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FRAMBOESIA or YAWS.

A study of the disease in Tobago

by

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Introduction.

In the island of Tobago the disease commonly called "Yaws" has become endemic among the black peasant population.

The negroes regard it as an evil which must be endured once in a life-time. The wish of a negro mother generally is that her children may have the disease as early as possible.

In 1894 I was appointed a District Medical Officer in Tobago, one of my official duties being the care and supervision of all persons afflicted with this disease. At the end of the Thesis, the Yaws regulation ordinance is attached, and the powers of the medical officers in charge of Yaws will be noticed.

Since 1894 I have had under my care 412 cases of Yaws.

The results of my two-and-a-half years' experience and observations I have endeavoured to summarise in the following pages, and I have freely quoted the opinions and teachings of the authorities on the subject in support of the views expressed.

I am indebted to Dr Nicholls' Report on Yaws, addressed to the Secretary of State for the Colonies,

for suggestion regarding the pathology of Yaws. The plates used in illustrating the microscopic appearances are copies from his work.

The ravages of Yaws among the peasantry of these far away Tropical islands is a serious and pressing danger, and it is the duty of those who, like myself, have to wage war against an affection that may aptly be described as a "common enemy," to use every endeavour to bring the disease to the notice of the great ones of the profession, that more light may shine on the subject, and the way be made clear.

Definition.

Yaws is a specific, highly contagious constitutional disease, probably of microbic origin, consisting of the formation of what may be called granulation tumours, sometimes locally and usually generally, characterised by a clinical history, which may be divided into:

- (a) A stage of incubation lasting from five to eight weeks, during which there are no symptoms.
- (b) A stage of invasion, of uncertain period, probably a week to ten days, during which there may be no prodromata whatever or only a slight indisposition and malaise, with sometimes pains of a rheumatic character affecting the joints of the extremities particularly; or there may be much constitutional disturbance, with a rise in temperature which may be considerable and is sometimes preceded by a rigor.
- (c) A stage of advance and eruption lasting from a few weeks (rarely) to months, and even years; the rash appearing as Squames, papules, and granulomata and maculae.
- (d) A stage of resolution, in which the eruption disappears and is followed sometimes by rheuma-

tic pains in the joints of the extremities, which may be very severe, resulting almost invariably in complete recovery.

Nomenclature.

The popular designation by which the disease is known is "Yaws," as to the derivation of which there are many opinions held.

In Webster's Dictionary, if the word "Yaws" be consulted, we find the following under that term: "African Yaw, a raspberry."

In the Cyclopaedia of Practical Medicine published in 1835, we find: "Yaws, a word which has its origin in the vernacular dialect of Guinea and the other parts of Africa, where it has been used to designate the fruit of the *Rubus idoeus* (raspberry); and from an imagined resemblance between it and certain fungoid excrescences from the dermoid tissues, peculiarly characteristic of a disease indigenous to that territory."

We thus note that the opinion of some writers is that the disease received its name "Yaws" from the fancied resemblance of the typical form of eruption met with in the affection, i.e. the granulomata, to a

raspberry, known as "Yaw" in Guinea. On the other hand there are other writers, particularly Dr Nicholls, who hold that the derivation suggested is incorrect, as the raspberry is not to be found in Tropical Africa, where the disease is endemic. The negroes could not compare the appearance of the eruption to a fruit they had never seen or heard of.

Winterbottom, who investigated the nomenclature of the disease on the West Coast of Africa in 1803, makes no mention of the word "Yaws" as used by the natives to designate the disease.

Mr Numa Rat in 1890 petitioned the Governor of the Gold Coast to obtain information concerning the vernacular names of the disease; and the result of the application was a Minute from one of the Medical Officers in which the following occurs:--

1. The Fanti name for Yaws is Dubi or Dube (pronounced Doobee or Doobay).
2. The Acra name is Agortor (pronounced Arjortor).
The same is applied to some forms of syphilis.
- 3/4. So far as I know, the name "Yaws" is not of West African origin.
5. "Pian" or "Epian" is not, so far as I know, of African origin.
6. Synonyms for Yaws:
"Sierra Leone, Lagos" Ogōdō

"Crepi, Kitta" -	-	-	Jahtor
"Haüsa" -	-	-	Tonjara
"Moshi" -	-	-	Toomah
"Kroo" -	-	-	Soombat (Grand Cess)
" " " -	-	-	Subanini (Sinoe)
"Sooso (Sierra Leone)			Dorgortch
"Grushi" -	-	-	Santsorror.

We thus note that among all these various tribes inhabiting the West Coast, the word "Yaws" is not used in reference to the disease.

I agree with Nicholls (page 273 Report on Yaws) that the derivation is Celtic. He says that "the Celtic word ias, pronounced yas, and meaning heat, "boiling, or bubbling up, is the source of the English word "Yaws," the primary meaning of which, "according to Webster, is 'to rise in blisters, breaking in white froth, as cane juice in sugar works.'"

The uneducated negro possesses a very limited vocabulary, and common words used to denote different details of his work are employed in a somewhat analogous sense in his domestic life. The principal work of the negro slaves amongst whom Yaws raged was in the manufacture of sugar; and an association of the terms in use in the boiling house and in the cane fields with events in the monotonous life of the ignorant Africans was inevitable. There is therefore

little doubt that it was after arriving in the West Indies that the negroes applied the term "Yaws" to the disease, for the bubbling up of the froth on the boiling cane juice may be likened to the evolution of the cutaneous eruption in the disease. On page 418 of the Medical Lexicon by Robley Dunglison of Philadelphia, we find under the term Framboesia the names "Epian" and "Pian" applied to the disease in the French West Indian Islands, and in those under British rule where the French element predominates. Levacher regarded these words as of Celtic origin; for in the "Dictionnaire de la Langue Celtique," published in 1760 in Besancon by M. Bullet, he found the following:--

"Pian, pianta, pena, poen; peine, trouble, angoisse."

"Poan;-- peine, douleur, maladie, effort."

"Poen; peine, supplice, douleur, tourment, travail, mal."

"Pian en irlandais; peine, trouble, angoisse."

Pian or Epian are terms which have been used to designate syphilis by the Bretons and others. Syphilis and Yaws were often confounded, especially in earlier times. It can easily be seen, then, how the term pian as applied to syphilis came to be applied to Yaws. Moreover, the fact that in the French islands the terms Epian and Pian are at present still

applied to Yaws bears this out, as the seafaring Bretons (who are Celts) imported them to these islands. The Spanish and Portuguese apply the term "buba," which means a tumour or pustule, to the disease in South America. This name was, like pian or epian, first used to denote Syphilis, but came to be applied to Yaws as well, for the same reason as in the case of the letter terms (pian and epian).

Framboesia was first used by Sauvages in 1761. He latinised the French word framboise, a raspberry, from what has been regarded as a resemblance of the typical granulomata to that fruit. But one needs a very elastic imagination to trace any resemblance between a raspberry and a granuloma, as may be noticed in the photographs given at p. 47

The term morula (from morus, a mulberry) was applied to the disease by Mason Good in 1825, and is used in the "Nomenclature of Diseases" drawn up by a joint committee appointed by the Royal College of Surgeons (London) in 1885.

The best term to apply to the disease is that suggested by Dr H. A. Nicholls, viz.-- Granuloma tropicum. This describes the principal characteristic of the disorder, the formation of granuloma, and the locality of its prevalence, the Tropics.

Origin.

Yaws is a disease of purely African origin. It made its first appearance after the introduction of African slaves. This fact is borne out fully by medical writers of those days. Persons are alive at the present day, who remember witnessing the landing of slaves afflicted with the disease from the slave-ships. I have myself heard the aged ex-slaves make such a statement. Previous to the introduction of slaves from Africa to the West Indies, Yaws did not exist among the aboriginal inhabitants. Some writers have thought that it did exist among the Caribs, for a disease known as Pian or Epian was very prevalent amongst them. But this was Syphilis, not Yaws.

Rochfort, writing in 1665, stated that a disease prevailed among the Caribs which was known as Pian or Pyan. He describes it as "une flacheuse maladie qu'ils nomment Pyans en leur langue." He further describes it as "une sale maladie."

Du Tetre in his work on the Antilles (1667) makes mention of a disease "Epian," evidently the same "Pyan" described by Rochfort. He writes of "cette infame maladie qu'ils appellent Epian, qui est

"la veritable verole." Further on he states that "enfants naissent et meurent avec cette villaine maladie." Now children are never born afflicted with Yaws, for it is distinctly not a hereditary disease, and they very rarely, if ever, die of it.

In Lavoisien's "Dictionnaire Portatif de Medecine," on reference to the word "Epian," we find that it is "une maladie fort commune dans l'Amerique, qui est la meme chose que celle que nous appelons en France verole"; and to still more strengthen the evidence needed, further on he writes: "la verole et les Yaws sont deux maladies tres distinctes."

In the Encyclopedie Methodique, begun last century, we find the following:

"Epian.-- Nom que les naturels de Sainte Dominique donnoient a la verole, qu'on croit avoir ete endemique dans cette isle, a qui parut pour la premier fois en Europe l'an 1494
"Il est actuellement prouve que c'est la meme maladie que les Francois ont appelee Mal de Naples, et les Italiens Mal Francois."

These extracts will serve to prove that the "Epian" or "Pian" or "Pyan" referred to by these writers was really Syphilis. In Dominica, where there is still a portion of the island entirely set

apart for the use of the "Caribs," it has been noted that these people enjoy an immunity, as a rule, from the disease. The Caribs themselves assert that Yaws is essentially confined to the negroes, but that is not quite correct, for it has met with case among them, though it must be regarded as an occurrence of exceeding rarity. The negro settlements all around the "Carib reserves" may be badly infected, but the Caribs themselves are rarely attacked. The descendants of an ancient race they are, like their forefathers, a cleanly and sober people. Now cleanliness and Yaws do not exist together; for Yaws is essentially a disease of dirt, and its accompaniment.

Yaws was and is still very prevalent in Guinea (West Coast of Africa), and from Guinea and the neighbourhood most of the slaves were exported to the West Indies.

It can easily be understood that persons brought from a country in which so contagious a disease as Yaws was (and is) endemic would not unlikely introduce such a disorder into their new home.

When we consider the manner in which slaves were transported, packed like sardines in a box in the dark, badly ventilated, foul holes of slave ships, can we wonder if a single case of Yaws served as a nursery for the dissemination of the disorder? Many

of those newly inoculated would be landed apparently healthy, then be drafted to the various sugar estates, and in time serve themselves as foci for the spread of the disease among the other inhabitants, who unaware of the contagiousness of the disorder would freely mix with those infected with the malady.

Medical men at that time were unacquainted with the disease, and no warning note was sounded to those whose interest it would be to prevent the importation of slaves so infected.

We may therefore lay it down as a recognised fact, that Yaws is a disease of purely African origin, at all events in so far as the West Indies are concerned.

Geography.

Yaws is an endemic disease in Tropical Africa, particularly the West Coast. From there it was introduced into the other parts of the world to which slaves were exported, i.e. the West Indies, the Brazils, and other parts of South and Central America. The disease is found also in Madagascar and the islands off Mozambique. In Asia and Oceania diseases resembling Yaws have been described, but the evidence

to prove that they really are Yaws is wanting, and their identity with the latter has certainly not been settled.

Etiology.

Race.-- There is a widespread belief amongst the non-medical that the white race possesses an immunity against the disease. But this is not really the case. At present I am attending the son of a planter, to all intents and purposes white, who is suffering from Yaws.

I have seen the disease among the East Indian immigrants (Coolies) in Trinidad, and among Mulattoes, and other half-breeds. But it is principally the negro who suffers from the complaint, and one is almost led to believe that there is some pre-disposing factor in his case. In Tobago the disorder is rarely seen outside of the pure negro. It however may be safely stated, that whereas Yaws is to be met with most commonly in the negro race, it is not confined to them alone, but may affect any race that may become inoculated with the virus.

Occupation and Class.

My own experience has been confined almost solely to the labouring class, and only in one case have I met with the disease in what one may term the middle class of society. The population of my district is composed entirely of the labouring class, with the exception of two ministers of religion and their families and a few other persons. In Dr Tulloch's Report of 1890, at page 15, we find the following list of the occupations of patients or of parents of patients who have had the disease:--

Labourers	-	596	Boilermen	-	2
Carpenters	-	32	Bakers	-	2
Washerwomen	-	17	Fishermen	-	2
Tailors	-	14	Schoolmasters		2
Coopers	-	13	Grooms	-	2
Masons	-	13	Manager	-	1
Blacksmiths	-	11	Shoemaker	-	1
Seamstresses	-	11	Apprentice	-	1
Sailors	-	11	Shopkeeper	-	1
Domestics	-	11	Saddler	-	1
Beggars	-	5	Carter	-	1
Hucksters	-	5	No occupation		<u>5</u>
Superintendents		<u>3</u>			<u>763</u>

N.B. The above represent negroes or mulattoes with few exceptions.

In what one may term the upper ranks of the island communities, the disease is probably never seen, every precaution being taken not to come in contact with persons suffering from the disorder. We notice from Dr Tulloch's list that out of 763 persons, 596 consisted of the labouring class, the *raison d'etre* of the prevalence of the malady among them being that they are always exposed to the contagion of the disease. They go about with scanty clothing, bootless and shoeless, and so are constantly being subjected to cuts and bruises, and thus often present a ready surface for inoculation with the virus of the malady. I have seldom met with a case of Yaws among the well educated and better classes of the negro race. They take as great care of themselves and live under similar conditions as the better class whites; hence the opportunities for inoculations and the conditions under which the disease thrives is wanting. One may justly conclude that the disease may occur in any section of a community, though principally among the labouring class.

Age.

Children are the greatest sufferers from Yaws, and it

is most commonly met with among them from the ages of 5 to 10 years. The following figures from my books will bear this out:--

	Under 5 yrs.	5-10 yrs.	10-20 years	20-30 years	30-40 years	40-50 years	50-60 years	Over 60 yrs.	Total
No of cases	103	180	66	30	14	7	3	9	412
percen- tage	25.0	43.7	16.0	7.3	3.4	1.7	.7	2.2	100.0

Sex.

It is generally believed that males are more often attacked than females, but what is really the case, as the following tables show, is that from infancy to adult life, more males are affected than females, but in adults, more women are affected than men. The explanation, in regard to the former age of life, is not easy to give, except it be that there is a pre-disposition in the case of boys. But with regard to adult life it is easy of explanation. The negro women of the labouring class soon after puberty become mothers, and usually long before marriage, if ever the latter takes place. Their children as a

rule soon contract Yaws, and so the mothers themselves become inoculated with the disease.

The following table is drawn up from my own books:--

Age	Total No of cases	Males	Females	Percent- -age Males	Percent- -age Females.
Under 5 yrs	103	61	42	59.2	40.8
5 to 10 "	180	101	79	56.1	43.9
10 to 20 "	66	35	31	53.0	47.0
20 to 30 "	30	14	16	46.7	53.3
over 30 yrs	33	13	20	39.4	60.6
Totals	412	224	188	54.4	45.6

The majority of those attacked contract the disease before puberty, the explanation being that with every additional year of life there are increasing numbers rendered more or less immune owing to a previous attack.

Hereditv.

Yaws is not a hereditary affection. All writers on Yaws bear this out, e.g. Rankine (1827), Mason (1831), Tulloch (1890), and others. On page 281 of

Nicholls' Report he states, "During the progress of my mission I have given particular attention to possible hereditariness of the disease, but I could not learn of a single case. This negative evidence, considered in connection with Hospital statistics and the recorded experience of those writers who have seen much of the malady, lead to the conclusion that Yaws is not hereditary."

Diet.

Some writers have taught that a special fish and salt-preserved fish diet predisposes to the disease. But this is a mistaken theory. The reason of the belief is that in the fishing villages on the coasts of some of the islands, Yaws is more prevalent than in those inland. If that were the case in all the islands, one would conclude that that is so. But how are we to reconcile such a theory with the fact that in such islands as Carriacou and Barbadoes, where the large bulk of the people on the coast live on such a diet as stated above, Yaws does not exist? The same question will occur to one in regard to writers who, on the other hand, look upon a purely vegetable diet as a predisposing factor. Such a theory will not

bear investigation, for in the interior of the islands, where Yaws does not exist, the peasantry, like their brethren in the infected islands, live on the same kind of food. The solution must be sought for in another direction. As a rule the labourers in these islands are content with a cup of sugar and water, sometimes with a little bread added as a morning meal before starting for work early in the morning. He then leaves home on this insufficient meal and works all day on an empty stomach. On coming home in the evening they partake of an elephantine feed of vegetables with a little fresh, but more usually salted, fish thrown in, until he can stuff himself no more. As a result disorders of the stomach are very common. My experience of a fairly extensive practice among these people is that nearly 40% of the diseases treated are those of the digestive organs. The children eat after the manner of their parents, for Quashi and his wife, or more usually his concubine, are out all day, and the poor children do as best they can until their parents return. What is the result? Such a condition of things, with so ill-nourishing a diet, predisposes the body to morbid influences and renders it more liable to the attack of disease. The system is in a more favourable condition for the development of

disorders, as the vital processes being enfeebled are less able to cope with the germs of disease, and destroy them. This I believe to be the true solution, and not that the diet in itself, on account of its being either of a fish or vegetable kind, has any special influence in predisposing to or inducing an attack of Yaws. The following table will give an idea of the prevalence of diseases of the digestive system amongst the negroes. This table is from the Registrar's Report of the deaths in Tobago from 1885-1890:--

Year	Total number of deaths.	Deaths from Diseases of the digestive system	
		Total number	Percentages
1885	426	45	10.5
1886	398	53	13.3
1887	381	52	13.6
1888	361	72	19.9
1889	437	114	26.0
1890	453	109	24.0
Total	2,456	445	18.1

Hygienic Conditions.

For the same reasons as in the case of their diet,

the conditions in which the negroes live render them very liable to an attack of such a contagious disease as Yaws and to the spread of the disorder. They are ignorant of the simplest hygienic rules. That cleanliness is next to godliness is an unknown factor, as a rule, in their lives. Children are often brought to the medical officer in as filthy a state as one would expect to meet with only among the Aborigines of Australia, and the Hottentots of Africa, literally encrusted with dirt. The remonstrances of the medical officers are utterly useless. If the mothers are questioned as to whether soap is ever used, the not invariable answer is "No, dactar." A bath once a month is a most phenomenal occurrence. One suit of clothes is used to work with in the day and sleep with at night, except on Sundays, when most flashy finery is worn. Often the one suit is never washed but is continually used until it is nothing more than rags, and its original white colour has become black, and then another is purchased. We can understand the results that may follow in persons whose pores are clogged with dirt, and in a climate where cleanliness and a perfect action of the excretory organs is so essential. As a rule the peasantry live in small huts covered with grass, sometimes with a board flooring, more often an earthen one.

The size of such a hut is usually not more than about 15 x 15 feet. At night, mother, father, sons and daughters, married and unmarried, and their children, all sleep together "heads and points," in the only room the "house" boasts of. All the doors and windows are most carefully shut, and any crevice that could give entrance to the fresh air is most securely blocked up, as the negro labourer has a great dread of the night air. We can only contemplate with horror what the atmosphere is like in such dwellings, and the effects it exerts on the constitutions of the inmates. To thoroughly appreciate how sweet the pure air of God's earth is, one must be a medical officer in the Tropics, and have to enter such a dwelling at night.

In the villages there is no attempt at sanitation as a rule. Water-closets and the like are unknown. The "jerry" or bucket in the morning is emptied anywhere, or if such a utensil is too much of a luxury, the bush about the huts is the favourite resort. To ask a patient if his bowels are regular would be to ask him a conundrum. The question must be: "Do you go to the bush every day?" Living under such conditions we need not wonder that there is always a suitable soil and thriving of the Yaws germs when introduced into the system. We here

have ideal conditions to induce their thriving and multiplying.

Previous diseases.

Any disorder which would cause a break in the continuity of the skin would offer a fit surface for inoculation with the virus. As such we may cite Tubercular Leprosy, Cutaneous diseases such as Eczema and its kindred, Ulcers, and all forms of wounds and abrasions. Inoculation may be brought about by direct contact with the secretions from Yaws granulomata. The carriage of such secretions by insects, as flies and mosquitoes, would serve as a typical method of inoculation. We can understand how possible it is for a fly just alighting upon an ulcer after visiting, en passant, a juicy granuloma, to carry sufficient material on its legs for inoculation.

The usual method of the introduction of the disease into the system is by a broken surface. I have often been informed by Yaws patients that the attack made its appearance after their receiving a bruise or cut or other wound. I have seen the first granuloma show itself on the site of a recently healed wound, on the edge of ulcers, and on the cracked nipples of

nursing women. Such broken surfaces have every opportunity of being points of inoculation, as the healthy and the infected all mingle and sleep together and take no precautions against contracting the disease or of infecting the uninfected.

Climate.

We are led to believe that a tropical climate is necessary, for this disease does not occur in the Temperate zone. That may be due, however, to the fact that there have not been any opportunities of introducing the disorder into the latter region.

Morbid Anatomy.

The ~~various~~ forms of eruption met with in Yaws may be described as:

1. Squamous patches (squames)
2. Papules
3. Granulomata
4. Maculae.

In describing their characteristics I propose taking them in the order of their occurrence.

1. Squamous Patches. This form has had the name maculae applied to it. Now a macula is a permanent discoloration of some portion of the skin, often with a change of texture,-- a spot (Dictionary of Medical Science by Robley Dunglison, 1866). I prefer the term Squamous patches, as it conveys a better idea of the histology of this form of eruption. It is not a permanent discoloration or a temporary one in the true sense of the term, as the following will, I trust, demonstrate. Each patch consists of an area of necrosed and desquamating epithelium. Examined with a pocket lens one can easily distinguish the desquamating epithelium, and it will be noted that it is the horny layer that has become necrosed. If a vertical section be examined under a power of 26 diameters the principal features of the change going on will be noticed.

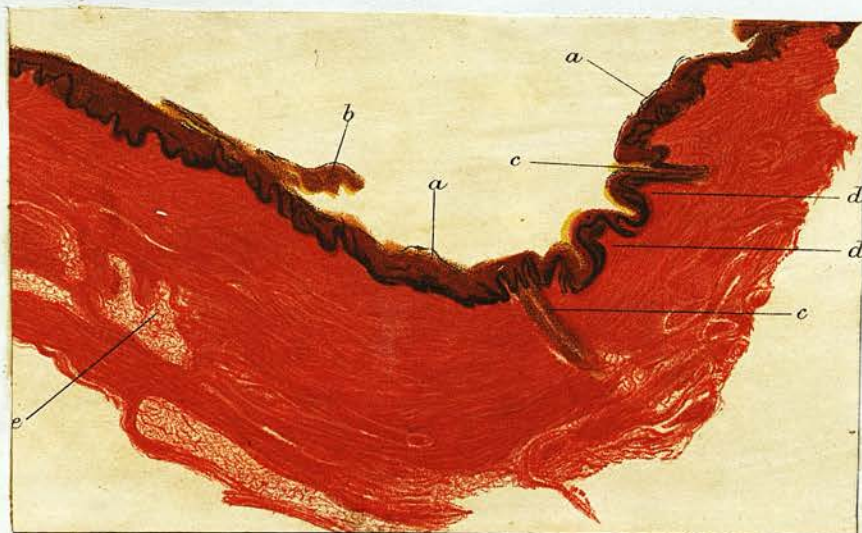


Fig 1. Vertical section of Squamous patch,
stained with Picro-Carmine and bismarits brown.
x 26.

The necrosed epidermis is seen to be flaking off in parts of the patch (b). Heaped up masses of necrosed epidermis and debris appear (a.a.). The hair follicles in the region of the part are dilated (c.c.) and funnel-shaped, and the hair is surrounded with inspissated secretion and debris, and commencing enlargement of the papillae within the necrosed area presents itself. The chief characteristic to be noted is, however, the necrosed desquamation, for the enlarged papillae ^(d.d.) represent the early stage of No 2, i.e. the papules. The size of a squamous patch is varied, from that of a threepenny to a crown piece, and even larger.

2. The Papules. We have seen that within the squamous patch the papillae of the skin show a commencing enlargement. After a time this becomes apparent to the naked eye, and from one to many enlarged papillae may be noted within a patch, according to its size.



Fig 2. Vertical section through the centre of a papula. Stained by Grain's method and afterwards with picro-carmin solution. x 26 D.S. 9 m

- a. Horny layer of epidermis flaking off.
- b.b. Protoplasmic cells forming the deeper layer of the epidermis.
- c.c. Enlarged papillae.
- d. A hair and its follicle in section.
- e.e.e. Granulation tissue in the dermis.

In the above figure the enlarged papillae are to be noted, with some of the features referred to in describing the squamous patch. To what is the increasing size of the papillae due? The answer is to the increasing proliferation of the cellular elements at circumscribed areas, the papillae enlarging gradually from the periphery to the centre of the affected skin. In the dermis a great infiltration of granulation tissue takes place. Owing to the proliferation of cellular elements and the infiltration of granulation cells, the papillae increase in size, and what are really formed are granulation tumours. In the early stages the summits of the papillae are denuded of the horny layer of epidermis. This later becomes covered with a mass of debris containing no ^{but} pus ~~or~~ secretion.

When a hair follicle becomes dilated, as has been seen in Fig 1, a very characteristic appearance results.



Fig 3. Vertical section through margin of a papula prepared as in Fig 2.

- a. Horny layer of epidermis flaking off.
- b.b. Protoplasmic cells forming deeper layer of horny epidermis.
- c.c. Enlarged papillae.
- d. Greatly dilated hair follicle, with portion of hair in centre.
- e.e. Granulation tissue.

The above figure represents a more advanced stage than is seen in Fig 2. The hair follicle has become greatly dilated, by an amorphous like secretion, not pus, filling up its interior, and the remains of a hair is to be noted in the centre of the follicle. The large masses of granulation tissue (e.e.) has caused the follicle to be extruded from the dermis, in the same manner as we have seen in describing the enlargement of the papules in Fig 2. Particular attention must be directed here to the mass of granu-

lation tissue which has formed a defensive barrier between the diseased parts of follicle and the surrounding tissues. It is of great importance to remember this when treating a case of Yaws. The amorphous yellow substance forms a crust on the top of the follicle, and here we have the commencement of the formation of the typical granuloma. The yellow amorphous substance shows an entire absence of pus cells. On Fig 4 we have a section of the granulation tissue of a papule magnified 750 diameters.

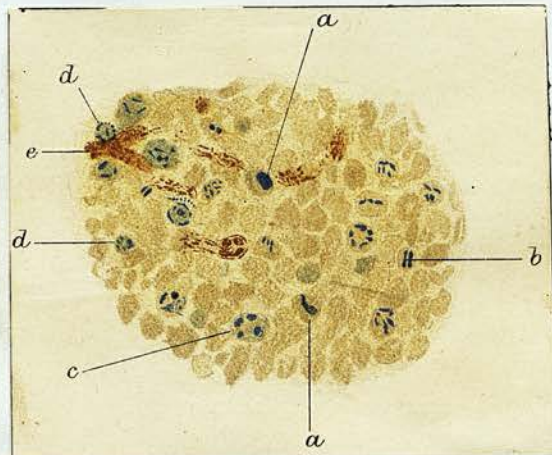


Fig IV

Some cells contain one large nucleus (a.a.). One cell contains two nuclei dividing (b). Another possesses three nuclei, the largest one dividing (c). Besides the above we note at (d.d.) multinuclear cells, and at (e) pigment cells, and melani^{ce} granules that have escaped from the cells.

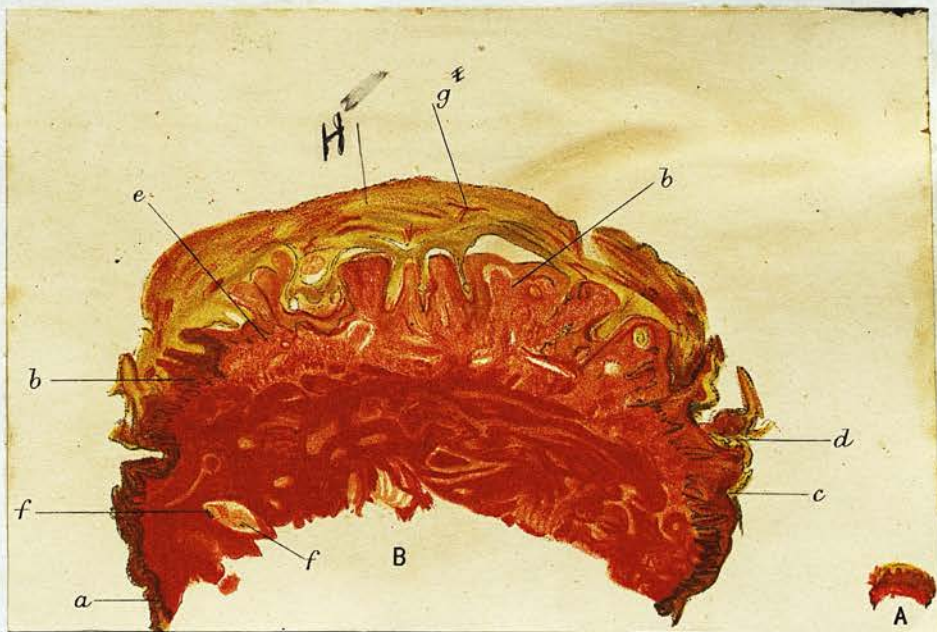
Micrococci and diplococci are to be observed in abundance in all the layers of the epidermis, and

that they are especially numerous in the yellow substance in the dilated hair follicles.

In none of the sections were any sebaceous or sudoriparous glands to be found.

3. The granulomata. The papules and follicles have now assumed a cap of yellow amorphous substance, which is composed of a mass of debris and secretions. The crust formed eventually covers several papules and follicles, and the latter increase in size and the crust in equal ratio; the result being a typical granuloma.

The true anatomy of such a tumour will best be studied from the following figure.



B. An entire section of a small granuloma x 10 diameter. A. Natural size.

Many of the papillae are seen enlarging from the circumference to the centre of the granuloma where they attain their greatest development (b.b.). At (c) we note how the proliferated epidermal tissues have terminated, and that the yellow crust has begun at this point to replace them over the papillae. The invasion of the papillae by granulation tissue (e) is to be recognised, and thus results an enormous enlargement of the papillae. Sections of hair showing unaltered pigmentation (f). Masses of micrococci retaining their violet stain, despite the decolorising of the specimen (d). Blood stains in the crust (g) and unaffected skin (a) at the margin, illustrating the difference between the natural size of the papillae here and in the diseased portion. All these features are beautifully illustrated in Fig 5. An exudation from the papillae takes place of a viscid fluid, and this is typically seen in the forms of * moist granulomata as they usually are in their early and fresh stage. The summits are covered with a thick viscid secretion.

We thus see how the papillae are developed from the squamous patch. The papillae enlarge by the proliferation of the cellular elements and by the invasion of granulation tissue. They enlarge more and more, and a yellow cap or incrustation gets formed

on the top, and the typical granuloma is the result. The natural termination of a granuloma is by resolution. By degrees the granulation tissue disappears, and as a result the papillae decrease in size. The secretions in the crust are absorbed, the latter dries and cracks in various directions and falls off, but before it has been cast off a thin horny layer of epidermis has formed under it to protect the mucous strata. When the last piece of the crust has fallen off, ~~then~~ we get what may be aptly described as a macula.

4. The maculae. The spot, however, where a granuloma existed becomes itself a scene of changes. The spheroidal cells from the periphery extend and gradually replace the necrosed layer. At the edges these cells spread towards the centre. The formation and multiplication of pigment cells containing melanine occurs in the rete malpighii, and the melanine at first is in excess in parts, leaving the macula darker in certain portions. This, however, is rectified in time, the excess of melanine disappears, and the skin assumes its natural hue. The absence of sudoriparous and sebaceous glands lead one to the conclusion that these organs with a few hairs are the only structures permanently damaged by the morbid processes.

The pigmentation is well seen in the following figure (6), which represents the vertical section of a macula stained with fuchsin and methyl blue (Gibbes'), magnified 100 diameters.

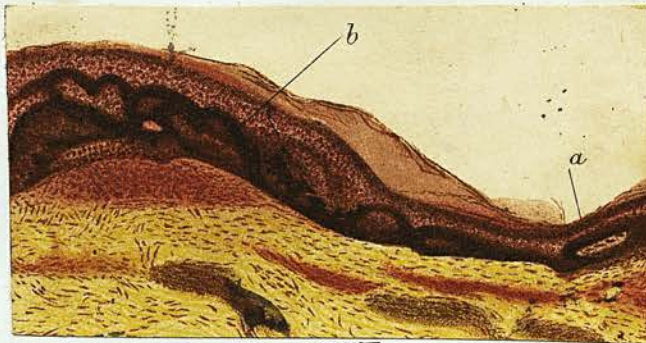


Fig. VI

Vertical section of macula x 100 diameters. The deep pigmentation of the malpighian layer is well seen (b).

In figure 7 a vertical section of a fading macula is illustrated. It is stained by Gram's method and afterwards with picro-carmin.

Here we see the horny layer of epidermis (a) desquamating and quite free of microbes, no portion of the specimen having retained the violet stain.

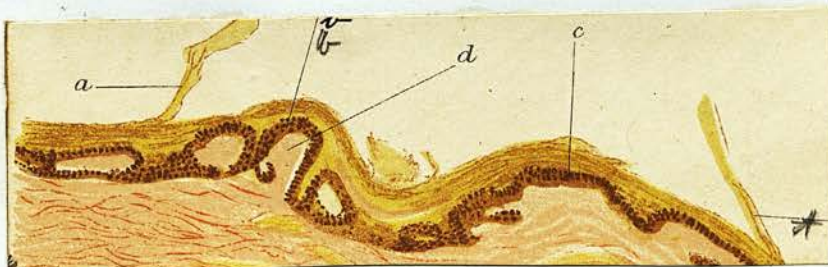


Fig VII

The rete malpighii (b) is much less pigmented than in Fig 6, thus showing the macula to be fading.

Micro-organism of Yaws.

In a disease of so contagious a nature as Yaws, the question of a microbe proper to the disease presents itself. All writers on the subject, with the exception of Dr Nicholls, have been silent as to the existence of any special micro-organism. In Dr Nicholls' Report of 1893, we find that this author was able to obtain material with which to undertake certain researches which throw a very interesting light on the subject. The researches were conducted by Dr H. A. Nicholls and Mr Francis Watt, F.I.C., Assoc. Mason Coll., and Government Chemist of Antigua.

A micro-organism was found to be invariably present in the affected cutaneous tissues and in the secretions from the granulomata. The microscopic characters were constant; and its microscopical appearances were different from those of the micrococci already described in bacteriology. All the inoculation experiments were of no value, as negative results only were obtained; but as Dr Nicholls points

out, the animals also proved immune when inoculated with the virus of the disease; the same virus producing the malady artificially in human beings. The same microbe was discovered to be a constant feature in the secretions of granulomata taken from Yaws patients in the Yaws Hospital of Dominica. Nicholls found it to be "a constant accompaniment of the disease." A patient examined after his death at the Yaws Hospital was found to have these micro-organisms, not only in the squamae, papulae, and granulomata, forming the characteristic local manifestations of the malady, but also in abundance in the lymphatic glands, and certain portions of the internal organs.

In the connective tissue of the cortex the micrococci were found. In the fibrous tissue (chiefly) of a prevertebral gland they were noted forming colonies.

In the spleen in section through the capsule and contiguous pulp cocci were seen in abundance. They were contained in the Tunica albuginea, and the two layers of the peritoneum, but mostly in the former, where they formed large colonies.

In the lungs no micrococci were found, except in sections which passed through the pleura. On this latter structure (the pleura), they were seen in masses interspersed amongst the fibres of this en-

velope.

The liver and kidneys were free from the microbes, but the capsules were affected like that of the spleen.

We thus conclude that the microbe selects apparently the fibrous tissue of organs in preference to the other structures, though it may invade the organs themselves. None of the microbes were to be found in the blood, though they were carefully searched for in the clot taken from the heart. No inflammatory changes were noticed in any of the organs in which the micrococci were found, and although there was some hyp^{er}aplasia of the fibrous tissue, there was no cellular infiltration.

Dr Nicholls observes, on page 309 of his Report, that "All the material for the examination of the "external organs was obtained from one subject; and "that, therefore, the absence of granulation tissue in "these organs is not conclusive evidence that it may not exist in them in certain stages of the disease. "The pains in the long bones and in the articulations "which occur in Yaws, more especially when the acces- "sion of fever indicates a general infection of the "system, would seem to point to some departure from "the normal condition of the periosteum and the other "fibrous tissues in these situations. The presence

Omitted by the Typist

Cultivations on nutrient jelly demonstrated the following characteristics of the micrococcus.

I The macroscopic appearances of the cultivated microbe is a white mucoid oval, or rounded mass, with a chromogenic tendency. The colouring matter when present, in most instances is of a salmon tint.

II Microscopically the microbe is a coccus, from 0.5 to 1.5μ in diameter, occurring singly or in twos, threes, fours, short chains, and zoogloea, or small colonies. The cocci multiply by transverse fission, thus the grouping in diplococci, triads, tetrads, and streptococci, is merely accidental, and indicative of the rapid growth of the micro-organism.

"of micrococci giving rise to pressure by hyperplasia
"of these tissues would account for pain, and for the
"tenderness which is sometimes present." Nicholls
was able also to cultivate the microbe from the dust
swept from the floor of the Yaws Hospital in Dominica.
From the dust he obtained three growths,-- mould,
bacterium lineola, and the Yaws micrococcus. Pure
cultivations of the micrococcus was then obtained,
differing in no particular, macroscopically or micro-
scopically, from those obtained in the experiments
conducted by himself and Mr Watts, except that they
were more vigorous and larger. This latter fact he
believes indicates that not only is the microbe pre-
served in the soil, but that when so preserved it
becomes more virulent, and therefore able more
readily to infect any person into whose system they
obtain an entry. This proves that not only is the
disease propagated by direct contagion with the in-
fected, but from the dust to be found in the huts
occupied by persons afflicted with the disease. Dr
Nicholls kept dust from which the micrococcus was ob-
tained for months, and was able to obtain pure culti-
vations of the microbe when placed in a suitable soil.
We may thus conclude that it is highly probable that
the micrococcus described by Nicholls and Watt is the
special microbe peculiar to Yaws. However, until

the disease can be artificially produced in animals by inoculation, with a pure cultivation of the microbe, and then rediscovered in the tissues of the inoculated animal, we cannot definitely state that Nicholls' and Watt's micrococcus is the microbe of Yaws.

Symptoms.

The stage of incubation lasts probably from seven to eight weeks. My reasons for believing such a period to be the length of this stage of the disease are the following:--

In Dr Tulloch's Report on Yaws of 1890, at page 6, we find that he makes mention of a case he had brought to his notice in which "he had successfully vaccinated a child 7 months old, living in a badly infected village, with lymph from the arm of a healthy child, which had been vaccinated the day before with imported calf lymph. The four marks healed perfectly, but nine weeks after the date of vaccination one of them formed 'a boil,' and the child brought three weeks later had a typical Yaws tubercle (granuloma), quite as large as a shilling on the site of the marks." Tulloch remarks that

the lymph was not to blame, as he vaccinated about a dozen children from the same arm and on the same day, and not one of them was in any way affected. Contagion could not have occurred until after the vesicles had ruptured, nor after they had healed. He therefore concludes, on the presumption that the child was inoculated by neighbours suffering from the disease, that the data furnished would give a period of incubation from seven to eight weeks. In the late Dr Beaven Rake's Report on the Leper Asylum in Trinidad for the year 1886, we find it stated that "eight cases of Yaws have occurred during the year. "Five of these, however, have been in new admissions, "who brought the disease with them into the Asylum, "either in its incubative or eruptive stage. The "other three cases form an interesting illustration "of the probable length of incubation in Yaws. S., "a coolie, aged 36, who had scarcely been free from "Yaws since her admission, had another outbreak at "the end of November 1885. At the beginning of "February 1886, L., another coolie, aged 51, and D., "her son, aged 10, were both found to have Yaws. "They had both been free from the disease before. "The beds of the two women were not far apart in the "ward, and the boy had often visited his mother there. "It seems fair to assume that these two, mother and

"son, contracted the disease from the other coolie
"about the same time. This would make the incuba-
"tion in these cases about eight weeks."

I have had an opportunity myself of forming a
probable estimate as to length of the incubation
period.

On the 8th of August 1896, I vaccinated a child
aged nine months, Diana C. Duncan, at Les Coteaux,
with imported calf lymph. The child when vaccina-
ted was very healthy looking, and on the 14th August
when I saw her again the vesicles had developed very
thoroughly. I did not see D. C. D. again until the
16th of October, when she was brought to me suffering
from Yaws, there being several well developed granu-
lomata about the buttocks and anus. One granuloma,
about the size of a sixpence, was present on one of
the vaccination marks. On enquiry of the mother, I
elicited the fact that she had noticed the first
granuloma two weeks previously, and that it appeared
on the site of one of the vaccination marks. She
also informed me that there was a case of Yaws in the
house, which had not been reported to me; and that
about the time the vaccination vesicles were ruptured,
the boy had several well-developed granulomata on his
face. She allowed the girl and the boy to play to-
gether quite freely. Here therefore we have a

healthy child vaccinated on the 7th of August 1896; seen on the 14th, vesicles well formed; brought to the District Medical Officer on the 17th October, nine weeks after, with Yaws. The first granuloma, which was the primary symptom noticed in this case, appeared two weeks previously.

The child had ample opportunities for being inoculated any day after the 14th, in fact, any day from the 14th, for I used her arm to vaccinate other children with, and thus ruptured the vesicles. None of the children vaccinated with the lymph from D. C. D's arm, now six months after, have had Yaws. We may thus safely presume that the incubation period in this case was about seven weeks.

Stage of invasion.

The prodromata vary, or there may be none at all. As a rule it is difficult to obtain any history. In some cases there are no noticeable symptoms preceding the onset of the rash, the persons affected with the disease often asserting that they felt in their usual health, the first notice of the disease being the eruption. Sometimes, however, a history of loss of appetite and a feeling of being somewhat "below par,"

will be given. In other cases in this stage, general malaise, headache, loss of appetite, and feverishness, are complained of.

As children are the greatest sufferers from Yaws, definite data as to the symptoms exhibited in the stage of invasion cannot be obtained. Negro mothers pay little attention to their children's ailments until they are forced upon their notice, and fear of prosecution by the District Medical Officer for negligence looms in view. The children, as a rule, are left all day in the care of their older brothers and sisters, whilst the parents are away working in their vegetable gardens or "grounds" as they are called, and thus they seldom notice any prodromata in this disease.

In some instances there is considerable constitutional disturbance, which lasts from a few days to a week. The fever in such cases is preceded by a rigor, and if of a continued type, the daily temperature ranging from 100° F. to 103° F.; and frequently there are nightly exacerbations. The ordinary subjective and objective phenomena of febrile conditions are present. The tongue is white and furred; the pulse is fast, and may be hard or soft, but usually full; and there is an increase in the number of respirations. At times there is also considerable

disturbance of the digestive tract, and this gives rise to vomiting or diarrhoea or both. The urine is somewhat scanty, and high coloured, and leaves a deposit on standing.

I have only seen one case of Yaws exhibiting such severe prodromata in my practice.

As a general rule I believe that the invasion of the disease is marked by a rise in temperature, which however, as a rule, is so slight that it escaped the notice of the uneducated negroes; malaise, causing loss of appetite and a general lowering of the system, and pains of a rheumatic character in the joints of the extremities, which sometimes are very severe. But as a rule the prodromata are not sufficient to keep those infected from work. When these symptoms subside, or, as occurs also, when there has been no appearance of any prodromata, the disease reaches the

Stage of advance and eruption.

This is the stage of the disease at which the infected seek treatment, and when they usually come under the notice of the District Medical Officer. The temperature now becomes normal, and the various forms of eruption in the disease present themselves

in a typical case in the following order:

The skin becomes dry and harsh, and in that condition so well seen on the girl's arm in photo No 3. Scattered about the trunk and limbs are whitish coloured patches, and the appearance is as if flour



*Photo No I
squamae on buttocks only.*

or whitewash had been sprinkled here and there on the skin. The appearance on the black skin of the negro is very characteristic.

It is really a *furfuracea* ceous desquamation.

These patches are the squamae; described as *muculae* by Tulloch, and popularly known as

"Pian dartre" in the French islands. The

squamae are usually scattered all over the body and limbs, but sometimes they may be more confined to the face, or to the limbs, with only a few on the trunk, and vice-versa. In size they are usually small, about that of a threepenny piece, but on the other hand the squamae may coalesce and form extensive patches. I have seen from this coalescing, an en-

tire leg from knee to ankle covered with one large patch, like a stocking. The patches, on the other hand, are sometimes so ill-defined as to need the aid of a pocket lens to see them. The shape of the squamae may be oval, rounded or irregular. Sometimes an accumulation of the necrosed epidermis may give the squamae a raised appearance, but this is rare, as the desquamations are easily brushed off by the clothes. The base is slightly elevated, if looked at with a pocket lens, and congested, but the congestion is only to be seen in the mulatto or lighter-skinned negro.

Sometimes at this stage, but rarely, the disease may abort, or it may become very chronic, and the squamae remain for many months. But, as a general rule, the disease goes on to the second form of eruption, the Papular form, also known popularly in the French islands as the "Pian gratelle," or "grater Yaws," from the appearance of the skin.

The papillae now make their appearance after an indefinite period that in some cases may be measured by days, in others by weeks.

The papules appear as a rule within the areas of the squamous patches, and show themselves at first as minute nodules. But they may at the same time appear in parts of the skin surface unaffected with the

squamous necrosis. Each papule is surrounded by a circle of epithelium at its base, curling away from it. This with the aid of a powerful pocket lens x 20 times will be seen to be due to a splitting of the epidermis by the pushing up of the papule from below. The crown or circlet being formed by the divided epithelium on the floor of the squamous patch.

My own experience leads me to believe that the papillae occur as often in parts unaffected by the squamae as within them.

The papillae are small in size, and their greatest measurement being about a millimetre in height. When they attain this size small yellow caps commence to form on the summit, and the typical eruption in Yaws now makes its appearance, viz:--

The granulomata.-- The papillae with the yellow heads increase in size, and the yellow incrustation likewise. This yellow cap is not pus, and cannot be brushed off except with force, then a small raw bleeding surface will be exposed to view. The larger a papilla grows, the larger grows the yellow incrustation, which eventually covers the whole papilla or even several of them, leaving no part of the papilla or papillae exposed to view. This is well seen in photo number 2, which is a most typical example of a fully formed granuloma. It is little

more than the size of a shilling in circumference. The large yellow cap is well marked, with its pithed and roughly granular



*Photo No II
a granuloma.*

surface. The sides have the appearance of having "boiled over." Its shape is rounded and it is considerably elevated above the surrounding skin. The colour is a light yellow and the surface exudes a viscid fluid, which renders it moist, and from which the term "moist tubercle" has been applied. The

granuloma is quite firm and by no means soft and gelatinous. Granulomata, however, vary in shape. They may be crescentic or quite circular, or may form a ring surrounding within healthy skin, or they may be more or less irregular. But whatever form they assume, the outlines are more or less circular. Some of these conditions are well seen in photo No 3.



Photo no III
Papillæ To be noted at A.
Granulomata on rest of face.

On the other hand the encrusted form of granuloma may be met with. In this variety the yellow "cap" is dry and there is no viscid exudation from the surface. Such granulomata are usually of long standing. The colour of the crust varies from

a dirty brownish yellow to a bright yellow.

On removing the yellow cap from a granuloma a raw, bleeding surface is exposed. The size of a granuloma ranges from a millimetre to that of a shilling and even a florin. Sometimes several



Photo no IV
Coalescing granulomata

adjacent granulomata will coalesce and form one very large granuloma, as is well seen in photo No 4, on the forehead, and just above and between the eyes of the black boy.

The favourite sites for the occurrence of granulomata are the face and feet and hands, the

junctions of skin and mucous membrane, as at the lips, anus, labiae, prepuce. But the eruption may occur in any part of the body, and may be common to the body as a whole.

The usual termination of a granuloma is by a process of absorption and shrinkage. The contained fluid disappears, the connective tissue shrinks and naturally the surface cracks and splits in various directions. This is shown in photo No 5, the granu-



lomata undergoing such a process are marked with circles of dots. As the shrinkage goes on dry crusts then form; these eventually detach in pieces, until all drop off and a pigmented surface remains to mark the site, leaving no scar and forming the characteristic macula. Each macula as a rule is represented by a darker circle of epidermis surrounding a lighter area, somewhat coppery in colour. Gradually the lighter centre develops islands of a darker hue until all these coalesce and the skin resumes its natural colour, from the formation of pigment met with in the negro skin. The

first granuloma to appear is called the "mamma" Yaw by the negroes, as they believe it to be the source of the others. Granulomata exhibit very little or no pain, and they are supplied, we may therefore conclude, with few nerve filaments or none at all.

The Tobboe.-- The skin of the negroes' foot is generally very dense and thick, and of a leathery consistency, owing to their always going about bare-footed. When a granuloma occurs on the sole of the foot, it has to push its way up through the thick horny layer of epidermis. The pressure exerted on the tumour causes great pain and renders the patient practically incapable of walking. In course of time, the granuloma pushes its way through the horny epidermis, the latter splitting in all directions. In this stage it is seen elevated above the surrounding cuticle which in immediate contact with it is ragged and irregular in outline. The granuloma in this position has no or little crust, and has a more or less raw appearance. The process of absorption is the same as in a granuloma in other sites, but there is no macula formed, for there is no melanine in the sole of a negro's foot. Occasionally the exudation from a granuloma in the sole of the foot before breaking through the horny epidermis burrows in all directions seeking an exit. It seems to

have some sort of corrosive action on the tissues, for a form of dermatitis always results in such cases, and the natives have given the name "crab Yaws" to this form. The surface of the sole of the foot becomes cracked and fissured irregularly in all directions. This condition is a very chronic one, and its course may often be measured by years. In the preceding pages I have endeavoured to describe the typical features in Yaws, but, like most diseases, the symptoms are often very erratic.

The squamae sometimes do not occur at all, and may even appear after the Papillary and granulomatous stages have disappeared. In such cases the condition becomes very chronic.

Again, the only manifestation of the disease may be the formation of squamae, but this is very rare indeed. On the other hand, no squamae may appear and the disease will be ushered in by the appearance of the papillae, these may go on to form granulomata, but sometimes the disease aborts before that stage.

In other instances no squamae or papules may be seen by the medical officer, and only a typical eruption of granulomata may be noted, but I regard these cases as those in which the patients do not present themselves until after the development of the granulomatous stage of the disease.

Pain in the joints of the extremities is a frequent symptom in Yaws. Often it occurs before the appearance of any rash, and it may continue for a considerable time, but it usually disappears on the appearance of the granulomata. On the other hand, the pain in a few rarer cases does not occur until all eruption has disappeared. Sometimes this rheumatic-like pain is very intense, especially when appearing late in the disease. The joints do not swell or exhibit in any way an increase in the local temperature. It should be regarded as due to an irritation of the nerves in those areas. The use of mercury sometimes intensifies the pain.

Onychia, and that of a very intractable form, occasionally occurs, especially in children.

Complications.-- Syphilis and Yaws sometimes occur together. I have met with a case of tertiary syphilis, in which necroses of the nasal bones, and destruction of the roof of the palate was very marked; whilst on the face and feet were several well-developed granulomata. These cases are very serious ones and a very aggravated form of Yaws results. Some of the most fearful examples of destructive ulceration witnessed have been due to the complication of Yaws with Syphilis, or Syphilis with Yaws. Dr Blanc, the Medical Officer of No 1 District of

this Island, who has had nine years' experience of Framboesia in Tobago, has informed me that he has met with several cases of Yaws complicated with tertiary Syphilis, but never with the primary or secondary forms. I have myself never seen these latter forms in connection with Yaws. Though I have not seen the disease complicated with primary or secondary Syphilis, I have attended persons on several occasions for primary Syphilis who had previously had Yaws.

Tuberculosis.-- The forms of this disease to be met with as complications of Yaws are Lupus and Scrofula. I have seen several examples, especially of the former variety.

Ulcers.-- Ulcers result when a number of granu-
lomata coalesce and are subjected to irritation and
injury, coupled with neglect and dirt. These
ulcers usually occur on the feet, and are of the



Photo No VI
Yaws. Ulcer.

callous variety and very intractable to treatment. They have all the characteristics of a callous ulcer, as described in works on surgery. These ulcers

are a fairly common complication of Yaws, and are known popularly as "Yaws sores."

Leprosy.-- I have never seen a case of Yaws and Leprosy together in the same person, but that such may occur will be seen from the table of the report for 1886 of the late Dr Beaven Rake in charge of the Trinidad Leper Asylum.

Years.	No of Lepers under treatment.	Cases of Yaws.			Total.
		In tuber- cular variety.	In anaes- -thetic variety.	In the mixed form of Leprosy.	
1886	216	2	5	1	8
1888	214	-	1	-	1
1889	216	1	3	-	4
1890	250	-	2	1	3
Totals.	896	3	11	2	16

Anaemia.-- This is a fairly frequent complication of Yaws, especially in the early stages, and when the patients first come under treatment. The anaemia must however not be attributed to the disease, but rather the manner of living of the average negro labourer.

Pica or dirt-eating is sometimes a complication

of Yaws. I have met with cases myself. The red clay is the favourite form of dirt eaten. It is difficult to break those afflicted off this habit. Nicholls makes mention of a case in which this complication took the form of picking the crusts from the granulomata and eating them.

Skin diseases.-- I have seen a well-marked case of eczema occurring in a Yaws patient. Various skin diseases may be met with in persons suffering from Yaws.

Talipes.-- Talip~~s~~s, in rare cases, occurs after an attack of the disease. This is seen where "tubboes" and "crab Yaws" occur in the soles of the feet and ulcers about the ankles and feet. The pain in walking obliges the person afflicted to walk on heels or toes, or the margins of the feet, and in this way talipes of various forms results. The statistics of the Central Yaws Hospital in Dominica showed that of 1647 cases admitted, 12 or 0.7 per centum of the patients were suffering from one or other of the forms of club foot due to the causes just enumerated.

Diagnosis:/
—

Diagnosis.

Syphilis has been much confounded with Yaws, from the days of slavery to the present. There is however no doubt that the diseases are quite distinct. The opinion of all those who have had to treat large numbers of Yaws patients and have been able to study the disease in regions where it occurs is that Yaws and syphilis are two different diseases.

Let one but consider the chief characteristics of the two diseases and the difference can be made clear.

- | | |
|--|--|
| <p>1. Syphilis is both acquired and hereditary.</p> | <p>1. Yaws is always acquired and never hereditary.</p> |
| <p>2. Syphilitic women usually abort.</p> | <p>2. Women with Yaws never abort.</p> |
| <p>3. Syphilis is a respecter of no class and occurs in every rank in life, as frequently in the higher as in the lower.</p> | <p>3. Yaws occurs principally among the negroes, and even amongst them usually in the working class. It is rarely met with amongst the whites or better-class negroes.</p> |
| <p>4. Persons contracting</p> | <p>4. Persons contracting</p> |

- | | |
|--|--|
| Syphilis once are rendered immune. | Yaws can acquire Syphilis afterwards. |
| 5. Children suffer from Syphilis congenitally. | 5. Children always acquire Yaws by direct inoculation. |
| 6. Syphilis is commonest among adults. | 6. Yaws is commoner in children. |

If we consider the above comparison and note the differences in the symptoms of the two diseases, I cannot see how Yaws can be described as a modified form of Syphilis.

Syphilis is fairly common among the negroes, in the forms met with in Europe, and I cannot conceive why it should occur as a modified form in one set of negroes and in an unmodified form in another.

Let us consider the ages at which Yaws is commonest. From the table in the paragraph on page 17, we note that out of the 412 cases the disease occurred in 180 or over 40% amongst those between the ages of 5 and 10 years. When we come to persons between the ages of 20-30 years, only 30 out of the 412 suffered from the malady. Syphilis when acquired is usually the result of impure sexual intercourse, and hence occurs commonest in adults. Yaws occurs commonest in young children in whom sexual intercourse is impossible. These facts are suffi-

cient in my humble opinion to conclusively demonstrate that the two diseases are essentially distinct.

There are two other diseases which bear a certain resemblance to Yaws, viz: Parangi and Oriental Sores. But there are certain characteristics which easily distinguish them from Yaws.

Parangi.

Yaws.

- | | |
|--|---|
| 1. Fever a constant symptom during stage of invasion. | 1. Fever not a constant feature of stage of invasion. |
| 2. Ulceration a chief feature of the disease and always follows the eruptions which are papular and macular. | 2. Ulceration never occurs except in rare instances when due to neglect, irritation and dirt. |
| 3. Granulomata never occur in Parangi. | 3. They are the chief characteristic eruption in Yaws. |

Oriental Sores first commence with an eruption of papules that become covered with yellow crusts, but the crusts are due to suppuration beneath, and under the crusts ulceration goes on. The ulcers are clean and the granulations secrete a sanious or seropurulent fluid. Cicatrices always mark the site of the ulcers. We can easily conclude that this disease is not Yaws, for its chief features,

ulceration with resulting cicatrices, are absent in Yaws.

Treatment.

The first principle to be recognised in the treatment of Yaws is that a routine form must not be relied upon as a sine qua non.

Each case must be treated upon its own merits, and that I am not singular in this belief can be shown by referring to page 313 of Dr Nicholls' Report, where he writes: "If such routine treatment were all that is necessary in dealing with the disease, the solution of the Yaws difficulty would be made an easy and speedy one, by placing a supply of the mixture at certain points of infected districts, and by putting an intelligent person capable of giving the necessary directions in charge of its distribution."

Whilst provisions are made for the disease by a method of treatment that has for its supporter such a high authority on Yaws as Dr Tulloch, no measures are adopted for treating the anaemia, the digestive troubles, and other afflictions so commonly met with in Yaws, and whose cure and alleviation are essential

for the proper treatment of the disease.

The medical officers cannot with any fair justice be called upon to supply free of charge the necessary drugs for these complications, for their allowances for medicines for paupers and those entitled to drugs free, namely, the children of labourers under the age of eight years, and labourers of the age of sixty and upwards, are so small (£15 a year to each district) that, excluding Yaws patients, the demand for medicines far exceeds the supply, and the medical officers usually find themselves out of pocket at the end of the year. The number of Yaws patients at present in the Island under treatment number about 1000, and unless the government authorities can see their way to augment the drugs by supplying the necessary medicines for treating the complications met with in the disease, or increase the allowances for drugs, the success that should follow the results of the crusade against the malady by the medical officers of Tobago will never be what it ought to be.

The first endeavours in the treatment of Yaws should be directed, I therefore believe, to the cure and alleviation of the complications commonly met with in the disease, such as anaemia, gastric affections, loss of appetite, and the like. These are to be treated on the ordinary lines laid down in

works on the Practice of Medicine. The reason for this being that there is little doubt that the morbid changes in the tissues in Yaws are due to the influence of a micro-organism. It therefore becomes necessary to place the tissues in such a condition as to render them fit to resist and overcome the action of the morbid processes. Therefore it cannot be regarded as rational or scientific any form of treatment that does not deal with the anaemia, the digestive trouble, the loss of appetite, or the scrofula. Yaws must be "guided" to a satisfactory cure, until such time as a specific is discovered for it. In those cases where the constitution is sufficiently vigorous to resist the influence of the microbes, a spontaneous cure takes place without any form of treatment. Again by removing the complications and strengthening the system, nature forms and strengthens the barriers of granulation tissue formed around the granulomata, as has been seen in the pathology of the disease, and thus isolates the microbes within certain boundaries.

In the early stages of the malady, any drugs which would be likely to suppress the efflorescence of the eruption are on no account to be administered. The drugs to be recommended in these early stages I believe to be those which favour a cutaneous circula-

tion. The rapid proliferation of tissue cells and their maintenance at full vigour require this.

Chills, insufficient clothing, any conditions of the like kind, as a too early bath, damp dwellings, etc., are thus to be avoided.

No form of treatment is to be more condemned than any attempt to destroy the granulomata at an early stage, in fact, at all; for the reasons already given, all one's efforts must be directed towards causing them to attain their full vigour.

Warm baths with care to prevent chill, or cold baths just sufficient to result in an increase in the cutaneous circulation, are very beneficial.

Nicholls recommends that the parts affected be dressed with carbolic oil to prevent the exfoliation of defective debris. This is no doubt a very good plan.

In the early stages of the malady I usually prescribe, after dealing with the complications, a mixture of *Liquor Arsenicalis* and *Tinctura Nucis Vomicae*. I have found this in many cases of very great benefit. This is specially valuable in those cases where the squames and papules assume a chronic form. Another useful form of preparation in these cases, ^{is} Donovan's solution, administered judiciously; but its administration must be watched, as in some cases the mercury

in the solution produces a bad effect. The dose used should be small.

Sulphocarbolate of calcium in 2 grain doses has been used by some physicians with benefit. After the granulomata have developed fully, the treatment required is of a different kind. In this stage all must be done to bring about a resolution as speedily as possible for nature has formed her barriers and the microbes are isolated. The drug to be most highly valued now is Iodide of Potash. It certainly has a very speedy effect in bringing about a resolution. Hence it should not be used in the early stages of the disease. The drug should be continued for a few weeks after the granulomata have disappeared. As a rule, I try as far as I can to get the patients to continue its use until the maculae have disappeared.

The use of salines to promote free diuretic and diaphoretic actions are indicated in those cases where the skin is dry, rough and harsh in appearance. Locally when the granulomata are well developed any antiseptic dressing is to be recommended. In Tobago Iodoform ointment is supplied by the government.

I also always recommend my patients when bathing to use carbolic soap in the bath for obvious reasons.

The diet should be as nourishing as possible,

and the hygienic surroundings of the best.

Ulcers met with in Yaws call for no special mode of treatment but that prescribed in standard works on Surgery.

The after rheumatic pains are benefitted by Iodide of Potash.

For the measures to be adopted to check the spread of the disease and to prevent contagion, I propose to leave until after reviewing the history of the malady in Tobago.

Prognosis.

In uncomplicated cases, and where treatment has been begun at the commencement of the disease, a cure will be most likely effected in from one to four months. But in neglected and complicated cases, a cure may not be effected under eighteen months and more. Children are more easily cured than adults. Yaws rarely results in death. Out of my 412 cases I have had only three deaths, and these cases death was due more to the complications, and from neglect. I quite agree with Tulloch that when death occurs from Yaws, those responsible for the patient are to be regarded as morally guilty of manslaughter. Yaws

may therefore be regarded conclusively as a non-fatal disease.

History of Yaws in Tobago.

Yaws, as has been mentioned in the Origin of the disease, was carried to this Island by the imported slaves from Africa. It is impossible to fix the date of its first appearance as there are no records in the archives of Tobago which would help one to determine the exact period of its introduction.

The disease raged all over the Island; and we find that the slave-owners took every precaution to overcome the ravages of the malady and to check its spread. In consulting the old records it is found that what were known as "Yaws houses" existed on all the principal plantations such as Charlotte Ville, Merchiston, King's Bay and Betsy's Hope in the Windward district of the Island; at Auchenskeoch, and Golden Grove in the Leeward or Sandy Point district; and at Castara, Woodlands, Arnos Vale, and Les Cotteaux in the Northern district. The smaller estates kept up one "Yaws house" between two or three of them.

Slaves suffering from Yaws were at once removed

from intercourse with their healthy brethern, and strictly isolated in these "Yaws houses." Each Yaws house was under the care of one or more old women, who acted as nurses, and were known as "Yaws grandies." The planters and slaves had an unbounded belief in these women, and preferred their services to those of members of the medical profession. There was a solid foundation for this want of faith in the professional treatment of Yaws, for the practitioners of that time treated the disease by means of excessive doses of mercury, which resulted in most cases in greatly aggravating the affection, and even in death. But apart from that fact, white persons had the utmost dread of contracting the malady, for we find in the writings of Dr Williamson (1817) on Yaws, the recommendation that all physicians visiting Yaws houses should wear a covering over the face and hands to protect themselves from contagion. One however must not conclude from this that the older medical men were less eager to brave infection for the sake of succouring helpless humanity than at the present time. Yaws was regarded with a terrible loathing in slavery times, and a white person who was infected became an outcast from his fellows and was ruined in fortune and prospects.

The treatment of the "Yaws grandies" consisted

chiefly in the administration of the decoctions and infusions of native herbs and plants of a diaphoretic and diuretic character, in cleanliness, and frequent bathing, as well as by the application of lime juice and salt to the granulomata. The benefit of this method of treatment rested on cleanliness and on the isolation. By these means the disease was kept in moderate bounds, but unfortunately fresh material was always arriving from Africa.

On the abolition of slavery the newly-liberated formed in such an island as Tobago (where there are ample opportunities for doing so) settlements in the highlands and backwoods, with the natural result that the negroes were removed from the direct observation of their old masters. It was after emancipation, and when the new order of things had had sway for some years, that Yaws was said to have disappeared. Unfortunately, those responsible were much mistaken, for, though the disease had apparently disappeared, we now know that the repressive measures under which the disease was kept in check being no longer in force so contagious a disease as Yaws was really not only holding its own but gaining ground.

The malady was stealthily doing its work, and there was no one to take intelligent notice of it. No medical aid or supervision was in vogue.

The people growing more familiar with the disease,-- the fear of contagion being blunted, as it is at the present day by that familiarity which breeds contempt,-- Yaws passed from house to house, and village to village, affecting principally the poorest, the dirtiest, and hence the largest portion of the people. The condition of the negroes of this class at this period was truly deplorable, and, as has been remarked, but for the exertions of the ministers of the various denominations, there would have been a relapse into savagery. "Quashi" had now learned to believe that Yaws was a necessary evil in his life that had to be endured, and his wish was to have it as early as possible. Even at the present day it is regarded by some of the negroes in the same light,-- "the black man's curse." At last a day dawned when the state of matters forced itself on the notice of the authorities, and it was seen that poor Quashi's condition needed prompt attention.

Now it was that Yaws was said to have reappeared. The result was that in 1882 a Medical Aid Ordinance was passed for the purposes of rendering gratuitous medical aid to paupers and labourers of the age of sixty years and upwards, and their children under the age of eight years. But no special measures were adopted for dealing with the disease, which was now

endemic in the Island, and was causing so much misery. Children suffering from Yaws were allowed to attend school, and the negroes were not taught to seek advice and treatment for the malady. As Tulloch remarks in his "Report," children suffering from some complaint, and also afflicted with Yaws, were often brought to him, but as soon as the "fever" or the "fresh cold" or the "worms" had disappeared the existence of Yaws was ignored and the patients seen no more.

In 1883 Tulloch, then a Medical Officer in Tobago, recognising the gravity of the situation, reported the matter to the Government and endeavoured to arouse the authorities to a sense of their duty. He was then asked for a full report and recommended the following scheme:--

1. That a small hospital should be established in each district or say two in the island, with a resident nurse and a stock of suitable drugs.
2. That a constable should be told off for each district with instructions to discover all cases of Yaws, and to require their attendance at stated times on the district Medical Officer.
3. In addition to hospital treatment a system of compulsory out-door relief for Yaws should be enforced by means of the police.
4. That any person found neglecting to report his

or her child suffering from Yaws to the Medical Officer of the district should be held liable for punishment under the Medical Aid Ordinance 1882.

A circular letter was addressed to the other medical officers and to some of the principal residents of the Island, asking for information regarding the prevalence of the disease. The answers of these letters proved that Yaws was prevalent all over the Island, and was increasing; that the negroes were indifferent and apathetic about it, and that prompt measures were necessary. But, as often happens in these islands, it all ended in smoke, as the government authorities were of opinion that the financial embarrassments of the Island would not allow of any expenditure in the treatment of the disease. Dr Tulloch, however, was asked to draw up a paper advising parents as to the correct manner of rearing infants, and this was printed and circulated. The idea was that parents would better understand how to properly rear their children, with a result that they would enjoy better health and so be less liable to "catch" Yaws.

This excellent paper of Tulloch's was brought to the notice of the Secretary of State by Sir Wm. Robinson, then Governor of Trinidad; but nothing was done until 1887 when Tulloch again directed the attention

of the Administrator of Tobago to the state of affairs and with better results. Arrangements were made so that the medical officers were to afford gratuitous attendance to those suffering from Yaws, the Government bearing the cost of the necessary drugs. An Order in Council was next passed bringing all parents and guardians of children under eight years of age under Section 14 of the Medical Aid Ordinance (which enforced compulsory attendance for medical treatment of sick children under that age). But unfortunately those over eight years of age were not included in the "Order," with the result that only the former were brought for treatment. The Board of Health, recognising this, passed a resolution recommending that attendance be made compulsory on all persons suffering from Yaws.

It was only in 1889, however, after much agitation by Dr Tulloch and the Board of Health, that a "Yaws Suppression Regulation" was passed, making attendance compulsory on all persons of whatever age or class suffering from that disease. A notice was issued informing the people of the passing of the Ordinance, with a table of the days and hours for attendance at various stations in the medical districts. Slowly but surely the zeal of the medical officers bore fruit, and a large number of cases

attended with creditable success. By the end of 1889, 1423 cases were treated, the average percentage of cures being 58. It may be noted that 8% of the total population were afflicted with the disease. Circular letters were again addressed to the principal residents in the Island requesting their opinion as to the result of the treatment. The Consensus of Opinion gathered from the replies was that the work of the medical officers had met with decided success, and that there was a marked diminution in the number of persons suffering from Yaws.

Unfortunately, however, the action of the then magistrate much lessened the good that might have been done, for he refused to convict persons under the provisions of the Yaws Ordinance if a plea of sickness for non-attendance was brought forward as a defence, unless proved to the contrary by the prosecutor. Necessarily there were those who would take advantage of this, and unfortunately many did.

After 1889 the Island became financially embarrassed and a constant supply of drugs was not always at hand, with the result that the good done was soon undone to a considerable extent. Dr Nicholls was in 1890 appointed by the Secretary of State to investigate the disease, its ravages, and the methods of treatment adopted in the various islands. His

*pop of island
20,000.*

Report was published in 1892. The result of Dr Nicholls' Report was, that at the end of 1894 the Secretary of State for the Colonies addressed to Sir F. Napier Broome, the Governor of Trinidad and Tobago, a despatch in which he directed that a vigorous crusade should be commenced against the disease. He was requested to instruct the medical officers that they were to leave no stone unturned in their endeavours to stamp out the malady, and that every assistance was to be afforded by the Government, and all the necessary drugs and appliances needed were to be at once supplied. The magistrate was to be informed that the provisions of the Yaws Regulations were to be carried out thoroughly, and that any action on his part which would render them invalid, would be considered a breach of duty, and treated as such. On receipt of the order from the Governor, the Commissioner of the Island took immediate steps to carry out the Secretary of State's instructions. Yaws stations were established at the following villages in the three districts of the Island:--

In Nos 1 and 2 district (Dr Blanc):

1. At the Hospital in the capital (Scarborough) every Friday (in No 1 district).
2. At Montgomery in No 2 every Monday.

In No 3 District (my own):

1. At Mason Hall every Monday.

2. At Moriah every Wednesday.
3. At Les Coteaux every Friday.
4. At Plymouth every Saturday.
5. At Parlatuvier the last Thursday of every month.
6. At Castara the last Thursday of every month.

The first four towns or villages in my district are situated equidistant about 5 miles from my residence, but the last two are respectively 21 and 11 miles away, hence they can only be visited once a month, the roads being so bad that it requires almost a day's journey to get to them.

In No 4 district (Dr Robinson):

1. At Mount St George every Saturday.
2. At Pembroke every Monday.
3. At Roxborough every Wednesday.
4. At Charlotteville twice a month.

Each medical officer keeps a record of his cases.

He is supplied with an assistant to compound and distribute the mixture and ointment. Yaws constables have been appointed in every district, their duties being to:

1. Ferret out and report all hidden cases of Yaws.
2. And to assist the medical officer as may be needed.

Every six months a half-yearly Report is sent in to the Government showing the results of the work done.

**Jomovans Sol.
Pot Kodid.
Delo & Sarra Co.*

The results of the treatment since 1895 have been as follows:--

Nos 1 and 2 districts:

Total No. treated.	Cured.	Still under treatment.
250	131	119

In No 3 district (my own):

Stations	Total No treated.	Cured	Died	Remaining still under treatment.
1. Plymouth	124	62	1	61
2. Les Coteaux	82	51	1	30
3. Moriah	85	57	1	27
4. Mason Hall	46	34	-	12
5. Castara	40	14	-	26
6. Parlatuvier	35	10	-	25
Totals	412	228	3	181

In No 4 District:

Total No. treated.	Cured.	Still under treatment.
396	194	202

In the whole Island therefore the total number of cases treated have been 1058, and the total number

of cures 553, or a little over 50%. There thus remained at the beginning of 1897 only 505 under treatment. But herein comes the drawback to the dispensary system, namely, that everyone of the 505 cases act as foci for disseminating the disease, and hence fresh cases are always appearing.

From the figures in the preceding paragraph, we notice that the percentage of cures in Tobago is fair, but not by any means what it ought to be. In Trinidad it is higher. This I attribute to the fact that the district medical officers have carte-blanche to order whatever drugs they require, and are not narrowed down to using a stock mixture, as in Tobago.

Measures of a partial nature, as are in vogue in Tobago, will never suffice to eradicate Yaws entirely from the island. All that can be expected is that the disease will be kept within controllable bounds. The revenue in Tobago is too small to afford the cost of erection and upkeep of Yaws hospitals for compulsory segregation, hence such a plan cannot be advised. No system of compulsory segregation would be of any value unless it be thorough. But in colonies like Trinidad where there is a large revenue Yaws hospitals should be erected, within which the strictest system of compulsory segregation would be enforced. Given such an institution, together with measures as will be

*Joniorans Solution
Potassium Iodide
Secord, Sarsa Co.*

recommended to make the Tobago dispensary system more effective, it would be quite reasonable to expect, as has occurred in Carriacou (one of the Grenadines), that the disease would be eradicated.

The measures that seem to me desirable for improving the Tobago system are:--

1. A Yaws compulsory notification ordinance, enforcing notification from the parents of all children afflicted with Yaws, under 15 years of age. From all persons of the age of 15 years and upwards. Neglect of the observance of the ordinance to be punishable by a fine or imprisonment.

2. The appointment of a sanitary officer for each village.

3. The isolation as far as possible of infected houses.

4. The disinfection of all infected houses, and the bedding and clothing therein.

5. The strict enforcement of all sanitary measures.

The medical officers to have power to order or prescribe any drugs they may deem necessary.

The Black peasantry have never been taught the simplest hygienic or sanitary laws. They must learn that such measures are necessary. It is essential that the Local Governments should understand that parsimonious measures will not help to cure the

malady. . . . A liberal expenditure, consistent with the revenue of the Colony, should be adopted. . . . No stone should be left unturned in checking the spread of this loathsome malady, and it is a duty the Colonial Governments owe to the Negro race in these islands.

Thomas B. Kenny



HENRY FOWLER,

Administrator.

2nd August, 1889.

TOBAGO.

A.D. 1889.

A REGULATION to make provision for the treatment of Persons suffering from Yaws. No. 3—of 1889.

[30th August, 1889.]

BE it enacted by the Commissioner of Tobago with the advice and consent of the Financial Board thereof as follows:—

1. This Regulation may be cited as "The Yaws Suppression Regulation, 1889." Short title.

2. In this Regulation the words "Medical Officer" mean a Medical Officer appointed under "The Medical Aid Ordinance 1882." Interpretation.

3. The Medical Officer in charge of each District shall furnish gratuitously, advice and medicine to all persons suffering from Yaws within his District, such medicine to be supplied to him, on his requisition for the same being approved by the Commissioner, from the Colonial Hospital. Medical Officer to furnish gratuitous advice and medicine.

4. The Medical Officer in charge of each District shall from time to time with the consent of the Commissioner appoint places and hours at which all persons suffering from Yaws shall attend for treatment. The Medical Officer shall appoint stations

5. Every person over fifteen years of age suffering from Yaws who shall neglect to attend for treatment at such times and places as the Medical Officer shall direct or being incapacitated by illness or otherwise shall fail to send or cause to be sent a report as to his condition at such said times and places or who shall wilfully and persistently neglect to carry out the instructions of the Medical Officer as to treatment or who shall bathe himself or his clothes in any river pool or stream except at such place or places as may be appointed for such purpose by the District Medical Officer shall on conviction before a Stipendiary Justice of the Peace be liable to be imprisoned with or without hard labour for any term not exceeding three months. Personal attendance at stations or the sending a report to be compulsory on Yaws patients.
Bathing forbidden except at selected places.

6. Every person being the father or mother of any legitimate child under fifteen years of age or the mother of any illegitimate child under fifteen years of age or any person having the custody or guardianship of any child under fifteen years of age who shall fail whenever such child is suffering or is suspected to be suffering from yaws to bring or cause to be brought such child to the District Medical Officer of the District in which such child resides and in case such child cannot be brought, to give or cause to be given a report respecting such child to such District Medical Officer at such places and hours as the Medical Officer shall appoint and to continue to bring or cause to be brought or to give or cause to be given a Report respecting such child at such subsequent places and hours as the Medical Officer shall direct or who shall wilfully and persistently neglect to carry out the instructions of Parents and guardians responsible for children up to fifteen years.

No. 3—of 1889.

the Medical Officer as to the treatment of such child or who shall bathe or permit to be bathed any such child or the clothes of any such child in any river pool or stream except in such place or places as the District Medical Officer shall direct shall on conviction before a Stipendiary Justice of the Peace be liable to be imprisoned with or without hard labor for any term not exceeding three months.

Medical Officer or Magistrate to enter house to search for Yaws patients.

7. It shall be lawful for any Medical Officer or Justice of the Peace who has reason to believe that any person suffering from Yaws is in any house or place and wilfully evading treatment to enter such house or place in the daytime to search for such person or to issue a written authority to any Police or other Constable so to do, and if such person be found therein by such Medical Officer, Justice of the Peace, Police or other Constable, such Medical Officer, Justice of the Peace, Police or other Constable shall arrest or cause such person to be arrested and any such person so concealing himself and wilfully evading treatment shall on conviction before a Stipendiary Justice of the Peace be liable to be imprisoned with or without hard labour for any term not exceeding three months.

Penalty on persons harbouring or concealing Yaws patients.

8. Every person who shall harbor or conceal any person suffering from Yaws and so enable such person to evade treatment shall on conviction before a Stipendiary Justice of the Peace for every such offence be liable to a penalty not exceeding five pounds.

Penalty for obstructing or molesting.

9. Every person who shall obstruct or molest any person empowered to act under this Regulation in the execution of any duty imposed on him by this Regulation shall on conviction (when not otherwise provided for) be liable to a penalty not exceeding five pounds.

Procedure.

10. Any penalty recoverable under this Regulation may be recovered before any Stipendiary Justice of the Peace in a Summary way and in the event of the same not being paid forthwith the Stipendiary Justice may order the party liable to pay the same to be imprisoned with or without hard labour for any term not exceeding three months unless such penalty and the costs of recovering the same and the charges of the commitment and conveying the party to prison (the amount of such costs and charges being stated in the commitment) be sooner paid; and when recovered such penalty shall be paid to the Treasurer for the use of the Island: Provided that the Commissioner may award any sum not exceeding one half of any such penalty when recovered to any person who shall have afforded such information as shall have led to a conviction.

Power to suspend Regulation.

11. It shall be lawful for the Commissioner by Proclamation to suspend the operation of this Regulation or any part thereof and for such period of time as may be deemed expedient and again to revive the same or any part thereof.

Patients to have right to consult Medical Practitioners other than District Medical Officer.

12 Nothing contained in this Regulation shall interfere with the right of any person suffering from Yaws to obtain medical aid from any duly qualified Medical Practitioner registered under the Medical Registration Ordinance 1885 and any such person while under treatment shall be exempt from the operation of this Regulation.

Passed the Financial Board this Eighteenth day of July in the Year of Our Lord One thousand eight hundred and eighty-nine.

JAMES A. P. BOWHILL,
Provisional Clerk of the Board.