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# THESIS

on

## DISEASES of the GILBERT and ELLICE ISLANDS

by

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For convenience of description I shall divide this paper into parts,one, dealing with those ailments usually found in hot climates and termed Tropical diseases;the other with those diseases which are found in Europe and in temperate climates as well as in the Tropics,and called European diseases.

## TROPICAL DISEASES.

YAWS.(Framboesia Tropica) Yaws is prevalent in the Gilbert and Ellice Islands. Though a disease of infancy and childhood, adults and even old people are also affected. It is slightly more prevalent among females than males in these islands. It is stated to have been introduced into the Gilbert and Ellice Islands some thirty years ago by native labourers returning from Samoa and Fiji.

Aetiology. Yaws is very contagious,the infection being due to a specific microorganism in the pus of the papules, discovered by Dr Aldo Castellani of Ceylon in 1905 and called the spirochaeta pertenuis. Morphologically it closely resembles the spirochaeta pallida of Schaudinn. In 1906, shortly after my appointment as P.M.O. of the Protectorate, I made examination of several series of films of the pus of Yaws papules and also of the secretions

secretions

from the interior of the papule after the upper half with the pus crust had been removed. The last series comprised thirty cases, twenty in which Giemsa's stain had been used and ten where Gentian Violet dissolved in a solution of acetozone, as recommended by Dr Alex. Maclennan of Glasgow. In each case six films were examined. I obtained the following results;-

(a) Staphylococcus albus and aureus in all the films.

(b) Streptococci in large numbers in all films.

(c) Bacilli with square ends containing spores in all films

(d)Large cocci in pairs in all films.

(e) The spirochaeta pertenuis of Castellani in twelve of the thirty cases examined.

(f) Divisional form of the spirochaeta pertenuis in sixteen cases.

Some spirochaetae had a ring like head, thickened on one side like a signet ring.In some varieties the spirils began close to the ring head;in others there was a straight interval before the commencement of the spirillation.

In the above described films I also noticed numerous bodies about three to four times the size of an ordinary pus corpuscle,which I think of sufficient importance to warrant description,in view of their possible close relation to the spirochaeta pertenuis.

These bodies ,presumably protozoa, were irregularly round or oval in shape and were surrounded with a delicate investing membrane,which, in some instances had ruptured.

ruptured. The cytoplasm was composed of fine granules lying in a network of fine fibrils. Two or more round or oval nuclei were present containing nucleoli, also vacuoles and refractile bodies. In nearly all of these protozoa, sp spirilla and chain like bodies (transitional forms of spirochaetae ?) were seen in the cytoplasm or in the neighbourhood of protozoa whose investing membrane had ruptured and given exit to their contents. The number of spirils in these spirillae/ or spirochaetae ranged from four to eight. The spirochaetes had a ringed head. They seemed to be capable of escaping from the protozoa without a preliminary rupture of the investing membrane, as some were seen with their head within the protozoan and the spiril portion of their body outside. In the cytoplasm there were also rod-like bodies with rounded ends or one extremity pointed containing one to three spores or nuclei as well as crescent bodies with spores or nuclei at either end or at the bend of the crescent. Some of the protozoa were seen to be in close contact as if a process of fusion were taking place, the limiting membrane being absent at the point of contact.

The presence of these ~~protozoa~~ spirochaetes in the above described protozoa raises the question -Are they the spirochaetae pertenues of Castellani, which they closely resemble?. If t they are, I should be inclined to regard the protozoa as the parent bodies of the spirochaetae pertenues, which are consequently a stage, possibly the final one, in the developmental cycle of this protozoan.

FLIES AS CARRIERS OF CONTAGION IN YAWS.

Observing that large numbers of flies infested the houses of natives suffering from yaws and were in frequent contact with the pus on the surface of the papules , I made the following experiment to ascertain whether or not flies were carriers of contagion. The patients in the Yaws compound were instructed to refrain from smearing the papules on their bodies with Ung Hydrarg Nit Dil , which is the practice in my hospitals,in order that the the flies might have an opportunity of settling on the papules and thus getting infected. The flies were then caught and placed in sterilised glass jars. ,which were afterwards filled with sterilised water.About two hundred flies were caught in this manner. The bottles were then shaken in order that any bacteria adhering to the flies might be wahed off into the water. Twenty four hours later , the water was centrifugalised and smear preparations made from the precipitate. Twelve slides were stained with Giemsa or Gentian Violet in acetozone, and twenty to thirty minutes spent in examining each slide. In all the slides examined,the same microorganisms were found as were senn in the pus obtained direct from the papules described above, and in four specimens well formed spirochaetes were present and divisional forms in eight.

From this experiment I draw the following conclusions;-

(1) The house fly is capable of carrying the virus of flies on its body or limbs, and should it alight on an abraded surface on the person of anyone not previously protected by an attack of the disease, infection would probably follow.

(2) It is necessary to prevent flies coming in contact with the sores on the bodies of yaws patients, lest they carry contagion to others on whose bodies there may be abrasions. This is effected in the native hospitals in the Gilberts by the patients annointing the papules on their bodies with Ung Hydrarg Nit Dil., and apparently is successful as in Tarawa, Hospital established over five years ago, not a single case of Yaws has arisen in the General Hospital, although it is distant not more than twenty yards from the Yaws compound.

SYMPTOMS. In the description of the symptoms of Yaws, it is convenient to divide the disease into four stages- An incubatiin stage,a pre-eruptive stage, an eruptive stage and a late stage or period of sequellae.

THE INCUBATION PERIOD. By the incubation stage I mean the period between the receiving of a skin abrasion or wound and the development of the primary papule or mother Yaw on this abrasion or wound. The duration of this period is of necessity uncertain, owing to the want of attention on the part of the natives, and their vague ideas as to time., Roughly, it may be regarded as varying from two to six weeks.The primary papule or mother Yaw , as mentioned

mentioned above,occurs where there has been an abrasion of the skin,usually on the arm or leg ,the natives being liable to injuries when fishing on the reef or walking through the bush on account of their limbs being naked. The dorsum of the foot,between the toes, the elbow,and the extensor aspect of the arms are favourite situations for the primary papule.Occasionally the primary papule appears on the female nipple,when the mother has been nursing a child with yaws on its lip.Another common situation is the upper arm where the mother rests the child's head.I have never seen the primary papule on the male or female genitals.

The mother yaw or primary papule is composed of granulation ,and as a rule does not attain the dimensions or prominence of an ordinary papule. It disappears in about a fortnight ,leaving a whitish scar similar to what is left by a superficial ulcer. In some cases it is impossible to recognise a definite mother yaw, a sore having the appearance of an ordinary ulcer being the only lesion present prior to the appearance of the general papular eruption.

THE PRE-ERUPTIVE STAGE. This period embraces the time between the appearance of the primary papule and the general eruption . It varies from eight or ten days to a fortnight.During this period there is a slight rise in temperature, nocturnal headache, pains in bones, and, in the case of children , often vomiting and diarrhoea.

ERUPTION STAGE. In ten days to a fortnight from the appearance of the mother yaw, a general eruption of small papules about the size of a pin's head is seen. These papules, which occur in successive crops, rapidly increase in size, assume a wart-like appearance and exude a clear fluid which afterwards becomes purulent and forms a firm yellow crust on the surface of the papule. On removal of this this crust a raw surface is exposed, shewing enlarged papillae similar to those of an ordinary wart. The mature papule varies in size from a quarter to one inch in diameter. In some instances the papules remain discrete, in others they coalesce and form condylomatous masses round the lips, nostrils, anus, male and female genitals, axillae and groins. I have never seen papules on the hairy scalp, though they often appear at the junction of the hair and skin. Yaws frequently appear on the soles of the feet, where, owing to the irritation caused by walking and their tendency to burrow under the thick skin of the sole, they cause great pain from pressure on nerves, often resulting in partial or complete lameness. In these situations the yaws are very intractable to treatment, and it is necessary to soften the skin with Sod Bicarb solution and afterwards scrape away the superjacent skin under an anaesthetic in order to gain access to the yaw underneath which by this time has given rise to more or less suppuration. Underneath and around the finger and toe nails are favourite situations for yaws, where they cause much pain.

In cases of neglected yaws the papules which have coalesced tend to ulcerate, but I have never seen the extensive and deep ulceration and necrosis, similar to the tertiary lesiins of syphilis, e.g. necrosis of nasal and palate bones, described by some authors as due to Yaws. In six years experience in the Gilbert Islands, where I have personally treated over 500 cases in Tarawa Central Hospital, as well as having seen several hundred others on the other islands of the Gilbert and Ellice/I/ Groups on my Official visits, I have never yet observed observed the extensive ulceration and necrosis of tissue described as occurring in the tertiary stage of Yaws, and which some observers are inclined to regard as a proof of the identity of Yaws and Syphilis. The cases of deep ulceration resulting in cicatricial contracture of joints, closure of mouth and nostrils and necrosis of bones, which I have seen in the Gilbert and Ellice Islands were due to syphilis which is prevalent in its congenital form throughout the islands, having been probably introduced by the Spanish adventurers who visited the islands in the 15th Century, or possibly earlier by Malays who may have drifted or sailed to these islands.

I have seen many cases of Yaws occurring in young persons who had syphilitic cicatrices on their bodies and whose parents were syphilitic. I am inclined to think with all due deference to those who describe necrotic changes similar to those of tertiary syphilis, that such cases were really a combination of Yaws and syphilis, i.e.

i.e. yaws occurring in a case of congenital syphilis, the virus of the latter disease having been given an opportunity of exercising its virulent properties ,owing to the resistive powers of the patient being lowered by the action of the toxins of the specific micro-organism of Yaws. That this explanation is probably correct is shewn by the recent successful inoculation of syphilitic monkeys with the virus of Yaws by Castellani, and the subsequent development of the latter disease. This is a point which I consider has not been sufficiently considered by those who regard the two diseases as identical. Another fact of practical importance which I have observed among the Gilbertese suggestive that the two diseases are distinct ,is the ease with which yaws can be cured by appropriate treatment , as compared with the protracted course of medication necessary in treating cases of syphilis. I shall refer to this later when discussing the treatment of the disease and the differential diagnosis of Yaws and Syphilis.

The papules under appropriate treatment disappear in three to eight weeks, leaving whitish discolorations, which fade and darken under the influence of sunlight, those round the mouth, anus and axillae being the last to be absorbed. The papules themselves are not sensitive, though there is pain on pressure in the circumjacent area. A peculiar fusty odour exudes from the bodies of those suffering from Yaws.

On the trunk the papules often coalesce and form rings with a clear area of skin in the centre.
During the eruptive period there are various constitutional affections, principally anaemia with subsequent loss of appetite and debility.The pains in the bones and headache are often so severe as to prevent sleep. In other cases of long standing which have not had suitable treatment there is a tendency to the development of tuberculosis, glandular or pulmonary, diseases which are common in the Gilbert Islands, accounting for two thirds o of the deaths in the Protectorate.
LATE STAGE OR PERIOD OF SEQUELLAE. Neuritis is common , especially among elderly people,and is often so severe as to cause partial lameness when it attacks the lower limbs. Pressure along the course of nerve trunks cause pain. It disappears rapidly under large doses of Iodide of Potassium and the daily application of the Faradic current. Phthisis pulmonalis supervenes in cases of long standing which have had no suitable treatment and are degbilitated. It usually has a fatal termination.
Asepticaemic condition occasionally ensues in cases of neglected yaws,where there is a copious eruption and purulent secretion. In one instance this condition ended fatally. The death rate in yaws in my experience has been nil,apart from the fatal terminations due to intercurrent diseasese.g. phthisis.
DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS FROM SYPHILIS.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS FROM SYPHILIS.

1. The eruption of small papules,which increase in size rapidly assuming the appearance of warts witha crust of pus on their surface, accompanied by a history of a mother yaw followed by sequelae of headache, pains in bones and slight fever, are quite sufficient to justify a diagnosis of Framboesia.

2 The rapid disappearance in a few weeks of the eruption under large doses of Potassium Iodide, contrasting in this respect with the prolonged course of medication necessary to cure syphilitic lesions , which may resemble the papules of Yaws.

3 The absence of sore throat, alopecia and the polymorphous skin affections of syphilis. With the exception of a slight desquamative dermatitis, I have not seen any skin lesion in yaws other than papules.

4 Ulceration, if any, is superficial, and does not present the 'punched out' cavity and glazed margins so characteristic of syphilitic ulcers.

5 Gummata, nodes and periosteal thickenings are not found in Yaws, while such lesions are common in syphilitic subjects in the Gilberts.

Yaws is never congenital, while syphilis is.

7. Yaws occurs in those who are syphilitic and who have old syphilitic scars on their bodies.

8 Asecond attack of Yaws is not uncommon in adults who have had the disease in their youth, while a second attack of syphilis is very improbable,or, at least,

least,exceedingly rare.

9 The primary sore in yaws is extra-genital, while the primary sore in syphilis is more frequently on the genitals than on other parts of the body.

10 The inoculation of syphilitic monkeys with the virus of yaws is followed in due course with the development of the latter disease.

## TREATMENT.

Cleanliness is essential in the treatment of yaws. This i s effected in the hospitals which I built by providing each hospital with a twenty gallon iron caldron, in which water is boiled, the caldron being kept in a small native house with open sides.The patients wash their bodies twice daily with carbolic soap, and afterwards annoint their papules with Ung Hydrarg Nit dil (vaseline three parts, Ung Hydrarg Nit one part), a small box of which is given to each patient. The ointment serves a double purpose, acting as an antiseptic and preventing the growth of pyogenic organisms in the secretions on the surface of the papule, and also prevents flies carrying contagion to healthy patients, as I mentioned in the earlier part of this paper.

Medical treatment consists in the administration of large doses of Potassium Iodide. Adults receive 10-20 grains thrice daily;children2-10 grains thrice daily according to age. The Gilbertese stand Pot Iod well, as I have only seen two cases where symptoms of coryza were present, even after several weeks of 20 grainst.i.d.

Where there is anaemia and debility , Iron$ tonics with codliver oil or Petroleum Emulsion are given in addition to the Potassium Iodide.

Yaws on the feet are treated by dressings of Sod Bicarb to soften the skin. The patient is then anaesthetised ,and the yaw exposed by thoroughly scraping away the thickened skin with a Völkmann's Spoon. The Yaw is then treated with Ung Hydrarg. Yaws on the soles of the feet are very persistent unless treated in this way. Neuritis disappears rapidly by Faradisation and massage.

For several months after I came to the Gilberts I tried various preparations of Mercury in the treatment of Yaw, but they had no appreciable effect on the papules or headache and pains in the bones. The contrast with the rapidity with which these symptoms disappeared under Potassioum Iodide was so great that I was compelled to discontinue the use of mercury, as the patients were asking why the others treated by Pot Iod along side them got well so rapidly. I also tried tonics alone, but they had no effect unless combined with Pot Iod.

The average time the patients are under treatment is five weeks. Some cases have completely recovered in three weeks, while othere have been in hospital for over two months., the latter being those who were debilitated.

The natives treat Yaws by dressings of leaves of astringent plants. This treatment has little effect ,if any, on the disease

and there is invariably much inflammation of circumjacent skin, and ulceration and neuritis in an aggravatated form.

**PATHOLOGY.** Microscopic section shews that the Yaws papules are composed of granulation tissue, There is great enlargement of the papillae of tehe skin and extensive round celled infiltration in the corium, and hair follicles. The coats of the blood vessels are thickened.

## LEPROSY.

Leprosy is found in the Gilberts Islands in the nodular and anaesthetic forms. I have never seen any cases of leprosy in the Ellice Islands. It is not very prevalent in the Protectorate, there being not more than 50 cases at present out of a population of over 30,000 people. The lepers are all segregated in compounds on separate islands or several miles from villages, in charge of Orderlies, and no communication is permitted between the lepers and their friends, except that once a week a relative may come to the fence surrounding the hospital and speak to a leper within.

It is often very difficult to diagnose leprosy in the early stage prior to the development of nodules or ulcerations of fingers, when there are only a few whitish discolorations on the body, which may have caught the attention of the native magistrate or the patients friends The following signs have been of great assistance to me in forming a diagnosis.

(a) Recurring attacks of erisipelas in the nasal and malar regions, causing considerable swelling.

The swelling may disappear entirely between the attacks, but latterly considerable thickening is left, which is always suggestive of possible leprosy.

Paralysis of the Levator Palpebrae

(c) Enlargement of the great Occipital nerve,Ulnar nerve

(d) Ulceration of the septum nasi(e)

(e) Careful testing of all discolorations in the back or chest for complete or partial anaesthesia.

Treatment.Beyond tonics and attempts to keep them clean I have not been able to make any attempts improve their condition. The natives treat leprosy by burning out the or cutting out the patches of anaesthetic skin, but ,o of course, it has no effect.

## ELEPHANTIASIS.

Elephantiasis is very common in the Ellice Islands, but rare in the Gilberts. It affects the arm, leg, scrotum, labium and female mamma.

The operation i do is as follows;- Under an anaesthetic the tumour (scrotal) is firmly ligatured by a strong rubber band tied in a figure of 8 as close to the pubis as possible. A catheter is then passed into the bladder and the penis dissected out, and, should the skin be affected , denuded and laid on the abdomen. Lateral incisions are then made over the testicles which are also placed on the abdomen.As hydrocoele is invariably present in elephantiasis of the scrotum, a double radicale cure is performed prior to this . Two iron skewers are then passed through the tumour below the rubber band at the

at the pubis; this prevents the band slipping off when the tumpur is removed , avoiding the haemorrhage which would be great on account of the enlarged bloodvessels. Flaps are then made on the scrotum and dissected back. The tumour is then amputated below the skewers, and after loosening the tourniquet slightly, all the bleeding vessels are ligated. The tourniquet is then removed and the testicles placed in the new scrotum formed by the flaps, which are stitched together with horse hair, drainage tubes being inserted at the sides. The penis is dressed with lint covered with vaseline. Healing takes place in a fortnight , the penis is afterwards functionable.

A similar operation is performed on the female labium. Great care should be exercised in removing labial tumours onaccount of the possibility of a hernia being present.

SKIN DISEASES. Tinea circinata is common in the Gilbert and Ellice Islands. Tinea imbricata is rare. Treatment. Tinct Iodi or Ung Chrysophanic dil Psoriasis is rare. Eczema is common. Dermatitis occurs in yaws.

EUROPEAN DISEASES.

## EUROPEAN DISEASES.

TUBERCULOSIS. Tuberculosis is common in both the Gilbert and Ellice Groups. According to the native death registers it is responsible for two thirds of all the deaths in the islands. However, it must be remembered with regard to native death registers that pneumonia and bronchitis , should they be accompanied by emaciation, are also included in the native word for consumption, which means a wasting.;also that any intestinal affection , accompanied by distension of the abdomen and emaciation is regarded as tubercular peritonitis. Still, in spite of the above sources, from my own personal experience of about 20,000 cases treated at my head quarters hospital and the records of my orderlies in other islands , who are stated to have treated over 40,000 cases in the hospitals under their charge, I do not think that the proportion of deaths ascribed to tuberculosis is too large.

I have been much impressed by the large number of cases of tuberculosis of the cervical glands, especially among children and young adults;also that tubercular adenitis of the neck was usually the precursor of phthisis pulmonalis and tubercular peritonitis. The natives themselves had also observed this connection, and on several occasions had attempted to remove the enlarged glands with their sheath knives, attempts ,which, unfortunately were unsuccessful as the patients died from haemorrhage, the natives not possessing pressure forceps., though,

though, they made made attempts to arrest the haemorrhage with their fingers.At my head quarter's hospital the majority of my major operations are for tubercular cervical adenitis,the parents or guardians bringing their children to the hospitalas soon as they discover an enlarged cercical gland, and I am frequently stoppped by mothers on the road to examine children's necks for glandular enlargement.

The explanation of the prevalence of tuberculosis among the islanders is to be found in the habits and hygienic conditions under which they live; the practice of promiscuous expectoration on the ground around their houses and also on the floor of their houses; the use of the same tobacco pipe which is passed round as a mark of good fellowship;and the use of common drinking utensils. However, I consider the most fertile source of infetion is the practice of mothers and nurses feeding infants and invalids by first chewing the pandanus and cocoanut ,and afterwards inserting the bolus in the mouths of those they are tending.Should it happen that the mother and nurse be tubercular with tubercle bacilli in their oral secretions, there is thus afforded an easy means of access through the oral oral lymphatics to the submaxillary and cervical lymph glands. I have also observed that the mesenteric glands become affected before there are physical signs pulmonary tuberculosis, but unfortunately, owing to the

the native prejudice against mutilation of the dead, I have been unable to verify this observation by post mortem examination. The above views are borne out by a series of experiments by O. Reumann of Grufswald (Progressive Medicine March 1906, p.270) who fed rabbits with tubercular material and found that the submaxillary and cervical glands became enlarged and tubercular first, then the abdominal glands, and finally the lungs and bronchial glands.

I also had an opportunity of verifying this in the human subject. A native carpenter who had been a patient in Tarawa Hospital on account of phthisis pulmonalis, and in whose sputum tubercle bacilli had been found on several occasions, brought me his child, aged three years for treatment on account of an enlarged gland on the right side of its neck. I examined the child's lungs carefully and found them normal. As the gland was small I did not operate, but prescribed tonics, and instructed the father to bring the chid to me in a fortnight. He returned in three weeks, when the following was the condition of the child;- The glands in the Anterior and Posterior cervical triangles were enlarged and suppurating; the abdomen was distended and the mesenteric glands enlarged; the left leg was oedematous due to pressure of the enlarged sacral glands on the iliac vein, and moist rales were audible at the left apex. On enquiry, the father stated that he had been feeding the child in the above mentioned native fashion. Death took place ten days later. No Post mortem was obtained.

Two similar cases also occurred where two healthy children belonging to healthy parents were infected by tubercular foster mothers by feeding in the native fashion described above. Though there is a possibility of infection by tubercle bacillideposited in the crypts of the tonsils during inhalation and afterwards carried to the cervical glands, still I am of the opinion that there is an intimate connection between this method of feeding infants and invalids and the large amount of glandular tuberculosis in the islands.

Tuberculosis is ststed to have been introduced into the Gilbert Islands by natives returning from Tahiti some thirty years ago. However, it may have reached the islands at an earlier date by means of sailors who had been wrecked or who had deserted from ships. In such instances it was customary for the chief of the island to present the stranger with a piece of land and a native wife.

Treatment of tuberculosis . Tuberculin. In early cases of glandular tubercle ,which I mentioned above as the precursor of systemic infection, I give injections of one two thousandth of a millegram of Koch's tuberculin(T.R one a week. In many cases when the glands are small and before secondary infection has supervened causing suppuration, absorption takes place. However, should absorption not take place in a month,I excise the glands. The glands must be thoroughly cleared outfrom both cervical triangles , as excision of one or two superficial glands

is useless, owing to infection spreading from the deep cervical glands lying alongside the Carotid sheathwhich are often difficult to detect by palpation before the deep cervical fascia is opened. As a result of an experience of over 1000 cases of tubercular cervical adenitis which I have operated on, I consider that when ever a superficial cervical gland is the size of a hazel nut, the deep cervical glands will also be found affected ,even though they do not appear enlarged on palpation.
The operation which I find is most beneficial is as follows; An incision is made from the tip of the Mastoid process across the neck at the level of the Cricoid cartilage following as far as possible one of the skin folds for the purpose of hiding the resulting scar as much as possible. The skin is then dissected up as far as the lower maxilla and down to the clavicle. If necessary, a second incision is made from the tip of the mastoid to the acromion process. Free access is thus gained to both cervical triangles. The superficial glands are then removed by blunt curved scissors and a Lane's dissector, the External Jugular Vein being divided between ligatures if necessary. The deep fascia over the ant triangle is then opened and the chain of glands adjacent to the Internal Jugular is dissected out. Great care must be used in opening the deep fascia, as often the enlarged glands push the internal jugular up to the deep surface of the fascia or even I have found the vein actually adherent

to it. The posterior triangle is then cleared in a similar manner. Formerly I used to divide the Sterno-Mastoid, but now I do not, as every gland can be removed by this operation.I always leave drainage tubes in for at least twenty four hours, as one can never be sure of rigid asepsis when using native assistants , especially as I have only one who has an intelligent knowledge of Listerism. Chloroform is administered with a Vernon Harcourt Inhaler provided with a long extension tube leading from the chloroform bottle to the mouth piece., the apparatus being hing from the pole of an irrigater. This extension tube is most important for surgeons in the Tropics when operationg on necks , especially in prolonged operations like these, as otherwise he himself will inhale quantities of the anaesthetic, which will necessitate him stopping the operation and going outside for fresh air. It also enables a surgeon to work to a great extent single handed, a matter of great importance when working with natives ,who are very ignorant and dirty in their habits.My practice when working on remote islands where I have not my chief assistant and my more intelligent medical students to help me,is as follows;-

The patient's head is shaven the night previous to the operation; the skin prepared by scrubbing with biniodide of mercury soap,spirit and a 1-40 Carbolic dressing applied. At the operation Tincture of Iodine is painted over the operation area. I then anaesthetise myself using the Vernon Harcourt inhaler ////////

When the patient is anaesthetised,I hand the apparatus over to a native with instructions to keep the jaw for - ward. The skin incision is made when 2% of chloroform is being given;the remainder of the operation is per- formed with 1% . To avoid contamination of the wound by the hands of natives, I use self retaining retractors. By this method there is little after sickness, as a very small amount of chloroform is used, in a three and a half hours operation, I often use only 6or 8 drachms.
The after results of the operations are excellent , when the patient is in a comparatively early stage of the disease, but , in advanced cases when there is much secondary infection with pyogenic germs, they die within six months. The natives, I am glad to say, now fully appreciate the danger of delay and now come to hospital, as soon as they notice enlargement of their cervical glands. Besides surgical treatment they also receive tuberculin, tonics and codliver oil.
The following preventive measures are also taken; Hospitals have been erected in nearly all the islands, and the magistrates instructed to segregate all the sick in them, the magistrate being fined if I find any cases of tubercle in their villages on my tours of inspection.; intelligent natives are trained to be Orderlies in hospitas , where medical treatment is given.;in the hospitals there are special tubercular compounds;improvements in the sanitation of the villages,e.g. cutting down of trees in order that sunlight may gain access to the houses;

Instructions given to magistrates in the elementary principles of hygiene.

Besides these measures, I drew up placards setting forth t the dangers of tuberculosis , its prevention and cure , printed in Gilbertese, and had them placed in the village ''maniabas''or town halls and other prominent places, similar to the pamphlets issued by Boards of Health in Europe.

## SYPHILIS.

Syphilis is prevalent in all the Gilbert and Ellice Island The natives ascribe its introduction to the crews of American whaling vessels, which frequented this part of the Pacific some 70 years ago. However, though the American whalers may have been an important factor in the spread of the disease, I am of the opinion that it was probably introduced at a much earlier date by the crews of European exploring vessels.

Captain Byron discovered the Eastern Gilberts in 1765; Captains Gilbert and Marshall the Northern Gilberts in 1788. The Ellice Islands were discovered by Maurelle in 1781. As Captain Cook states in his diary that his sailors introduced syphilis into several islands they visited, I do not think that there is any reason for doubting that the disease may have been introduced by the crews of the above mentioned explorers.

The disease occurs in the congenital form.During six years residence in the islands, I have not seen a single

case of primary or secondary syphilis

case of primary or secondary syphilis, and those cases which on my arrival in the Protectorate, I was inclined to consider as tertiary,now in the light of more intimate knowledge of the islanders, I should regard as congenital. As the majority of the cases had been untreated,there were many fine illustrations of the destructive action of the syphilitic virus on the human body;necrosis of the palate and nasal bones, sometimes associated with partial loss of the superior maxilla; ulceration of the larynz, resulting in complete aphonia;extensive ulceration of the mouth with contracture of the oral aperture till the finger tip could with difficulty introduce food, ectropion of the lower eyelid,followed by ulceration of the cornea. In several cases of contracture of joints, I have been successful in restoring function by dissecting the cicatrices from the underlying structures, and afterwards treating the affected joints by daily passive movement. Ina case of almost complete obliteration of the mouth, I made a new mouth by dissecting away a large cicatrice, with excellent results.

The following are a few examples of syphilis on the various systems observed in the Gilbert and Ellice Islands ;- Osseous system. Periostitis and epiphysitis. These affect principally the long bones and are accompanied by nocturnal pains. They disappear rapidly under large doses of Pot Iod.

Muscular System. Pains in the muscles, especially the lumbar region are common.

Neuritis is common. Locomotor ataxy is met with .I have treated 10 cases at Tarawa hospital.There was considerable improvement in three of them under Pot Iod and electrical treatment.

Eye. Keratitis, iritis and optic atrophy are met with.

Ear. Deafness due to thickening of the membranum tympani; there was no improvement under treatment.

Throat. Laryngitis and rhinitis are found especially among children.

Treatment. The only drug which has any effect is Pot Iod which must be administered in large doses.

For experimental reasons, I tried all the preparations of mercury on both adults and children, but they had no effect. I was much surprised that Hydrarg cum Creta had no effect on the children, as this is contrary to my experience with children in Europe and Australia.

Gonorrhoea. This now prevalent in the islands, having been introduced by sailors from Sydney, and it has spread with great rapidity owing to thr social customs of the islanders. I have not yet met with any cases of pyosalpinx.

NERVOUS DISEASES. Congenital spastic paralysis;bulbar paralysis and hydrocephalus are met with. I operated successfully on a case of Fronto-nasal cephalocoele;it lived two years.

Respiratory Diseases.

RESPIRATORY DISEASES. Bronchitis and broncho-pneumonia are common among the islanders. According to Europeans who have been resident in th islands for twenty years and elderly natives, there is an increased susceptibility to pulmonary affections since they adopted European dress, as owing to the majority of the natives possessing a limited wardrope, should they get wet, they never change their clothes, but allow them to dry on their bodies and thus get chilled; also at night they throw off their clothes and sleep in a loin cloth of calico or a kilt of leaves. As the temperature at night is comparatively low, they consequently get chilled and develope pneumonia or bronchitis. Formerly the natives wore nothing but kilts of cocoanut leaves and annointed their bodies with oil, which is a most excellent protective against cold, but now , principally owing to the influence of missionaries and traders they have adopted calico dresses, which in my opinion are neither sanitary or ornamental, as they are often dirty, as many natives cannot afford soap to wash them. However, it must be remembered by those who are conservative in the matter of change of native customs and dress that, with the increased facilities of communication with European countries and adoption of their modes of dress, there have also been introduced by the trading vessels numerous disease germs, especially those which attack the respiratory tract. During two epidemics of influenza introduced by trading vessels from Sydney,

I examined the sputa and nasal secretions of several patients who were suffering from the diseass,and found the influenza bacillus in large numbers in every specimen examined.Influenza was only introduced recently into the islands from Sydney. The pneumococcus and the micrococcus catarrhalis were also found in hospital patients.

DISEASES OF THE DIGESTIVE TRACT. Functional diseases of the gastro-intestinal tract are common. I consider that they are due to eating sun-dried fish often decomposed, also to over distension of the of the intestines by large quantities of of cocoanuts ,which are very indigestible when old on account of the large amount of cellulose they contain, and consequent fermentation of the intestinal contents. Many patients come to me after feasts when they usually gorge themselves with cocoanuts.

DISEASES OF THE BLADDER. Cystitis is common,and is due to drinkinking the cocoanut sap which has been contaminated by the secretion of a yellow fly, which is very acrid causing a blister on the skin.

SKIN DISEASES. Impetigo, acns, eczema, psoriasis, tinea circinata and occasionally imbricata are seen.

DISEASES OF WOMEN. Endometritis is common, being usually due to abortion. Salpingitis occurs. Fibro-myomata occur occasionally. I examined one which extended up to the ensiform cartilage. I attempted to remove it, but the patient took the anaesthetic badly and I was compelled to stop the operation

operation. Carcinoma of the uterus is fairly common. In six years I have seen nine cases. I removed one large ovarian cyst a few months ago; they are rare.

OBSTETRICS. Childbirth is, as a rule, easy., mal-presentations being rare, and when they occur the midwife turns by external manipulation., though, recently some of the women come to me. One native custom, which I consider has a bearing on the easy labour and the absence of complications due to uterine inertia, is the native custom of massaging the lumbar and abdominal muscles. Gentle massage is commenced about the third month of pregnancy and continued nearly to term.; the uterus is also moved from side to side. Labour is conducted in the crouching position. The placenta is permitted to come away naturally, no compression of the uterus being practised by the midwife. There are midwives in every village and the office is often hereditary. After expulsion of the placenta, an abdominal binder of pandanus or cocoanut leaves is tied around the abdomen, some strands being above and some below the umbilicus. The cord is tied with cocoanut fibre string about six inches from the child's umbilicus. It is not cut for a considerable time after the cord has ceased to pulsate. No dressing is applied to the stump. The vulvar pad is made from the husk of the young cocoanut which is Steeped in water and hammered with a mallet to make it soft. It is then boiled in water and place between two clean leaves till required.

The woman is washed in fresh water, sometimes warmed, and usually gets up on the second or third day. The child is not put to the breast for at least twelve hours after delivery, and is given water to drink in the interval. Formerly they used cocoanut shells as feeding bottles, but now, since I introduced Allen and Hanbury's feeding bottles, they use them in preference. Should the mother have no milk or poor milk, they feed the child on the milk of the young cocoanut, and allow it to suck the husk of the sweet cocoanut. I was permitted to be present at several accouchments and was much impressed with the skill of the native midwife. I think that the Gilbertian ante-partum massage might with advantage be introduced into European practice in the case of women with flaby abdomens; it would tend to prevent post-partum haemorrhage from uterine inertia due to defective muscular tone. They also have methods of treating complications in labour which are of interest. Adherent placenta. They treat this by shaking the woman and also by compressing her abdomen. In one case where they were unsuccessful they sent for me, and I removed the placenta with my hand in the usual manner. They were much impressed as they thought it was bad practice to introduce the hand into the uterus. This idea probably explains the small amount of sepsis in the islands after childbirth.

A rigid perinaeum, they incise, 3ß/ with a piece of glass, as they say the wound heals better than if they allowed it to rupture naturally. There is a legend that

that a Caesarian section was once performed by a man with his sheath knife on a woman who died in childbirth.

DYSENTERY is common in both the Gilbert and Ellice Islands It was introduced by labourers returning from Ocean Island a few years ago and caused a great mortality anong the natives. It is bacillary Dysentery,(Shiga'sbacillus) My method of treatment is as follows; White Mixture consisting of Mag Sulph gr 10, Mag Carb gr 10 Peppermint and water is given every two hours for three days till all the blood and mucus has ceased. It is then reduced to threee times a day combined with draughts containing acetozone. After the bowel is thoroughly cleared,Dover's Powder gr10 is given three times a day. I have tried all kinds of treatment, and I am satisfied that this is the best, and I have never lost a single case where I got the patient early. Diet is ,of course, restricted to well boiled rice and condensed milk ,when procurable. The patients ' abdomens are protected by flannel binders.

DISEASES OF THE EYE. Blepharitis,chalazion, entropion, ectropion, dacryocystitis, conjunctivitis, ophthalmia neonatorum,phlyctenular conjunctivitis, pterygium, keratiti , corneal ulcer,conical cornea(one case) iritis, iritis, albuminuric retinitis. optic neuritis, optic atrophy and c cataract have been treated at Tarawa Hospital. I also operated on successfull y on two cases of sarcoma of the orbit, and afterwards fitted then with artificial eyes.

Diseases of the Ear. Mastoid disease is common. I have operated on five cases.

Diseasesof the Throat and Nose. Pharyngitis due to excessive smoking of strong tobacco is common. Tonsilitis with chronic enlargement occurs. Tuberculosis of the larynx was seen in three cases.

Nasal mucous polypi and fibro-myxomate are very common. Enlarged turbinates and deviations of the septum are occasionally met with.

Diseases of the Rectum. Haemorrhoids are common. Fistulae in ano are very common both in men and women.

New growths. Carcinoma, sarcoma, fibroma,lipoma, myoma,chondroma, fibro-neuroma, cystoma(ovarian), and adenoma(mammae) are found in the Gilberts .

MEDICAL ARRANGEMENTS IN THE GILBERT & ELLICE ISLANDS.

The Medical Department of the Protectorate consists of a headquarter's hospital at Tarawa, one of the large central of the Protectorate. Here I have built a fairly up-to-date operating room and dispensary and have also a pathological and bacteriological department, and all the necessary equipment . My bulk stores for drugs , dressings etc are also here . There are also native hospitals on the other islands capable of holding from 200 to 400 patients. These hospitals or more properly compounds consist of native houses with raised floors arranged in rows, some being set apart for the treatment of tuberculosis, others for the treatment of yaws,and other for the treatment ofgeneral diseases. In these hospitals , there are bath houses, sea closets and large eating houses or sheds as I have forbidden the natives

dining houses ,as I have forbidden the natives to eat in their dwelling houses on account of the refuse of food attracting flies. Those who are unable to walk are, of course, fed in the dwelling houses. A wooden fence encloses the compounds, and no stranger is permitted to enter the hospital except at special times and with the permission of the native magistrate or Orderly in charge of the hospital. The nursing arrangements are effected by a relative of a patient accompanying him or her into hospital, as it is against native custom to be nursed by anyone except a relative., and in some instances , I have to permit several children to accompany the parents ,should they be unable to get friends to look after them in their absence. In establishing hospitals among those, who a comparatively short time ago were savages, it is absolutely necessary that a medical department should be established on native lines ,improved if possible and in accordance with modern sanitary ideas , but no interference with old established native customs must be attempted, unless, of course, they are dangerous to life or health.To buid modern wards in the Gilbert Islands would have been folly, though many well meaning ,but foolish people advised me to do so. , and the correctness of my views is shewn by the fact that over 60,000 people have been treated in the hospitals since their establishment over six years's ago, and 1500 operations performed. Each hospital is in charge of a native orderly who has had six moths training at the central hospital

in dispensing simple drugs and the dressing of wounds. They are also taught the diagnosisi and treatment of the diseases occurring in the islands. Periodically supplies of of drugs are sent to the different hospitals, already made up and ready for administration. Before I left the Protectorate , I made arrangement s for the establishment of a medical school where the more intelligent Orderlies might receive instruction in elementary anatomy , medicine and surgery. Some of them are very quick in recognising morbid chest sounds, and take great delight in examining each others chests with their wooden stethescopes.

My chief assistant, a Fijian has performed many major operations, laparotomies, amputations and radical operations for tubercular cervical adenitis. He also cuts and stains sections of tumours.,and bacteria.

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