of cells"

The Leprous Tubercle. On section a number of small slightly granular cells infiltrate the tissues, and are arranged between the connective tissue layers, flattening down the papillae, and pressing together until they lead to atrophy of the hair follicle and sudoriparous and sebaceous glands. These cells may assume different shapes due to mutual compression, and they may become fatty degenerated and break down. They generally are disposed around the vessels.

In mucous membranes there is the same cell infiltration. Those most liable to leprous deposits are the mouth cavity, the nose and the throat and larynx.

The lymphatic glands, especially in the Tubercular variety, are swollen and enlarged. But the typical leprous deposit may not be found, only hyperplasia of the cellular elements.

The liver, Spleen and kidneys also show changes - In the connective tissue of the liver between the lobules there is infiltration of these granulation cells, which ultimately act upon the lobule.

The Spleen - shows the usual changes which are met with in all chronic diseases — an increase of the colourless or white corpuscles. In a pro Examination with the Haemacytometer found a relative and absolute increase of the white blood cells; and with the Haemoglobinometer a decrease of Haemoglobin.

The Kidneys frequently are affected, and further notice will be found later on.

The Testicles are similarly affected by the leprous tissue, the growth of new cells pressing against the seminiferous tubules and blood vessels. This ultimately leads to the sexual vigour, which in older cases is lost, and the fecundity of leper is extremely small. The Ovaries are also affected in this manner.

The Nervous System. The peripheral nerves are principally affected at first: there is swelling of the neurilemma, later the cell exudation compresses the

the tubules - The larger nerves are considerably swollen - the medican, the ulnar and the peroneal and anterior and posterior tibials. They are reddened and are swollen in a fusiform manner, and in the more external parts are easily felt under by fingers - the swelling is more prominent in these parts.

The Spinal Cord - The loss of the reflexes and the equine gait are suggestive of a lesion similar to that of locomotor ataxy.

In the brain no special change occurs.

Bones - diseases of these are dependent on the nervous influence which is abstracted, and is well noted in the effect of nerve stretching in the separation of dead bone.

Intercurrent Diseases.

It is interesting to note the chief intercurrent diseases which prevail amongst lepers, and I have therefore drawn up a table which shews the diseases and their relative prevalence among the different varieties of Leprosy, and the proportion in which the sexes are affected. The table has been drawn up from the Byculla record for five years 1888 - 1892, and is a detailed statement of diseases affecting lepers.

Disease.	Form of Leprosy								
	Tuberculat?		Anæsthetic		Mixed		Total		
	M.	F	m	F	m	F	m	F	
Tuberculosis	6	5	1	1	2	2	9	8	17
Malarial Fever	191	61	268	34	76	30	535	125	660
Erysipelas	–	2	2	–	3	–	5	2	7
Syphilis	2	1	11	–	–	–	13	1	14
Chicken Pox	6	–	10	–	3	–	19	–	19
Influenza.	7	–	22	–	11	–	40	–	40
Epilepsy	3	–	1	2	–	–	4	2	6
Mania	2	1	2	1	1	2	5	4	9
Locomotor Ataxia	–	–	1	–	–	–	1	–	1
Ophthalmia	6	–	13	1	4	2	23	3	26
Corneal Ulcer	1	–	8	–	2	–	11	–	11
Cataract	–	7	7	1	2	1	9	2	11
Iritis	3	–	–	–	2	2	5	2	7
Pterygium	–	–	6	–	1	–	7	–	7
Staphyloma ant.	–	–	–	2	–	–	–	2	2
Pericarditis	3	–	3	2	–	–	6	2	8
Cardiac Hypertrophy	5	1	–	–	–	–	5	1	6
" Dilatation	–	–	6	–	–	–	6	–	6
" Atheroma	1	–	4	–	–	–	5	–	5
Mitral Disease	–	–	2	–	1	–	3	–	3
Atheroma of Arteries	–	–	1	–	–	–	1	–	1
Hypertrophy of Spleen	1	2	3	1	3	–	7	3	10

Disease	Form of Leprosy.								Grand Total
	Tuberculated		Anæsthetic		Mixed		Total		
	M.	F	M	F	M	F	M	F	
Pleurisy	2	–	4	–	–	–	6	–	6
Bronchitis	6	1	26	2	7	–	39	3	42
Pneumonia	1	1	7	–	–	–	8	1	9
Abscess of Lungs	–	1	–	–	–	–	–	1	1
Neuro-pneumonia	–	–	1	–	–	–	1	–	1
Sanguem of Lungs	–	–	–	1	–	–	–	1	1
Phthisis	3	4	12	2	3	–	18	6	24
Congestion of Lungs	–	–	5	–	–	1	5	1	6
Asthma	–	–	1	1	–	–	1	1	2
Tubercular Laryngitis	4	–	–	–	1	–	5	–	5
Diarrhœa	34	10	48	2	14	5	96	17	113
Dysentery	9	5	26	2	4	1	39	8	47
Hernia	–	–	4	–	1	–	5	–	5
Congestion of Liver	1	1	5	1	–	1	6	3	9
Mixed Kidney.	1	3	4	1	–	–	5	4	9
Hydronephrosis	–	–	1	–	–	–	1	–	1
Menorrhagia	–	1	–	2	–	–	–	3	3.
Vesical Irritation	–	1	–	–	–	–	–	–	1
Eczema	3	–	21	3	6	1	30	4	34
Rambœsia	2	1	9	1	2	–	13	2	15
Scabies	2	–	–	–	–	1	2	1	3
Jonea	–	–	5	–	4	–	9	–	9
Tinea.	2	–	5	–	–	–	7	–	7

Disease	Forms of Leprosy								
	Tuberculated		Anaesthetic		Mixed		Total		
	M	F	M	F	M	F	M	F	
Lardaceous Degeneration	1	"	1	"	"	"	2	"	2
Measles	1	"	1	"	1	"	3	"	3
Hemicrania	"	"	1	"	"	"	1	"	1
Cerebral Haemorrhage	"	"	"	1	"	"	"	1	1
" Thrombosis	"	"	"	1	"	"	"	1	1
Dementia	"	"	2	1	"	"	2	1	3
Conjunctivitis	"	"	1	"	"	"	1	"	1
Hypopion	1	"	"	"	"	"	1	"	1
Keratitis	"	"	2	"	"	"	2	"	2
Phlebitis	"	"	1	"	1	"	2	"	2
Valvular Disease	"	"	1	"	"	"	1	"	1
Angina Pectoris	"	"	1	"	"	"	1	"	1
Fatty Liver	1	1	2	"	"	"	3	1	4
Waxy Liver	"	"	2	"	"	"	2	"	2
Cirrhosis of Liver	"	"	2	1	"	"	2	1	3
Gall Stones.	1	1	"	"	"	"	1	1	2
Anklostoma duodenale	"	"	3	"	4	"	7	"	7
Ascarides	3	"	"	"	2	"	5	"	5
Congestion of Spleen.	"	"	2	"	"	"	2	"	2
Waxy " "	1	"	1	"	"	"	2	"	2
Waxy Kidney	1	"	1	"	"	"	2	"	2
Large White Kidney	"	1	2	"	"	"	2	1	3
Granular Kidney	1	2	7	1	2	"	10	3	13.
Fatty Kidney	"	"	"	"	1	1	1	1	2
Psoriasis	"	"	2	"	"	"	2	"	2
Molluscum Fibrosum	"	"	1	"	"	"	1	"	1
	318	107	591	68	164	50	1073	225	1298

It will be seen that lepers, like ordinarily healthy people, are subject to the same kinds of disease which prevail in this island — Malarial fevers, Dysentery & Diarrhoea claiming most patients. Indeed it may be said that leprosy does not induce any particular disease. Even the nervous affection in the anæsthetic variety does not seem to bring on any modified nervous lesion. The only exception to the above statement is that Tuberculosis (of the lungs) & Kidney disease are very prevalent among lepers, and cause a large percentage of the deaths. This will be brought out in another table — I have omitted the details from the present table.

Lesions found after Death.

On the next page I have drawn up a table calculated on 65 deaths during the years 1889, 1890 and 1891 in the Leper Asylum, which shews the determining cause of death in these cases & the proportion in which the different varieties of leprosy were affected. On a small scale it shews fairly accurately — and it has been calculated on a larger scale, shewing the same results — the nature of the disease which proves fatal. The table also shews the different proportion in which the sexes are affected.

Disease	Form of Leprosy								Grand Total
	Tubercul?		Anaesthetic		Mixed		Total		
	M	F	M	F	M	F	M	F	
Kidney Disease	2	5	4	1	7	2	14	8	22
Tuberculosis { Lungs / Larynx	5	6	2	1	3	"	10	7	17
Gangrene { Foot / Leg	1	"	3	1	1	"	5	1	6
Cardiac Dilatation	"	1	2	"	"	"	2	1	3
Acute Pneumonia	1	"	2	"	"	"	3	"	3
Anchylostomiasis	"	"	"	1	1	"	1	1	2
Abscess of Ankle joint	"	"	1	"	"	"	1	"	1
Cardiac Atheroma	"	"	1	"	"	"	1	"	1
Malarial Fever	"	"	"	"	1	"	1	"	1
Gangrene of Lungs	"	"	"	1	"	"	"	1	1
Pleurisy	1	"	"	"	"	"	1	"	1
Pericarditis	1	"	"	"	1	"	2	"	2
Acute Congestion of Lungs	"	"	1	"	"	"	1	"	1
Serous Apoplexy	"	"	1	"	"	"	1	"	1
Diarrhoea	"	"	"	"	1	"	1	"	1
Cirrhosis of Liver	"	"	1	"	"	"	1	"	1
Convulsions	"	"	"	"	1	"	1	"	1
Anaemia (progressive)	"	"	1	"	"	"	1	"	1
Addison's Disease	1	"	"	"	"	"	1	"	1
Sunstroke	1	"	"	"	"	"	1	"	1
Cerebral Haemorrhage	"	"	"	1	"	"	"	1	1
" Thrombosis	"	"	"	1	"	"	"	1	1

The following table shews the actual number of subjects examined post mortem from which the previous table was constructed. In some cases several different lesions were found in the same body, hence the total number of lesions is in excess of the number of subjects examined.

Sex	Tubercu-lated	Anæsth-etic	Mixed	Total
Males	12	18	15	45
Females	11	7	2	20
Total	23	25	17	65

Analysing the causes we may divide them into four principal groups: —

Disease of the Kidney — 33·84 per cent.
Tuberculosis — 26·16 " "
Gangrene — 9·08 " "
Other Diseases — 30·92 " "

Disease of the Kidney — has long known to be common in Leprosy. In the 65 cases examined we note a percentage of 33·84, being quite a third of the total number. This number and percentage being contrasted with the record of deaths in the Colonial Hospital shews that in the latter institution Disease of the Kidneys causes only seven and a half per cent. Then it is evident that Kidney lesions are of very frequent occurrence in

in Leprosy. The varieties of Kidney lesions which prevail are, in order of frequency (1) Mixed, (2) Large White, (3) Contracted. They occur most frequently in the Mixed variety of Leprosy, next in the Tuberculated form, and lastly in the Anæsthetic, and affect males more frequently and in greater proportion than females. The duration of life too is greater in anæsthetic lepers with Kidney lesions. It is highly probable that the varieties of Nephritis which occur are not due to leprous growth, because bacilli are present only in scarcely calculable proportion in the kidneys, but that they take no direct action in proportion to the affection of the skin, and are due to the correlation of function between Kidney and Skin. Hence the greater frequency of the Mixed and Tuberculated varieties being affected — because of the development of tubercles and damage to the sudoriparous glands of the skin.

Tuberculosis :— Tubercular disease of one or more of the serous membranes or viscera occurred in 26·16 per cent of deaths in Leprosy, while in the Colonial Hospital Island, roughly, Eighteen per cent of the deaths are due to this cause. It is undoubtedly the case that deaths from tuberculosis, especially of the lungs, are commoner in lepers than in the ordinary population. The question arises whether the invasion of the leprous or the

or the tubercle bacillus causes the lesions, and on this point there is not sufficient evidence to come to any conclusion, the chief authorities differing in their opinions. Arning in his Report to the Hawaiian Board of Health 1886 says "In all advanced tubercular cases I was struck with the extreme frequency of gross changes in the larger viscera, more especially the lungs, liver, spleen and bowels. These organs presented an aspect quite new to me, and closer examination of their tissues has enabled me to prove that we have been mistaken in attributing deaths of lepers to intercurrent pneumonia, tubercular phthisis and dysentery which were simulated by the clinical symptoms. The ulceration of bowels and the breaking down of lung tissue are due to leprous infiltrations, and we shall have to modify our opinions of leprosy being mainly a disease of the cutis & peripheral nerves, and introduce terms such as phthisis leprosa and enteritis leprosa." Hansen (Contribution à l'étude de la Lepre - Archives Romaines - Jan. 1889) takes an opposite view and attributes these lesions to tubercular changes. Experimentally all attempts to cultivate bacilli or infect animals by fragments of phthisical lungs or tubercular organs have failed. The conclusion to be drawn, at present, is that tuberculosis is more probably the cause of the visceral lesions - It is noteworthy that of the 17 patients affected, 11 were suffering from Tuberculated leprosy

and

and only 3 Each pure Anæsthetic and Mixed leprosy – In cases of tuberculated leprosy rapid disappearance of the cut-aneous tubercles is often followed by the development of vis-ceral tuberculosis, and this suggests some connection between the tuberculous and the leprous lesions.

Gangrene :– Ulceration and gangrene are present in some degree in almost every case examined while only in six cases, a percentage of 9·08, was it of sufficient intensity and extent as to be the cause of death – The gangrene is apt to supervene very rapidly – a slight injury inducing it in patients who are much de-bilitated. The preponderance of the affection in cases of anæsthetic leprosy, although only a few cases occurred, shews that the affection of the nerves and the interference with the trophic influence predispose to ulceration & gangrene.

Other Lesions :– With the exception of the lesions mentioned above it is worthy of note that none of the morbid changes can be traced to leprosy, and that they are such as occur under ordinary circumstances.

The Table I have given above shews clearly the nature of the lesion, and the frequency of its occurrence in the different varieties and sexes.

Table shewing Deaths in each Month during past twelve years together with percentage.

Month	1882			1883			1884			1885			1886			1887			1888			1889			1890			1891			1892			1893.			Grand Total	Percentage on Number treated.
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T		
January	1	1	2	–	1	1	4	1	5	–	1	1	–	–	–	1	2	3	–	–	–	1	–	1	–	–	–	4	–	4	1	–	1	1	2	3	21	Year 1882–10·50
February	1	–	1	2	–	2	–	–	–	–	1	1	2	1	3	3	1	4	1	–	1	2	–	2	3	1	4	1	–	1	2	–	2	1	–	1	22	1883–13·51
March	3	1	4	1	1	2	1	–	1	3	2	5	1	1	2	3	1	4	1	–	1	1	1	2	1	–	1	–	2	2	2	–	2	3	1	4	30	1884–12·92
April	2	–	2	4	–	4	2	–	2	1	–	1	1	–	1	3	1	4	–	–	–	3	–	3	–	–	–	1	1	2	2	1	3	–	–	–	22	1885–15·13
May	–	–	–	1	–	1	1	–	1	2	–	2	2	–	2	2	1	3	1	–	1	–	–	–	1	2	3	1	–	1	3	1	4	2	–	2	20	1886–9·72
June	–	–	–	2	–	2	1	–	1	5	2	7	2	1	3	2	–	2	2	–	2	–	1	1	2	2	4	1	–	1	1	–	1	–	–	–	17	1887–13·39
July	–	–	–	–	1	1	–	1	1	2	1	3	1	1	2	4	–	4	2	–	2	–	–	–	–	–	–	3	1	4	2	–	2	3	–	3	28	1888–7·47
August	1	–	1	1	1	2	–	–	–	3	–	3	1	1	2	1	–	1	–	2	2	–	1	1	2	1	3	2	1	3	–	3	3	1	–	1	21	1889–7·40
September	1	1	2	2	1	3	–	–	–	–	–	–	–	2	2	1	–	1	1	1	2	–	1	1	4	1	5	3	–	3	1	1	2	1	–	1	23	1890–10·00
October	1	–	1	2	2	4	3	2	5	1	–	1	2	–	2	1	–	1	2	–	2	–	–	–	–	1	1	2	–	2	–	–	–	–	–	–	13	1891–10·27
November	2	–	2	2	1	3	2	2	4	3	1	4	1	1	2	1	–	1	2	1	3	2	–	2	1	2	3	1	–	1	–	–	–	4	1	5	28	1892–10·12
December	1	2	3	–	–	–	1	2	3	–	–	–	–	–	–	2	–	2	–	–	–	1	2	3	1	–	1	2	–	2	3	2	5	3	–	3	31	1893–8·88
Total	13	5	18	17	8	25	15	8	23	20	8	28	13	8	21	24	6	30	12	4	16	10	6	16	15	10	25	21	5	26	17	8	25	19	4	23	276	

Table of Deaths.

The foregoing table shews the deaths which have occurred in each month of the past twelve years, and the percentage of deaths each year on the total number of patients under treatment. It will be noted that the number during each month is fairly constant: only in the month of October the rate is lower. October is a healthy month, and the beginning of the cool season in the island, and this probably accounts for the lower rate.

The percentage shews 10·78 average on the number treated each year, which is not high considering the facility with which lepers contract other diseases, and the climatic conditions in which they live.

The Treatment of Leprosy.

No advance in the treatment of leprosy has been made in recent years, and owing to its intractable nature various remedies have been recommended and tried, but up to the present day we cannot say that any one means of treatment has been successful. In considering the treatment I will classify it under the following heads (1) Hygienic; (2) Dietetic; and (3) Medicinal; (4) Surgical. It is by a combination of these that we are frequently able to obtain some amelioration in the progress of the disease.

(1) Hygienic Treatment.

That the most thorough and absolute cleanliness is one of the very first desiderata need no pointing out. In the lower classes in all countries personal cleanliness is a quantite' negligé. Therefore among the inmates of an Asylum which is recruited mainly from the lower classes this must be strictly enforced. Daily baths either in fresh or salt water should be had, if possible. Salt water, owing to its stimulant action upon the skin, is perhaps preferable. Our patients in the Asylum have salt-water baths about three or four times a week. The clothing should be changed frequently, especially the underwear. In tropical countries warm clothing is not necessary, but care should be taken to avoid draughts and colds in view of the great tendency to pulmonary complaints. The living rooms should be airy and well ventilated. Patients should be encouraged to be in the open air as much as possible. Outdoor occupation for such as may be able to indulge in it should also be encouraged. And lastly, overcrowding should be avoided.

(2) Dietetic Treatment.

A full and generous diet should be allowed. The food should always be quite fresh, and especially is this important in the matter of animal food, which should be

be quite fresh and well cooked. Salt fish and preserved meats in tropical climates had better be avoided. Fresh fish - if the freshness of it can be ensured — may be used well cooked. To careful attention cannot be paid to the dietary - Regarding the use of wines and spirits, unless they are absolutely necessary, I see no reason for their administration. They should be given medicinally when indicated, rarely as a luxury.

(3) Medicinal Treatment.

Drugs of almost all kinds have been tried, and various are the recommendations in the different countries in which they have been tried - I will state those in use in our Asylum.

Chaulmoogra oil (Gynocardia odorata) is used both internally and externally; and is used very extensively. From my experience with it I draw the following conclusions:-

(α) The action of the oil in causing the absorption of tubercles is uncertain and variable.

(β) Its action in reducing anesthesia is also very uncertain. Among my cases not one was improved in this respect.

(γ) Its most certain action is that of allaying the neuralgic pains in the limbs and joints.

(δ) Under its use superficial ulcerations heal up rapidly

rapidly, and sometimes perforating ulcers.

(ε) During its use there is great improvement in the physical condition of the patient. The skin acts well, the appetite improves.

(ζ) There is much difficulty in its administration owing to the nausea it causes. Rather more than 50 per cent of the patients has to give up taking it on this account, and employ it only by friction.

(η) Dosage. I generally began with ten minims three times a day and pushed it rapidly. In some cases I began with thirty minims. Those who were able to retain this dose showed rapid improvement in physical condition.

(θ) Length of Administration. This should be prolonged to effect any good. Its persistent continuous administration is the only way to secure any benefit in the graver and characteristic lesions.

(ι) Mode of Administration. Usually in the pure form. It is more easily tolerated as an Emulsion. Mixed with Cocoanut oil or other bland oil it is used for application by friction.

<u>Arsenic</u> - I have found this drug do good in some cases. One case recently under treatment seems to have gained much benefit by its use. J. W., a Hindu, suffering from anaesthetic leprosy, was admitted in an extreme degree of emaciation,

and

had a perforating ulcer under little toe of right foot, and an indolent ulcer on heel. The foot was inflamed, and swollen, and anæsthetic. There is complete anæsthesia in both hands & a little way up the forearm, and slight diminution of sensibility in the back. He was very weak and feeble and scarcely able to walk. The ulcer was slit up freely, and he was put upon Fowler's solution of Arsenic, five minims, three times a day. After four months of this treatment — and he had no other drug except a little Bromide of Potash for insomnia — he has improved much. He has put on flesh and gained body weight. The sores have healed, and he is able to walk about and make himself generally useful. The anæsthesia has not diminished, but the disease is certainly stationary. Arsenic acts as a general tonic, and good results are invariably seen by its use here. It is generally used.

Strychnine — This drug was tried in a few cases of nerve-lepra with the idea that there might possibly be some action on the affected nerves. The results however are not invariably satisfactory. Its action is more allied to that of an ordinary tonic. I have not observed any diminution in the amount of anæsthesia after its use.

Salol — has been highly praised by some authorities for use in leprosy, and during leprotic fever, but in my hands has never met with any success. I have tried it in many cases where there was Elevation of temperature swelling

swelling and tenderness of tubercles, slight swelling of joints, and much sweating - It was administered in fifteen grain doses but almost invariably caused nausea and vomiting - When it was retained it seemed to do no good at all, even in four hourly doses continued for some days. It generally caused pain in the stomach after ingestion.

Thyroid Extract — in some cases lately this has been tried - Dr Bramwell has noted, in some cases treated with this, marked desquamation occurring during its administration in Myxoedema: and it was tried in psoriasis successfully. In leprosy however even when its administration was pushed to the extent of inducing thyroidism, no beneficial result ensued.

Chlorate of Potash — St Carreau of Guadeloupe succeeded in obtaining remarkable results by the administration of large doses of Chlorate of Potash - He gave 20 grammes on the first day of the treatment, 10 grammes two days after, and 15 grammes the day after the last. Bilious vomiting, diarrhoea and prostration set in and the day after the last dose a sudden attack of syncope. He observed tubercles to disappear, the skin to become smooth, and "abdominal tissues", and the Extremities "Entièrement plissée", and attributes the good results to Methaemoglobinaemia, for the band of methaemoglobin was observed under the spectroscope, and suggests that

that this condition of the blood may be incompatible with the life of the bacilli - The treatment has been tried in the Asylum here, but with negative results so far.

The Beaupertuy method of treatment was carried out fully here many years ago. Depending as it does mainly upon strict hygienic measures in combination with purely drug treatment we can understand how in many cases it causes temporary amelioration. We used the perchloride of mercury internally, and externally stimulating liniments, and such strong irritants as nitrate of silver and Cashew nut oil. I am not aware that this treatment is still in vogue.

Gurjun oil is not used here to any extent though in the East it has acquired much reputation. Combined with friction, baths &c it does good.

Treatment of Leprosy by Tuberculin.

Dr Robert Koch of Berlin very kindly sent me a quantity of Tuberculin which I tried on many patients in the Asylum. A detailed report of my experiments would be too lengthy - I therefore give an abstract, and analysis of the cases.

Dose. Invariably began with 0·001 gramme with an interval of time before the administration of subsequent doses, each of which was increased in quantity until 0·1 gramme was reached - Lately I tried the continuous

method

method, that is, administration of a small dose, at first 0·001 gramme, increasing it in some cases to 0·01 gramme daily, once, twice, or three times, endeavouring thus to keep the system continuously under its influence.

Method of Administration – Subcutaneously by the hypodermic syringe

Site of Injection – Generally between the shoulder blades; sometimes into substance of muscles, the deltoid, triceps and calf of leg.

Results as regards

1: Subjective Phenomena

These phenomena were most diverse – I merely note those that were most generally complained of. At the patients complained of burning at the site of injection, but the same site was never chosen twice in succession and no abscess resulted. Headache was almost always complained of. General pains – such as pain in moving the hip, pains in the back and in the arms, between the shoulders, in the shoulder blades, down one side, shooting pains in the ears and down the arms; lancing pains in the temple.

'Pins and needles' in the leg: pricking in the tips of the fingers; once a pricking sensation in the ball of the Right little finger and Right great toe. A feeling as if pins were running through the ulcers=

of

of insects crawling on the face; of the flesh 'jumping'; of blood running down the arm.

General chilliness - Sometimes numbness in lung tubercular deposits. At other times pains in anesthetic areas. Ringing in the ears, giddiness, sudden 'darkness over the eyes', and pulses in the head.

And finally, a feeling as if the body has been thoroughly bruised, and hence their own Expression "washed up".

2° Objective Phenomena.

The appearance of small tubercles and papules; their sites were the front of the ankle, about wrist, over fingers, and on legs.

No erythematous Eruption occurred in one case.

Tubercular (leprotic) infiltration of the skin without evidence of papulation.

Sometimes all the tubercles, and the infiltrated hypertrophic condition of the skin, became tense and painful, and the tubercles seemed as if they were about to burst: in one case only did the nodules ulcerate and subside, in the other cases they subsided spontaneously.

Condition of SKIN: in one case, a light-skinned girl, the skin about the chin and nose turned first a light yellow and then a ochre colour. In another woman there

there was reddening of the hypertrophied skin; and in another, a black woman, it became brownish in the legs. It was also noticed to become shiny and greasy sometimes in uninfiltrated parts. After the preliminary swelling and tenderness of infiltrated skin, softness, loss of tenseness, and suppleness followed, and in one case the disappearance of a shotty condition of the skin.

Ulcers: these became reddened and irritable with pricking and painful sensation in them, and ultimately they took on healing action. Iron latterly tried its effect on perforating ulcers, and other ulcers connected with small carious bone, in order to see if the separation of diseased bone would be hastened thereby, and to effect this small doses were administered in order to avoid the occurrence of pyrexia. Apart from a cleansing of the ulcers however no result ensued.

Enlargement of lymphatic Glands. The axillary and in one case the Femoral glands were enlarged, painful and tender, but subsided after a time.

Albuminuria and Ascites occurred in one case: in all the other cases the urinary secretion was unaffected, being generally of low specific gravity, pale and clear, and free from albumen. In the case of albuminuria the urine was loaded with albumen, but subsequently became free of it, & the anasarca

subsided

subsided, as well as the Bacilli.

Menstruation was accelerated in two cases.

Irritability of the Stomach and Vomiting was frequently noticed: most intractable and yielding to no treatment Except the withdrawal of the Tuberculin.

Mania, of marked intensity, occurred after prolonged injections, in two cases.

3° Temperature. The effect of Tuberculin on the temperature is so characteristic in cases of Tuberculosis that we can best consider its effects on Leprosy by going at some length into an Examination of some of the cases in which the drug was tried.

Case I. Twenty four hours after the injection of one milligramme the temperature rose to 100°, it then fell to 97·8°, and then remained at or near the normal. After the fifth injection – dose 0·015 grammes – the temperature rose in 5½ hours to 100·4°, and in 24 hrs it rose to 102°, falling to 101° after 30 hours. The day after, the temperature shewed a tendency to come down, but an injection of 0·02 grammes caused high fever in about 12 hours. An injection of 0·15 grammes caused fever and general restlessness, as also did a subsequent injection of 0·1 gramme. The temperature then fell and remained steadily at the normal. Now, in the second series of injections in this patient, amounting in all to Eighty one injections, the dose in the earlier part being

being one milligramme and later one centigramme, the temp-erature never rose above 99° all the time the injections were continued. The patient was a female, suffering from Tuberculated Leprosy.

Case II. Also a female suffering from Tuberculated Leprosy. One day after the injection of one centigramme the temperature rose to 101°, forty eight hours after it reached 102° and then fell. Twenty four hours after the injection of a quarter of one deci-gramme the temperature rose to 103°, but fell shortly after & remained at the normal. Twenty four hours after the injection of half a decigramme it rose to 102°, fell in about 30 hours to 100°, and then went down to the normal where it remained for some days. After this one injection of one milligramme caused high fever with foul tongue and much debility. A fortnight after, another injection of one milligramme caused a rise of temperature to 103°, and another the day after to 104°. After this it fell to the normal.

Case III. Tuberculated Leprosy in a Female - In this Case sixty eight injections of one milligramme each were made; but the temperature remained normal throughout, Except on five odd days when it reached 100° or 101°, but did not remain at that for more than forty eight hours.

Case IV. A negress with Mixed Leprosy. This patient had fifty nine injections of one milligramme each, in all. Up to the 36th injection the temperature remained at, or near

near the normal, except on one occasion when it rose to 100°. After the 37th injection temperature ran up reaching on one occasion 106·2°, and fluctuating all the time between 100° and 105°. After the last injection the temperature kept up falling to the normal only four weeks later: from when it kept down.

Case V. A coloured girl with Mixed Leprosy. Temperature after increasing dose did not rise above 99·2°.

Case VI. Male negro. with Tuberculated Leprosy. Patient was suffering from Septic fever when he had an injection of one milligramme, which caused the temperature to rise slightly. Then after a subsequent injection of one centi-gramme the temperature ran up to 103°. A few hours after another injection of one centigramme it rose to 102°, and the next day after the injection of a similar dose it rose to 102° again. The injections were now stopped and the temperature fell to and remained at the normal. The patient felt considerably relieved.

Case VII A Portuguese Male with Tuberculated Leprosy - In this case there were two series of injections - During the first series, comprising six in all, the temperature rose to 100° on two days. In the second series of fifteen injections, of one milligramme each, it only rose to 100° on two days.

Case VIII. A Portuguese Male with Anæsthetic Leprosy. This patient had only one injection of one centi-

- gramme

-gramme during a period of eruptive tubercular fever — the fever not very high — but after the administration of the Tuberculin the temperature rose to 105°, and kept high for a prolonged period, remitting in the morning and exacerbating in the evening sometimes to 103·8°. The patient was so profoundly affected with what he called "bad feelings" that he begged that no more injections should be tried.

Of four other cases, one Tubercular, one Prosthetic and two Mixed, the temperature did not rise above the normal although one had fifteen injections.

Summing up - Dealing with a substance so powerful in its effects as Tuberculin we cannot but be struck with the fact that some of the cases manifested remarkable tolerance and resistance to its use. Some of them very early showed the "characteristic reaction" — fever, but others again, for instance Case III, in which sixty eight injections were continuously administered, seemed to show absolutely no reaction, although the patient may be supposed to have been under its influence all the time, except on one or two occasions when the temperature rose to 100° and 101°. In Case IV it is remarkable that after thirty six injections had been administered the temperature ran up and remained very high for four weeks after the cessation of administration of the substance, leading to extreme prostration and debility - In administration during

hectic

leprotic fever, that is fever attended by an eruption, caused an immediate elevation of the temperature to 105° in one case, but in another had no effect. The elevation of temperature was never on any occasion accompanied by an immediate outbreak of tubercles — these appeared only in three cases, but only late in the course of treatment, after many injections had been administered, and then were very few and scanty. In this respect our experience here does not coincide with what was observed elsewhere, namely an almost immediate outbreak of tubercles following the injections.

Improvement in varying but slight degree has occurred in some of the cases. The tense constricted feeling of the skin was reduced — as one patient expressed it she was "able to close her hands more easily", "the skin felt slack." In one case absorption of tubercles occurred, preceded in some of the tubercles by ulceration. Reduction of swelling of the joints and disappearance of pains and fever, followed in another case. There was diminution of the hypertrophied, infiltrated condition of the tissues, as was ascertained by actual measurement. But in almost all the cases, and Especially those which were subjected to the prolonged continuous method of administration there occurred great debility and anaemia from which the patients took some considerable time to recover.

On the whole the slight benefits compensed by its use

do

do not counterbalance the serious disadvantages which attend and follow its continuous administration. Its effects are much too uncertain, and much too unreliable for it to be acknowledged as a permanent agent in the treatment of leprosy.

Intercurrent Diseases are treated by the drugs in ordinary use quite independent of the leprotic affection.

Among drugs used externally, alone or in combination with internal remedies, I may mention the following.

Creolin (Jeyes preparation) diluted: In the Asylum it is used exclusively in dressing ulcers &c. Its advantages are that it reduces the smell of the gangrene: rapidly promotes the growth of healthy granulations: and there is no danger of poisoning by absorption. It is used also for the Eczema which so frequently complicates leprosy.

Ichthyol and Resorcin have also been tried but with no marked benefit.

Red Iodide of Mercury Ointment - as a caustic and germicide has been tried in early cases when tuberculation was not extensive: without any effect however.

Summarising the treatment of leprosy we come to the following conclusions: -

1° No drug has yet been used which exerts a specific action on leprosy, like Mercury and the

Iodides

Iodides in Syphilis, and Quinine in Malaria.

2°. Of the Drugs used Chaulmoogra oil seems to act most beneficially.

3°. Intercurrent diseases yield to ordinary measures.

4°. The hygienic and dietetic treatment should be carried on simultaneously with the exhibition of Drugs.

(4) The Surgical Treatment of Leprosy and The Value of Surgery in Leprosy.

The treatment of very early cases of leprosy by the Excision of Nodules may be considered. The operation is indicated only in the following cases:— where the growth is of small extent and markedly circumscribed, and where there is no infiltration of the surrounding skin. In those instances in which I operated removing the growth with some of the surrounding unaffected skin, and cauterising the area from which it was removed with Carbolic acid I found the granulations came up readily and cicatrization occurred in the normal manner in all the cases though the growths were apparently completely removed, after a few months interval nodules have appeared, leaving however the cicatrix free, but rapidly affecting the surrounding areas. After experimenting in many cases I am of opinion that excision of these nodules

nodules has no appreciable effect on the disease in the direction of retarding it.

Treatment of Perforating Ulcers. These ulcers, so common in leprosy rapidly lead to gangrene of the tissues unless they are promptly dealt with. The method in vogue in the Asylum here is as follows — the ulcer is pierced with a curved bistoury right through the substance of the part from Side to Dorsum, or in any other situation, and the bistoury is brought outwards towards the nearest free border, completely cutting through all the ~~part~~ tissues - The wound is then stuffed with lint and allowed to heal by granulation - In the cases treated by this method have been remarkably successful - The tissues heal quickly — and en passant it may be noted that knife wounds in lepers heal quickly.

The Value of Nerve Stretching. Various nerves have been stretched with the following results: —

In Ulceration. Perforating ulcers in the feet have been treated by stretching the Sciatic nerve, and in the majority of cases have healed up, but the method advocated above is more successful.

For Relief of Pain. In some cases of anæsthetic leprosy there often is severe pain, deep seated, associated sometimes with perforating ulcers, sometimes without any assignable cause - Such pain is frequently relieved by nerve stretching - When pain is due to thickening of the

nerves

nerves as they emerge from foramina in bones, such as the supra orbital much relief may still be obtained

In Anæsthesia - the results are not encouraging. In one case here only a few benefitted, and that only temporarily.

To diminish tuberculation nerves have been stretched in the Asylum, but no success has ensued.

Separation of necrosed bone is facilitated by stretching of nerves.

The nerves principally stretched have been the Great Sciatic, the Median, the Ulnar, the Supra orbital. They are almost always enlarged.

Amputations: are usually called for by rapidly spreading gangrene; intractable ulceration; necrosis of bones. The principal amputations are of the fingers and toes. In extensive disease of the tarsus Syme's operation with invariably good results - a firm stump resulting, which the patient is able to use well. The operation of amputation below the knee by lateral flaps I have always performed in lepers with also very good results.

Removal of necrosed bone is invariably carried out in the Asylum, and then gangrene and other evils are averted. They occur mostly in anæsthetic cases - Ulcers and sinuses heal readily after the removal of dead bone

2

a cartilage - Removal of tubercles from the cornea has not been satisfactory -

Ligature of the vessels supplying tubercles of cornea has been tried - it is only of temporary benefit.

Tracheotomy and Laryngotomy are frequently performed when the Larynx is beginning to be seriously affected - It prolongs life for some months as it avoids sudden death by suffocation which without this preliminary measure is apt to occur.

Incisions into parts where burning swellings exist, into ulcers, sinuses; and to relieve the tension of tissues, are of much value in averting large sloughs and gangrene.

Circumcision may be done in cases of phymosis induced by tuberculation of prepuce.

Operations on the Eye - such as for Cataract: Iridectomy: Removal of pterygium, have been done as palliative measures.

There is no doubt that operative interference in leprous subjects is capable of affording much relief and giving much amelioration in a very large percentage of cases, and that by its timely aid life can be prolonged, and those cases of extensive gangrene averted, which bring on a quick death. And considering that the healing power of leprous tissues is quite as

good

food as that of normal and healthy tissues no hesitation should ever be displayed towards Operative interference. This remarkable healing power of the tissues is due to the high percentage of fibrin in the blood of lepers - about four times as much as in normal blood - and thus the formation of clots takes place readily and quickly.

A Note on the Prevalence of leprosy among East Indian Immigrants.

I have drawn attention (p) to the large proportion of East Indian Immigrants admitted into the Asylum. To obtain definite information regarding the proportion I have searched the Register of Admissions for 25 years, 1867 to 1891, and find that in these years there were admitted a total of 1078 patients, of whom were

Natives of Trinidad 447
" " India 434
" " Other Countries 197.

Of this total there were 101 Readmissions:—

Natives of Trinidad 37.
" " India 38
" " Other Countries 26

Deducting these we have:— Natives of Trinidad 410
" " India 396
" " Other Countries 171

This gives in the following proportions of admissions to the total :— Natives of Trinidad 41·96 per cent.

" " India 40·53 " "

" " Other Countries 17·51 " "

For the purpose of more detailed comparison however I append another table which will enable us to form a somewhat more accurate judgement.

Year	Natives of Trinidad	East Indian Immigrants	Natives of Other Countries
1867	63·15 p.c.	7·89 p.c	28·96 p.c.
1868	54·54	27·27	18·19
1869	62·85	20·00	17·15
1870	46·34	41·46	12·20
1871	66·66	29·18	4·16
1872	25·00	60·72	14·28
1873	48·27	48·27	3·46
1874	33·93	53·57	12·50
1875	34·28	54·28	11·44
1876	22·85	57·42	25·73
1877	40·00	45·71	14·29
1878	43·47	45·65	10·88
1879	60·00	36·66	3·34
1880	40·00	44·44	15·56
1881	42·00	38·00	20·00
1882	35·86	39·62	24·52
1883	26·92	51·92	21·16
1884	28·21	38·46	33·33
1885	43·18	40·90	15·92
1886	28·38	43·24	28·38
1887	40·00	41·53	18·47
1888	55·26	28·96	15·78
1889	60·53	13·15	26·32
1890	35·21	45·08	19·71
1891	40·91	43·18	15·91

It will thus be seen that each year a very high proportion of Immigrants is admitted, and the question naturally arises ; Do they bring the disease with them, or do

they

they contract it here? The possible prolonged latency of lep-
-rosy may be some grounds for the supposition that they are al-
-ready subjects of the disease before they leave India; that they
shew not the least trace or sign of the disease then must be
Evident on considering the fact that they have to undergo repeat-
-ed Examination at the hands of four medical men who
would unhesitatingly reject them on such discovery. We have
then to consider the period of manifestation of the disease
after their arrival in this Colony, and here we have the fact
that there are now in the Asylum only two patients who have
shewn the disease before the period of their indenture has expired,
that there have been only a few other such cases known, and
that in the great majority of cases the disease shews itself only
after the period of indenture, five years, has expired. It
seems unlikely that the great majority of leprous Coolies, if
they bring the disease, should not manifest any Symptoms
until after the expiry of this period: although the prodromal
Symptoms may persist for an inordinate length of time —
in some cases of Tuberculated Leprosy for almost six years
according to Boeck, and in Anæsthetic cases according to
Hillis for twelve months, yet in such cases there are Symptoms
which may lead to the suspicion, if not the actual diagnosis,
of the disease. We must therefore take it for granted that
there is not the least trace of the disease in them on
their arrival, and when they are sent to the Estates.

H

would seem therefore, judging from the table above, that the number of immigrant Coolies admitted maintains a steady average proportion, that this proportion is a high one, and that it shews no sign of decrease, although there does not seem any decided increase. And we must come to the conclusion that in all probability they do not bring the disease with them but contract it here, and that they are predisposed to it in some way as to make the conditions of life in which they find themselves after the expiry of their period of indenture affect them so as to induce the disease.

Segregation & Isolation

On a reference to the practice which prevails in the different countries in which leprosy is Endemic I find that isolation is carried out in some of them, and on the other hand that free communication is allowed between the lepers and the healthy population in others. Thus in the British Colonies, according to the Report of the Colonial Minister to the Hawaiian Government's enquiry, we find that in the East no segregation is enforced; while in the West Indian Colonies, in deference to the popular opinion in favour of the contagiousness of leprosy, it is strictly enforced. People who go about in the streets suffering with leprosy are liable to be arrested

by the Police, and are then examined by a special Medical Committee and sent to the Asylum.

In Spain restrictions are not placed in the way of communication between the lepers and the healthy. Nor is it otherwise in Portugal, for according to the 'Correio de Lisboa' lepers are allowed to use public vehicles + omnibuses.

In New Brunswick Dr. Tache states that the check and the decrease are in ratio of more or less prompt resort to Lazaretto: "Segregation is in my opinion the cause of the diminution of the disease." And the testimony of Dr. Smith also attributes the diminution there to segregation and the improving condition of the people.

In most other countries there prevails no systematic method of segregation.

In Norway, a country in which all questions in connection with leprosy have been worked out in great detail and with much Labonian care, and where a complete registration is made of all the lepers, the steady diminution in the number of lepers is attributed principally to the system of isolation pursued. "More than a single beneficial influence may be at work, but predominant is their exclusion dealing with the individual leper, as himself the source of ill to others"

In the Sandwich Islands an attempt is made to carry out a complete system of isolation, but owing to relatives

being

being allowed to live with the afflicted, and to have intercourse with the outside public, it cannot be looked upon as very efficient.

In Trinidad there is no system of Isolation although the system of Segregation is partially carried out owing to the existence of the Leper Asylum. Patients however are allowed to leave the Institution whenever they wish their discharge, and are granted leave of absence to go out of the Asylum grounds, whenever they may ask for such leave. There is no Law compelling them to stay in the Asylum, and no Law compelling them to go there. It is owing to the many advantages they see they derive from this place that they seek admission there to - The Leper in Trinidad is free and independent - he goes about the streets freely, and is a sight often seen outside in the streets, around the busy places and in the markets and places of amusement. He is allowed to engage in trade - to vend meat, and vegetables and bread; and he is given all the liberty of ordinary citizens and is subject to no special laws.

In view of the arguments I have adduced in an earlier part of this Thesis, and Especially of the fact that every leper is a focus of possible contagion and of certain dissemination of the disease, I am strongly of opinion that rigid isolation and segregation

Should

should be enforced in all countries where leprosy is endemic: it is only to this means that we can really attribute the dying out, the stamping out, of the disease in England and other European countries. There should be a complete registration of all lepers, a life history of the cases should be kept; and the Government should provide and subsidize places for their reception. No intercourse with the outside world should be permitted. But lepers may be allowed to marry (their fecundity is not great, and such a step would save much immorality). They should not be allowed to live outside among the healthy community, nor to engage in any trade or pursuit. They should be strictly isolated and segregated. Such an ideal Settlement would be in an island; the lepers to have plots of land and be allowed to cultivate provisions &c; to have their own domiciles and be allowed to marry: the provisions to be sold to the Government for market cost, the money to be paid to the lepers and such luxuries as tobacco &c be brought. Communication with the outside world to be prohibited.

But many difficulties present themselves in connection with the consideration of any system of compulsory isolation. First, at the stage of the disease at which isolation should be carried out. In the very earliest stages the patients themselves are unaware of their affliction, and even if

They

they came under observation in this early stage, could they be torn away from their relatives and be isolated? If so, should cases in every stage be allowed to mix with each other? Then again the difficulty arises of the manner of dealing with the better class patients, for if isolation is compulsory they will have to be dealt with in a similar manner with their poorer brethren. If a moral sense of the necessity of isolation in dealing with the disease could be made to prevail among the members of a community the task would be much facilitated.

The question of Compulsory isolation is bound to come to the front: for if a system of isolation is carried out, in order to be effective it must be thorough and complete. Diminution in the prevailing amount of leprosy has been observed where isolation is strictly carried out; this diminution may possibly have been due to other causes as well, such as improved sanitation and hygienic measures. But be that as it may, one cannot help but be struck with the fact. And when we consider what an appalling disease leprosy is; how it marks its victims and maims them; and how through a prolonged period of suffering it leads them to a sure death, no means that we can adopt, however stringent and compulsory, should be omitted by which we might stay the foul plague.

W. M. Koch.

Illustrative Cases.

Case. XI. Anæsthetic leprosy. Confined to Hands and Feet - Clear History.

Charles Goin, 50 - Male. living in Arima. No family history - Father was an Irishman; died from some cerebral mischief - 'deranged' from a fall. Mother also dead, from Dysentery. One Sister had some ulcers on face which healed rapidly.

In 1881 patient was Manager of a Cocoa Estate in Arima (Verdant Vale). He went out hunting in the woods. On his return was caught in a shower of rain and got wet through. The same night severe fever (malarial) set in, and lasted for two months: it came on in the afternoon and left him in the morning. He was much emaciated and weakened after this. Two weeks after getting up from bed - in October - he noticed a yellow mark, circular, flush with the skin, not painful, "like a stain", and insensation was present. It was indistinct at the edges - It lasted about 6 months. Then about 2 months after the onset of this he noticed another similar spot, larger; under left breast - This was oval, and insensation was present. This lasted for an indefinite time. He took a decoction of Sarsaparilla root and Epsom salts and

ground

found that these spots had disappeared after some months. At the same time he felt a great deal of drowsiness (which he mentioned to me without being questioned on the point), had no inclination to work, was easily tired out, and perspired profusely. At the same time he had subjective feelings — pins and needles — in the soles of his feet. He felt nothing wrong for 4 years: then he struck his left leg on a piece of wood, and a sore resulted which has never healed. He had much pain in the leg, and no anesthesia. Four years after the spots came on he went to Erin (a malarious district) where he again had severe fever, and an abscess in the back — this made him leave the district in 1885. He went back to Brina and has never done any work since owing to weakness and pain in the back. At this time there was no progress of the disease. In 1887 the feet were noticed to be numb, and to swell during the day, he got cramps easily, and 'pins and needles' in the soles. Then the colour of the lower part of forearms and of hands began to change to a dark brown. The tips of the fingers were benumbed, the nails began to shrivel and fall out. Then the loss of sensation began to spread upwards. He is a steady man, given only occasionally to excess in drink. Only had Gonorrhoea, no other venereal disease. Has 7 children,

of whom only 5 are living, one having died in infancy, cause unknown, the other in childhood (of malarial fever).

Examined 16 Oct. 1891. Expression of face heavy, dull. Capillaries dilated on cheeks and chin and nose. Slight anaesthesia in left ear. Skin of trunk quite free from mark and anaesthesia.

Upper Extremities: Lower half of forearm and hands affected. Skin darkened and bronzed. Quite anaesthetic, except in a circular patch on palm of both hands. Fingers swollen and glossy. Nails are shrivelled and dried up. Muscles of thumb wasted - Ulnar nerve enlarged and painful on pressure, and pain radiates to fingers. Median nerve also enlarged, painful and tender.

Lower Extremities. From lower half of legs downwards skin is affected; is darkened and bronzed. Ankles swollen and oedematous, skin hypertrophied. Total anaesthesia, except in soles where tickling can be felt and there is sensation to pain. On anterior surface of lower part of left leg a large ulcer. Under right heel a chronic ulcer - margins of which are thickened, anaesthetic and overhanging. An ulcer also under L. great toe.

Nose still blocked sometimes.

Remarks. The early history is marked and clear, the premonitory symptoms or prodromata also are clear. The case shews well the implication of extremities only.

Case XII Anæsthetic Leprosy of long duration affecting only the extremities

Manuel de Reitas, 30. Born in St Kitts. Came to Trinidad 3 years before admission. Led a fairly steady life, and surroundings at home were comfortable. No family history. Attributes disease to a cold.

History. Fifteen years ago the Right hand and arm became suddenly swollen, and on its subsidence "left no feeling at all". When the swelling came on he had much pain – unable to lie down or move. He had no feeling and no strength. About 5 years after he had pains and swelling in Right leg, from its middle to the ankle. This subsided after being blistered and leeched – but soon recurred, accompanied by fever and ague. (This he noticed always at the change of the moon). The leg was thereafter always swollen to some extent. Sensation was lost after the swelling came on. He then had "feelings" in his body — "things" in the body eating him up, feeling of heat and cold, sometimes heat spots came out (? erythema), which made him "look like a sea". This state of things continued – He was ailing more or less. Then about 2 years before admission he lost the sensation of left hand and left leg. He says it is not spreading. Has a slight erythematous Eruption on the thighs which causes him much pain & heat. Has never

never had Syphilis – only gonorrhœa.

On admission 27 August 1891. Face : Scalp : Ears &c normal. Trunk normal : Nipples normal.

Right Arm – an oval tâche above Elbow. Came on about a year ago. It began to itch him, he scratched it, & much "water and blood" came out. It scabbed over and left a cicatrix which is anæsthetic. Upper arm is normal. Upper half of anterior surface of forearm normal, elsewhere much anæsthesia. But only diminished sensation in palm pone web of fingers to wrist. little finger and ulnar side of Ring anæsthetic : in other fingers sensation diminished but not lost. Left Hand in same condition but he feels much more readily in the palm. Ulnar nerve enlarged.

Small erythematous patches in thighs which cause him burning and itching. Anæsthesia commences in middle third of leg, where it is absolute, runs to dorsum of foot (not quite so intense). Sensation normal in calves and in soles of feet. Œdema and tremor condition of Right leg ; less so of left. Feet and toes swollen. Right knee jerk present. No wasting of fingers. Slight contraction of R. little finger. No wasting of muscles. Feet are swollen, but there are no sores. In good state of bodily nutrition. Noticeable points are 1st its prolonged course. 2nd its limited extent 3rd the comparative freedom of fingers and toes.

Case XIII Anæsthetic leprosy, occurring at an early age: rapid spread at first.

George Welsh, ♂. Negro. Born in Trinidad. Family history cannot be obtained. As regards Personal history – as far as can be made out from his account he seems to have had the disease for about three years. It commenced with nodules in the ears, then he got a 'fit', and the left hand became contracted.

A boy of pleasant appearance but poorly nourished. Tâches are present over face, body, arms and legs: they are of varying size: generally circular in shape with a sinuous or serrate border, and sometimes fading into the surrounding skin. Colour varies from a light yellow to a dark brown. They are mostly anæsthetic.

Anæsthesia is extensive, over the patches, over face, ears, whole of Right arm, left forearm and fingers, legs (Except R. buttock), upper part of thighs & back of left leg. Sensation absent to superficial stimulation, but he feels pain deeper, as when a pin is run in about half an inch. Fingers show incipient contraction with absorption of terminal phalanges of both index. Hands not so characteristic. Feet anæsthetic with characteristic thickening of skin. Toes normal. No incipient perforating ulcer under left heel. Right Epitrochlear and Femoral glands Enlarged. Right Ulnar nerve more enlarged than left.

Remarks. Case is noticeable because of its early commencement. The extent of the anæsthesia is also to be noticed, as well as the fact that it occurs independently of the tâches. The enlargement of the nerves does not frequently occur to so marked an extent.

Case XIV. Anæsthetic leprosy. of long duration and stationary.

Subboo. Male. 27. Coolie.

He states that blebs appeared on left fore-arm, then on Right, and spread to thighs. Commenced ten years before examination. No family history. No cause assigned. The following is his condition on examination on 5th September 1890. Skin over both cheeks slightly thickened; over Malars and nose anæsthetic. Helix, lobes and back of ears anæsthetic. The affected patches are lighter in colour.

Both sides of back anæsthetic. A large tâche runs from R. scapular border around axilla to front. Anæsthesia in front over mammary region.

Complete anæsthesia in both upper extremities. No scars over ulnar borders of both fore arms - Commencing contraction of fingers: Cicatrices on palmar surface of same. Terminal phalanges of both indices absorbed and nails implanted on 2nd phalanges.

Total anæsthesia of lower extremities. Cicatrices on under surface of thighs and on legs & soles of feet.

Femoral glands enlarged – none others.

Voice etc. normal.

Remarks. Disease is of long duration in this case. Anæsthesia is extensive over arms and legs but contraction is only commencing in the fingers. The Tâches are lightly coloured and anæsthetic – not typical Lepra lepræ. Its origin in the blebs – the earliest sign noted – In spite of extensive anæsthesia there are no evidences of recent ulceration.

Case XV. Anæsthetic Leprosy. a mild case, stationary.

Anganoo. M. 38. Cookie.

Disease commenced three years ago with a sore on left great toe – no family history. Says he got it from a cold contracted while working in the boiling house of an estate.

Examined 9 Jany. 1890. A few patches on forehead. Nothing abnormal in Nose, Cheeks, Lips, Eyes, Ears or Neck – no anæsthesia.

Two small pale patches on loins: no anæsthesia.

Nipples normal.

Upper Extremities. Pale patch, back of L. arm and

Elbow. Also back of R. Elbow and forearm. Both little fingers becoming contracted, also 4th fingers. No anaesthesia. Nails intact –

Lower Extremities – Few small patches below knees. Skin of feet thickened and toes a little swollen. Nails broken. R. little toe shortened – Large pale patches on thighs – not anaesthetic.

Glands not enlarged. Voice normal.

Case XVI. Anaesthetic Leprosy: progress fairly rapid – hands involved to some extent.

Meelan, an aged Male Cochin who gives his age as 54 but is more 64 years in appearance.

No family history. He knows no probable cause but on questioning him he states that next door to him on the Estate lived a leper with ulcers on hands and feet and fingers dropped off. Patient is not very clear in his statement but the question of contagion might well be considered here. Commenced three years ago with pain in left foot.

On admission 17 March 1891 his condition was as follows — Over face etc skin is loose: there are no tâches and no anaesthesia. On Trunk, small circular pale patches of varying size, not anaesthetic

Upper extremities. Tâches over Hands & both

Arms

arms. Anæsthesia commences 1 inch above wrist and is absolute in hands and fingers: higher up sensation is normal. Left hand – middle, ring and index becoming contracted – Right – much less so. Nails, right middle wasted; ring and little, are furrowed transversely. No cicatrices. Lower Extremities – From 2 in. above Ankles and downward there is total anæsthesia: above this sensation is normal. Tâches on thighs are few. Left great toe absorbed and shortened. Knee jerk diminished. Ulnar and Median nerves enlarged on both sides.

Remarks. Here we see that the tâches are not anæsthetic, that anæsthesia occurs in hands and feet; Contraction of fingers only commencing; nails not much affected; nerves Enlarged. This a fairly recent case and illustrates the Early affection of hands and feet.

+

Case XVII. A recent Case of ? Mixed Leprosy.

Jemdah – 25. Male. Cookie.

The disease commenced 2 years ago, with small papules and desquamation on back of left hand. No other members of family affected and Cause unknown. He says he knew intimately and associated with two other lepers on the same Estate, where he is an indentured Cookie.

He

On admission 4 July 1891. Over bridge of nose and both malar prominences a reddened acneiform condition - on ears small papules. Hairs not dropped off. Reddening and thickening of skin over supra ciliary ridges. A few vesicles on back.

Right Nipple slightly enlarged.

Upper Extremities - Right - sensation only in terminal phalanges; on dorsum of hand none. Sensibility on palms - Wasting of dorsal interossei, and muscles of ball of thumb. Nails intact. Tendency to eczematous Eruption in upper arm. Left. Anæsthesia as in right. Commencing wasting of ulnar border of hand. Nails intact. Eczema over elbow. Both Ulnar Nerves Enlarged.

Lower extremities - Puffiness and edema of both legs - much itching. Anæsthesia of feet. Nails opaque.

Glands not enlarged. Other systems normal.

Remarks: The case shews well the slow and insidious progress of the disease after it is implanted. The hands and feet principally are anæsthetic. The only evidence of tuberculation is over the malars (where the skin is thickened and lymphoid) and the papulation of ears. It commenced in back of left hand. There is no contraction and anæsthesia is limited - It shewed itself 6 months after his arrival in the Colony under indenture - This is a very early case.

Case XVIII. To illustrate paralytic symptoms which occur in Anæsthetic Leprosy: with a suspicion of syphilitic taint.

Robert Dixon. 34. Negro.

Family history good: Commenced like a patch of ringworm on face.

Suspicious signs of Syphilis, (1) thickening and pain of supra orbital nerve, (2) mouth drawn up to left side. (3) discharge from prepuce and sore on penis, (4) enlarged axillary glands.

Re admission 12 July 1867. Over R. eyebrow is a small pale patch about ½ in. in diameter. The supra orbital notch can be plainly felt, and the thickened nerve rolling about under the finger. Patch very hypo æsthetic. Much thickening of lips, lower desquamating. Mouth drawn up to left side. Sight good. Eyeballs prominent. R. Eye bloodshot, left less so. Pain in eyes when matter is lost. Pale, scaly patches below and behind ears, but sensation normal. Scaly patches over back and front of chest and abdomen, varying from 1 in to 6 in. in diameter. Sensibility diminished. Edges raised.

Upper Extremities, similar scaly anæsthetic patches in arms and over Deltoid. Back of forearms involved in similar patches, and to a less extent

the

the front. fingers contracting. Skin hard, thick. Blebs on fingers have arisen spontaneously (like Burns). Hands and fingers quite anæsthetic, also back of forearms, and wherever patches are on forearms. Nails inclined to split longitudinally.

Lower Extremities - Similar patches on thigh - Large scaly patches extending a little above knees and encircling the legs: quite anæsthetic. A little sensation left on inner side of R. leg above ankle, where skin is free, and on dorsum of R. foot. Toes swollen. Nails breaking. Healed ulcer on ball of left great toe.

Glands - axillary much enlarged - Femoral slightly.

The left side of face is drawn up, and the right side is quite paralysed: paralysis involves the orbicular muscle of eye. It presents all the appearance of Bells paralysis. This variety of paralysis is frequently seen in anæsthetic leprosy.

Case XIX. Anæsthetic leprosy. Almost complete anæsthesia of the body.

Rampersad. Male, about 50, Coolie. Onset 12 years ago. First noticed anæsthesia; three years set in which lasted one year.

Admitted 2 February 1891. There is ~~almost~~ total anæsthesia of Forehead, Nose, Cheeks, lips, Eyes and

Ears: On the scalp there is slight anæsthesia. The neck is anæsthetic and there are a few tâches. On the front and back of the trunk there are patches of anæsthesia all over, and the site of yaws tubercles is well marked. In both Right and Left Arm, Forearm, Hand and fingers there is total anæsthesia: and Enlargement of middle phalanx of R middle and terminal joint of other fingers. Total anæsthesia in both Lower extremities, the skin rough and dry, and yaws being present in Soles of feet - Femoral glands enlarged. Buccal cavity anæsthetic - Larynx and Voice normal. Digestive, Respiratory, Circulatory and Genito-Urinary systems normal, except Temperature in first system which is totally anæsthetic - General nutrition fair.

Fingers :— Right. little, slight contraction: Ring, enormous swelling of middle phalanx: Middle, first phalanx and proximal part of second enlarged: Index, second phalanx enlarged and dislocated; Thumb, meta-tarsal enlarged: Wasting of muscles of thumb: Nails unaffected. Left. Swelling of distal ends of meta-carpals, and phalanges obliquely set: Fourth meta carpal and fifth not enlarged, but 1st phalanx of little finger. Nails normal. Superficial ulcer on of L. little toe.

Remarks. 1°. Extensive area of anæsthesia, only the scalp being slightly exempt. 2°. Enlargement of bones — which seems like Rheumatoid Arthritis —

No pain: bone itself seems enlarged: movements at joints possible, except where the enlargement of bones prevents it. 3°. Anæsthesia of Torque remarkable. 4°. In spite of the extensive anæsthesia of lower extremities, walk is not affected. 5°. Knee jerk is normal, but no ankle clonus present. 6°. Vaso spots prominent on chest and arms — dark, irregular outline.

Case XX. Anæsthetic Leprosy. Early case in a young child: Mother being a patient in Asylum with Mixed Leprosy.

Beatrice Louise - Female - 4 years.

Mother suffering from Mixed Leprosy contracted while she was nursing the child, and when she left the child four years ago there was a suspicious spot on cheek.

She is a plump, sturdy child of pleasant features & shows no likeness to a leper. Skin soft and supple.

Tâches are most marked — 1. Under left eye about size of a shilling, 2. Over ulnar side, back and front of R. arm. 3. Over left upper arm. 4. Right calf and shin. 5. Inner side of left knee. They are all lighter coloured, lustreless, somewhat dry but not papulacem. Anæsthesia present in varying degrees in some. Hands and nails quite normal: also the feet. Ulnar nerve slightly enlarged. Over the arms and legs in addition to the typical

typical taches, there are small circular darker coloured patches, as are left after the disappearance of a gyaws tubercle.

Remarks: 1°. Youth of patient, probably set in shortly after birth, the tache under left eye being earliest signs. 2°. Slight amount of anæsthesia. 3°. Hands and feet not yet involved. 4°. Good case of Early anæsthetic leprosy.

Case XXI. Tuberculated leprosy occurring in childhood. Maternal grandmother has disease of the same variety.

Buddram. M. 5. Admitted 5 Sept. 1890. Disease has existed almost a year before admission, and first appeared in Right Ear and Cheek, and then in left ear and cheek.

On examination - Skin infiltrated and thickened over forehead; and all over face there are tubercles of varying size. Skin of face is glossy, thickened, with fine capillaries running over it. The whole of the nose is affected with thickening of the skin. Ears are tuberculated and enlarged. Trunk: a few taches of varying size over front and back with slight anæsthesia. One large patch over R shoulder. A pityriasis rash over lower abdomen. Nipples - left enlarged, right small. Right Upper Extremity - Skin thickened over elbow, & on outer surface of forearm a few small

taches

taches. Large taches extending from shoulder. Fingers glossy and slightly swollen. Left Upper Extremity is the same — a few taches with slight anæsthesia. Lower extremities: Skin over legs hypertrophied and large taches over calf and thighs. Pityriasis spreading on to thighs from abdomen. No anæsthesia. 12 Aug. 91. Has had two severe attacks of Remittent Fever and the tubercles of face, large flattened elevations, have subsided after each attack, but have grown up again. At present they are flat on the face, the skin being thickened and darker. The patches on forearm are like splashes of dirty water: sweat ducts obstructed: skin roughened and dry. The nose is now anæsthetic, also the flattened tubercles of face. Eye brows are beginning to fall out.

Remarks: 1° Heredity - Example of Atavism — maternal grandmother in Reykum with Tuberculated leprosy. 2°. Early onset: when 4 years old. 3° Subsidence after each attack of fever. 4°: Anæsthesia of tubercles. 5°. Fingers not affected.

Books of Reference.

1. Lepers Asylum Reports + Records - Trinidad.
2. Sandwich Islands Reports.
3. Velsir - Traité theorique et pratique de la lepre
4. Willis - Leprosy in British Guiana.
5. Carter H V. Lepra.
6. Liveing - True Leprosy.
7 Macnamara - Leprosy a communicable disease
8 Danielssen and Boeck - Traité de la Spedalskhed