"On the Occurrence of Framboesia in South China, with Description of Cases."

by

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"Framboesia in South China."

The disease of warm climates known by the name of Yaws or Framboesia, and by a variety of other synonyms in different parts of the tropical world, has I believe not hitherto been recorded from China. As the introduction of a new disease into a hitherto virgin community is more than a matter of interest to the compiler of medical knowledge, but has an epidemiological importance, the writer may be justified in bringing to notice the occurrence of Framboesia in that portion at least of the Chinese mainland with which he is acquainted, and to which the disease has probably been imported within quite recent years.

Following upon the comparatively recent formation of schools of Tropical Medicine, and the increased interest in and more accurate knowledge acquired in them of the pathology of those diseases which have in the main their habitat within the tropical zone, it is to be expected that fresh additions to our knowledge from these sources will come to hand.
with increasing rapidity. Not only will new types be brought into notice, and differentiation of groups or of individual morbid types hitherto classed together be adopted, but the geographical distribution of some of these conditions will be found to have a wider range than was before suspected. So far as it concerns the mere tabulation of our knowledge of existing diseases, the last-mentioned feature is perhaps of less importance than the correction and completion of knowledge in the discovery of new diseases or, and this will be found in perhaps the majority of cases to be essentially the same thing—the discrimination between variety, species, and genus of already known diseases. But on the other hand the geographical limits of any disorder are liable at any time to be extended by the intercommunication of native races, a factor which was probably never more active than at the present day, when the question of coolie emigration from one country to another and even from continent to continent, taxes the resources of Colonial Authorities to provide or to control, and calls for legislation by interested Governments. A typical instance of the spread of a contagious disorder from what may have been a prehistoric endemic focus to regions beyond, is found in the case of Yaws.
To the medical man as to the Colonial Office, the introduction of this disease into the West Indies by African slaves from the Gulf of Guinea is, if the usually accepted belief be correct, a matter of history, and after the emancipation legislative machinery had to be put in motion to control its spread in Dominica.

The same fact is further illustrated in the same regions by the readiness with which the imported East Indian coolies contracted the disease from the negroes.

If it be the case as Nicholls remarks, that there is no evidence to establish the fact that yaws was endemic in Tropical America during the first century and a half after its discovery, it is evident that the introduction of Yaws to the New World has resulted in an enormously extended area of incidence for that disease. Yaws is now known to be endemic or prevalent in greater or less degree in the following regions of the Western Hemisphere: The West Indian Islands, (particularly Dominica and Jamaica), Tropical South America (especially in Brazil but also in Guiana and Venezuela), Central America, Mexico, and the Southern States of North America.

Again, even if there were no foci nearer home, the susceptibility of the Asiatic coolie would render it likely that he would convey the disease on his return.

(1) XXth Century Practice of Medicine, New York 1899, vol. XVII, p. 309.
to Hindustan. As it happens, specific reference is made to this occurrence in an article on Yaws by Dr. Arthur Powell as follows:—"The Englishman newspaper of Calcutta reported in May 1895 that a number of soldiers returning from the West Indies were landed covered with yaws; a similar occurrence being recorded of four cases arriving from Fiji.

Such causes are in yearly increasing operation in various parts of the world, and in particular wherever colonial enterprise and commerce have created the demand for native labour, so that it is by no means an unreasonable expectation that this disease, which can be shown to have a distribution over parts of three continents besides widely separated island groups, a distribution in fact which some consider to be coextensive with the tropical zone, should sooner or later make its appearance in the Southern Latitudes of the Chinese Empire.

It is the object of this paper to prove this occurrence, and to determine the existence of Framboesia from a consideration of the cases described amongst Chinese in their own country, and then to discuss some of the main points in which the appearances as here recorded differ from or resemble those of the better known descriptions of Yaws by authors who have devoted much attention to the subject, after which reference will be (1) "Yaws in Assam," Brit. Journ. of Dermatol. Dec. 1879, p. 468.
made to the source of infection so far as China is concerned.

The cases of Yaws which have come under my notice were all seen in the hospital of the English Presbyterian Mission in Swatow, a treaty port in the most easterly corner of the Canton province. That institution attracts patients from the alluvial districts between the mountains and the sea included in the two prefectures Chao-chow and Wei-chow, an area which lies along the seacoast for a distance of about 150 miles, between the 115th and 117th meridians of longitude. If therefore Yaws existed in either of these two districts, it is all but certain that cases would sooner or later be recorded in that hospital, through which there pass each year either as dispensary cases or as temporary inmates, from 30,000 to 50,000 patients speaking one dialect (known as Hoklo). It may be added that these numbers indicate no lack of willingness on the part of the natives to come for Western treatment to a foreign institution, which indeed affords them practically the only opportunity of rational medical and surgical treatment in the district. This hospital has been open for upwards of thirty years, and so far as can be gathered from the day-book records each year, no case has yet been diagnosed
with certainty as Yaws. During the first part of my six years' experience there, from 1896 to 1902, occasional cases were admitted to the hospital with symptoms regarding which I can only at this date say that they may have been Yaws, and from later experience one is tempted to believe that some of them actually were instances of that disease; but being without any previous knowledge of Yaws, and not having had one's attention directed to the possibility of its occurrence in China, they were discreetly recorded as some of the protean forms of syphilis. During the last two years of that period, however, the number of cases showing these symptoms in so well-defined a manner and with a uniformity to which syphilis affords no parallel, increased to such a degree that the diagnosis of the latent condition was held to be more than doubtful, and the textbook descriptions of Syphilis were consulted. Still as no medical man in the neighbourhood had ever seen a case of unequivocal Yaws, and as its geographical distribution was apparently not admitted for China, the diagnosis was so far left sub judice until confirmation was obtained.
Description of Cases.

Case 1. Keng-lim, aged 49, was admitted to hospital as an inpatient on February 17th, 1900, suffering from an eruption of encrusted tubercles affecting practically all parts of the body with the exception of the hands, feet, and the perineal region. He was a working-class native from a village some forty miles by river from Swatow, and was in good health at the time of admission.

History. The patient had acquired syphilis at the age of twenty-five, and had never been abroad. About five months before admission, (i.e. in September 1899), he observed on the front of the ulnar side of the right wrist a gradually enlarging tubercle, which had resulted from the union of two smaller ones. As this increased in size it became covered with a yellow scab, and was followed some weeks after its first appearance by a crop of papules on the forehead and shaven part of the scalp, enlarging into tubercles nearly similar to but of less dimensions than the original lesion. A like eruption soon appeared on the front of the neck and later all over the general surface of the body and limbs. During their growth they gave rise
to considerable itching, but at no time had they been accompanied by constitutional symptoms such as fever, aching limbs &c, and from their commencement the patient's health had been in no way impaired. His own account of the origin of the condition was as follows. A child (Ah Ming, Case 3) about three years old, belonging to his employer, had shown symptoms of the same nature in March 1899, and had a copious eruption of scabby tubercles all over the body, and particularly on the legs and buttocks. A girl aged nine (Case 4) was accustomed to carry this child, and some months later, (viz. about August 1899) she also developed the same condition. Kung-lin himself then used to carry the child, and in the end of September he found the first lesion on his wrist. His master, the father of the younger child, had been in Singapore for three years, but it was now four years since his return home, and so far as could be ascertained he had not suffered from either syphilis or the condition presented by his child and his employee. No other persons in the village were known at that time to be similarly affected.

**Distribution.** The eruption was symmetrical and widespread. Large and small encrusted
tubercles were abundant on all aspects of the trunk and even in the axillae; the four limbs shared equally and the lesions were as numerous on the extensor as on the flexor surfaces, and on the upper as on the lower segments of each limb. On the anterior part of the scalp the lesions were closely set, but were at the date of admission devoid of crusts, and beginning to dry up, while the face and forehead at this time presented the sites of former tubercles in the form of patches of irregular roughened surface. Both surfaces of the hands and feet were free, and no tubercles were found on the genitals and perineum.

Description. An examination of any one of the more prominent lesions showed that it consisted of a dome-shaped tubercle closely covered with a dirty yellow crust. From the more mature tubercles, this crust adhering as it did chiefly at its circumference could be easily detached without injury to the body which it covered, and when this was done, a soft but compact growth of granulation tissue somewhat obscured by a thin creamy deposit on its surface, was revealed. On those tubercles which had not yet attained maturity the crust adhered somewhat closely.
and the effort required to detach it from these, or even the slight amount of pressure employed in wiping off the traces of creamy secretion on the surface, was sufficient to cause bleeding from the highly vascular excrescence. On the removal of the crust from an immature tubercle—a thin serous fluid was exuded, and on gently wiping the surface the compact head of pale papillary granulations, suggesting pieces of cauliflower in proportions but not in colour, could be directly inspected.
This is the typical "jaw", the raspberry (raspboire) lesion described with great uniformity in all descriptions of the disease, but to the native mind as also to the foreigner acquainted with local fruits, a comparison to the Chinese arbutoide (Arctium caput), commends itself as even more apt in describing at once consistence, relative proportions of the papillary elevations composing the growth, and even colour, if an under-ripe fruit be selected as the standard. In outline these tubercles were round or oval, attaining a hemispherical shape, and at maturity they varied in size from three quarters to one quarter of an inch or less in diameter. In every instance they rose abruptly from a perfectly healthy base
absolutely free from all trace of induration or
discolouration, and with the crusts removed, might
be compared to rounded pieces of firm granulation
tissue adventitiously fixed to the healthy skin.
The application of dilute hydrochloric acid to the
moist exuding surface elicited very little smarting,
and although the tumour was not insensitive a little
free handling as in detaching the crust caused
comparatively little pain.
Such is a description of the mature stage in
this case, but coincident with the fully formed
type could be seen both the preliminary and
the later and ultimate stages. At this date
the early papular stage was less evident in
comparison with the full blown and fading crop
of tubercles. There found these papules had little
to distinguish them on first appearance as char-
acteristic of any particular disease, but if one of them
be kept under observation the epi democr is soon
seen to scale from the summit, and before long
a hand lens will readily reveal a minute red
protrusion of papillated tissue, which in the course
of its growth acquires in a few days a thin yellowish
crust.
Specimens of the resolving stages of the eruption
were at the time of admission quite as numerous as those which had not reached maturity. Those which caught the eye most readily were flat and almost warty in appearance, of sizes corresponding to those in the fully formed stage, and of a dull brownish purple colour. It was easy to find on any part of the body individuals showing every stage between these and the typical fungoid tubercle, and they were obviously the resolving stage of the granuloma, which from being soft moist and vascular, became after shedding the crust gradually dried up and flattened to the level of the normal skin. On the forehead and shaven scalp where the eruption had first appeared, most of the lesions had already arrived at this stage, though a few of the more recent encrusted tubercle, mingled with them. Here also and on other parts of the body one could find patches in a still later stage of resolution, presenting merely dusky round or oval spots not at all elevated above the surrounding skin, and showing a roughened surface suggesting merely an exaggeration of the normal structures which give character to the surface of the skin, the last revulsion of the shrinking papillae separated by enlarged orifices of sweat ducts.
and hair follicles. For purposes of demonstration it was instructive to trace an area on the back where three patches in line showed types of the different stages, one from which the crust had recently fallen was just becoming dry and flat, with the papillary granulations still distinctly traceable; the next still slightly raised above the surface and of a dry warty appearance, giving the impression that it might be smoothed off by sand-paper; and the third merely a service roughened plaque of dusky purple colour. The final appearance before complete resolution, viz. a dark macule, or merely a little clustering of dark purple spots from which the colour could not be entirely removed by pressure, was readily detected on various parts of the surface coexistent with lesions in the earlier stages, and in no instance was anything of the nature of a scar or even anything suggestive of a slight atrophy of the skin to be detected, the pigmentation in the course of months disappearing very slowly and leaving no trace whatever of the former site of the nodule. Itching which had been a feature of the growing tubercles was still present in the resolving patches.
Of particular interest was the earliest and largest tumour, namely that on the wrist which was said to have preceded the general eruption by some weeks. At the time of admission this presented a rough scaly surface of a dirty white appearance, irregularly cut and fissured in every direction, and which from having been according to the patient a moist fungoid incurvated excrescence, differing chiefly in size from the later typical tumours, was apparently now in the process of becoming dry and horny. It occupied an area of about two inches in length by nearly as much in breadth, and was raised a quarter of an inch above the surface of the skin.

Progress. The patient remained in hospital for twenty days, during which the only treatment he received was the local application of Ung. Hydrarg. Oxid. Fluor. and the following mixture:

Rx.

Potass. Iodid. 3 i
Sig. Hydrarg. Perchlor. 3 ii
Tinct. Gentian. Co. 3 iv
Ag. ad 3 vi.

Sig. 3 fo. t. d.

i.e. 15 grains of Potassium Iodide and 1/4 grain of Perchloride of Mercury daily.
During that time the condition certainly improved with extraordinary rapidity, and when he returned home there were comparatively few years at the encrusted stage, those which had been at that stage or beyond it at the date of admission having passed through their normal evolution towards the macular condition, while those which had been then at the papular stage had rapidly attained maturity, no new papules having developed in the interval.

After being at home for three weeks, during which treatment was practically suspended, he returned to hospital in the end of March. The former tubercles had either disappeared or were in the later stages of the course of involution above described. The forehead and scalp were free, and showed only a general unevenness of surface where the once thickly set tubercles were nearly planed off to the level of the surrounding surface, while the mottled dusky colour of these patches, which in that situation happened to come short of actual pigmentation, was enhanced by a natural tendency of the patient's skin to oily seborrhoea. But elsewhere on the body the old generation had merely given
place to a new and vigorous crop, and two or three new encrusted tubercles had appeared on the left eyelid. Being encouraged by his rapid improvement in hospital he went home after a few days with the intention of bringing back with him for treatment the two children. He was next seen on April 16th (having returned to hospital unfortunately without the children), and at that date the improvement of existing lesions had apparently continued, but fresh tubercles less numerous and smaller in size still continued to appear from time to time, and in addition to those on the eyelid there were now a few on the upper lip, around the nares, and on the chin, while either ear showed a single tubercle placed with remarkable precision on exactly corresponding points. The verrucose mass on the wrist gradually disappeared, becoming less elevated and more divided into discrete warty tags which could from time to time be pulled off without giving rise to pain or bleeding, and by the end of April these had all so shrunk or been rubbed away that a rough surface free from scarring had resulted. The patient paid occasional brief visits to the hospital
at intervals of weeks or months, and the progress of the case was much as has been sketched in the last paragraph. Treatment was naturally interrupted, but so far as was possible he received supplies of the same medicines to take to his home after each visit. The general improvement of existing crops of eruption was uninterrupted, but whenever an interval of a few weeks passed without treatment a few isolated yaws were likely to appear.

On November 4 $\frac{1}{2}$ 1900, there were only a few small tubercles in the drying stage on the scalp at the back of the head, but a single repressed yaw in the sole had made its way through the thickened epidermis, and was drying up after having caused some irritation.

On February 4 $\frac{1}{2}$ 1901, (i.e. almost exactly a year after he first came under notice), even the pigmented maculae had all but disappeared from the body, and the patient was practically free from all trace of the disease.

Eight months later however, in October 1901, when the patient was seen again, though the body showed no trace of yaws, there was ulceration of the sole from a rerudescence of yaw tubercles.
in that situation, which had been left untreated and were subject to constant irritation.

Diagnosis. In the detailed description of the above case it has been assumed that the disease from which he suffered was Yaws, and it now remains to state on what grounds this diagnosis was arrived at, since the diagnosis of a locally rare condition must necessarily be made with reserve by those to whom the appearances are unfamiliar. Those appearances which are absolutely characteristic to one who is acquainted with the disease, may at the same time be only puzzling to one who sees them for the first time. How in the circumstances under which this case first presented itself, it was inevitable that the question of its being some form of syphilis should receive first consideration. Here we have in a district in which syphilis is one of the commonest of diseases, a case, presenting in a patient who had acquired syphilis in former years, a symmetrical and peculiar eruption which appeared to yield readily to potassium iodide and mercurials. The diagnosis of the more familiar malady might seem temptingly easy,
but the superficial resemblance of the en crusted
ulcers to the limpet-shell lesions of rupia,
or more remotely to a tubercular syphilide,
could only mislead one whose attention was
not alert to the possibility of the occurrence
of a disease hitherto unrecorded in the locality.
Rupia in this case could be easily excluded
by the excellent general health of the patient,
and by the fact that the crust which was
thin and not laminated, covered in every
example a convex tumour of fungoid gran-
ulation tissue, not a punched out ulcer,
the lesion commencing as a papule free from
pus and not as a bulla or ulcerated papule,
and ending not in a scar but in a complete
restoration to normal skin.

On the other hand the lesions bore no
resemblance to any described form of tubercular
syphilide, and showed the phenomena of
new formation without inflammation. Without
the crusts they looked like pieces of gran-
ulation tissue placed on the healthy skin,
with complete absence of painful and inflam-
matory induration around the margin. The
crust was a cap completely covering the entire
non-pustular tubercle, while a tubercular syphilide when ulcerated has an adherent crust set within the skin on a red infiltrated base. The latter, even if involving extensive tracts is not symmetrical, and would certainly leave traces in the form of characteristic scars.

In regard to the general question of diagnosis with a view to the exclusion of syphilis, it may be suggested that so extensive and vigorous an eruption as was here present would surely, if constitutional syphilis were the cause, have caused no little constitutional disturbance, yet the patient throughout the course of the disease maintained his usual health, and when not in hospital performed his usual work.

Nor is it likely that syphilitic lesions so numerous and prominent as these were, would all disappear completely without ulceration, and without in a single instance leaving any trace of scarring.

The essentially fungous and papillary character of the excrescences, which forms perhaps the most striking peculiarity in the case, although it cannot be said to be conclusive against syphilis, must certainly be regarded as an exceptional
manifestation of that disease, at least in situations other than the junction of skin and mucous membrane.

Again with the exception of one or two small glands in the axillae, lymphatic enlargement could scarcely be detected, whereas with the same amount of cutaneous accompaniments in syphilis a polyadenitis would be unmistakable.

Lastly, the constant character of the eruption, which, if it be admitted that the popular and the rarity forms represented the preliminary and resolving stages respectively of the typical granuloma, exhibited one uniform type of eruption and one only, not merely at any one time but throughout its course of months, suggests something to which the polymorphous and imitative lesions of syphilis afford no parallel.

The usual scapegoat in doubtful cases viz. syphilis, being thus provisionally exonerated, and the written description of pangs being before our minds, the diagnosis of the latter unusual condition was so far strengthened, but was left an open question in the absence of an opinion from anyone who had seen a case of that disease. Such an opinion was fortunately secured during
The patient's first visit to the hospital, when we had the good fortune to have the diagnosis corroborated by a medical man of large experience in West Equatorial Africa (1), to whom Yaws was a familiar ailment in its native habitat.

We had no hesitation in pronouncing the encrusted tubercles to be typical Yaws. The dry mulberry-like patches were new to him, and until the successive stages of their resolution from the fungoid tubercles were demonstrated, they might have been dismissed as possibly belonging to an independent condition. Their identity however could be abundantly proved at almost any part of the surface, and fortified by the expert opinion quoted above, the case was recorded for the first time as truly one of Framboesia.

Briefly, this disease-like syphilis is insidious, and frequently symmetrical, and in the experience of some yields to mercury and the iodides. The pronounced itching, the tendency to spontaneous cure without scarring, the absence of induration, all strongly support the diagnosis founded in the main on the characteristic raspberry

(1) A. Sims, M.D., D.P.H., Congo Free State.
Author of "Malaria Flus and the Congo."
nodules with their yellow crusts.

We shall now proceed to describe a few other cases, some of which it will be seen were directly connected with the case of King-lin, while others had an independent origin.

Case 2. King-lin-sim (i.e. Mrs. King-lin, wife of Case 1) aged 40, was seen in hospital on August 23rd 1900. Her first symptom had been an encrusted tubercle which developed on the back in February 1900. She believed that she had received the contagium from her husband who had by that time suffered from the eruption for six months. This had been preceded by some aching of the bones, particularly in the fingers which were stiff and difficult to bend. In March and April, following the first developed tubercle on the back at the interval of about a month, a crop of smaller ones appeared on the hands, including one or two on the palms, and later on the body. Altogether the eruption was a mild one, there being in all comparatively few tubercles. At the time of admission, six months after commencement, the initial lesion on the back appeared as a dry plaque almost level with the skin, the other pustules being also
in the later stages of dry involution, with the exception of one encrusted tubercle on the chest. The stiffness of the fingers was still present and no enlarged glands were detected. She was treated with 12 grains of potassium iodide and $\frac{1}{2}$ grain of perchloride of mercury daily, and an ointment of Creosote was applied locally.

R. Creosote 3i
Ung. simplex. 3i.

She did not present herself at hospital again, but her husband reported from time to time, and recovery was practically uneventful.

So far as this case was under observation the duration of the disease was about nine months.

Case 3. Ah Ming, girl aged three (the daughter of King-lin's master), was affected first in March 1899. Her father had been in Singapore but had returned three years previously. No one else in the neighbourhood was known to be affected at the time this child contracted the disease, and so the source of contagion in this the earliest case of which I have any knowledge remains obscure. She was brought to hospital by Mr. King-lin on August 23rd, 1900, i.e. 17 months after the first symptoms appeared, and
showed at that time a copious crop of typical encrusted yaws all over the body, face, scalp, and buttocks.

Case 4. Gee-mie, aged 9, (daughter of Case 9). She carried Ah Ming in her arms and was affected in August 1899. The first appearance was in the form of two tubercles on her left hand, (suggestive of direct contagion from the buttocks of Ah Ming), followed after an interval of between two and three months by several on the thighs. On admission on August 23rd 1900, (i.e., 12 months after the first symptoms observed), she showed clustered tubercles over Scarpa's triangle and on the inner surface of both thighs, one above and one below the right knee, a few scattered yaws on the upper part of the back, on the neck, and in front of the left clavicle, and one or two on the elbows.

Case 5. Soy-mie, aged 4, sister of Gee-mie, by whom she was carried, was first affected in November 1899. Two tubercles first appeared on the buttocks, (presumably by infection from the hand of Gee-mie), and these were followed a few weeks later by yaws all over the body, face, and limbs. When first seen in hospital
on August 23rd 1900, (viz. 9 months after the earliest appearances), the condition had improved but the lesions were still numinous on the buttocks, and a few were found on the thighs. Elsewhere on the body, legs, face, and scalp, the later stages were present as nearly smooth reddish patches, scarcely pigmented and with scaly edges.

Case 6. Toa-mae, aged 14, another sister, in June 1900 developed an encrusted tubercle just on the centre of the scalp, (which native pathological opinion attributed to the urine of a large speckled spider), followed after an interval of ten days by a copious eruption all over the face and back, and on both arms, but leaving the legs and the abdomen free. On admission on August 23rd 1900, (i.e. two months after the appearance of the first lesion), these were seen as large encrusted tubercles confluent in places, and most numerous on the face and back. This case showed a more copious eruption with excrescences of larger size than any of the others, and a particularly rapid development.

Cases 4, 5, and 6, were treated with small doses of nitrate of potassium and mercury, graduated
according to age, and yellow oxide of mercury ointment locally. The condition in each rapidly improved so long as the drops were continued, but when treatment was omitted on their return home, fresh crops, either in the form of one or two isolated gaws, or as a more widespread eruption, continued to appear at uncertain intervals for months.

Gee-mie (case 4) who last seen on December 29th 1900, appeared to be free from all traces of the disease, except a few stains on the sites of former gaws. The duration of the disease in this case was therefore apparently about 16 months, viz. from August 1899 to December 1900.

Dog-mie (case 5) improved progressively during October and November, but on December 29th they next seen a fresh and abundant crop of gaws had appeared, which were almost confluent on the back and thighs, scattered on the buttocks and arms, and one or two were seen on the face. Treatment which had been suspended for nearly two months was resumed, and on February 4th 1901 most of these had disappeared, but there were still a few isolated gaws on face, arm, and buttocks. This case then in whom the disease had been
contracted in November 1899, still continued to
develop the lesions of yaws 15 months later.
Toa-mote, (case 6), in whom the eruption had
been most conspicuous and widespread, showed
most rapid and complete recovery. On November 26th
only one lesion remained on the cheek, and when
seen on December 29th, and again on February 4th,
1901, there was no trace of the disease. As she
had contracted the disease in June, the duration
in this case would appear to have been only about
six months.

Case 7. Mrs. Yue, aged 34, mother of Cases 4, 5,
and 6, acquired the disease early in
July 1900, when a large yaw developed on the
epigastrium. About four weeks later an eruption
of encrusted yaws appeared on the back and
arms, the legs and face being free, and this
was the condition on admission on August 23rd.
The single large yaw on the abdomen having
already declined to the condition of a dry
plague. In this case there were initial
symptoms in the form of sensations of shivering
without fever, and aching, the hands and arms
being painful enough to prevent her washing clothes.
The development of the eruption was attended by
pronounced itching, a symptom which continued even in the spots after subsidence of the excrescences. She remained in hospital for a few days and received the same treatment as Mrs. Kong-lin. Early in September she returned to her home where treatment was naturally interrupted, and a purulent exudate developed on the left nipple on a sore caused by the bite of her baby then 14 months old, who at that date showed no appearance of jaws.

On October 20th she returned to hospital, and in addition to the jaw on the breast, and a few small ones on the back, she had one on each sole, where the growths were as was to be expected modified by the local conditions.

On November 20th no new jaws had appeared, and the existing ones were disappearing, and on December 29th with the exception of one small tubercle on the hand, the only traces of the disease were the fading stains left by the past lesions.

Case 8. Mrs. Yu's infant, seen on October 20th, 1900, then aged 15 months. On Mrs. Yu's first visit to the hospital in August, the child had been left at home in the charge of a neighbour.
to nurse, and was not at that date affected. After the mother's return the baby developed pustules around the mouth, inoculated presumably from the nipple, and three or four weeks later a copious crop appeared on the buttocks, and all over the body, as seen on admission. Yellow oxide of mercury ointment as for the others was given, and on December 20th the eruption was on the decline but only fresh tubercle had developed on the lower lip.

Case 9. Ah Yue, aged 38, father of cases 4, 5, 6 and 8. In July 1900 an encrusted tubercle developed on the scalp, followed after an interval of about a fortnight by another on the sole of the right foot, and numerous others on the back. When he was seen for the first time on August 23rd, there was found on the middle of the scalp, at the margin of the unshaven part, a rather large encrusted pustule about three quarters of an inch in diameter, from which the crust was easily removed, displaying the characteristic mulberry-like excrescence just leaving the moist stage. The back was thickly studded with large hemispherical or flat-topped encrusted pustules,
some of them an inch or more in diameter. (Photo no. 1.) On the right sole opposite the 4th and 5th toes there was a similar fungoid tubercle just bursting through the thick skin. The only others were a few of average size on the back of the neck, and on the auricle of either ear, the front of the body and limbs being at this date free. The gum on the sole was very painful, and elsewhere the commencement of the rather scanty eruption had been attended with itching, which in this case was not severe and diminished with the full development of the lesions. The patient's health was unimpaired and no enlarged glands could be detected. He was treated by daily amounts of iodide of potassium 15 grains, with perchloride of mercury 4 grains, and ointment of yellow oxide of mercury locally, but only remained in hospital for two or three days, after which he went home taking with him a supply of these remedies for continuance of the treatment. This first crop almost disappeared during the next few weeks, and the remedies were suspended, after which another crop of gums developed on the buttocks and thighs, along with one large one
on the front of the abdomen.

On October 20th, when he next reported himself in person, this latter was seen as a prominent excrescence about the size of a walnut, below and to the left of the umbilicus, covered by a crust which was easily removed, revealing a soft raspberry-like tumour with a whitish secretion which for the most part adhered to the under surface of the scalp. The former crop on the back had for the most part cleared up, leaving only pigmented stains surrounded by a pale halo, and in a few less advanced spots patches of a rough, almost warty surface, corresponding in size and position with the lesions of the first eruption (photo, no. 2). The recently formed set on the thighs and buttocks showed resolving rough patches which from their size indicated a large and vigorous crop. The situation of the first noticed gout on the scalp was not marked by any scar, and another small tubercle was found amongst the hair on the parietal region, while the painful gout on the sole had from its situation been retarded in development, and now appeared as an irritable fungous tubercle exuding a foul serous fluid, around
and over which the thickened epidermis was breaking away and in process of removal. The same treatment was renewed, and by November 20th all existing yaws had disappeared, except the one on the sole which was beginning to dry up. He soon ceased taking the medicine, and on December 29th when he again came to hospital a new but scanty crop had appeared, scattered both on front and back of the body, and two or three small encrusted yaws were found on the hairy scalp. The sole was well, the thickened broken skin returning to its natural condition.

The patient was seen again on February 4th 1901, at which date all previously existing lesions had disappeared, but one fresh yaw was found on the knee, one on the arm and one on the abdomen.

Case 10. Ah Kim, aged 43, admitted to hospital, October 4th 1901, with face and body covered with conspicuous yaw tumours. The native village of this patient was about four miles from the home of King-lim, and the two were relatives.

The history he gave was that about two years
previously a neighbour had returned from Siam to his village, bringing with him a child whose body was covered with the same type of eruption. Patient's child, a girl, was infected from him (presumably in playing together), and the patient himself acquired the disease from his daughter, according to his own belief either from sleeping with her or bathing along with her.

The first appearance in his case had been a large scabbed sore on the left forefinger, which had developed three months before admission to hospital, (i.e. in July 1901), and which was followed after the interval of a month by a general eruption all over the body. The appearance of the latter was accompanied by some fever and shivering such as any Chinaman might be subject to at the onset of any illness; there had been no pain in the joints and no other constitutional symptoms.

On admission, he presented (photos. 3, 4, and 5) a most perfect and striking eruption of yellow-crusted pustules on face and head, and all over the body, front and back, with the exception of the parts covered by the short trousers, (in the Chinese costume the trousers reach from below the waist
to the lower third of the thigh) there being a few above the knees but none on the upper thighs and buttocks. These were particularly numerous on the back where they were large and flat-topped, some of them being the size of a two-shilling piece. On the face these encrusted excrescences were very numerous, and were confluent on the chin where they formed a large, prominent fungating mass covered by the usual dirty-yellow crusts, while on the shaven scalp the bristly tufts of hair occupying the fungoid tubercles indicated no deterioration in the hair follicles.

The original lesion in this case presented at this date all the characters of a large encrusted fungoid excrescence of irregular shape, occupying the second phalanx with its proximal joint of the left forefinger, extending around about two thirds of the circumference of the finger, and differing in no essential respect from the typical forms of the general eruption which had developed a month later and was now mature.

There was no disturbance of the general health, except such as might be accounted for by
loss of sleep from the discomfort caused by
lying down. Itching had not been a pronounced
feature in the development of the eruption, nor
had it been attended by pain in the joints.
No enlarged glands were found.
He mentioned that his daughter had had a
scorbutic eruption all over the body, which had
mostly disappeared without treatment leaving
now, (October 1901), only a few.
In this case the tubercles were all at one
stage, differing only in size, no specimens of
the early papular form, or of the later
resolving patches, or of pigmented spots
being visible.
He was treated by:—Iod. Hydarg. Ox. Flav., applied
locally after removing the crusts where these
were not adherent, and the following in solution;

R.

Potass. Iodid. gr. 96.

Liq. Hydarg. Perchlor. 3 1/2.

Tinct. Belladonna. 3 1/2.

Ag. ad 3 6.

Sig. 3 fo t. i. d.

i.e. 24 grains of the iodide daily, with
3/46 grain Perchloride of Mercury.
The patient remained in hospital for six or seven days during which no new lesions appeared, and the existing ones showed an unmistakable improvement, the crusts becoming looser and the moist excrescences tending to shrink and become dry on the surface, thus indicating the commencement of decline in the eruption.

On his return from his village (where treatment had been suspended for the past few days), he was seen on October 31st, at which date the eruption was in process of drying up all over the body and face, the large growth on the finger and the confluent mass on the chin having diminished to about half their former prominence.

After returning to his home the patient was seen again on November 15th, and as is evident from photo no. 6, taken on that date, the improvement was most pronounced. The face was entirely free short of its natural smoothness, even the large fungating mass on the chin having almost completely resolved, leaving only some irregularity of surface, the rest of the face, forehead, and scalp showing in the sites of the tubercle pale blotches of smooth skin with darker centres. On both surfaces of the trunk all
The gums had resolved in greater or less degree, even those which were most tardy in decline showing rough reddish-brown patches with a slightly elevated surface, from which cheesy particles of seb could be picked off, leaving a roughened dry warty looking plaque surrounded by a smooth pale areola. Others in a further stage of evolution showed only small areas of reddish-brown skin papillae, from which the red colour disappeared on pressure, leaving spots of brown pigmentation surrounded by a white halo rather sharply defined from the naturally bronzed skin. The mercurial ointment was stopped but the binoxide mixture was continued, and a few weeks later the eruption on the body was represented in places by pale maculae having a superficial resemblance to old vaccination scars; in other places there in a further stage were losing definition of outline and were scarcely distinguishable from the normal skin, a fact which proved the absence of true scarring and was confirmed by subsequent observation a few weeks later. The patient then made an uninterrupted
recovery, and in the period during which he was under observation developed no fresh crop of pustules. The pigmentation of spots marking the sites of former lesions was in this case slight in degree and of short duration.

Case II. Chinnay, aged 36, returned to China from Annam in May 1901. When in Cholen near Saigon, in the end of April, he was bitten by a dog on the calf of the leg. The wound healed but about three months later (i.e. in July, two months after he came home), the scar broke out again in the form of what the patient described as a "numb ulcer." To this a native poultice of cow dung was applied with the result that a ring of ulceration formed around the first, and on these tubercles of granulation tissue developed, which were treated by the application of native blue stone. Four or five later similar excrecences appeared on the body, the development of which had been attended by itching, and had been preceded by aching of the legs and chivering.

The patient was first seen on October 10th, 1901, when he showed a sparse eruption of encrusted
Tubercles on a healthy base over the front of the trunk; some rather large ones of half an inch or more in diameter on the arms, a few widely scattered on the back, and a fairly plentiful distribution of large tubercles on the buttocks, lumbar regions, and upper parts of the thighs. (Photo no. 8.) All these were covered by dirty crusts which were discoloured by coarse native sulphate of copper. On the shaven scalp and at the margin of the hair were several coarsely rusty exsurgences devoid of crusts, in the drying stage and briskly with the strongly growing hair. Smaller crusted pustules were also to be seen on the front of the neck, on the face, eyelids, around the nose and occupying each nostril, on the upper lip but not at the buccal margin, on the ear lobes and symmetrically placed in either auricle. There was one on the corona glandis of the penis, soft and uncrusted, the arms and perianal region in general being free. The site of the original infection on the calf of the left leg (Photo no. 7) was occupied by a central scab surrounded by
an irregular circle of raised sebaceous which when removed revealed the usual rounded bump of prim granulations passing now into the dry stage. There was no local induration, but both inguinal and saphenous glands of both sides were enlarged.

On the sole of the right foot there was a dry tubercle in the centre, to which native blue stone had been applied, and which was nearly healed, while the whole surface of the sole was mottled with scaly patches suggestive of abortive papules which had been absorbed before they reached the surface.

Treatment as for the other cases was employed, but the patient did not remain long in hospital and was not seen again.

In this case besides the peculiar site of inoculation, the enlarged glands were a feature not observed in any of the others. Whether the infection was acquired in Cochin China or at home must be doubtful.

In the former case the incubation must have been about three months, so that the latter must be held to be the more probable. The usual incubation period of the initial
lesion is now believed to vary between 10 days and about six weeks, periods of months sometimes quoted being rightly held to be open to doubt.

On the other hand he came from a village from which many patients come from time to time to the Summer Hospital, but from which no other similar case has been observed, and it may be added that that village was in a district remote from that which supplied the group of cases 1-9.

Case 12. Tso-Liao, aged 32, was seen on October 4th, 1901. In June a soft painless sore, covered by a scale, had developed on the left hand, occupying the ulnar margin and back of the metacarpal and first phalanx of the little finger. A month later similar growths had appeared on the body, face, and legs.

At the time of admission the original sore on the hand presented a verrucose mass of irregular shape, in part still covered by a crust, which on removal revealed a dry cauliflower-like excrescence, almost bloodless, and corresponding in appearance with the condition of dry evolution described in the
former cases. The rest of the growth was
dvoid of scabs, and had become dry and horny
and irregularly fissured, resulting as it were
in a forest of warty tags of almost pebbly
hardness, which could be removed without
bleeding. In some parts this process had
begun naturally at the edges, leaving a rough,
mutting scraper-like surface in course of
being smoothed off.

On the face and chin there were two large
prominent patches consisting of confluent
tubercles covered with scabs. One tubercle,
thickly set with stumpy hairs was found on
the shaved part at the back of the scalp,
a few were widely scattered on both surfaces of
the trunk, and on the legs, and one in no
way differing from the others was found
on the scrotum.

He received the same treatment as the others,
but only remained for two days and was not
seen again.

It is to be remarked that this patient and
Ah Rein arrived at hospital on the same day,
within an hour of each other, though quite
independently. Two-Siao's village was about
Two miles distant from that of Ah Hein, but the two men were not acquainted and the former did not know of the existence of any cases in his village similar to his own.

Case 13. Chun-mee, a girl aged 11, seen on November 7th, 1901. She had suffered from the disease for 16 months, having been first affected in July 1900, when a scabbed tubercle appeared on the left elbow, followed two months later by a similar eruption on other parts. When examined, the back of the elbow was found to be occupied by a single large jaw loosely covered by a thin dry crust, and surrounded by an area of harsh scaly skin interspersed with a few more recent and small jaw tubercles. The front and back of the body, the feet and the scalp, were free, but the arms and shoulders, the face, eyelids, both legs and thighs, were sparsely studded with typical examples of the lesion. The angles of the mouth were occupied by moist flat tubercles resembling condylomata, but in close proximity to these, on the lip beyond the mucous margin, were the usual
seabbed raspberry forms. On the opposed
skin surfaces of the buttocks, (but not near
the anal orifice), there was a group of tubercles
on either side in contact with each other,
and devoid of the usual cheesy crusts
which had been removed by friction and
moisture, but covered with a pale sodden
epithelial deposit, under which the typical
raspberry nodule could be demonstrated.
The femoral glands and the supra trocheal
gland in both arms were enlarged, and a
few small glands could be felt in the axilla.
The general health was unimpaired.
The father of this girl was stated to have
developed a similar eruption in September 1901,
but he did not present himself at the
hospital.

Case 14. Mrs. Kheem, aged 28, seen on November
7th 1901. Her first symptom was
a large encrusted tubercle on the left leg,
which appeared early in August and was
followed five or six weeks later by several others
on other parts of the body.
Above the outer malleolus there was a large
fungating excrescence covered by a scat,
and surrounded by an irregular circle of scalbed tubercles, the whole forming an appearance roughly in the shape of a signet ring. The dorsum of the foot and the anterior surface of the legs presented a papulo-squamous eruption which had begun about six days ago, and did not itch. A similar condition was present on the back, and also on the right leg, which showed at the same time a few isolated gums in the drying stage.

On both arms and on the face there were a few scattered gums in various stages of dry resolution. The femoral glands on the left side and the supratrochlear gland on each arm were enlarged.

Case 15. A child, aged four, son of Case 14, seen on November 7th, 1901, when he presented only one large flat gum about the size of a two-shilling piece on the left forearm. This had been present for one month, having developed about a fortnight after the general eruption on his mother. The supratrochlear gland above the elbow on the same side was enlarged.

Case 16. A child, male, aged five, came first
to hospital on August 28th, 1900.

About six weeks previously he had fever for a few days, and then a few papules appeared on the forehead, followed later by a sore on the raphe of the prepuce, and a few tubules around the anal orifice.

On arrival there were present as small encrusted tubules, modified on the surface in the neighborhood of the anus, while the one on the prepuce was simply a soft raspberry-like tubule devoid of a stalk. Around the mouth, and on the neck, early papular forms were beginning to appear. To some of the tubules a single application of Copper Sulfate was made, and Iodoform ointment was given to be applied regularly.

Hydragryum cum Bota, gr. 2, with Bismuth Subnitrate gr. 1/2, thrice daily were given internally for a few days, but the child was taken home and did not return until October 11th.

At this date there was a copious eruption, confluent at places on the neck, and several tubules scattered on the arms, back, and thighs, those in the latter situation showing commencing ulceration. On the lower lip, and all around the mouth, there was a close chain of crusts,
those at the angles of the mouth presenting the usual white sodden appearance. Ointment of yellow oxide of mercury was applied locally after removing those crusts which were loose, and the following mixture was given.

Potass. Iodid.  
gros. 18.
3 f.
Ag. Menth. Põ. ad 3 vi
Sig. 3 f. t. i. d.

After one week (October 18½) the improvement was great. Those on the back and arms were almost flat, and around the mouth and chin they had resolved into flat rough patches more or less clustered. In the thighs the tubercles which had threatened to break down were beginning to shrink, the ulceration had not progressed and was healing up.

The further progress of the case could not be followed as the patient was taken home and did not return to hospital.

This is the only case in which there was even a suggestion of ulceration of the lesions. The exceedingly rapid improvement under the same remedies was a feature in common with practically all the other cases.
Case 17. A girl, aged 9, seen on August 15th, 1900, suffering from a scattered eruption of encrusted pustules on the abdomen, back, arms, and buttocks, which had existed unaltered for about three months. There was nothing of particular note in this case, and it is mentioned chiefly to record the fact that she came from a village within four miles of the port of Sutan itself, and that a neighbour whose husband had been lately in the Straits had the disease at the same time. The locality may be taken as excluding most possibilities of intercourse with those districts which furnished the other cases, and the probability which suggests itself is that the person who had lately returned from Singapore, or someone associated with him, had brought the disease from abroad.
Comparison with other descriptions of Yaws.

It is necessary now to discuss the resemblances or differences between the disease of which the characters have been outlined in the cases recorded above, and that which has been described as Framboesia or Yaws in recent literature, by competent observers from their experience of that disease in various parts of the world.

One of the difficulties in the diagnosis of Yaws in a new locality, is the fact that authors in different parts of the world have described very various attributes as essential characteristics of the disease.

**Ulceration.** In the above cases it will be seen that the absence of ulceration is an all but constant character. Case 16, a child whose condition had been grossly neglected at home, was positively the only one in which any of the fully formed lesions showed the slightest tendency to break down. In no case was any scar left to mark the site of individual jaws, and these then once the stage of maturity was reached,
disappeared by one process only, viz. drying up by interstitial absorption.

The appearances and course therefore appear to me to be absolutely typical of the benign form of yaws. There is authority for this simple distinction, for we may conceivably accept Maxwell's division of the phenomena of yaws into a fungoid and ulcerative variety, though even this classification is modified by the remark that the fungoid is the normal state from which all other forms may be observed to spring; but at the same time to one who is acquainted only with the typical fungoid condition, there is it must be confessed in the description of Breda's three cases, characterized as they are by ulceration and by affection of the mucous membranes, the existence of "any form of granuloma" being expressly denied (p. 288) —

little to suggest their identity with yaws of the usual type, if these cases here recorded are conceded to be examples of that disease.

In this particular my experience small as it has been corresponds with that recorded by Charlevoix, who insists on the "fusilli fungosus",

(2) Breda's Paper on Brazilian Framboesia or "Bouba." Ibid. p. 267 et seq.
(3) "On Polyhastomia Tropicum" (Framboesia)." Ibid. pp. 296, 298.
form" of all tubercles whatever their situation, ulceration being a result only of severe irritation or injury. There is not really much disagreement on the part of writers on jaws in respect to ulceration as an essential characteristic or otherwise of the disease. With the exception of the description of Brazilian Framboesia or "Boubas" referred to above (in which the symptoms may have been modified by chronicity and other causes), most other accounts in recent literature refer to jaws as, apart from accidental causes or complications, injury, irritation, bad treatment, cachexia etc., an essentially non-ulcerative condition which heals without loss of tissue and consequent scarring. Hitchcock (1) (in the Twentieth Century Practice of Medicine) indeed considers that the sufficient recognition of this fact would prevent confusion in the diagnosis of jaws in different parts of the world. The same observer insists on this feature as one of the most important diagnostic signs between jaws and syphilis, an opinion shared by Firth (2), Powell (3) and others.

Perna Cat, however, although in his Essay on Jaws

(3) Albutt's System of Medicine, 1897, Vol. III. "Framboesia," by R.H. Firth, p. 504.
ulceration of the tubercles does not appear to be mentioned as a characteristic feature of the disease, in a later paper takes exception to any insistence being placed on the absence or rarity of ulceration in what he consistently enough calls the "secondary eruption of Jaws," this being an attribute which can be equally claimed for the manifestations of syphilis in the secondary stage.

The cell infiltration of the normal elements of the true skin of which the jaws granuloma is mainly composed, consists of plasma cells (of Unna) diffusing from the neighbourhood of the vessels and follicles, lymphocytes and connective tissue cells with no tendency to organization, and abundance of polym.uclear leucocytes. (2)

Composed as it is then of elements which show no natural tendency to cause breaking down of the surrounding tissues, it is not to be expected that the jaws during its course of growth and decline will ulcerate, unless as the result of injury, local or constitutional, and septic absorption.

It may be admitted then that the absence of ulceration and resulting cicatrizes in these

(1) "A Paper on Jaws:" by Dr. Hume Pat, M.R.C.S.

Chinese cases, is in accordance with the observations of those who have had most experience of Framboesia in endemic centres.

**Adenitis.** Coming now to the question of gland complication in relation to yaws, it will be found on consulting the various authors that opinion is more evenly divided in regard to its existence as an essential feature of the disease. A perusal of the notes of these cases will show that lymphatic enlargement was not a conspicuous feature.

Case 11, (Chin-nay), had enlargement of the femoral and inguinal glands on both sides. Case 13, had enlarged femoral glands and a few small ones in the upper extremities. In Case 14, the femoral glands on the side corresponding to the chief lesion were enlarged, besides the supratrochlear on both sides. In Case 15, the supratrochlear gland of one side was enlarged in sympathy with the solitary lesion on the forearm.

In the other cases some of whom had as described widespread and exuberant eruptions, no glandular enlargement could be detected.
It will be seen that this represents something entirely different from the general polyadenitis of secondary syphilis, a distinction which is emphasized by Rat, who refers to the absence of adenopathies as characteristic of yaws.\(^\text{1}\).

Glandular enlargement in the latter he describes as occurring locally in sympathy with ulcerating tubercles on the corresponding lymphatic area, e.g. enlarged femoral glands (the most commonly involved), not symmetrical but affecting "only that thigh which corresponds with the leg or foot on which the infected wound or ulcer is situated." Maxwell makes no mention of enlarged glands in his Price Essay on Yaws.

Daniels\(^\text{2}\) remarks that "the glands are little affected and buboes do not occur."

Powell also refers to the absence of glandular enlargement in his cases in Assam, apart from irritation and septic absorption.

On the other hand buboes or general adenits are stated by others with different degrees of insistence to belong to the essential nature of yaws.

For example in a brief account of "Yaws in St. Lucia" by Dr. St. Geo. Gray, \(^\text{3}\) "femoral buboes" are referred to

\(^{1}\) Essay on Yaws, pp. 31, 32.


in conjunction with the "sessile granulomata" as the chief points to be noted.
Charlouis and Firth both describe what would appear to be specific glandular enlargements, and Kynsey admits a specific polyadenitis in yaws as in syphilis.
Charlouis describes a polyadenitis in his cases, pain and swelling commencing with the appearance of the eruption, the pain passing off but the glands remaining hard and swollen for some time after its decline. This however cannot be an invariable feature, as in the case of Grojo (pp. 303, 304), there was not the slightest indication of any glandular affection.
Firth on the other hand mentions "lymphatic enlargement which in some cases may be extreme," and which "invariably subsides as involution begins."
Richello describes a distinct painful adenitis affecting most frequently the femoral, inguinal, and cervical, and other superficial glands. In an examination of 750 hospital cases in Dominica "the abscessed glands were found to be greatly enlarged in 28 or 3.7% of the cases." In studying

(3) Loc. cit. (7th Cent. Pract. of Med.) p. 327.
the notes on 132 cases run and examined by himself and recorded in his Govt. Report (1894, pp. 138-143), I can find 5 in which there is mention of glandular enlargement, (or again about 3.8%). In all five there is sufficient to suggest that the enlargement of the glands might be due not to the action of the specific poison of Yaws, but to the absorption of other matters, because all had either "tubercos", or ulceration of some sort, or non-encrusted tubercles, or oesophial ulceration, and the enlarged femoral glands in three out of these five cases were on one side only, the side corresponding to that on which the ulceration is mentioned; in the other two, ulceration and enlarged femoral glands existed on both sides. It would thus appear that the relation of glandular enlargement to the yaws as gathered from these cases, is similar to that represented by Dr. Neuma Rat as sympathetic rather than specific.

In the Chinese cases such enlarged glands as were present might readily be accounted for by infection by pyogenic organisms, which may easily occur particularly where the
The same thing is suggested by Mr. L. Martin (1) in a description of several cases of “tuba,” and “patek,” occurring in Japanese in Deli, Sumatra. The inguinal and crural glands were enlarged in cases suffering from “tuba” on the soles, the elbow glands being affected where “patek” occurred on the hands, and the observer concludes that apart from syphilitic infection, they “may be attributed to a simultaneous infection with streptococci or staphylococci.”

In spite of differences of opinion as to the relation of addicts to the specific poison of jaws, the cases here described are quite in accordance with the experience of many of the most reliable observers.

Primary Sore.

Another question which these cases illustrate is the uncertainty which appears to exist regarding the existence of a primary sore in jaws, a moot point which still draws out strenuous expressions of opinion on opposite sides from experts who have studied the disease even in the same locality.

Dr. Wuna Pat, whose now classical essay on yaws forms the basis of many of the textbook descriptions, asserts the existence of a definite and characteristic primary lesion, an opinion which is again defended in a recent paper in the Journal of Tropical Medicine (already referred to). He accepts as conclusive the experiments of Charlebois, as proving the existence of a characteristic primary ulcer.

Nicholls on the other hand emphatically denies the existence of any initial lesion at all. As Powell states that Imray also denies the existence of a 'primary ulcer,' it must be confessed that even within the limits of the West Indies capable observers hold diverse opinions on the point. Powell indeed quotes several authorities (Paullet, Macgregor, Prout, Nicholls, de Rochas, Imray), in support of his own opinion that a primary lesion is either absent altogether, the general eruption being the first symptom, or is exactly like one of the typical granuloma subcutis subsequently developed.

Further also describes no primary lesion at the site of inoculation, or at most a papule or slight growth of granulation tissue.

(1) Loc. cit. p. 463.
In Charlebois’ experimental inoculations, 28 out of the 32 cases developed after 14 days a papule at the site of inoculation, which later became an ulcus molle, of which the ultimate fate was in some cases a scar, and in others a fungating raised tumour “which presented exactly the appearance of fomites in tubercles.” The general eruption followed the local manifestation after an interval of over two months, or even over three months.

Powell (2) refers to Paullet’s experiments, in which 4 out of 14 cases inoculated the general eruption was the first evidence of the infection, the others corroborating the majority of his own experiments in proving that “there is no distinction between the sore at the seat of inoculation and the subsequent eruption.”

It would appear then that on the whole, the case against a characteristic primary sore, or at least a primary “ulcer,” is supported by as much weight of authority as that in its favour, but bearing these conflicting views in mind we may glance at the cases which form the subject of this paper.

It will be seen that in all but two there is

(1) Loc. cit. pp. 311-312.
at least some information concerning the earliest
lesion. For convenience of reference they are
noted below.
Case 1. In Kellaine the earliest tubercle on the
wrist preceded the general eruption by "a few weeks."
It had commenced as a fungoid tubercle similar
to those later developed, but had grown to an
unusual size, had assumed an unusual dry
serpentine condition, and on this account took
longer to disappear than the first crop of the
general eruption.
Case 2. The primary lesion was an ordinary pustule
on the back, followed after "about a month"
by a crop on hands and body.
Case 3. Origin of infection not known.
Case 4. Initial lesion was on the hand. After
between two and three months similar tubercles
appeared on the thighs.
Case 5. First tubercle on the buttock, followed
after "a few weeks" by a similar eruption elsewhere.
Case 6. Primary pustule on the scalp. General eruption
10 days later.
Case 7. Primary pustule on the epigastrium. Four
weeks later similar pustules elsewhere.

(1) It must be admitted that in some of the cases this
information rested on the statements of the patient, or in the
case of children the relatives, but in others the facts were evident.
Case 8. (Infant). First developed around the mouth, and "three or four weeks later" appeared elsewhere.


Case 10. Initial lesion on forefinger, preceding the general eruption by one month. It was larger than usual and disappeared pari passu with the others.

Case 11. Original lesion multiple on the leg, on an old wound which had again broken down and ulcerated. Even in this somewhat anomalous origin the initial tubercles were similar to those of the general eruption which developed four or five weeks later.

Case 12. Original sore on finger, preceding the general eruption by one month. It became dry and verrucose as in Case 1.

Case 13. The first tubercle appeared on the elbow and was followed after two months by a similar eruption on other parts.

Case 14. Original tubercle on the leg with satellites, five or six weeks before others appeared elsewhere.

Case 15. There was only a single large papain present. It had existed for a month and may possibly have
been followed subsequently by a general eruption.

Case 16. A multiple eruption of gum papules was
the first symptom without any observed initial
lesion.

Thus in all these, with the exception of Case 3,
and Case 16, a primary gum was present and it preceded the general eruption by an interval which varied from 10 days (Case 6), to about as
many weeks (Case 4), and which in the majority
of the cases was about one month.

In Powell’s cases in Assam, the earliest fungoid
tubercolae was followed, “usually within 10 days or
possibly pari passu with the initial lesion,” by a
similar general eruption.

A similar period, viz. 7 to 10 days is stated by
Fowlis as the duration of the proromitory stage
before the appearance of the general eruption.

Radcliffe Croker (3), whose account of Jaws is mainly
derived from Dr. Numa Rat, gives a month from the
outset of the initial stage as the incubation of the
secondary eruption, a period which coincides with
that illustrated by the above cases.

If any conclusion may be drawn from the evidence
afforded by these cases, one may perhaps be
justified in regarding the characteristic eruption
of Yaws as the secondary stage, in much the same way as that term is used in regard to syphilis. There appears to be sufficient evidence to show that Yaws does admit a primary lesion, though it may be too much to say with Dr. Bat that it is "as characteristic of the affection as the chancre is of syphilis." When it is remembered that syphilis is ordinarily inoculated on a mucous membrane, while Yaws in ordinary circumstances is not, but enters the system by some breach of surface in the skin, some open ulcer, or even by an easily overlooked and possibly minute abrasion, then it is further considered that the inoculation period of naturally acquired Yaws appears to be of somewhat indefinite duration, and that any information as to the time of inoculation is in such cases rarely to be obtained, it will be understood that the primary lesion is not so likely to present itself as a characteristic, or even as a prominent feature in Yaws as in the case in syphilis. If it be admitted further with Dr. Nicholls, (who however stoutly denies the existence of a true "primary" lesion comparable to that in syphilis), that any lesion which appears at the site of inoculation "differs in no essential..."
particular from the characteristic eruption of the disease,"(1) it is easy to see why the existence of any true initial lesion in Jaws should be doubted or denied by some, and by the majority be looked upon as still an open question. My own experience so far as it goes, leads me to believe that there is a primary yaw, preceding the general eruption by a period of time which appears to vary within rather wide limits, but that this initial lesion has in the main the same features as any individual lesion of the subsequently developed eruption. Cases 1 and 12 above are no exceptions, as they illustrate merely an exaggerated form of the primary yaw, which in its inception differs in no way from the type of those granulomata which appear later.

But it must be further noted that such a primary lesion as is illustrated by the above cases, differs materially from an initial papule which not only becomes an ulcer "with perpendicular edges and a clean base lined with granulation tissue," but also "disappears in a fortnight before the beginning of the secondary stage."(2)

Colcott Fox in the course of remarks on (1) "Rept on Jaws." (appendix, p. 312).
a paper on "Pierre" by W.C. Brown, M.D. (1), quotes the same opinion, viz. that the initial sore usually disappears before the onset of the general eruption. These Chinese cases on the other hand exemplify a condition in which the initial lesion is discernible, is simply a primary pustule, which precedes the general or so-called secondary eruption by a few days or weeks, but which remains to accompany at least the first crop of the latter in its evolution and decline, features with which the accounts of those whose names are quoted by Powell are probably in the main in agreement. Perhaps some of these instances would be described as more or less typical specimens of the "Mother Pustule" (e.g. Cases 1, 10, 11, 12, and 14), but except for their greater proportions and precedence in point of time, they resemble the others and do not possess the indurated base, or the tendency to long persistence, and ultimate deep ulceration sometimes associated with that lesion as observed in the West Indies. So far then as these cases illustrate the occurrence of a primary pustule it may be remarked that (1).—It may be absolutely the same as any one of the secondary lesions; (2).—It may be (1). Brit. Journ. of Dermatol. June 1893, p. 166.
absolutely the same but more persistent;

(3) - It may be the same in general characters, but larger, or confluent and irregular in shape;

(4) - It may have some more or less definite characters besides the originally similar appearances; e.g. the decidedly papillomatous form assumed in Cases 1 and 12, in place of the original soft granuloma, due no doubt to an exaggeration of the interpapillary processes of the stratum malpighii, with a simultaneous absorption of the granulation cells in the enlarged papillae of the corium; but in no case were its characters altered so as to make it a fundamentally different type of lesion, as for example an ulcer.

Itching.

The eruption of Jaws is described in most of the textbooks as being attended by itching, a symptom which several of the above cases present. It is often mentioned as a diagnostic feature from syphilitis, and Alibert is quoted by Hutchinson as distinguishing "Pia" from the latter by its "insupportable itching." (1)

The Javan name "pattek" is stated by Charlebois to be equivalent to "native itch," but in the

East the term “itch” is applied to many forms of sore, and Charleouis does not mention itching as a symptom of his “Polypapilloma Tropicum.” Similarly Maxwell does not appear to mention this symptom as a characteristic of Yaws, but in one of his cases (Case 5), the eruption was “attended with great itching” (1).

Richollos(2) describes it as a common and sometimes distressing symptom which subsides when the granulomata are mature.

In my patients, Cases 1 and 7 had pronounced itching during the development of the tubercles, which continued even in the resolving patches, and in the spots left after subsidence.

In Case 9, the itching was not severe, and diminished when the granulomata were fully formed.

Case 10, with an extensive and exuberant eruption of typical characters gave no history of itching.

Case 11, had itching with development of the general eruption.

Case 14 definitely stated that there was no itching.

Thus the presence of itching does not appear to be a constant symptom in Yaws, and

(1) Loc. cit. p. 218.

Hirsch's reference to it as an "occasional" (1) feature would not suit the present cases, in which also it was in some observed to cease at maturity of the granuloma, and in other cases to persist even to the stage of complete resolution. Scabies is a common enough complaint amongst the Chinese as amongst negroes, but it is surely unnecessary to conclude that it is "the coincidence of the two maladies," which "causes the belief that the secondary eruptions of yaws are attended by itching." (2)

Pain.

There is considerable uniformity of opinion as to the absence of tenderness in the fully formed yaws granuloma.

Crockert and Firth (3), both refer to painlessness as one of the most characteristic features, and Manson, Hirsch, and others refer to the same phenomenon.

Charlou (4) on the contrary describes the development of the eruption as attended by continuous severe pain, a symptom which was also observed in the artificially inoculated cases.


in which however the later crops of tubercles were painless.

Certainly in all my cases, the absence of tenderness except on firm pressure, was an unmistakable feature, and one which is in conformity with the usual text-book descriptions of Yaws. 

**Constitutional Disturbance.**

The effect of Yaws on the constitution of the patient is another question on which different authors have made contrary statements. Rat mentions anaemia as a constant accompanyment, either at the commencement or during the progress of the disease, and Michelle, while describing the disease as one which does not greatly undermine the general health, states that in 5-2% of cases examined there was "marked cachexia." (1).

In Powell's cases the constitutional symptoms were absent or slight, the eruption as a rule causing no inconvenience.

This is in accordance with my experience as noted in the Chinese cases, in none of whom were there any signs that the general health was affected. Charlotis in particular refers to the good health and unimpaired vitality of the patients, and says that whatever the duration of the disease the

constitution never suffers.

Similarly, the premonitory symptoms of the eruption were, in the majority of my cases, unnoticed, and in none of them severe.

Cases 2, 7, 10, 11, and 16, admitted some preliminary aching of limbs or back, with or without shivering, and though these may be taken as agreeing with the commonly described onset of the yaws eruption, still in Chinese patients who have probably all suffered from malaria at some period, there is nothing unusual in the occurrence of some shivering with aching at times, whether followed or not by the symptoms of some other morbid condition.

Curiously enough Charleux, who insists on the absence of constitutional disturbance during the course of the disease, describes well marked initial phenomena which precede and usher in the eruption, viz. fever with rigors commencing a week before the exanthem and lasting a fortnight, accompanied by pains in the joints. (1)

Parts affected.

In regard to distribution of the eruption a consideration of the above cases is interesting. There is no part of the surface which is not

represented in forming a site for the tubercles, and the first distribution in Case 1, occupying all parts except the hands, feet, and perineal region, may be taken as fairly representative of all the cases together.

Apart from three cases, (nos. 4, 10, and 12), in which the initial lesion was on the hand, only one (Case 2) showed a few tubercles on the hands, and this case was distinguished from all the others by having one or two on the palms. In one other case (no. 7), a single small tubercle occurred on the hand in a late eruption.

Tubercles on the soles were met with in three instances (nos. 1, 7 and 9).

The genitals and perineal region were affected in three cases, viz. Case 11, on the penis (corona), Case 12 on the scrotum, and Case 16 (achild) on the prepuce and around the anus.

In all these, which have been mentioned as presenting lesions in somewhat exceptional situations, the eruption was well marked and widely distributed elsewhere, (with the exception of Case 2 in which there were few tubercles altogether).

The eruption in general freely affected the
scalp, face, (lips, nares, chin, eyelids), neck, front and back of the trunk, arms, legs, thighs and gluteal region.

Prout says the eruption is "less frequently seen on trunk and hairy scalp."

Charlebois describes the hairy scalp as commonly affected, and mentions the healthy condition of the hair in tubercles found in that situation.

Nicholls found tubercles on the scalp in only 3 out of 100 cases analysed.

In my cases, on the other hand the shaved scalp was affected in nearly half the number.

A tempting explanation is that the shaving of the head in the Chinese exposes the surface on the one hand to contagion, (in two of the cases the initial lesion was on the scalp), and on the other to the same external influences or accidents which may conceivably be concerned in determining the injection of the system to those sites on the general surface of the body at which its effects will be produced.

In Case 15, the disease was represented by only a single yeast, a circumstance which has numerous parallels in the literature of Yaws. (and Maxwell Davidson's "Hygiene and Diseases of Warm Climates." 1893, p. 515.

(b) Loc. cit. pp. 289, 300.
saying "where this happens it frequently occupies one of the toes".

At the same time the eruption of Yaws is usually often symmetrical, a fact which is mentioned by Micholls, (both in his Report and in the account already quoted from in the Twentieth Century Practice of Medicine). But on the other hand Rat mentions absence of symmetry as one of the distinguishing features between Yaws and syphilis, (Essay p. 21) a statement which is followed for the same purpose in textbook descriptions based on his account of the disease.

There can be no doubt that clinical descriptions of Yaws from various sources, indicate that the eruption though often scanty and local, is very frequently as widely and as symmetrically distributed over the body as is the case in secondary syphilis. In such examples of widespread eruptions as are represented in some of the Chinese cases, it is also not difficult to find amongst them instances of tubercles placed with mathematical precision on exactly symmetrical spots.

Case 1. and Case II. (and perhaps also Case 9), may be mentioned as the more striking instances, but examples of the same phenomenon occurred

in several of the others on parts of the body, where their position would be less likely to attract attention.

Autoinoculation. In these situations where bilateral tubercles are found on such extreme points as the opposite ear-juvenile, the occurrence of autoinoculation is out of the question, but it may be otherwise where we find tubercles in contact with each other on the opposed surfaces of the buttocks, at the skin margins of the anus, (not in my cases unless Case 16 is a possible example), or at the angles of the mouth.

The possibility of autoinfection is denied by Rat, affirmed by Nicholls, and proved by the experiments of Charlonis. It is not proved however that it is a usual occurrence during the natural course of the disease, and certainly the frequent occurrence of unilateral lesions on such suitable sites for autoinoculation as the contiguous surfaces of the buttocks, or, (in cases described by others), in the perineum and near the anus, where according to Rat even an abrasion artificially produced will not produce another tubercle, seem to

suggest that automisculation is not commonly operative under natural conditions.

Hector.

I could not detect any recognisable odour in association with the tubercles, such as some authors describe, and which Nicholls states to be so peculiar that your can be detected "by the sense of smell alone"; nor are the Chinese sufficiently cleanly in their personal habits as to render it likely that its absence was due to diligence in their ablutions.

Uniformity.

My cases also do not illustrate any form of eruption besides the granuloma, or its initial popular stage, and any pre-papular stage I have never seen. The difficulty of finding any one term such as tubercle, fungus, nodule, &c., descriptive of the "yaws," certainly does not arise from any great variation in their form and appearance, for there is probably no disease in which the type of eruption at maturity varies within such narrow limits, or which possesses alike for descriptive and for diagnostic purposes a lesion of more well defined and constant characters. The sebaceous furfuraceous (Dartred), W. Lee, cit. XX Cent. Pract. of Med. p. 322.
and the military vesicular condition ('gratelle', 'guinea corn' jaws &c.), mentioned in some accounts of the disease, I have not met with, and it would seem that some confusion exists as to their nature and the relationship in which they stand to the type. They are described by Inray as unusual forms, Pratt also apparently giving them the rank of distinct varieties of eruption which may occur at any stage of the disease, independently of, or replacing the usual tubercles, while Maxwell describes the same as "precursive eruptions".

There is a general agreement now in accepting at least the squalene and the papule as merely the preliminary forms which develop successively into the mature granuloma, and this is confirmed by the histologic characters described by Macleod.

Contagiousness.

That "jaws is an inseparable disease" is one thing, that it can be communicated by direct personal contact is admitted, but that this is the usual mode of propagation is a subject on which there is difference of opinion. Michell's expresses the belief that "in most instances

the disease is spread by direct contact of the healthy with the sick. Some of my cases appear to illustrate this mode of contagion in a striking manner.

Case 1, developed the first lesion on the front of the wrist, having presumably been infected from the buttocks of the child whom he carried in his arms.

Case 4, was apparently infected in exactly the same manner, from the same child, and on a similar situation. It is also probably more than a coincidence that in both the initial lesion appeared as two contiguous tubercles.

Case 5, was infected first on the buttock, very probably from the hand of Case 4, by whom she was carried. It is still more suggestive to note that the initial symptom in this case was in the form of two tubercles, presumably corresponding to the two tubercles which formed the primary lesion in Case 4, and further that an interval of about one month separated the first appearance in the one from that in the other.

Cases similarly illustrative of direct contagion are not difficult to find amongst published
By way of illustration there is appended below a diagram indicating the known or presumable derivation of infection in the members of the group of Cases 1-9. Ah Ming was the source of contagion from whom Gee-mue and Keng-lim acquired the disease, and so on.

Ah Ming.

- Gee-mue.
  - Soy-mue.
    - Toa-mue (2).
      - Mrs Yu (2).
        - Ah-yu (2)
          - Mrs Yu's infant.
  - Keng-lim.
    - Keng-lim-sim.
clinical reports. An almost parallel example
is Hynsey's Case 14, in which a father with
parangi used to carry a child who thus got
inoculated with jaws on a sore on the
outside of the leg.

Case 8 of my series, an infant, appears to
have derived the infection on the mouth from
the sore on the mother's nipple, the latter having
developed before any symptoms appeared in the
child. This may be compared with a case
illustrating a converse inoculation from
infant to mother, viz. Hynsey's Case 15, in which
a child with parangi around the mouth
injected the mother's nipple.

Dr. W. R. Pat expresses an opposite opinion,
and says that intimate and prolonged contact
is necessary to affect the system, the virus
not being easily communicated, and that
the disease is usually contracted by transmission
from the virus in soil, air, or water.

It will be recalled however that the practice
which prevailed among native races, both negro
and Polynesian, of inoculating children, must
have been suggested by the common occurrence
of communication through contact between the

2. Ibid. p. 8.
injected and the healthy.

And it may be remarked also that flies are believed by competent observers to be amongst the agents at work in conveying the virus so as to infect open sores or abraded surfaces; and if the relatively small quantity adhering to an insect's legs applied to a receptive surface establishes itself long enough to effect transmission of the disease, surely the amount of contact likely to occur in the events of everyday life, children playing, carrying, ponding &c., will be sufficient to ensure the disease being contracted in this way.

It is not unlikely that the presence of the specific virus in water and soil, or in the dust of floors, may result in the transmission of the disease in a large number of cases in which the lower limbs are first affected without personal contact, but at the same time, naked coolest under tropical conditions are particularly liable to have wounds and pricks of the skin on the lower extremities, rendering these the more receptive of the contagium from whatever source it may be applied.

An earlier expression of opinion by the same observer
is found in his "Essay on Jaws" (p.8), where Dr. Rat
gives as the commonest sites of the primary sore —
the lips, the breast, the groin, the genitals, and the
perineum," situations which are explained by
the modes of communication by direct contact
(Ibid. p.27), — "kissing, sucking, sexual intercourse,
or by any act by which the body is made to
touch an affected part." Although the genitals
and perineum have been affected in comparatively
few of the cases observed in China, the instances
mentioned above may be taken as quite in
accordance with this definition of the common
modes of contagion.

So far then as they go my cases certainly appear
to favour the idea that contagion by personal
contact is the usual means by which the disease
is naturally acquired, and do not afford sufficient
reason for regarding either air, soil, or water, as the
usual intermediary in conveying the contagium
to the abraded skin.

Treatment.

The treatment employed in my cases
was simple in the extreme, and proved so
satisfactory that practically no variation was
made in the different cases beyond graduation of
the dosage according to age. It was suggested by the observation that similar cases treated by antisyphilitic remedies before the confirmation of the diagnosis of Framboesia in Hong-lin, had responded to this treatment, a fact which it need hardly be said tended also to obscure the true nature of the cases by seeming to confirm the diagnosis of syphilis. The Chinese amongst whom venereal disease is exceedingly common, particularly in districts near the coast, respond to comparatively small doses of the usual remedies.

The use and efficacy of mercury and the iodides in Yaws, though perhaps in general agreed upon, have evoked almost every shade of opinion in regard to their respective merits.

Maxwell distinguishes Yaws from Sibbens on the ground amongst others that the former is "invariably rendered worse" by mercury, while in the latter the use of that mineral is curative. Similarly Kynsey, referring to the use of the same remedies in the treatment of Yaws and syphilis, says that mercury and the iodides are "unnecessary and often harmful in Yaws." (2)

Hirsch (3) derives the opinion that "the use of mercury

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in Yaws has been found to be absolutely injurious.

Charlois, on the other hand, who quotes Sauvages, Plenck, Bowerbank, and others in support of mercury, discards practically all other drugs for the combined use of mercury and iodide of potassium, giving the first place to the former as the real curative agent.

Even within certain geographical limits, practitioners hold different views as to the relative importance of these remedies. Bowerbank "is in favour of mercury at all stages." Others consider its use doubtful or unnecessary, and many hold it to be positively injurious. Dr. Hunkel finds it injurious in the primary and early secondary stages, tending to induce chronicity.

Nicholls is in agreement with the general consensus of opinion in the use of mercurial ointments locally and salts of mercury and potassium iodide internally.

As regards the use of potassium iodide, Hunkel (4) employs it to hasten dispersion at any stage, as "a safer and quite as effectual a remedy as mercury," but refers to its slower action and lesser usefulness as compared with tertiary syphilis.

This is contrary to the experience recorded in my cases, in which the use of mercury with potassium iodide was always attended by the most rapid results, the treatment being so successful indeed that I have never thought it worth while to alter it for trial of any other. Their use was indeed attended by this disadvantage, that the condition improved so rapidly that the patient invariably went home before all traces of the eruption had disappeared, in the hope that progress once started would be uninterrupted even when the remedies were laid aside, and as was to be expected they returned sooner or later with full crops in relapse. From the experience of others, and in accordance with what is apparently the general opinion, the disease will relapse in a considerable proportion of the cases even after apparent cure, no matter what the treatment may have been. The experience of different observers gathered from widely distant sources, confirms the belief that both potassium iodide and mercury will in many cases readily cause at least a temporary disappearance of the eruption, (Charlös in Malaya, Daniels in Fiji, and Nicholls in the West Indies).

The same treatment, regulated according to age, was uniformly successful in all the Chinese cases, but as an equally uniform tendency to relapse was displayed in most of them, it is uncertain how far the duration of the disease was actually curtailed by the use of these drugs. The long persistence unchanged of a few tubercles, or of a single general crop in the absence of treatment, as compared with the immediate effect of potassium iodide in starting their resolution, indicates that the disease is temporarily arrested, and in all probability its course shortened, though to what extent it is impossible to estimate, for the reason that there is after all in Yaws a generally admitted natural tendency to spontaneous recovery ultimately, though this event may be delayed for months, or even for a period estimated by years. In my cases the effect of the combined use of mercury in the form of an ointment, and along with potassium iodide internally, was very satisfactory so long as it was continued, but the usual relapses occurred when the remedies were not renewed, as was usually the case when the patient was sent home. Case 1 was under
observation from time to time during a period of about twenty months, and the benefit as well as the limitations of treatment by means of these drugs could be traced. On the whole it was observed that the effect of treatment was such that the involution of those tubercles which had already passed maturity was accelerated, while the younger lesions which were still in the papular form were at the same time stimulated to a more rapid development, with the result that they pursued throughout treatment a briefer course.

But it must be added that the effects of the drugs were almost immediately apparent, every case which remained for at least a week in hospital showing the commencement of a most undeniable improvement.

In Case 1, as will be seen by a reference to the notes, treatment for three weeks caused an unmistakable alteration in an eruption which at the beginning of that time had been both universal and at different stages of development. No new papules had appeared, although there had been many incipient ones on his arrival in hospital; the latter had during that comparatively short period already attained the encrusted stage,
and those which were then mature or were already resolving had either disappeared, or were in the later stages of dry involution.

In the child recorded as Case 16, after having been neglected for several weeks at home, during which time a copious eruption appeared on parts of the body, treatment for one week resulted in a most surprising improvement of the condition on all affected parts. (1).

It is evident that such a rapid effect on the eruption, immediate improvement commencing with the exhibition of the drugs, finds no real parallel in the action of potassium iodide on tertiary syphilis.

Let us by way of comparison refer to the experience of others in the use of these remedies, particularly the iodide and the mode of its action.

Daniels (2), from experience in Fiji, discarded all drugs in favour of the iodide, and found that "both it and mercury in many cases cause speedy disappearance of the eruption, in fact, often more markedly.


(1) In case it may be thought that hospital régime was responsible for this improvement, it may be remarked that owing to rebuilding of the accommodation was strained to the utmost, the conditions at this time resembling more those of a medical hostelry. The general hygiene though inadequate, was no doubt superior to that of their native villages, but the patients were permitted to supply and cook their own food. J. M. D.
than in the case of syphilis."

Dr. Mapleton of St. Hills, (in the reply to questions circulated by Dr. Nicholls in the preparation of his Report), describes "magical" results from Donovan's solution in acute cases.

Nicholls recommends the use of the iodide after the granulomata are fully formed, and quotes Lucius Brunton on the action of the drug:

"The iodine from the iodide is taken up by the albuminous substances, and the entrance of the iodine molecules into their composition causes them to undergo more rapid metamorphosis."

The jaws tubercles being composed mainly of embryonic granulation cells, it is readily understood how the administration of the iodide will stimulate the immature lesions to rapid development, while those granulomata which have already attained maturity will be dispersed when the system is under the action of the drug.

A clinical instance of this action has already been quoted in the case of Ring-lim (Case 1), and we may refer to Case 10 as a further example, and one which is of interest in that it differs from the former in one circumstance, viz. the lesions were all at one stage, that of the fully formed


(2). Ibid. p. 257.
enocrusted jaw, no pustules and no resolving tubercles being present. This patient (Ah Kim) received like the others yellow oxide of mercury locally, and potassium iodide with corrosive sublimate internally, and within a week decided improvement was apparent in the eruption, as evidenced by the drying and shrinking of the tubercles with consequent loosening of the crusts. In spite of interruptions in the treatment when the patient went home, the eruption had practically been absorbed in six weeks' time, no new tubercles appeared, and within two months from the commencement of treatment the only trace of the past disease was in the form of pale maculae marking some of the sites occupied by the pustules. At the same time although we may fairly attribute this effect to the drug employed, it must be remembered that several authors have described the temporary disappearance of the eruption during an acute intercurrent attack of some other disease such as dysentery, measles, smallpox, or ulcerative conditions. Very striking effects of pyrexia whether naturally acquired or artificially induced on the tubercles are mentioned by Powell (1). The undeveloped pustules were stimulated to rapid

growth, and "in ten days most of them had blossomed out into fully developed granulomata." The latter became in a few days correspondingly drier and flatter, and in a fortnight had all disappeared,—a state of matters which affords a parallel to the described effect of potassium iodide than which it is even more rapid.

I have not had any opportunity of noticing the effect of malarial fever or any other form of pyrexia on the course of the disease in the Chinese patients. Reliable as are the results which some have found with mercury and potassium iodide, there are others who find these drugs disappointing and rarely employ them. Some appear to get equally satisfactory results from arsenic, and others believe in the value of thyroid extract.

I have no experience of any other drugs than those mentioned in the notes of my cases, as the application of a mild mercurial ointment to some of the tubercles after removal of the crusts, and the internal administration of potassium iodide and perchloride of mercury in comparatively small doses which did not require to be progressively increased, suited every case which I have had so far to treat.
Duration.

As seems to be the experience everywhere, the duration in my cases varied from weeks to many months. I did not have an opportunity of following the ultimate history of several of the patients, but from such cases as I was able to trace, and from the resemblance in general clinical history to that which was described in the experience of others, it is likely that a proportion of them continued to develop fresh crops or isolated yaws for a year or two. Mr. King-lin was under observation for over a year and a half, and had suffered from the disease for several months previous to his first visit to the hospital. Thus after 25 months from the commencement of his symptoms he still suffered from a recurrence of yaws in the soles, and although treatment had a marked effect on his condition as long as his system was under the influence of the drugs, he still continued to have what may be styled "reminders" (or the "membra yaws" of the negro).

The duration of the disease may however be greatly extended by the mere persistence of...
single lesions or of a few localized ones, without any recurrence of the eruption elsewhere. It is indeed difficult to say what is the duration of an individual tubercle, since they appear to vary in this respect in an extreme degree. Single large tubercles on parts of the body where they were likely to obtrude themselves on the notice of the patient himself, have been pointed out as having existed without alteration for many months. For example a conspicuous tubercle on the front of the abdomen has been referred to by a patient as the first to appear, and as having remained almost unaltered while crops of others appeared and disappeared to be succeeded by others at different parts of the surface. A single one or groups of two or three tubercles situated at an inconvenient point on the back, may be complained of for months as preventing the patient from sleeping. In all such instances however it must be admitted that unless he has been under observation for a long consecutive period, one has little besides the patient's own statements as a guide, and these are unfortunately
Far from infallible amongst Orientals, whose information is more often mixed with the sole desire to prove acceptable to the inquirer, than with any concern for accuracy in the interests of science.

I have satisfied myself however that individual tubercles, and perhaps it would not be inaccurate to say whole crops of them, may during a period of apparently perfect health on the part of the patient, remain practically unchanged for long periods, in the absence on the one hand of any treatment, and on the other of causes of irritation and sepsis.

Dr. Hume Pat(1) is no doubt right in saying that "the normal duration of the tubercle is its disappearance by interstitial absorption, at the end of about six weeks from the time of its development," but it has not been my experience that any unfavourable circumstances in regard to housing, and food, or concomitant weakening causes, beyond what is the usual lot of the lower class Chinese (which though poor is undoubtedly on a higher level than the condition

(1). Essay on "Taws." p. 11.
of the negro), are necessary to prolong the duration of the secondary eruption, whether this appears as a few individual lesions or as is so frequently the case, in the form of repeated crops.

Yaws and Syphilis.

The relation of Yaws to Syphilis is a wide and vexed question which does not come within the scope of this paper, except in so far as concerns the diagnosis of the condition described in these patients.

The main points relied upon to establish the diagnosis have been already alluded to in the case of King-lim, and are all such as have been repeatedly referred to by others who believe the two diseases to be specifically distinct.

There can be no doubt that the great majority of practitioners in countries where Yaws is endemic hold the opinion that it is a distinct disease from syphilis, yet if there can be shown to be an increasing tendency on the part of medical men in the tropics to favour the view of their identity, or even to reserve judgment on the question until the bacteriologist
is able to adduce positive evidence on one side or the other, there would be more reason for those to whom the disease is unfamiliar, to rest content with the powerful arguments in favour of its identity with syphilis put forward by Mr. Jonathan Hutchinson in the recent monograph accompanying Fasciculus XIV of the New Sydenham Society's Atlas. All that can be adduced in support of that view is there stated with a force which might be convincing were it known that the arguments were based on an actual study of the disease in its tropical homes, and were it not that the fact remains that almost all practitioners who are called upon to treat cases in the endemic localities do not hesitate to commit themselves to the opinion that Yaws is a disease sui generis. It must be admitted however that some recent observers incline to the belief that Yaws and Syphilis are identical.

1. Fasciculus XIV. Frambesial Syphilis (Yaws and Parangi).

refers to Scheube as in agreement.

Dr. Finucane, Assistant Medical Officer, Fiji, in a paper "On Yaws as observed in Fiji," read before the Standing Committee on Yaws, maintains that Fijian Yaws differs in type from that met with in West Africa and the West Indies, endorses the belief of Mr. Hutchinson that Yaws is a form of Syphilis "and for all practical purposes, as to treatment, identical," and believes that as no one has yet demonstrated the existence of a hard chancre in Fiji, the Fijian is "protected by being already syphilised by yaws." Yet Dr. Daniels (3) who from experience both of "Coko" in Fiji, and of West Indian Yaws in British Guiana, has no doubt that there are "identical in appearance, in course, and in behaviour under treatment," has already given in unanswerable language a surely convincing statement on the "non-identity of Yaws and syphilis." Professor R. Koch, the head of the German Malaria Expedition, refers to the prevalence of Framboesia in German New Guinea and the (4). Scheube, "The Diseases of Warm Climates," Ed. by Jas. Cantlie, M.B., F.R.C.S., 1903. The reference (which I have not verified) occurs on p. 51 of the original, "Die venrischen Krankheiten in der warmen Länder," Leipzig, 1902.

neighbouring islands of the Pacific, where in some villages almost the whole juvenile population was affected, but "did not meet with a solitary case" of syphilis in purely native villages. With regard to China syphilis in some of its manifestations forms a considerable proportion of the cases which come under our notice, and in the Foo-chow district where emigration to and return from the Straits affect the character and social condition of the native population to no small degree, a statement that the patient has been abroad is usually taken (and indeed often meant) as equivalent to an admission of syphilis. No difficulty attends the recognition of this very frequent disease in China as identical with the syphilis of Europe. But when a single case of this anomalous type of eruption (as it be a syphilide) presents itself, it is most unlikely that a group of cases from the same neighbourhood amongst whom there is fair evidence of contagion, should present exactly the same unusual appearance. Admit the existence of Yaws, a distinct specific contagious malady, having many analogies with syphilis, but possessing an eruption in uncomplicated
cases of very definite character, and the matter requires no explanation.

The amount of clinical evidence which has already been supplied to the mills of criticism has been amply sufficient to settle the question if it is capable of being decided by such material alone, and the fact that authorities on the subject are still short of unanimity suggests that when the microorganism of syphilis is discovered, and after the usual bacteriological tests have been satisfied, is identified or discriminated from that of jaws, then and not till then will this much debated question be laid to rest. Further the micrococci isolated and cultivated from jaws secretions by Nicholls and Watts, and by Pirie, nor the yeast fungus found by Powell, nor the "frambesia bacillus" or "tubus bacillus" of Breda, has apparently as yet been accepted as the specific cause of jaws, nor has any organism of a protozoic nature been definitely associated with the disease.

Meanwhile therefore the nearest approach to an acceptable decision is perhaps one based on histological inquiry and expressed by
Macleod, (who by the way failed to find any specific microbe of jaws), after an examination of many sections of both jaws and various syphilis granulations, "I have come to the conclusion that we are dealing with two types of lesions which are histologically distinct, and that in sections in which the peculiar characteristics of jaws are well marked it should no more difficult to differentiate jaws from syphilis histologically than it may be to distinguish between the histological pictures of tuberculosis and syphilis." (1).

In reviewing the comparison attempted in the preceding pages of the type of disease presented by my Chinese patients with the chief features of jaws as described by various authorities, it will be seen that the condition from which they suffered differs from those descriptions as much as and no more than they differ from each other, a consideration which corresponds accurately with the present unsettled state of opinion as to the absolute identity or mere analogy of the diseases observed in different countries, described under different names, and usually grouped

under the generic name of "gaws or Framboesia. Probably in regard to none of the points dealt with in detail above is there complete unanimity of opinion. One distinguishes gaws from Syphilis by the absence of glandular enlargement, while another adduces polyadenitis as common to both diseases. One describes the eruption as usually symmetrical, a distinction which another denies. Some protest against the use of mercury, while others employ it as the real curative agent. Painlessness, itching, and absence of constitutional disturbance are referred to in different terms by different observers, mentioned as characteristic features by some or passed without reference by others.

In China it would seem that the disease though showing no excessive virulence as is to be expected when a contagious disease attacks an unprotected community, shows in the Chinese to whom it has apparently been introduced in their own country within the last few years, a perfectly pure type, running a typical and unexceptional course uncomplicated by any of the anomalies, mixed infections, and
so-called tertiary symptoms or sequelae, which appear to be a feature in at least a proportion of the cases met with in the West Indies and elsewhere where the disease has been endemic for generations. Although I cannot claim to have had access to the full literature on the subject, I have studied most of the best known descriptions of recent years, and have little hesitation in basing the diagnosis of yaws in the above cases on such an account of that disease as is given by Dr. McD. in the XVI Vol. of the Twentieth Century Practice of Medicine (New York, 1899). The description however with which I have found my cases to be most accurately in agreement in almost every detail, is that of Powell in his recorded outbreak of yaws in Assam (Brit. Journ. of Dermatology, Dec. 1896), which has been already quoted from in the course of this paper. In practically every particular, the appearance of the so-called primary yaws, the incubation period of the general eruption, the appearance and course of the granuloma, constitutional disturbance, macules, absence of anomalous features,
duration, absence of glandular enlargement, of induration, areola, tenderness &c., what is there stated as descriptive of the disease in his cases is accurately applicable to the condition seen in my Chinese patients.

Still more suggestive is the mention of the "reddy or almost warty appearance, with the papillae separated by crevices," which is assumed by some of the older patches when drying up and in process of decline, an appearance to which I have seen no reference by any other author. This form he describes as not common, but in the case of Heng-lim it appeared to be the normal mode of resolution, all the jaws which arrived at maturity undergoing this change, which probably results from the more rapid disappearance of the enlarged papillae than the hyperplastic interpapillary processes of the "prickle" layer. The same appearance was seen in Ah Yu (Case 9), but in him it was a feature of resolution in only a proportion of the tubercles, whereas in Heng-lim all the lesions without exception before regaining the level of the surrounding surface presented this peculiarity, which was further enhanced by the deep almost
port wine colour acquired by some of the plaques at this stage. In Ah Kin (Case 10) on the other hand, this dry papillomatous appearance was much less marked, and except that attention had been already directed to it in Case 1, would probably have passed without comment.

On the other hand it is curious that with such an exact parallel in the clinical type of the two sets of cases, there should be a discrepancy in the results of treatment, for Powell found mercury and the iodides disappointing, whereas the Chinese patients responded immediately to treatment with these drugs, relapsing as soon as they were laid aside. Perhaps it is only fair to mention however as equally curious, that Dr. P.B. Couland of the English Presbyterian Mission reported a case of Yaws from Chao-chow-fou, in which he states that antisyphtilitic remedies proved inefficacious.

Note. The photo of this case is shown in the "Journal of Tropical Medicine," Apr. 15th, 1901, and it is important to note that the patient and her son acquired the disease from her husband, who was suffering from Yaws when he returned from Singapore. None of my cases seen in Swatow happened to come from the neighbourhood of Chao-chow-fou, which is the Prefectural City of the district, and is about 24 miles from Swatow. I was in charge of the hospital there for 18 months, but did not meet with a case of Yaws during that time.
On the other hand, it should be mentioned that with Powell's description before his mind, Nicholls does not see his way to admit with certainty the existence of Yaws in any Asiatic country. Though it is evident that Dr. Numa Rat accepts Powell's account as descriptive of that disease.

In passing I would also refer to the account of Button Deavry in Hirsch's "Geographical and Historical Pathology" (vol. ii. p. 112), a disease the identity of which with Yaws is admitted, which as to appearance, course, and general features, might stand for an accurate and concise definition of such a simple and uncomplicated type of the disease as is exhibited by the Chinese cases. The tenderness on pressure, and the favourite seat on the palms, described amongst the symptoms of Button Deavry, are points in regard to which there may well be variation in any degree.

Yaws in Asia.

Of more importance for the purpose of this paper is a consideration of the occurrence of Yaws in the Orient, a distribution which, as has been mentioned, is doubted or held as not proven by one at least of the best authorities on this disease.

It appears either to be more frequent than was formerly supposed, or to have recently extended its area in British India. Bearing in mind the configuration of the map and of trade routes from Hindustan to Farther India and the Far East, we find it recorded from Ceylon, (Sir Wm. Rynas having definitely admitted the identity of Paranghi with Jaws), from the Coromandel Coast, from Assam, while Powell also quotes Maitland, Hare, Haffkine, Pilgrim, and Nolan as having reported cases in India. It is further of significance that Nolan's cases were Burmese.\(1\) There is no other record known to me of the occurrence of Jaws in Burmah, though it is quite possible that we may before long hear either of its existence there or of its extension thither from British India. The same may be said of Siam from which there is so far as I can discover no reference to this disease. In the case of Ah Kin (Case 10), it will be remembered that a neighbour had returned from Siam bringing with him a child suffering from Jaws, who communicated the disease to others in the village. This is at least suggestive of its occurrence in Siam,  

\(1\) Powell, loc. cit. p. 258.
but without further evidence one cannot say more.

I have not succeeded in finding any exact reference to Yaws as occurring in the Malay Peninsula, further than the general assumption on the part of some that owing to its prevalence amongst Malaya and others in the Dutch Indies it is probable that it occurs in the Malaya States or in British Malaya. The Malayan “Puru,” is probably of the nature of “Oriental sore” or “Delhi Boil” an ulcerative condition quite distinct from Yaws. Certainly evidence of its existence as an endemic in the Straits Settlements would help to establish more clearly the origin of some of my cases, but even if its occurrence there may not be assumed its widespread distribution throughout the Malay Archipelago, and the intimate shipping and trade connections between these islands and Singapore, under the assumption unnecessary. The “bouton d’Amboine” or “Patch” of the Malay is accepted by almost all present authorities (except Piccolo) as synonymous with Yaws, and if so it is interesting to note that the medical account from this part of the world by Bontius (1718),
is amongst the earliest authentic descriptions of the disease, and at the same time this area of diffusion must rank in point of extent next to that of the African continent. The most complete description of this condition from Malaya is that of Charlebois, and it would be a matter of some satisfaction could the similarity of the symptoms in his cases to those in mine be established as completely as is the case with those in Assam. The points in which they differ are mainly these:—the prodromal symptoms, fever and pain in the joints appear to be more usual and certainly more severe; the rash tubercles are described as very painful and surrounded by dark areolae; and the lymphatic glands are swollen and painful.

Now all these symptoms are variously mentioned by one or other writer as sometimes present in their cases, or as characteristic of the disease. The preliminary constitutional symptoms are a notoriously uncertain feature, and in the Chinese who constantly suffer from brief attacks of ague, a preliminary fever with aching limbs would be totally disregarded, and even if severe would not necessarily or even likely be supposed
to have any connection with a succeeding eruption. Glandular enlargement has already been discussed; its dependence on the yaw poison is by some denied, and its significance is variously interpreted; if it is a constant feature in the Malay it is more usually absent in the Chinese. The painfulness of the growing excrescence is probably of little importance, and the majority of authors are agreed that the yaw tubercle is a painless growth. Races like individuals vary in their susceptibility to pain, and the Hoklo Chinese are remarkably callous in this respect.

The existence of an areola around the base of the granuloma is not mentioned or is expressly denied by almost all authorities on yaws. Maxwell has a slight reference to it, but the majority describe the yaw as apparently planted casually on the healthy skin, a feature with which most of the plates appended to written descriptions are in agreement, (e.g. Figs 2 and 3 at the end of Nicholls' Report, which along with several of the others present appearances typical of some of the smaller of the lesions in the Chinese patients).

(1) In the Swatow mission hospital Chloroform is only resorted to for major operations, and even Cocaine is comparatively seldom used.

(2) Loc. cit. p. 293.
On the other hand, the majority of the characteristic symptoms in the Javan patients are just those which were equally noticeable in the Chinese. Added to the unmistakable papillo-fungous character which is a constant feature of the encrusted tubercle, the parts affected (including the hairy scalp), the absence of ulceration under natural conditions, the unimpaired health of the patients, the duration, and tendency to spontaneous involution with an absolute return to normal skin, the favourable prognosis both as to the local lesions and as to the constitution, the curtailment of the course of the disease by appropriate treatment, all present altogether a sufficient parallel to the condition which pertains in the cases recorded in this paper. The results of treatment by the same remedies (mercurial ointment locally and potassium iodide internally) are similar, and had the Chinese cases been under observation for a month or two of continuous treatment, it is possible that they might have recovered in that time without relapse, the occurrence of which is not mentioned by Charlois.

Admitting then the identity in general type, with only such variations as are more or less
to be expected when a disease affects a new
race in a new country, let us trace the
incidence of Yaws in the Malay Archipelago.

In Davidson's "Geographical Pathology" it is
stated to be rare in the island of Banca (off
Sumatra), moderately common in the Rio Archipelago
(between Sumatra and the Peninsula), endemic
in Java amongst natives and others, including
Chinese, and widely endemic in the Molucca
group, the Celebes etc.

Hirsch mentions that its colloquial name in
Timor is Buba or Boba, the same as in Brazil,
and that it is called Bobento in Ternate in
the Moluccas, where also the island of Ambon
has given it a name which has ceased to be local.

We have a definite account of cases in
Deli, Sumatra, by Dr. L. Martin (3).
Cases have been observed in Borneo by Capt. F.
Smith, A. M. S. (4).

Sir W. Macgregor (5) mentions Yaws as endemic in
New Guinea, and Professor R. Koch in the course
of the German Malari Expedition, found it to be
very common indeed in the German colonies, German
New Guinea and the neighbouring Bismarck Archipelago.

the Carolines and Ladrones, and widely spread throughout the South Sea.

There is very little doubt indeed that the disease exists extensively in parts, less frequently in other places, throughout the whole East Indian Archipelago from Sumatra to New Guinea.

Whether as part of an endemic focus, or as a possible result of the importation of African slaves to a Spanish colony prior to the emancipation, the disease might be expected to occur in the Philippines, but I can find no reference to its existence in these islands at any time.

The importance for the purposes of this paper of this extensive diffusion of such a contagious malady as Yaws over this region, depends upon the fact that the bulk of the Chinese in Malaya belong to the provinces of Canton and Fokien.

One might almost further narrow the limit, and say that probably a very large proportion of them come from those districts in China which find their points of departure in the treaty ports of Swatow and Amoy, the former in the eastern corner of the Canton province, and the latter in the south of Fokien.

(1) It may be remarked that the Swatow or Teo-chow Chinese, called Hoklos, although occupying a part of the province of Canton, are a different people from the Cantonese and speak a quite different dialect.
Some figures may help to emphasize the extent of the influence which the labour market in the Straits and the neighbouring countries has upon emigration from these two ports.

From Amoy (Hok-kien coolies), about 50,000 coolies are shipped annually to the Straits (mainly to the tin-mines), and about 3000 to Saigon in Cochin China.

From Swatow (Hoklo and Hakka coolies) to the Straits from 30,000 to 40,000; and to Siam about 20,000; to Saigon from 8,000 to 10,000; and to Deli in Sumatra about 7,000 to 8,000. (1)

That is to say, from the port of Swatow some 60,000 to 80,000 coolies are exported annually to different parts of the Malay Peninsula, Siam, French Cochin China, and the Dutch Indies, (not including families and individuals who emigrate as a private enterprise), of whom about twenty-five or thirty per cent. return after a few years. Emigration from the southern ports of China to New Guinea is a recent venture, and is probably yet in the experimental stage, but numbers of Chinese find their way to the various islands of the Archipelago.

(1) I am unable to quote the exact figures, which might be found in the Annual Reports of the Imperial Maritime Customs, but the above figures have been given me by a business man of long experience in Swatow, and may be relied upon as accurate enough for the purpose in hand.

J. W. D.
Natives of that country are not insusceptible to Yaws as cases are described amongst them in the West Indies and elsewhere, and according to de Rochas (1) the Chinese are frequently affected. In no statement of the geographical distribution of Yaws can I find that it has ever been recorded from China itself. Dr. Manson in his "Tropical Diseases" (1899) says, "if it occurs in China, it is certainly rare there, at all events on the coast." The only cases which have been brought to my notice in China are, (1), that of a woman aged 40, in Foochow recorded in the "China Medical Missionary Journal," April 1900, by Dr. Margaret Polk; and (2), a man aged 32, seen by Dr. Arthur Samson, C.M.S. Hospital, Ningpo, near Foochow, in March 1900. The notes and a photograph of this patient, taken on arrival in hospital were sent to me by Dr. Samson, and they appear to be those of a case of Yaws (2).

How to return to our cases, H. Ming (Case 3) would appear to have been the source of contagion directly or indirectly to the group of eight persons described as Cases 1-9. It was ascertained that this child's father had been in Singapore three years previously.

(2) It may be of interest to add that six days after arrival, this patient developed a primary syphilitic chancre on the penis with enlarged inguinal glands.
but the child was born after his return, and there is no evidence that he had the disease at that time. The source of the disease in Ah Ming therefore cannot be ascertained.

The case of Ah Kim (Case 10) has already been referred to in considering the possibility of the existence of Jaws in Siam. There is a definite statement at least that Ah Kim's daughter, and indirectly Ah Kim himself, had been infected from a child who was landed from Bangkok suffering from Jaws. The source of the disease then in this case must of necessity have been in Siam, the possibility of contagion on board ship being out of the question, since the incubation period of the disease is always longer than the time required for the voyage (about 8 days). (1)

Chim-yau (Case 11), received a dog bite on the leg shortly before embarking at Saigon. What happened in his case was probably that the rear of his wound broke down, (an exceedingly common occurrence in the leg ulcers of Chinese coolies), and the poison of Jaws was inoculated on the sore from some case in his village. The period which had elapsed however does not quite exclude infection in Annam, (2) steamers carrying native passengers from Bangkok to Shanghai almost invariably go direct without touching at any other port en route.
or on the voyage to China, but if otherwise, the history is suggestive of the existence of 'Jaws in Chinese villages to a greater extent than we have as yet been able to trace.

I so Ciao (Case 12) came from a village near the home of Ah Kim. It is probable that there were other cases in the village.

Case 17, came from a village near Swatos, and there was fair presumptive evidence that the disease had been brought directly from abroad, as was also the case in regard to the patient (already referred to) who was seen by Dr. Cousland. I would submit that it is unlikely that a direct communication with the Straits or elsewhere abroad would be ascertained in every case, even if we had the complete history of each. The evidence of direct transmission from one to another beginning with the case of Ah Tung, is suggestive enough of how the disease once introduced is likely to spread amongst a community possessed of such personal and social habits as the Chinese.

That fresh cases are being landed in the persons of returned emigrants from Malaya, and perhaps from Siam, there can be no doubt, and given
some further time for the contagious affection
to work its will, it will not be surprising if
some day one may find almost all the
children in a Chinese village affected with
Jaws, as Professor Koch did in the South Sea.
For is Jaws the first communicable
disease which has been imported into China
in this manner. The original home of
_Tinea imbricata_ was the Eastern Archipelago,
from whence it spread to the islands of the
Pacific and to the coast of China. The time
has long passed when we found it of interest
to ask the patient who presented himself covered
with _Tinea imbricata_, whether he had been
abroad; and like this _Tinea_ Jaws has probably
come to stay. In a Chinese village population
there are all the elements suited for a
vigorous propagation of any newly introduced
contagious disorder,—a virgin soil, filthy
habits, crowded and ill-ventilated houses,
free and promiscuous social intercourse,
scanty clothing or in summer partial
nudity, and a plentiful crop of wounds and
cutaneous abrasions, ulcers, eczema, ringworm
and scabies, affording every facility for the
reception of the virus.

The latitude of Swatow is just within the Tropic of Cancer. A glance at the map will show that the areas of greatest endemic prevalence of Yaws in Africa, the West Indies with South America, the East Indian Archipelago, and Oceania, are all strictly within the tropics, but every statement of the geographical distribution includes countries which are beyond tropical latitudes. Algeria and the Southern United States are both between the 30th and 40th parallels of latitude north, and the account of Bilton Scurry in Ireland affords historical evidence of its occurrence even in decidedly temperate regions.

My experience in Swatow serves to show that Yaws, until recently a rare disease, is now not uncommon in that district and is probably on the increase, but at the same time the evidence tends to prove that it is not indigenous. In some of the cases the origin of infection by a returned emigrant from the Straits or elsewhere could be proved, but in others evidence as to the presence of such individuals bearing the disease.

was not complete.

In these days when large numbers of coolies and private emigrants leave the port of Swatow for the Straits, Siam, and the Malay Archipelago, a proportion of whom return sooner or later to their homes in Foo-chow and the adjoining prefectures, it is clear that opportunities for the introduction of the disease into this area from any endemic focus in those countries, will increase in proportion to the magnitude of the traffic in native labour. The chances of infection in their homes from imported cases will depend upon the presence in any native community of emigrants affected with the disease, returned from the countries where Yaws is endemic, and the possibility of its becoming endemic in China when introduced into so favourable a soil and conditions as the body of the Chinaman and his social habits are already known to be, are yearly enhanced by the further importation of fresh cases. Bearing this in mind, it is after all by no means unlikely that those cases in which contact with an imported case could not be proved were really contracted in a community
which had already become in itself a local centre for the spread of the disease. Such centres being once established, may, in a short time if it has not already done so, become endemic throughout this district of Southern China independently of further accessions from without.
Photo no. 1. Ah Yu, (Case 9). Taken Aug 23rd, 1909, before treatment, and about 14 weeks after development of general eruption on the back. Note: yaws on the back large and flattened, smaller and hemispherical on the flanks and upper arms, all encrusted, no areola. Yaws also in the axillae, on back of neck, and on ears.

Photo no. 2. The same on October 20th after interrupted treatment with nitrate of potassium and mercury. The sites of the yaws are represented by pale areas with slightly pigmented centres. The darker spots are less completely resolved flat wart-y patches. In the neighbourhood of the right scapula is a group of small unresolved tubercles. The site of almost every individual yau on the back can be traced by comparing the two photos.
Photo. no. 3. Ah Kim. (Case 10).

Taken Oct. 4th 1901, before treatment, and after general eruption had existed for two months. From two or three tubercles on the front of the body the cruts are removed, causing a deceptive appearance as if of depression in the centre.

Photo. no. 4. The same showing face and back, where the gums are particularly large and more flattened. The finger shows the "primary gum" which preceded the others by an interval of one month. Note gums on the auricle and scalp.

Photo. no. 5. The same showing the exuberant eruption on the face. Note the large confluent mass on the chin, also a cluster with growing hair on top of scalp. Note gums on eyebrows and eyelids, around the nostrils, and at one point tending to encroach on the mucous surface of the lip; all encrusted.

Photo. no. 6. The same on Nov. 15th after discontinuous treatment with potassium iodide and mercury. The face shows only unevenness of surface, and the trunk and arms pale areas with darker centres in the situations of the gums. A few spots which appear darker in the
photo represent rough or varty patches which as
they shrink reveal proportionately more of the
pale halo. The primary jaw on the finger
has been almost absorbed like the mass on
the chin.

Photo. no. 7. Chin-ray, (Case 11), Showing scar
of dog-bite, which broke down and
ulcerated afresh. A central jaw and some
smaller ones irregularly placed around it
developed on the ulcers. These were followed
after four or five weeks by jaws on the body.

Photo. no. 8. The same patient, showing some
of the larger tubercles of the general
eruption, on the buttocks, lumbar region,
and arms.