

but autopsies were permitted on two only. In one of these both lungs were found markedly emphysematous and in the upper lobe of the left lung there was a large infarct. The heart showed considerable dilatation of both ventricles but the coronary arteries were not diseased. In the other patient, who died of secondary broncho-pneumonia, the pericardium was completely adherent, the condition being part of a polyserositis. There was also profound anæmia. Both ventricles were hypertrophied and dilated.

Electro-cardiographic changes were present in all except three. In two the curves indicated right branch bundle block and in one of these, as already mentioned, there were attacks of ventricular tachycardia. In one patient auricular fibrillation and auriculo-ventricular block occurred together, the result being a slow irregular pulse. Other features were inversion of T_1 , T_2 and T_3 , of T_2 and T_3 , and of T_1 and T_2 , notching and widening of the QRS complex, prominence of Q_3 , and the presence of "escaped" ventricular beats. Electro-cardiography is an important method of examination in such cases, especially when the symptoms are out of proportion to the physical signs.

The cause of myocardial disease in these patients is not at all clear. We do not consider syphilis to have been an ætiological agent in any one of them. No history of venereal infection could be elicited and the Wassermann reaction was negative in all. Further, none of the cases presented the characteristic features of syphilitic heart disease. As far as the heart and great vessels are concerned syphilis usually attacks the first part of the aorta, the aortic valves and the origins of the coronary arteries, and gives rise to aneurysm, dilatation of the aorta, angina of effort and aortic incompetence, usually with high systolic blood pressure and pronounced left ventricular hypertrophy. The heart muscle suffers chiefly from defective blood supply and not from direct syphilitic lesions. Although syphilis seems to be common in parts of the Punjab we have no reason to think that it is a frequent cause of heart disease in the province. In the majority of non-valvular cases seen by us a degenerative process involving the muscles, either directly or by causing disease of the coronary arteries, would appear to have been at work. What this is related to, it is at present difficult to say. It may be the result of previous infections, active focal sepsis, defective diet, etc., or it may be due to a combination of causes. That it is by no means confined to old people is shown by the fact that of the 18 patients mentioned above 7 were under 40 and 11 under 50 years of age.

Summary.

Instances are described of the following features of heart disease as seen in the Punjab:—

1. The occurrence of uncomplicated aortic regurgitation of rheumatic origin.
2. The occurrence of sub-acute bacterial endocarditis.
3. Electro-cardiographic evidence of myocardial involvement in rheumatic cases.
4. The prevalence in middle age of a "degenerative" type of non-valvular heart disease in the causation of which neither rheumatism nor syphilis seems to play any part.

Our thanks are due to Dr. D. L. Shrivastava who took the electro-cardiograms and to Dr. K. K. Jaswal, our house physician, for assistance during the investigation.

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THE MANIFESTATIONS OF CHRONIC YAWS.

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SINCE the publication by one of us (Dey, 1930) of a preliminary study of yaws in the Kamrup district of Assam, we have had the opportunity of investigating a further series of 400 cases in the same area and we offer the following observations in the hope that they will aid in the diagnosis of the often puzzling manifestations of this disease.

The standard works on tropical medicine lay great stress upon the florid secondary eruptions, which last for a comparatively short period, whilst the tertiary lesions, which tend to pursue a chronic course, and are infinitely more refractory to treatment are, as a rule, dismissed with the briefest reference. It is, of course, possible that in the localities where it has been chiefly studied, Ceylon, Haiti, Cochin China, the Gold Coast and Central Africa, the secondary eruptions are found in greater profusion than in the relatively temperate climate of Assam.* Be the explanation what it may, yaws as it is usually met with here, *i.e.*, in the adult who contracted the disease in childhood, bears scant resemblance to the clinical picture presented by most writers on the subject. It is, therefore, not improbable that it may be encountered in many other undeveloped parts of India where it has hitherto remained unrecognised.

Ramsay (1925) who saw 1,000 cases in the Cachar district of Assam was the first to note

* We hesitate to adopt the suggestion, put forward by Lieutenant-Colonel H. W. Acton in a recent paper on filariasis, that the bulk of observers have followed their cases for a short period only in the cooler months!

the effect of altitude upon the lesions. Amongst the hill tribes condylomata in moist regions and a "chronic dermatitis" of the hands and feet were chiefly seen. (It had been previously held that yaws did not exist above 1,000 feet.) In the plains in the hot season the disease assumed its classic form, and a hill-man coming to a lower level developed lesions of this type, and in the plains during the cold weather the lesions came to resemble those seen in the hills throughout the year. These observations accord with our experience. Tertiary lesions he found to be rare, though commoner among the hill tribes.

history is one of an annual recrudescence from an early age, with almost complete freedom in the winter months save for joint or muscle pains and the hyperkeratosis of the hands and feet to be presently described.

Non-vegetating lesions we have found to be as common, if not more common, than vegetating ones; the fungating generalised framboeside is rare in adults and in not a few cases no history of such lesions having appeared can be elicited. In long-standing cases keloid formation of all degrees of severity is very often met with.



Fig. 1.—Secondary eruption on soles (healing). An ulcer can be seen near the right great toe.

Powell (1923) who observed yaws in Assam for 10½ years saw no tertiary lesions and, although he found plantar hyperkeratosis to be common, he did not believe it to be of yaws origin.

We on the contrary have found tertiary lesions to be relatively common.

Mukharji (1930) in describing yaws in Chittagong Hill Tracts makes no reference to tertiary lesions and Muir in his leprosy survey of Bihar found cases which had been mistaken for leprosy (Chopra, Gupta and Mullick, 1928).

A point of some interest is the extreme chronicity of the condition. In many, the

Yaws, then, as we meet it, bears somewhat the same relationship to the classic yaws of the textbooks, that syphilis in western Europe, among a population partially immune to the virus, does to that seen upon its first introduction to a virgin soil.

Let us now consider some of these conditions in more detail.

Clavus (Crab Yaws).

This term is of some vagueness, for under it would seem to be included two completely different conditions, viz.:—

- (a) Secondary eruptions on the soles, and
- (b) hyperkeratosis with cracking and undermined ulcers.

The first appears within a few months of the initial lesion and forms part of the general eruptive stage from which it in no way differs, though, owing to their position, the frambœsides readily break down and become open sores (figure 1).*

Somewhat later in the secondary stage, a condylomatous condition is seen between the toes, usually in children.

Hyperkeratosis.—This we found in 144 cases

of tissue beneath the thickened epidermis gives rise to ulcers of considerable depth (figure 2). On the hands, the stages of the process can be observed in more detail, patches of hyperkeratosis can be seen irregularly distributed in all stages of desquamation, thin pale skin appearing when the epidermis has completely come away which as a rule remains permanently paler in colour. At the bends of the fingers cracks are seen penetrating between the folds of the thickened skin on the flexor aspect extending to the true skin and often breaking into linear ulcers, and a similar condition is noted on

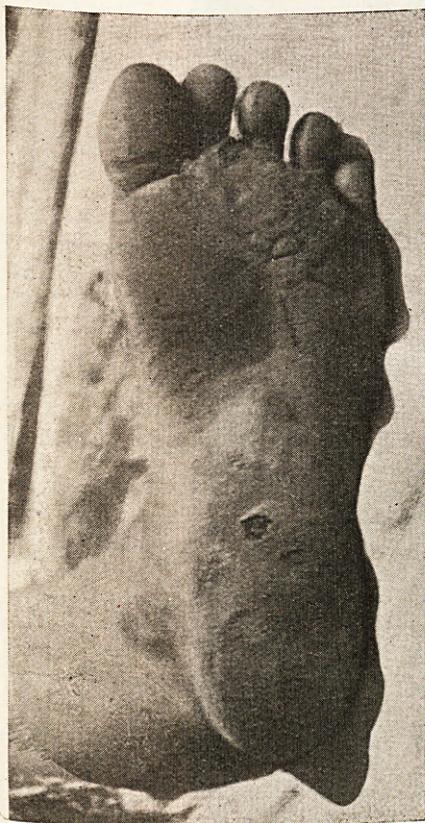


Fig. 2.—Hyperkeratosis; a perforating ulcer on the arch of the foot. Contrast with figure 1.

Fig. 3.—Ringworm-like distribution with patchy desquamation.

of our series (36 per cent.), 128 adults and 16 children under twelve. The average duration was seven years. Eleven cases only (7.7 per cent.) showed other active lesions and in these the hyperkeratosis was of two years' duration only.

Its essential feature is an overgrowth of the horny layer which sooner or later cracks in lines corresponding to the natural folds of the skin, exfoliation occurs, and the breaking down

of the palm. Sometimes a wide and roughly circular area on the palm bears a marked resemblance to ringworm (figure 3).

In performing a rapid survey of the population in an infected area *e.g.*, at fairs and markets) it is often useful to observe the skin around the back of the heel. This is seen to be unduly thickened and shows numbers of fine cracks extending slightly upwards around the sides. This is of great assistance in the diagnosis of latent cases.

A distinction must be made between this and the more widespread keratolysis plantare sulcatum recently described by Acton and McGuire

*These figures are probably not a fair sample of the affected population, as they were collected during the winter months, when the disability is least.

(1930 and 1931). Both lead to great disability at the times when the agriculturist has to work in water for many hours daily. This latter, which is actinomycotic in origin, gives rise to large numbers of symmetrically-distributed pits, most marked at the heel and ball of the foot. When breaking down occurs, a mouse-eaten appearance results, quite unlike the flaky desquamation of yaws and, however far advanced the disintegration, a few pits can always be seen which

as to be indistinguishable from it otherwise than microscopically. A good example is shown in figure 4. In this case treatment by arsenicals caused almost complete disappearance of the lesions, the nature of which is thus proved. These lesions we have found in 1 per cent. of our cases. In one case this was the only lesion, nor could any history be elicited; the serum, however, was positive and the condition rapidly cleared up after treatment, leaving a tempo-

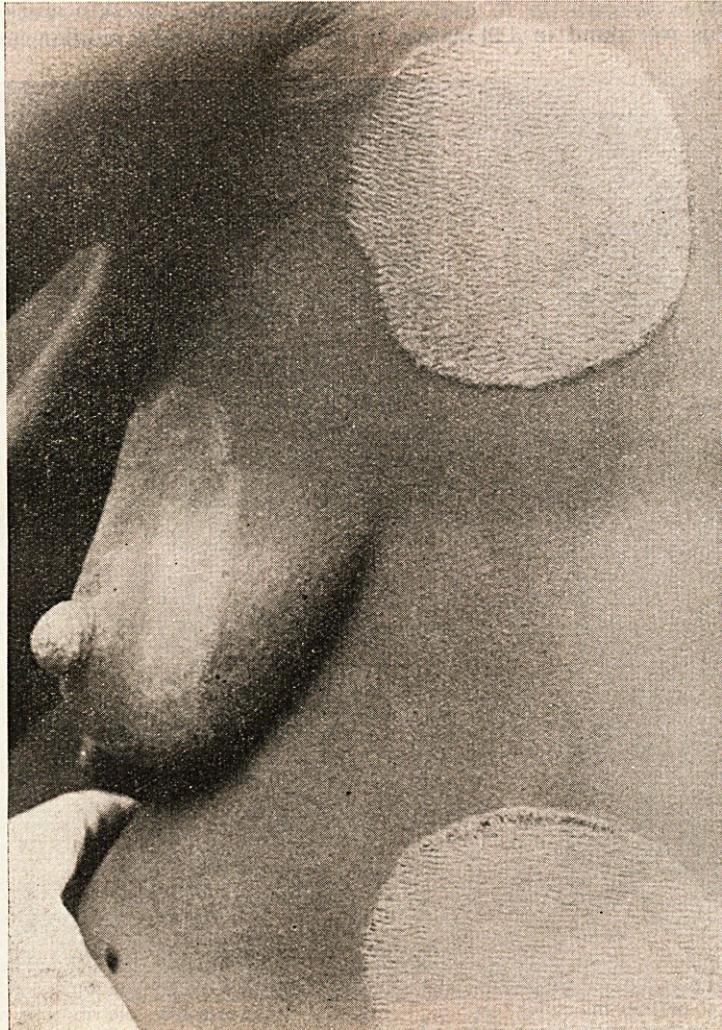


Fig. 4.—Ringworm yaws.

determine the diagnosis. Mixed cases occur, though rarely.

Occasionally, a massive pad-like thickening of part of the sole is seen, which shows no tendency to break down but is nevertheless painful. The serum in these cases was negative and we presume it to be due to some actinomycotic infection.

Ringworm yaws.

There is a type of squamous frambæside which resembles *tinea circinata* so closely

rarely-depigmented patch, which subsequently regained its normal pigmentation.

Large, ill-defined areas of a desquamating squamous eruption are common on the trunk and owing to their slight irritation are mistaken by patients for ringworm—a universal malady in Assam. Under treatment they disappear, sometimes after a single dose, leaving a wide area lighter than the surrounding skin.

Psoriasisiform lesions.

Lesions with scale formation are often seen, the flexor aspect of the wrist, the extensor surface

of the ankle and inner aspect of the thigh being common sites. They thus differ from psoriasis which favours especially the extensor surfaces, notably the elbows and knees, nor does bleeding occur when the scales are removed. On healing an area of darkened pigmented skin remains.

In lesions of long standing lichenisation occurs with much thickening and pigmentation.

In one instance we noted a papulo-vesicular eruption, distributed over two of the lower ribs and intercostal spaces, bearing a superficial

latent cases and are useful aids in diagnosis. They were found in 3.5 per cent. of this series. Goundou (a symmetrical enlargement of the nasal bones) is rare (0.75 per cent.) and gangosa has only once been seen.

Keloid conditions.

The hideous deformities resulting from untreated yaws do not receive adequate notice in most textbooks; massive keloid growths suggesting the sequela of a boiler explosion and covering half the trunk are sometimes seen; they

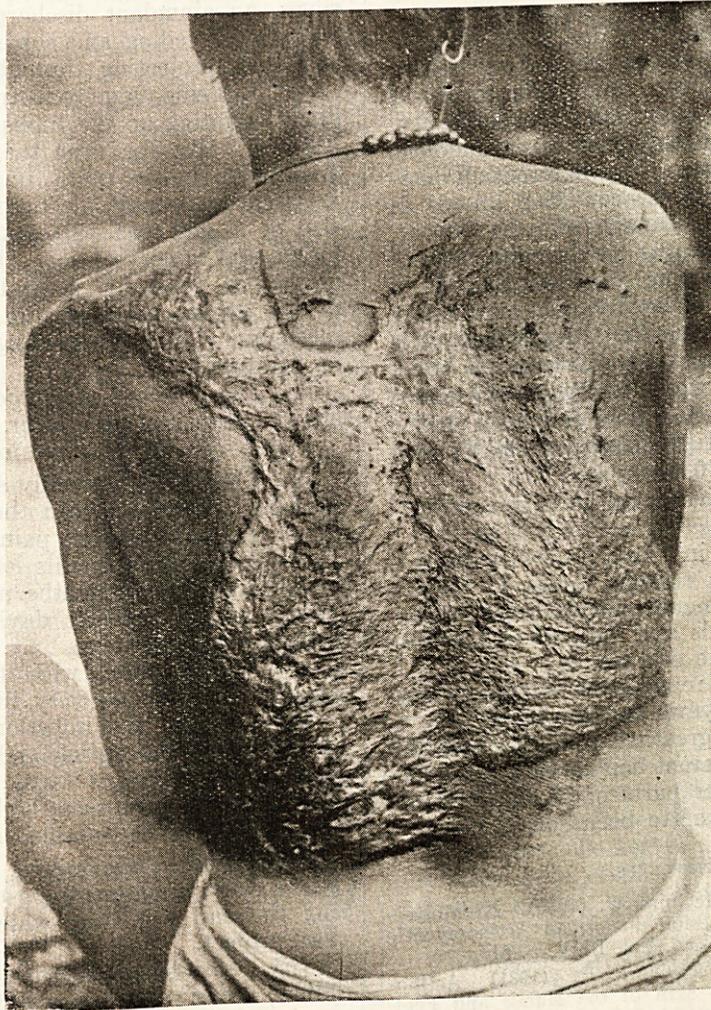


Fig. 5.—Keloid scarring.

resemblance to herpes zoster. The duration of the disease was eight months; there was a positive serological test. This also yielded readily to treatment leaving a pigmented scar.

Leucoderma.—This we found in 2 per cent. of our series but in another endemic area, where patients had received a small quantity of Stovarsol some time before, we were interested to note that the incidence was far higher.

Juxta-articular nodules.—These have been very fully described and are referred to here only because they are frequently seen in otherwise

constitute 2 per cent. of our series (figure 5). In others both upper and lower limbs are completely atrophied as a result of keloid growths, and the patient becomes a hopeless cripple. In one instance we were able to see the process at work.* Here it appeared that successive crops

*The photograph illustrating this was forwarded by the authors for reproduction, but as it has already been reproduced (figure 17) in the junior writer's previous paper (Dey, 1930) it was omitted. The reader is advised to refer to this paper as it contains a number of photographs illustrating some of the conditions referred to above.—EDITOR, I. M. G.

of ulcers had enclosed the arms, gradually spreading upwards from wrist to shoulder and leaving in their wake scar tissue. The arms and legs are commonly flexed. At this stage, nothing can of course be done, though treatment improves the general health to a remarkable extent.

This condition bears little resemblance to anything seen in syphilis.

Keloid scarring, serpiginous or linear, frequently follows secondary ulceration in all situations and may sometimes be the only evidence of past yaws.

Bony lesions and tertiary ulcerations.

These we found in 8 per cent. of our series, they are considerably more common on the lower limbs, leading often to considerable deformity. The typical appearance is that of an indolent ulcer, resistant to cure. The differential diagnosis between this and the condition known as Naga sore is impossible apart from the history, though the patients are as a rule quite definite on the subject, referring to the latter as a "government sore" (*sirkari ghaw*), presumably for the reason that, like the Government, it is widespread. Naga sores tend, however, to break out during the rains, whilst tertiary yaws lesions are fairly constant. A diffuse periostitis of the long bones, ulna and tibia, is occasionally seen and also dactylitis (0.5 per cent.).

In two cases we have found yaws in combination with leprosy.

Summary.—Yaws in the Kamrup district, possibly for climatic reasons, tends to chronicity, its commonest manifestation being hyperkeratosis of the hands and feet, which subsides every year during the dry season.

In other cases a remarkable similarity has been noted between yaws and ringworm.

It is possible that greater familiarity with the signs of yaws in a latent condition will lead to its discovery in other parts of India where its existence has not hitherto been suspected.

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NOTES ON THE DIAGNOSIS AND TREATMENT OF ULCUS TROPICUM.

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THE diagnostic points are:—

(a) An acute-looking ulcer of long duration with deep and punched-out or undermined edges, an abundant discharge of glairy mucus with free bleeding and sometimes pearly islets, engorged, projecting through the base.

(b) Extreme hypersensitiveness and pain often radiating up the limbs and causing sleeplessness. (By the time the patient comes for treatment, he is quite unnerved. Even the very chronic small ulcer with a red spot the size of a split pea will cause a man sleepless nights and unnerve him. This is a very useful diagnostic point for it leads to the discovery of the causal organisms in apparently trivial ulcers and eliminates the diagnosis of the patient as neurotic.)

(c) The presence of *Spirochæta schaudinni* in smears made from the ulcer.

There seem to be three main types:—

(a) The acute; a rapidly-spreading ulcer with cave-like extensions into the tissues, abundant discharge and exquisite pain.

(b) The subacute; this looks acute, but it is really an 8 to 10 months ulcer which appears like a lesion of 10 days, with pain and hæmorrhagic discharge.

(c) The chronic; with thickened edges, a small red point and very little discharge.

Occasionally, the infections seem to arise *de novo*, as an erupting and multiple condition associated sometimes with inflamed inguinal glands and a distressing high fever. Otherwise the causes can be classified as follows:—

(a) Injuries: (i) Broken, stubbed toe nails which cause a non-healing, subacute ulcer covering the nail bed from which remnants of the nail project.

(ii) Contused or incised wounds on the lower limbs, more rarely on the hands, forearms or back.

(iii) Healing burns.

(b) Secondary infection of syphilitic lesions: Many cases of generalized syphilitic eruptions show the lesions on the lower limbs altered by ulcer tropicum.

Treatment.—For many years we have treated these cases with a thick dusting of quinine sulphate for the first dressing and of cinchona powder for subsequent dressings. The effect is magical. One can safely promise relief of the pain within half an hour and sleep that night. The ulcer fills up rapidly and heals completely within a fortnight. Some severe ones take 3 to