A STUDY OF LEISHMANIASIS AS IT OCCURS IN INDIA

by

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C O N T E N T S.

LIST OF ILLUSTRATIONS.

INTRODUCTION.

In the course of service in India I was stationed in Roorkee in the United Provinces where oriental sore is common. On 30th May 1935, the Quetta earthquake took place, and two companies of K.G.O. (Bengal) Sappers and miners were sent to render assistance. In all about 500 men including a few officers were sent there. As I inspected them before their departure and on their arrival back in Roorkee after a few months stay in Quetta, I was in an excellent position to study the course, treatment and clinical picture of oriental sore with which 11.8 per cent of them become infected. The majority of the sores developed in Roorkee and were treated by me in the Indian Military Hospital.

In July 1936 I was transferred to Chittagong in Bengal which is an endemic centre for kala azar, and to a lesser extent dermal leishmaniasis.

The cases described are those which I treated in Dehra Dun and Roorkee in the United Provinces as well as those which I saw in Bengal.

I am deeply grateful to Captain G.B.W. Fisher, I.M.S., Civil Surgeon, Chittagong, for the additional opportunities he gave me to study kala azar in his hospital and for permission to study the records and case-sheets of discharged cases.

QUETTA.

The above photographs illustrate the destruction caused by the earthquake of 30.5.35. The troops in the upper photograph can be seen wearing shorts.

QUETTA.

More photographs of the earthquake. The lower one illustrates the activities of the troops.

QUETTA.

The destruction in the bazaar was particularly extensive, as seen in the uppermost photograph.

DEFINITION.

Leishmaniasis is the term applied to a group of diseases caused by closely related protozoan organisms i.e. Leishmania donovani, Leishmania tropica, and Leishmania braziliensis.

These organisms are oval or spherical and contain two nuclei, one usually larger than the other. They are found inside the large mononuclear cells, or may be seen lying extra-cellularly. They stain readily with Giemsa or Leishman stains. In culture they develop flagellate forms.

The means whereby these diseases are spread is still not fully understood, but it is probable that in each case a sandfly is the transmitting agent.

The diseases included under the term Leishmaniasis are:-

(1) Kala-azar (L. donovani)

(2) Dermal Leishmaniasis (L. donovani)

(3) Oriental Sore (L. tropica)

(4) Espundia (L. braziliensis)

As Infantile Kala-azar and Sudan Leishmaniasis are variations of kala-azar, they are included under that heading.

Espundia is a disease affecting the mucous membrane of the nose and throat, occurring principally in/

in Brazil and other parts of South America. As it does not occur in India it will not be discussed further in this work.

Synonyms.

There are many alternative names for each of the Leishmaniasis group of diseases.

Kala Azar (Black Sickness) is also known as Dum Dum Fever, Tropical Leishmaniasis besides the names given to it in foreign countries.

Dermal Leishmaniasis is a comparatively recently described disease and has the following synonyms:-

Dermal Leishmanoid, Cutaneous Leishmanoid, Post Kala AzarDermal Leishmaniasis.

Oriental Sore has many names, the chief being Frontier Sore, Delhi Boil, Aleppo Boil, Baghdad Sore and Biskra Button.

These names give a useful indication of the places where this disease is common.

HISTORY.

Kala Azar. It is probable that Kala Azar has existed for centuries.

The first description of the disease was given by Clarke (1) in 1882 in which he attributed the cause to malaria. He pointed out that the disease was prevalent in Assam and that large numbers of the population/

population died of it. Giles (2) in 1889 asserted that the disease was really ankylostomiasis brought about by chronic malaria.

In 1896, L. Rogers (3) after investigating the disease in Nowgong, considered that kala azar was a form of malignant tertian malaria. This belief was supported by Sir Ronald Ross (4) after personal investigation in Assam.

The discovery of "bodies" in the spleen of a soldier who died at Netley from Dum Dum Fever in 1900 added greatly to our knowledge of the disease. The discoverer, W.B. Leishman, (5) did not publish his discovery till 1903. In the same year, C. Donovan (6) reported having found the same "bodies" in the spleen juice of living patients suffering from malarial cachexia.

Flagellate forms were cultivated in 1904 by L. Rogers (7) who published a paper entitled "Leishman-Donovan Bodies in Malarial Cachexia and Kala-Azar".

It soon became recognised that kala-azar and many cases of malarial cachexia were the same condition and the term kala azar came to be used for both.

From now onwards, numerous reports appeared on cases in different parts of the world. Thus Cathoire/

Cathoire (8) in 1904 observed peculiar bodies in the spleen of a child who died in Tunis, and Pianese (9) found the same organisms in smears from the spleens of children who died of infantile splenic anaemia in Italy.

Gabbi (10) in 1908 drew attention to the number of cases of this disease in Sicily, and thereafter much work was done on kala azar in Italy where it was found to be very common, especially in Calabria, Naples, Rome and Trieste.

Cases of kala azar have been reported from Russia and Spain in 1912 and later.

Dermal Leishmaniasis.

This disease was reported by Thomson and Balfour (11) in the Sudan in 1909, and described by Brahmachari (12) in the Indian Medical Gazette of April 1922 under the name of Dermal Leishmanoid. Since then, many more cases have been published.

In 1930, Napier and Das Gupta (13) published a series of cases under the heading of a "Clinical study of Post Kala Azar Dermal Leishmaniasis". Further contributions to our knowledge were added in 1934 by the same authors (14) under the title of "Further Clinical Observations on Post Kala Azar Dermal Leishmaniasis".

In October 1935 Smith and Halder (15) in the Indian/

Indian Medical Gazette, published a further series of cases, describing other types of Dermal Leishmaniasis.

It is now recognised that Dermal Leishmaniasis can be considered as a separate disease closely related to Kala Azar, and that it normally occurs about a year after treatment of that condition.

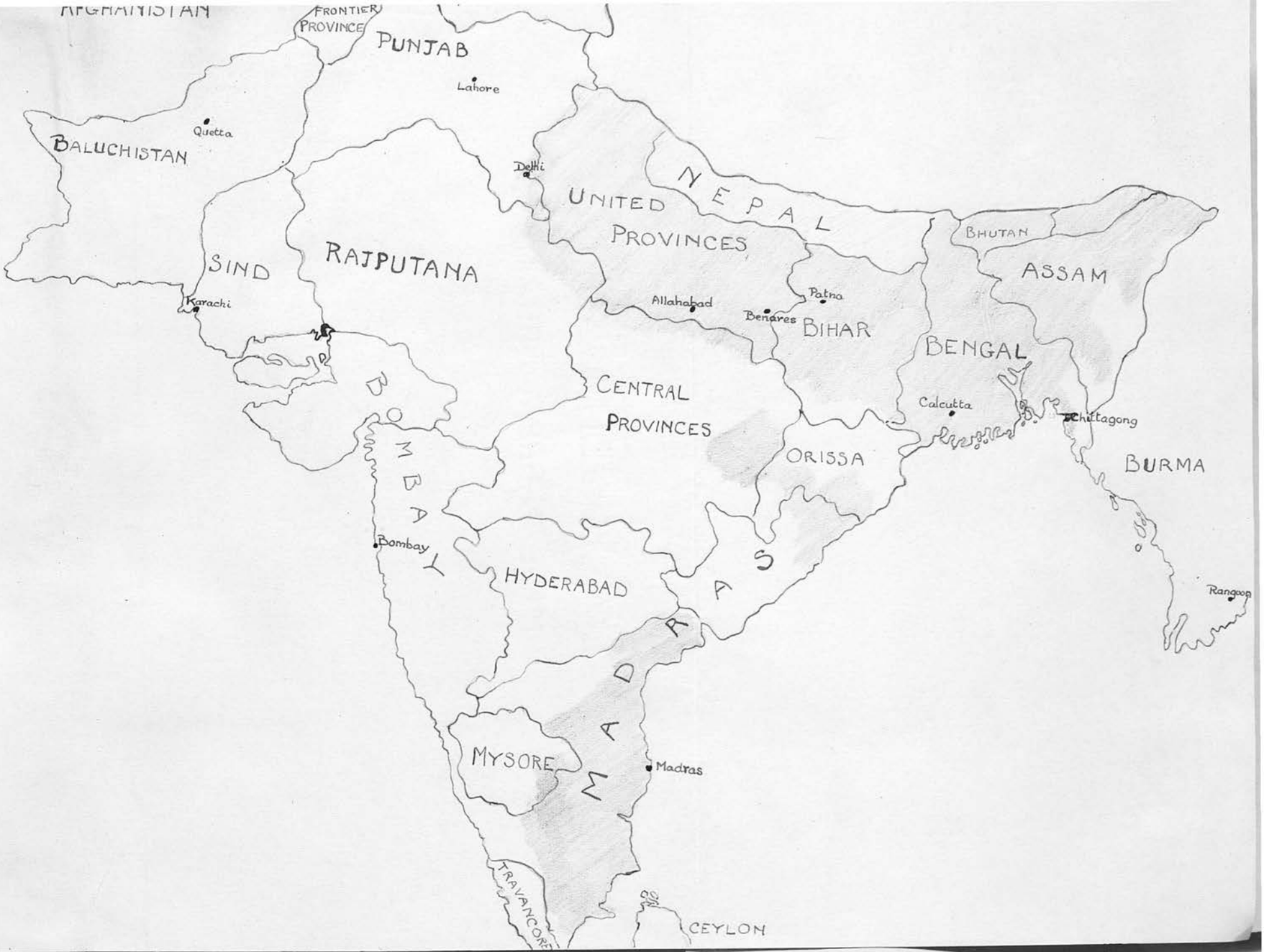
Oriental Sore.

This has been known for a long time in the North West Frontier of India, and in Lahore, and Delhi.

In 1885, D.D. Cunningham (16) described parasitic bodies in the mononuclear cells of oriental sores. This discovery was confirmed in 1903 by J.H. Wright (17) working in America.

Since the cultivation of Leishman-Donovan bodies of kala azar, Nicolle and Manceaux (18) were able to cultivate Leishmania tropica in the water of condensation of neutral blood serum agar. Later still, C.M. Wenyon succeeded in inoculating himself with the juice of a sore and developed two sores himself six months later. In 1927, Ganapati Panja (19) described how he inoculated an Indian volunteer with a flagellate culture of L.tropica, which caused the man to develop a nodule at the end of three weeks. The lesion lasted for one year and was finally cured with carbon dioxide snow.

The majority of recent work has been confined almost/



MAP OF INDIA SHOWING DISTRIBUTION OF KALA AZAR.

Kala azar in India is restricted in its area in the same way as oriental sore. It occurs in Eastern India, the south-east coast, and the course of the river Ganges. To a lesser extent, it may occur in Nepal and parts of the United Provinces.

N.B. The shading represents the endemic areas.

MAP OF INDIA SHOWING DISTRIBUTION OF ORIENTAL SORE.

In India, oriental sore has a very limited area of occurrence. The chief endemic centres being Quetta, Lahore, Peshawar and Delhi.

almost entirely to the treatment of this condition.

Distribution.

The distribution of kala azar and dermal leishmaniasis in India is almost identical, as the latter is a sequel of the former. Oriental sore, on the other hand, has a very distinct and separate distribution. Generally speaking, oriental sore is a disease of the north and west, and kala azar a disease of the east and south east. The chief sources of oriental sore in India are Quetta and the North West Frontier, Lahore, Delhi, the Punjab, Rajputana and Western United Provinces. Kala azar is commonest in Assam, Bengal, Bihar and Orissa, Eastern United Provinces and the East Coast of Southern India around Madras. Calcutta, Benares and the country traversed by the Ganges and Brahmaputra rivers are endemic areas.

Kala Azar occurs outside India principally in the countries adjacent to the Mediterranean and in the Sudan, Arabia, China and Abyssinia.

Oriental Sore is also common in the mediterranean countries, Persia and Iraq.

KALA AZAR.

Aetiology. The disease has a tendency to occur in the same family and often in the same house. It is common to find several brothers and sisters suffering from the disease at the same time.

As regards age, it is most common between six and ten and comparatively rare under six months, and over thirty years.

There is no difference in the sex incidence. The statistics on this point vary, but if at times there appears to be a greater preponderance of one sex or the other, an explanation of the difference is nearly always forthcoming.

Europeans are less often attacked than Indians and poor, under-nourished people more often suffer than rich, well-nourished people. Cases occur from time to time in Europeans, but no epidemic has been reported, whereas in Indians in Assam, epidemics are comparatively common. The disease is much less common now than it was twenty years ago.

Climate.

A warm climate with only moderate variation in temperature seems essential. Assam and Bengal are ideal in this respect, as the temperature is seldom very hot or very cold and there is a rather humid atmosphere./

atmosphere. In my experience cases are commoner in the cold weather.

The belief that the disease does not occur at heights over 2,000 ft. above sea level is not correct. I have seen several cases in Gurkhas who have been on leave to Nepal and who have never lived in a recognised endemic area. Kala Azar is comparatively common among Indian troops in Dehra Dun which is over 2,000 ft. above sea level.

Savage (20) (July 1927) has recorded two cases of Kala Azar in Europeans aged 15 and 16 years in Sanawar in the Simla Hills, 5,760 feet above sea level. He demonstrated L.donovani bodies in one of these cases, and also noted that the sandfly P. major breeds in this district.

Mukerji (21) (I.M.G. Oct. 1927) has also found living sandflies at a level of 7,000 feet above sea level with associated cases of Kala Azar.

Transmission:-

Our knowledge of the causation of Kala Azar is incomplete. The causal organism has long been known but how it is transmitted is still not definitely understood. There is strong evidence, however, that sandflies are the transmitting agents.

Causal Organism:-

W.B. Leishman (5) discovered certain oval or spherical/

spherical bodies in the spleen of a soldier in 1900 and reported his discovery in 1903 (the same year as Donovan reported having found them in living patients). These Leishman-Donovan bodies are about 2 to 5 microns in diameter but in the longer forms the smaller diameter may be 1.5 to 2.5 microns. Sometimes flattened forms may be seen with almost pointed ends. These are commoner in Oriental Sore. They consist of cytoplasm with two nuclei - the tropho-nucleus which is larger and the kinetonucleus which is smaller and often rod shaped. Leishman and Giemsa stains are excellent for demonstrating these bodies. In culture they develop flagellae and are motile. They multiply by a process of simple fission which is preceeded by elongation of the Leishman-Donovan body and division of the two nuclei.

The parasites are usually intra-cellular and divide and multiply in the large endothelial cells, leucocytes or monocytes. Often, however, they are seen lying free in the blood plasma. In smears made from spleen or liver puncture, they are very numerous and one may often see as many as two hundred bodies in one field of the microscope.

On close inspection in cultured forms two or three vacuoles may be seen in each body. The cytoplasm is slightly granular and is surrounded by a membrane.

SPLEEN JUICE IN A CASE OF KALA AZAR SHOWING L.DONOVANI.

The above sketch was made from spleen juice obtained by splenic puncture. It is a reproduction of a field of the microscope as seen under the oil immersion lens. Red blood corpuscles, large endothelial cells and mononuclears are numerous. Leishman-Donovan bodies can be seen lying free, and in the protoplasm of the large endothelial cells and mononuclears.

In culture both Leishman-Donovan bodies and Leishmania tropica bodies become flagellated.

Theories of Transmission:-

There are many theories as to the mode of transmission of kala azar. The following are the more important ones:-

(1) Droplet infection from nose and throat.

(2) Bugs (Patton) Theory.

(3) Faecal theory.

(4) Herpetomoniasis Theory.

(5) Sandfly.

In addition it has been reported that the disease has been conveyed by mother to child- congenital theory.

Droplet Infection Theory:-

Forkner and Zia (22) in 1934 reported finding Leishmania in the nasal secretion, saliva and tonsils of patients suffering from kala azar. In 1935 they published a second paper (23) in which they examined the nasal secretions of 22 cases of kala azar and discovered Leishmania in 12 of them. They also stated that in ten cases whose tonsils were examined Leishmania were present in 3. In all cases a very prolonged and careful examination was necessary. From these observations they argued that transmission of/

of Leishmania by the oral route was most likely. Although a few cases may be transmitted by this means, the general opinion is that it is not a common occurrence. This conclusion is based upon the following facts. The disease is not spread by infected people who travel outside the endemic areas. If an infected person was capable of infecting others by the oral route, then why is the disease confined to certain well defined areas? Also to be really infective the Leishmania should be found more readily in the saliva and tonsils.

Bug Theory.

Some people still believe that a bug is the transmitting agent. The disease has been found to be common in communities who use an insanitary type of latrine where bugs are likely to be present. Patton (24) in 1907, discovered that if bugs were allowed to feed on the blood of infected patients, he could find Leishmania in their alimentary canals. These Leishmania were in all stages of development and included flagellate forms. This work has been repeated by Donovan (25) in 1909, by Wenyon (26), Brahmachari (27) and the Kala Azar Commission (28) in India with negative results.

Mackie (29) examined over 800 bugs caught in the beds of Kala Azar patients without finding any Leishmania. He also crushed laboratory-bred bugs which had/

had been allowed to feed on kala azar patients and injected them into monkeys without success.

Patton (24) fed bugs on cultures of Leishmania and were able to subculture from the intestine after a month.

Mrs Adie (30) thought that the Leishmania penetrated the stomach of the bug and developed in the surrounding tissue. She later found Leishmania in the salivary glands of Cimex rotundatus. No proof of the transmission of Kala Azar by bugs has been produced and the theory must be rejected on the following grounds.

(1) Leishmania can be cultured in test tubes under favourable conditions. (2) The incidence of kala azar and the presence of bugs does not always correspond. (3) Infected patients travel from endemic areas to places where kala azar is unknown without causing any spread of the disease to these parts.

Faecal Theory:-

It is thought by some that Leishmania may be transmitted by faecal contamination of drinking water.

Greig and Christophers (31) succeeded in infecting a monkey by injection of faecal matter into its intestine. It is rare, however, to find Leishmania in routine examination of stools, and the oral administration/

administration of Leishmania to mice has not been found to cause the disease.

Herpetomoniasis Theory.

In addition to the above theories one must mention the theory of herpetomoniasis. It is thought that "Leishmaniasis may be an insect borne herpetomoniasis, and the natural herpetomonads of insects may become pathogenic to man". (Brahmachari (32). Herpetomonad flagellates have been found by many investigators in fleas, bugs, lizards, and pigeons, and attempts have been made to infect laboratory vertebrates with the flagellate forms occurring in insects. Laveran and Franchini (33) as a result of a series of experiments demonstrated the possibility of infecting mice with flagellates from fleas. Other investigators, however, Hoare (34) and Shortt (35) failed to confirm these results, and it is generally considered that herpetomonads do not transmit the disease.

Sandfly Theory.

In 1911 Wenyon (36) suggested that a sand fly was the vector of oriental sore and in 1922 Sinton (37) suggested that it is the vector of Kala Azar in India. The Sergents (38) working in Algiers proved that Wenyon's suggestion was correct. Since then a great deal of work has been done by The Calcutta School of Tropical Medicine and the Kala Azar Commission.

Findings of K.A. Commission (Shortt, Barraud, and Craighead).

Sandflies (P.argentipes) were allowed to feed on peripheral blood from Kala Azar patients and were kept at 28°C. and dissected at intervals. Sandflies dissected after 24 hours contained a few parasites in groups or singly in the mid gut. After 48 hours, flagellate forms were found; and after 72 hours elongated, actively motile flagellates were present throughout the mid gut. Dissections of flies made on the 4th or 5th day showed active multiplication and a tendency for the parasites to collect in the anterior end of the gut and even over-flow into the pharynx.

At this stage (5th day after first feed of blood) the sandfly is normally ready for another feed having laid its first batch of eggs.

Sandflies were then allowed another feed of infected blood and again dissected at intervals. From these dissections it was seen that the parasites multiplied rapidly and extended into the pharynx and buccal cavity about the 8th day after the first feed or 3rd day after the 2nd feed.

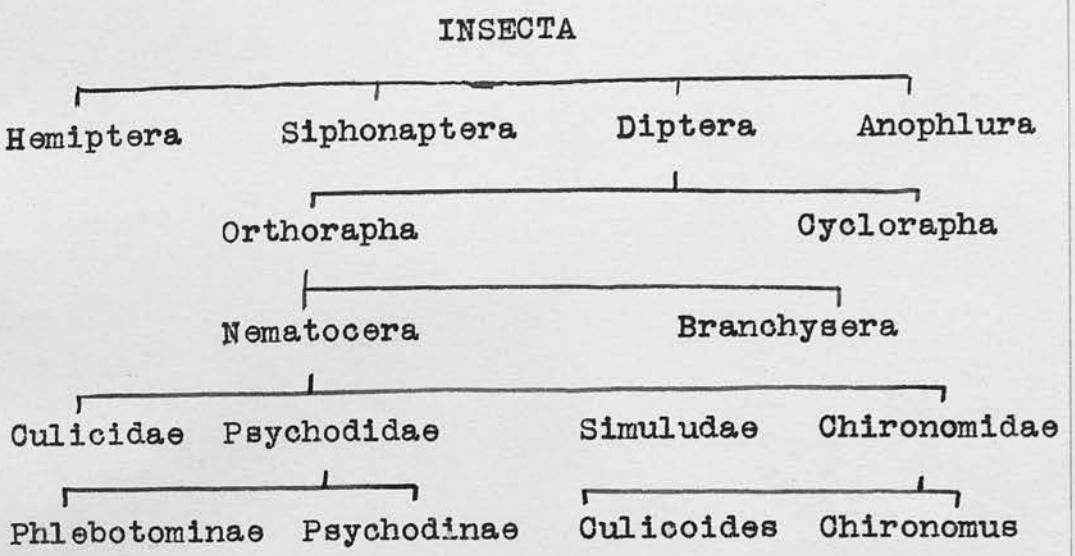
Further experiments were carried out by the same investigators in 1927. One hundred and fifty infected sandflies (P.argentipes) were allowed to bite 60 animals without managing to transmit the disease.

Findings of Calcutta School of Tropical Medicine.

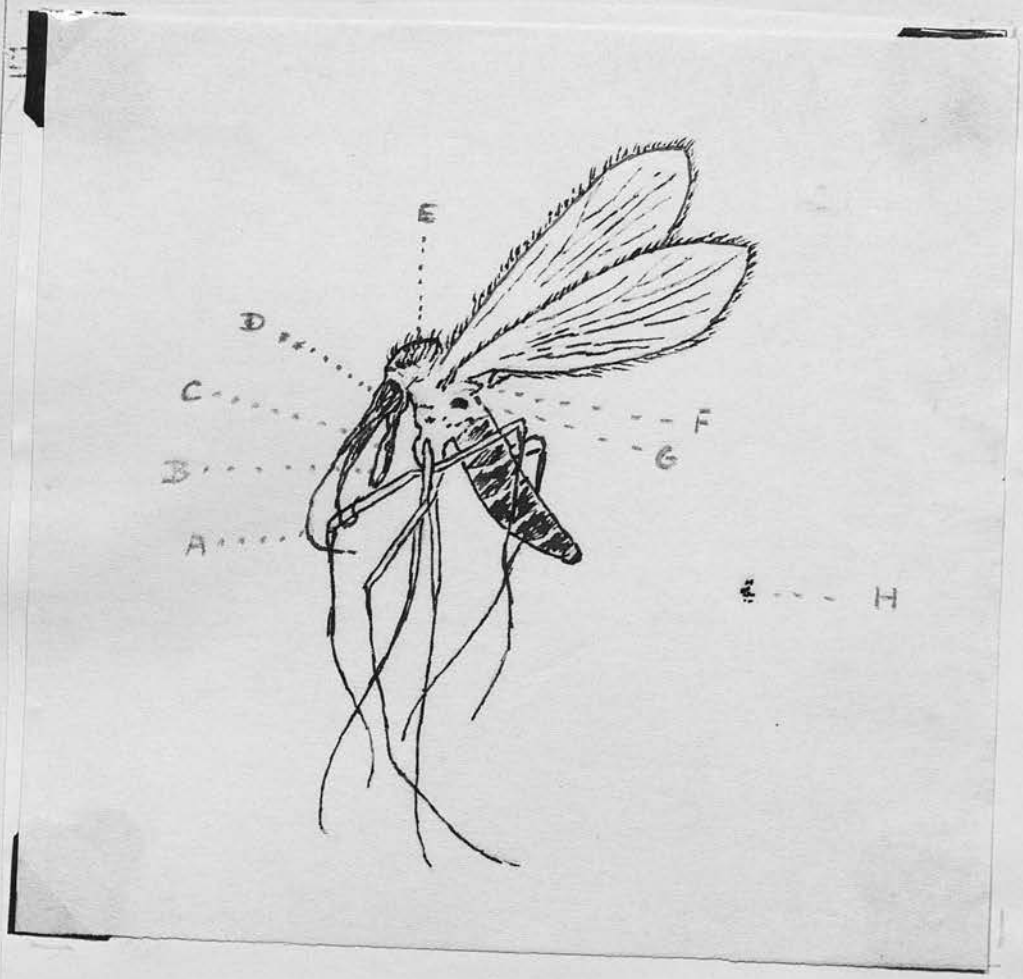
It was noticed in Calcutta that there were two areas, one endemic for Kala Azar and one not endemic. In the former area the people were poor and lived in broken down houses, with no cows, and slept on the ground floor. In the latter, the people were more prosperous and kept a cow or cows in the compound, and slept upstairs. An entomologist (Bainbridge Fletcher) was asked to tour these areas and he noted that both were suitable for sandfly breeding, but that the endemic area was much more suitable. He also stated that Culicoides were breeding in every Kala Azar infected house examined. The case of Culicoides being the transmitter of Kala Azar has never received experimental support.

Four species of sandfly were found to breed in or around Calcutta, namely P.minutus, P.papatasii, P.squamipleuris and P.argentipes, the last named being very common. In 1924, Smith, Knowles and Napier (39) saw the flagellate stage in P.argentipes and in 10 out of 11 feeding experiments, Leishmania were present in this sandfly. They also found that 25 out of 56 sandflies showed infection although the blood films of the patients had shown only very scanty numbers of parasites.

In one case sandflies fed on a patient showed parasites/



The above simple diagram shows how the flies are related to each other and the classes into which they are divided. It starts with the class of insects being divided into bugs, fleas, flies and lice. It ends with the separation of the families of psychodidae and chironomidae which are split into groups containing phlebotiminae on one side and culicoides on the other.



Phlebotomus (papatasii)

A	Antennae	E	Prothorax
B	Palps	F	Plates of Mesothorax
C	Proboscis	G	Halteres
D	Head	H	Phlebotomus (natural size)

parasites on dissection before the diagnosis of Kala Azar was confirmed by Spleen puncture.

Control sandflies fed on patients suffering from diseases other than K.A. failed to produce parasites.

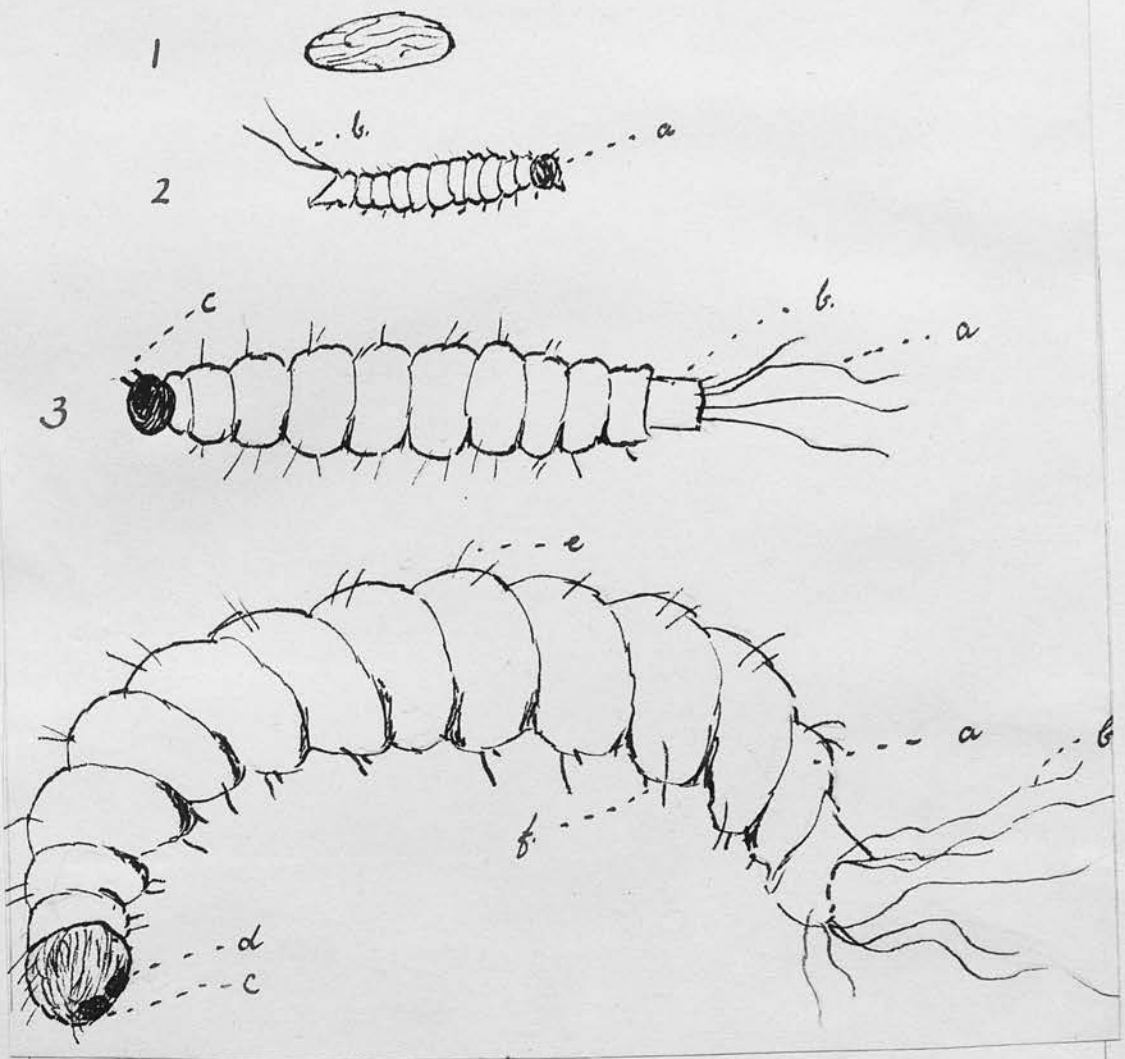
It was noted that sandflies prefer to feed on cattle and do not as a rule fly higher than 30 feet, so that a certain amount of protection from infection can be obtained by keeping a cow and sleeping upstairs.

A Chinese animal - the Hamster - was found to be susceptible to infection by P.argentipes. Napier (40) found that 2% of P.papatasii fed on patients became infected whereas 42% of P.argentipes became infected.

In contrast to the findings in artificially infected sandflies, naturally infected sandflies develop parasites posteriorly, and the contaminated faeces are passed on the ground and swallowed by larvae.

Attempts made to transmit infection with Kala Azar from man to man, or from man to a susceptible animal by the bite of infected P.argentipes, have so far been unsuccessful.

Napier holds the view that Leishmaniasis is a widespread infection which does not of its own accord give rise to symptoms, but that when the patient acquires some other disease, notably typhoid fever, it then causes symptoms of kala azar to appear. The infection lies dormant under the skin and is lit up by malaria or enteric fever.



LIFE HISTORY OF PHLEBOTOMUS (papatasii).

(1) Ovum 7 days old.

(2) Larval form, first stage, 2 days old.
a = head
b = caudal bristles

(3) Larval form, third stage, 13 days old (magnified 40)
a = caudal bristles
b = segment
c = antennae

(4) Larval form, fourth stage, 22 days old (magnified 40)
a = last segment
b = caudal bristles
c = mandibles
d = labial plate
e = body hairs
f = false legs

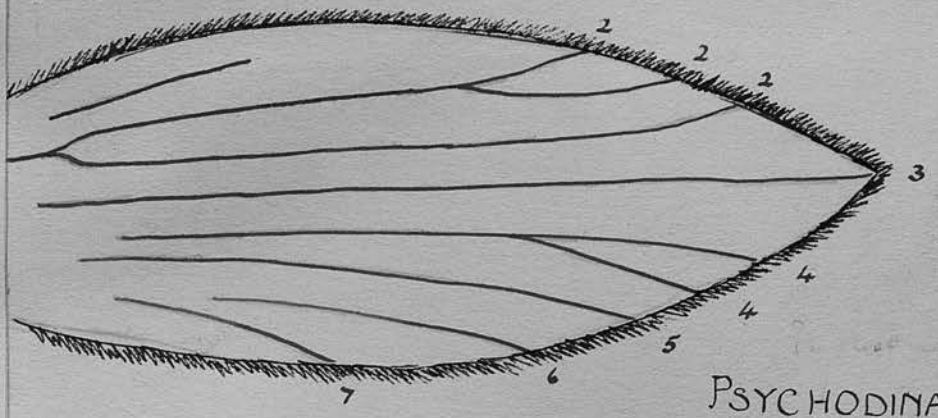
Description of Suspected Vectors:-

The flies suspected of being concerned in the transmission of Leishmaniasis in India are 2 species of Phlebotomus, namely P.argentipes and P.papatasii. In addition, P.perniciousus, P.sergenti and P.lutzi are suspected of carrying the disease in places outside India, in the Mediterranean, China and South America respectively. In India, kala azar is thought to be spread mainly by P.argentipes, and oriental sore by P.papatasii.

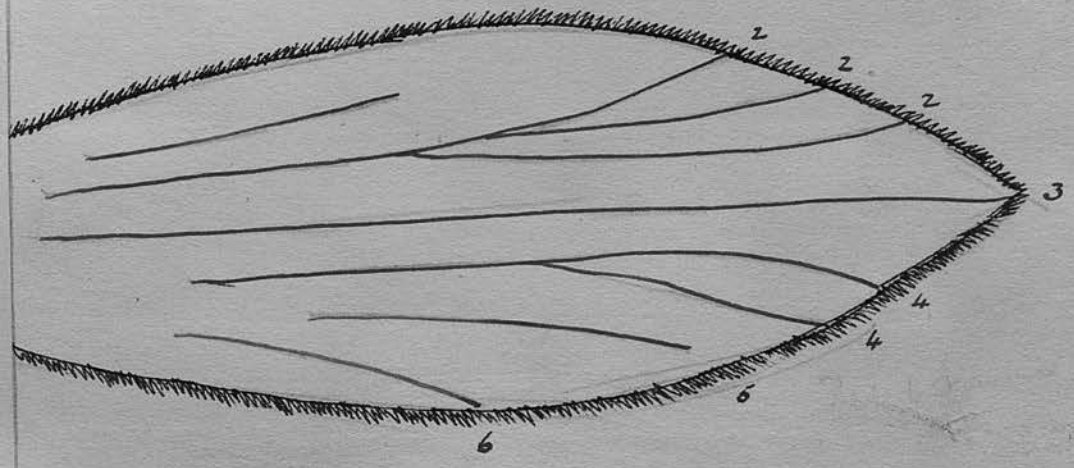
P.argentipes lives and breeds in cattle sheds and human habitations. The females suck the blood of cattle or man. They have a small range of flight and usually do not fly as high as the upper storey of a house. The eggs hatch in 6 days and the larval stage lasts six days and the pupal stage seven. The female lays eggs on the fifth or sixth day and then usually dies, but may survive if the temperature is suitable as long as the 8th or 10th day. The favourite breeding places are, trenches, rubbish and moist earth. A female may lay 20 - 80 eggs in a lifetime - usually 5 or 10 in a batch.

P.papatasii (see illustrations) is the common vector of phlebotomus fever in India as well as oriental sore. It breeds in moisture in the same kind of places as described above for P.argentipes.

The/



PSYCHODINAE



PHLEBOTOMINAE

SKETCH OF WINGS OF PSYCHODINAE AND PHLEBOTOMINAE.

Note the difference in vein formation. The second longitudinal vein in psychodinae divides early into three branches, the phlebotominae divide later on.

The eggs are laid singly and are 0.38 mm. in length and 0.12 mm. in breadth. After 6 - 9 days the egg hatches into 12 larvae which have dorsal bristles on the terminal segment.

The larval stage lasts about 4 weeks and is divided into 4 stages (see illustration). The pupa is covered with small spines on the sides of the thorax and abdomen. The adults are most active at night and are very fearless and will even penetrate under the bed clothes to obtain a meal.

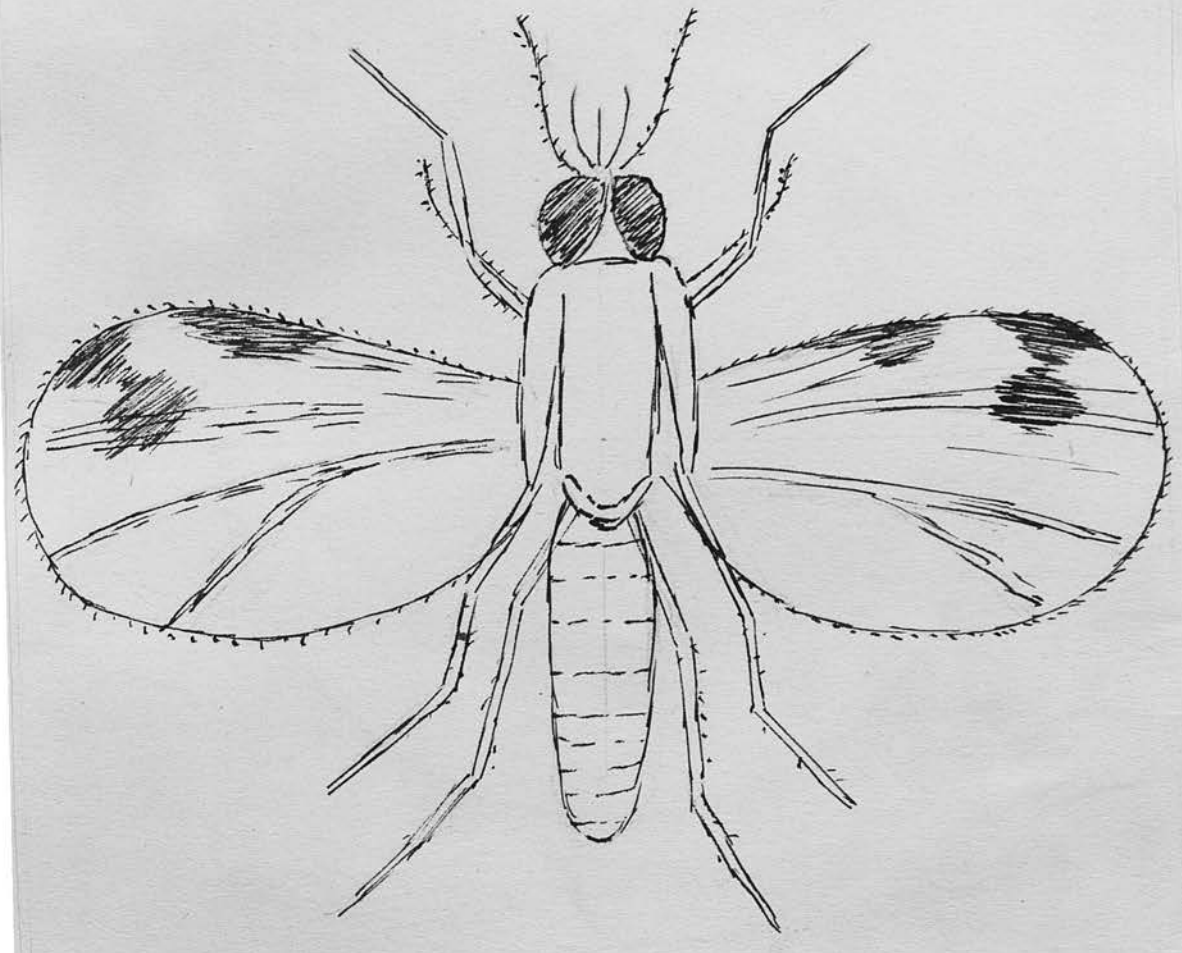
Their flight is feeble and they can seldom travel more than 50 yards.

The main points of identification of Phlebotomus in general are:-

1. Biting mouth parts.
2. Wings parallel and do not touch.
3. Antennae have no constrictions or beads.
4. Hairs come off between segments.
5. Female has no hook or ovipositor.
6. Male has 3 pairs of enormous claspers.
7. Second longitudinal vein branches into three near the tip (see diagram).

Culicoides, mentioned above in connection with the work of Bainbridge Fletcher, need not be described in detail as it is not considered of any importance as a vector. It belongs to the family of Chironomidae (Midges).

The/



CULICOIDES FEMALE (magnified 70 times).

Note the smudging of the anterior borders of the wings, the rounded shape, and the branching of the fourth longitudinal vein.

The main points of identification are:-

1. Biting mouth parts.
2. Very small size.
3. Rounded Wings.
4. Smudge spots on anterior border of wings.
5. 2nd and 3rd longitudinal veins indistinct.
6. 4th longitudinal vein definitely branched.
7. Long antennae (15 segments and last 3 or 4 of which increase in length).

Oriental Sore:-

A great deal of the etiology of oriental sore has been mentioned in dealing with kala azar. Age, sex and occupation have no effect on the susceptibility to this disease. It occurs equally in all races exposed to it, whatever their profession.

The causal organism L.tropica is identical to L.donovani and L.infantum and L.braziliensis. It occurs in the skin lesions, sometimes in large numbers and sometimes very sparsely. It is easily demonstrated in early lesions and in the papules before they have formed ulcers and suppurated. It is commonest in the margins of the sores and is best obtained by passing a needle or glass pipette from the margin outwards towards the healthy skin.

If one examines the skin round an ulcer under a microscope, it will be seen that there is an invasion of/

LEISHMANIA TROPICA.

The above drawing was made from the field of the microscope under oil immersion lens. The material was obtained from a scraping taken from the edge of an oriental sore. (Kaka Singh Case No.55).

Note the numerous leishmania lying free and also in the epithelial cells.

LEISHMANIA TROPICA.

Another sketch of L.tropica as seen under the oil immersion lens. The material was taken from a sore by means of a glass pipette. Leishmania tropica, leucocytes, red blood corpuscles, and epithelial cells are all present in the above drawing.

of the tissue by small round granulation cells lying around the blood vessels and lymphatics. The Leishmania tropica bodies are found lying free or in the leucocytes and large mononuclear cells.

In culture the L.tropica can be easily grown on N.N.N. medium in the same way as L.donovani. After 48 hours - 3 weeks cultural forms can be obtained.

It is practically certain that oriental sore is spread by sandflies.

In 1911 it was suggested by Wenyon (36) that sandflies spread the disease in Baghdad, as he found that 6% of the sandflies he examined contained flagellate forms in their intestines.

In 1921 the Sergents, Parrot, Donatien and Beguet (41) produced an Oriental Sore in a man in Algiers.

They scarified the skin of his arm and rubbed into it a saline suspension of crushed Phlebotomus papatasii.

The flies had been brought from Biskra where there was much oriental sore, to Algiers, where there was none. The man developed a sore 2½ months afterwards.

This experiment was confirmed by Adler and Theodor (42) working in Palestine in 1926. They also traced the flagellate forms of the L.tropica to the biting parts of the sandfly, by showing that the bite of/

of this insect was capable of inoculating man.

In India P.papatasii is the common carrier, but other species are capable of transmitting the disease, e.g. P.perniciosus in the Mediterranean and P.sergenti in China.

Dermal Leishmaniasis.

This is almost always a sequal to Kala Azar and occurs usually a year after completion of treatment for that disease. When first described in India by Bramachari (12) in 1922 it was thought to be a rare disease but since then many more cases have been described and it has been found to be comparatively common in Bengal and Assam. In the Calcutta School of Tropical Medicine, an average of 60 cases per year are/

seen. Most of these are referred from the Skin and Leprosy departments as many patients come to seek advice because they fear that they are suffering from leprosy or venereal disease.

Brahmachari called this condition Dermal Leishmanoid but Acton and Napier (43) have recently adopted the term Post Kala Azar Dermal Leishmaniasis and this and Dermal Leishmaniasis are the two names now commonly used in the literature. It has no immediate connection with oriental sore except that of belonging to the Leishmania group of diseases.

One of the chief differences is that oriental sore tends to ulcerate whereas in dermal leishmaniasis the growth is more a non-ulcerative granuloma with no tendency to ulcerate. Knowles (44) stated in 1934 that "it is now much easier to obtain cases of dermal leishmaniasis than untreated cases of Kala Azar".

This may be true of Calcutta, but the statement cannot be supported in regards to other towns in Bengal. In the General Hospital, Chittagong, for instance, there has not been one case of dermal leishmaniasis in the past nine months (July 1936 to March 1937), although kala azar is very common.

Napier and Das Gupta (14) have had experience of over 500 cases of dermal leishmaniasis in Calcutta and published a paper in 1934.

There are several types of the disease which will be/

be described later. The face, arms, chest and scrotum are favourite sites for the lesions to appear. These cases present a grave danger to the general public as the lesions are swarming with L.donovani. It has even been proved (Smith and Halder (45)) that sandflies allowed to bite the chin of a man who showed no obvious lesions but who had had kala azar 2 years previously, became infected with L.donovani.

If a scraping is taken as in oriental sore, the L.donovani can be demonstrated in large numbers. They lie in the large endothelial cells just under the surface of the skin and may also be found lying extra-cellularly. The deeper one goes into the skin the fewer the parasites become. The parasites can be cultured in N.N.N.medium, and in citrated human blood kept at body temperature, and produce flagellate forms, as in kala azar.

Das Gupta (46) stated that cultures from peripheral blood of patients were always negative for L.donovani as were also cultures from spleen smears. He produced a generalised visceral infection in mice by means of material obtained from a Hindu patient, and so proved that the organism in Dermal Leishmaniasis is L.donovani and not L.tropica.

The disease does not appear to be influenced by age, environment or race. It has been described in adults and children with perhaps a slight tendency to be commoner in males.

Pathology.

There can be seen a round-celled infiltration round the capillaries. These increase in number forming masses of granulation tissue which are split up by inter-papillary connective tissue. The granulation tissue contains many giant cells with several nuclei and usually large numbers of Leishmania parasites. The tissue is very vascular and bleeds easily. The parasites both intra- and extra-cellular are mainly situated close under the epithelial layer and become fewer in number in the deeper tissues.

The skin over the nodules is often de-pigmented. Bramachari considers that the disease first shows itself as erythematous patches over the skin before any de-pigmentation or nodule appears in the skin.

Cases have been reported where there was no history of previous Kala Azar, (Indian Journal of Medicine, Sept.1926).

Canine Leishmaniasis.

Nicolle (47) thought that there was a close relationship between human Kala Azar and Leishmaniasis in dogs. In the course of his investigations he noticed that in each house in which there was a case of kala azar there was also a dog which was infected with the canine form of Leishmaniasis.

In order to test his beliefs he examined 222 dogs in/

in Tunis and of these 4 were infected. Other investigators examined dogs and found varying numbers of them infected. Cases of infection of dogs have been reported from Rome, Malta, Athens, Turin, Lisbon, Mesopotamia, France, West Africa and the Sudan. In India, Avari and Mackie (48) found Leishmania in a dog in Bombay and in another in the Punjab.

On the whole, however, canine leishmaniasis is uncommon in India.

Leishmania can be recovered from the spleen, liver and bone marrow of infected dogs and also from the cutaneous sores, which are present on the ears, lips and nose. In Turkistan the brown bear has been found to be infected with Leishmania.

Dogs can be experimentally infected with either canine or human leishmania. The resulting symptoms, however, are very similar to the latter, and gives support to the general opinion that the two forms of the disease are due to the same parasites namely, Leishmania donovani.

It was formerly thought that dogs were reservoirs of infection to man. This is not generally believed to be the case, principally because in many places, (e.g. Persia) kala azar in dogs is common, but human kala azar does not exist.

INCUBATION PERIODS.

The incubation period of kala azar is variable. It may be anything from ten days to two years. Normally, however, it is a matter of months, and experimental evidence leads one to believe that two months may be taken as a rough figure to work on. Shortt (49) quotes a definite case of a man who lived in Shillong and contracted kala azar in Gauhati. In this case the incubation period was nine to ten months.

Derman leishmaniasis usually occurs a year at least after the last symptoms of kala azar. Napier and Das Gupta (14) in their two series of cases quote 1.88 years in the first series and 2.32 years in the second. As a general rule, we may therefore take the incubation period as one to three years after an attack of kala azar.

The incubation period of oriental sore is usually considered to be between six weeks and four months, but great variation of this has often been noted. For example, Marzinowsky and Schourewkoff (50) in 1924 reported an incubation period of fourteen days, and Napier and Halder (51) have reported the case of a native of Rajputana who developed a typical sore on his nose although he had never been out of Calcutta for three and a half years.

In my experience the incubation period was three to four months. (Goodall (52)).

SYMPTOMATOLOGY OF KALA AZAR.

The onset may be insidious or sudden, but more often the former. It is often ushered in with a rigor and sudden rise of temperature. The fever which usually lasts for two to three weeks in the first instance, may be continuous, remittent or intermittent. It often resembles enteric fever and a great many cases are wrongly diagnosed as this disease at the onset. A common characteristic is the 'double remittent' type of fever wherein the temperature shows two distinct rises in twenty four hours. This can be demonstrated most easily by recording four-hourly temperature readings. Many people consider this double rise of primary diagnostic importance. The fever at the end of three weeks subsides and is followed by a period of apyrexia. It may, however, persist for as long as six weeks.

The spleen enlarges rapidly and early in the disease, and reaches very often an enormous size. In the majority of cases of three months duration or more it enlarges down to the umbilicus. In more long-standing cases, it may fill the whole abdomen down to the symphysis pubis. The consistency varies, but is usually firm and not nearly so hard as the spleen of chronic malaria. By causing a marked protuberance of/

of the abdomen it stands out in great contrast to the emaciation of the chest and body generally.

The leucocyte count is very important as in nearly every case there is a marked leucopenia. The usual counts are between one and three thousand per c.mm. Examination of the case sheets of kala azar patients admitted to the Civil Hospital, Chittagong, over a period of six months, revealed the fact that 64.2 per cent of these cases had a total leucocyte count of less than three thousand per c.mm. Cases complicated with cancrum oris on the other hand, showed a constant leucocytosis.

The ratio of white to red cells is characteristic, there being usually about one white to 1,500 red which is half the normal proportion.

Differential counts show a reduction in the number of polymorphonuclears. Eosinophils are rarely seen.

The disease may run an acute course and the patient die in a few months, but more often if untreated it progresses with alternate periods of pyrexia and apyrexia for one or two years, when death occurs. The appetite is remarkably good, and the tongue is usually clean. There may be constipation at the commencement, but very often the bowels are loose, and if ulcers are present in the bowel wall, blood is passed in the faeces. Cutaneous purpura may occur, but/

but I have not seen it in any of my cases. Epistaxis is very common during the febrile periods.

On examination, tachycardia and haemic murmurs are fairly common. A great many cases too, present symptoms of bronchitis. Some patients have developed dark pigmentation of the skin, mainly on the cheeks. This is the origin of the name 'kala azar' (black sickness). It is by no means a constant feature and I have seen many cases without a sign of it. It is not present in the early stages of the disease and is more common in long-standing cases.

A symptom which was very common in the cases I have seen, was a tendency for the hair to become brittle and fall out. The essential symptoms and signs of kala azar are as follows:-

(1) Enlargement of spleen and liver.

(2) Chronic fever with apyrexial intervals.

(3) Wasting or emaciation.

(4) Anaemia with marked leucopenia.

An examination of the records of the General Hospital, Chittagong, for the period 1st July 1936 to 31st December 1936, revealed the following statistics:-

(1) Number of adults admitted suffering from kala azar 62

(2) Number of children admitted suffering from kala azar 19

(3)/

(3) Number of adults attending as Out-patients suffering from kala azar ... 358

(4) Number of children attending as Out-patients suffering from kala azar ... 115

The above figures are instructive in so far as they show that the majority of kala azar patients are treated as out-patients and not admitted to hospital.

Very few of the admitted cases were in the acute febrile stage. The majority were complicated cases and of these the greater part did not stay in hospital to complete their treatment, unless they were hopeless cases who died eventually of general anasarca or other grave complication.

Chronic febrile and afebrile cases were treated as out-patients and often walked miles between the hospital and their homes for treatment. As a rule, as soon as they felt an improvement, or the fever left them, they ceased to attend.

CASE NOTES.

The following ten cases were treated in Dehra Dun, Roorkee, and Chittagong. Six additional cases complicated by cancrum oris are described later.

Of the ten kala azar cases, six occurred in sepoys, one in the wife of a Bengali contractor, one in a Bengali agricultural worker, and two in Bengali children. The sepoys were treated in Military Hospitals and the other four were placed under my care by the kindness of the Civil Surgeon in Chittagong.

It will be noticed on studying these cases that the duration of the illnesses varies very much. One patient, a sepoy, was definite in his assertion that he had only been ill for three days. I am not convinced that this was correct, and in all probability, he had suffered from fever for many weeks before this without it being of sufficient intensity to prevent him from carrying out his duties.

Another patient, a boy of ten, gave a history of three and a half years duration. Judging from the physical condition of the case I believe this to be correct. It is very noticeable that the cases among troops come under treatment very much sooner than the civil cases, i.e. on an average after six months illness/

illness, compared with eighteen months illness in civil cases. This accounts too for the greater degree of emaciation in civil than in military cases.

As regards the ages of these patients, I believe they are fairly representative of the period within which kala azar occurs. The minimum age of ten years is not low enough, however, as kala azar is common in young children. Most of my cases occurring in children were complicated by cancrum oris.

The spleen in every case was enlarged, even in the patient with a history of three days duration. Ordinarily, if one can feel a spleen below the costal margin the patient has suffered from the disease for at least a month.

The liver was easily palpable in all but two, both being cases of short duration.

Leishman Donovan bodies were found in the six patients on whom splenic puncture was performed. It was not always easy to obtain them, and in a few cases the puncture had to be repeated. The technique employed will be mentioned later. Splenic puncture was not performed in the other four cases as it was not the custom in the hospital concerned, reliance being placed on the clinical picture, Chopra test and blood picture.

The blood picture was examined in all ten cases.

A/

A constant anaemia was found, the usual figure for the red corpuscles being two to three millions per c.mm. The leucocyte counts showed a considerable leucopenia, the lowest figure being 1,600 per c.mm. and the highest 5,000 per c.mm. The ratio of whites to reds was worked out in each case. In practically all patients, the normal 1:600 ratio was upset. The average ratio for these cases was 1:1066 which is slightly below the figure quoted in text books.

The differential counts showed a marked reduction of polymorphonuclears in most cases, with a relative increase in lymphocytes. Eosinophils were absent.

The fever in six cases was remittant in type, two cases were intermittant, and two showed a continuous form. The double rise in twenty four hours was noted in the four hourly charts of two cases, but on the whole this was not found to be a constant feature. I have seen this feature in tuberculosis and many other diseases, and do not think it can be relied upon as a clinical sign.

The aldehyde test was found most valuable and there was only one negative result. This was in a very early case. The Chopra test was performed on four cases and found positive in each.

CASE NO.1.

SHARIF JAN. AGE 30 YEARS.

Admitted 2.11.36.

Complaint: Fever and Weakness.

History.

Patient was in good health until eight months ago, when she was troubled with fever. This fever occurred in attacks which lasted for four or five days after which she might be free for some weeks. When the fever was present, patient felt chilled and suffered from headache. She has been losing weight steadily, and has felt progressively more weak. She carried on with her work, however, except when the fever was bad. At times she has also been troubled with bleeding from the gums, and when she has fever she is conscious of pains in all her bones. Sometimes she notices that her ankles are swollen. She has no cough.

Previous History.

Patient has never been admitted to hospital before. She has one daughter alive. Her husband, a contractor, is alive.

Examination.

Temperature 98.4 F.

There is noticeable pigmentation of the skin of the forehead.

Alimentary System.

Tongue clean and moist. Liver is palpable. Spleen is palpable below the umbilicus.

Circulatory System.

Pulse 94 per minute, regular in time and force. Heart is not enlarged. Both sounds closed.

Red corpuscles, 2.3 millions. Leucocytes 1.8 thousand.

Respiratory System.

Expansion normal. Resonant percussion note. Vesicular breath sounds. No accompaniments.

Other Systems. Nil to note.

Treatment and Progress.

6.11.36. Ureastibamine 0.15 gm. intravenously.

8.11.36. U.S. 0.15 gm. I.V.

10.11.36. U.S. 0.2 gm. I.V.

12.11.36. 0.2 gm. U.S. I.V. Spleen reduced in size, reaching just to the level of the umbilicus.

13.11.36. U.S. 0.2 gm. I.V.

14.11.36. U.S. 0.2 gm. I.V.

15.11.36. U.S. 0.2 gm. I.V.

16.11.36. U.S. 0.2 gm. I.V.

Patient much improved. Spleen still palpable two fingers breadths below umbilicus.

18.11.30. Patient discharged.

Summary.

This was my only case of kala azar in a female. She demonstrated among other symptoms, bleeding from the gums, swelling of the ankles, and pigmentation of the face. She had a clean tongue throughout.

A spleen palpable below the umbilicus is compatible with a history of eight months duration. She received eight injections of Urea Stibamine, and showed great improvement on discharge.

CASE 2.

AHMED HUSSAIN. AGE 12 YEARS.

Admitted: 16.10.36.

Complaint: Fever, pain in the abdomen, swelling of both feet, and enlargement of spleen.

History.

Patient was taken ill one year ago, when he was troubled with fever occurring at irregular intervals, and coming on at nights. He never had any rigors. On one or two occasions, while he was suffering from fever he vomited, but he went about as usual and took his food, being normally hungry. There were some intervals of as much as four months during which time patient had no fever, although he was taking no medicine.

The bowels have had a tendency to be either over loose or constipated, and he has frequently suffered from vague pains in the abdomen. More recently he has been troubled with bleeding from his gums, and has had some cough. About fifteen days ago his feet became swollen. He has been suffering from a burning sensation on passing urine.

Previous History.

No other illnesses.

Examination.

Patient is emaciated and his skin is rather dark in/

in colour. Temperature 101 F.

Alimentary System.

Tongue clean and moist. Gums spongy. There are several enlarged and tender cervical glands. Abdomen large and full. No tenderness. Spleen is enlarged to the extent of about four breadths below the costal margin. Liver is also palpable about one finger's breadth below the costal margin.

Circulatory System.

Pulse 100 per minute, regular in time and force. Heart shows no enlargement. No thrills. No murmurs.

Respiratory System.

Chest expansion poor. Respirations 22 per minute. Patient has a loose cough. Percussion note impaired at both bases. Breath sounds vesicular.

Other Systems. Nothing abnormal to note.

Treatment and Progress.

Intravenous injections Urea Stibamine, one injection daily for nine days receiving:-

.05 gms. for three days
.1 gm. " " "
.15 gms. " " "

TESTS.

Aldehyde Test +
Chopra's Test ++

Differential/

PHOTOGRAPH OF AHMED HUSSAIN AND BROTHER.

The larger of the two boys is Ahmed Hussain. Note the state of emaciation, the prominent clavicles and ribs, and the wasting of the arms and legs.

Differential Blood Count:-

Polymorph Leucocytes	24%
Small Lymphocytes	52%
Large Lymphocytes	20%
Basiphil polymorphs	4%

Red Blood Count = 3,100,000 per c.mm.
White Blood Count = 2,800 per c.mm.

26.10.36. Discharged owing to lack of room. To attend as outpatient for treatment.

PROGRESS:

2.11.36. Reported for inspection. Weight much increased. Spleen reduced in size but still palpable.

SUMMARY.

The boy was the elder brother of case No.3. He gave a typical long history of untreated kala azar. Like many of these patients he became accustomed to having fever, and used to do his work in the intervals when he was apyretic.

He exhibited common symptoms such as a good appetite, a clean tongue, bleeding gums, transient swelling of the ankles, and a tendency to looseness of the bowels.

Emaciation (see photograph) was a marked feature as one would expect from the duration of the disease. The spleen on the other hand was smaller than the history suggested.

He received nine intravenous injections of Urea Stibamine on consecutive days. His blood showed a typical reduction in polymorphs, and an unusual rise in basophils.

His condition was much improved on discharge.

CASE NO.3.

ABEDAL HAQ. AGE 10 YEARS.

Admitted: 16.10.36.

Complaint: Pain in the abdomen. Fever.

History.

Patient was taken ill three and a half years ago when he had an attack of fever preceded by a rigor. Since that time the attacks have occurred intermittently, there being sometimes periods of six months during which time the patient has been entirely free from fever.

He has not been taking his food well, having had no appetite, and at times he has vomited. The bowels have generally been loose and too frequent. When he had a bad attack of fever he remained in bed.

At times there has been bleeding from the nose.

Previous History. No illness to note.

Examination.

Patient is emaciated, thin and wasted - the ribs being prominent while the abdomen is large.
Temperature 97.8 F.

Alimentary System.

Tongue clean and moist. There is slight darkening/

darkening of the face and abdomen. Abdomen is large and full. No tenderness. Reflexes present. Spleen is enlarged to the level of the umbilicus. Liver is enlarged to about two fingers breadths below the costal margin in the nipple line.

Circulatory System.

Pulse 80 per minute, regular in time and force. Heart shows no enlargement, no murmurs present.

Respiratory System.

Respirations 22 per minute. Expansion normal. Resonant percussion note. Breath sounds vesicular.

Other Systems. Nothing abnormal to note.

Treatment and Progress.

Intravenous injections of Urea Stibamine once daily for nine days. Dosage as follows:-

.05 gm. for three days.

.1 gm. for three days.

.15 gm. for three days.

Tests.

Aldehyde Test +
Chopra's Test +++

Differential Blood Count:-

Polymorph leucocytes	43%
Small Lymphocytes	26%
Large Lymphocytes	26%
Myelocytes	4%

Condition on discharge. Had increased in weight. Temperature now remains normal. Spleen reduced in size.

Summary.

Patient was the brother of Ahmad Hussain. He has an even longer history. A clean tongue is again seen in this case. The spleen was enlarged down to the umbilicus. He received the same treatment as his brother, namely nine injections of Urea Stibamine.

He showed great improvement on discharge, but both he and his brother required a more prolonged treatment than he received.

This was the only case of members of the same family being infected at the same time in the series.

CASE NO.4.

BAKSHU MIA. AGE 25 YEARS.

Admitted: 22.11.36.

Complaint: Sleeplessness, fever, enlargement of abdomen, and constipation.

History.

Patient was taken ill over a year ago, when he was troubled with fever which persisted for seven months. He was then free from fever for two months after which it recurred and has again troubled him for the past five months. Patient was able to carry on with his work until seven months ago when he no longer felt fit for it. His appetite has been good but he has been troubled with indigestion. There has never been any vomiting.

Patient has a slight cough. There has been no swelling of the ankles. His hair has recently been falling out.

Previous History - None available.

Examination.

Temperature 100 F.

Patient is markedly emaciated, and the abdomen is grossly enlarged. Patient seems very weak and is only able to walk slowly and with difficulty. The skin/

skin is very dry and is covered with whitish scales. There is no black discolouration. The hair is dry and tends to fall out very easily.

Alimentary System.

Tongue clean and moist. Abdomen is very prominent and full. Spleen is enlarged down to the pubis. There is no tenderness. Liver is enlarged to four fingers breadths below the costal margin in the nipple line.

Circulatory system.

Pulse 98 per minute, regular in time and force. Heart shows no enlargement. Both sounds closed.

Respiratory System.

Respirations 24 per minute. Expansion normal. Resonant percussion note. Vesicular breath sounds.

Other Systems - Nothing abnormal to note.

Investigations.

Red Blood Count 2,370,000 per c.mm.
White Blood Count 2,800 per c.mm.

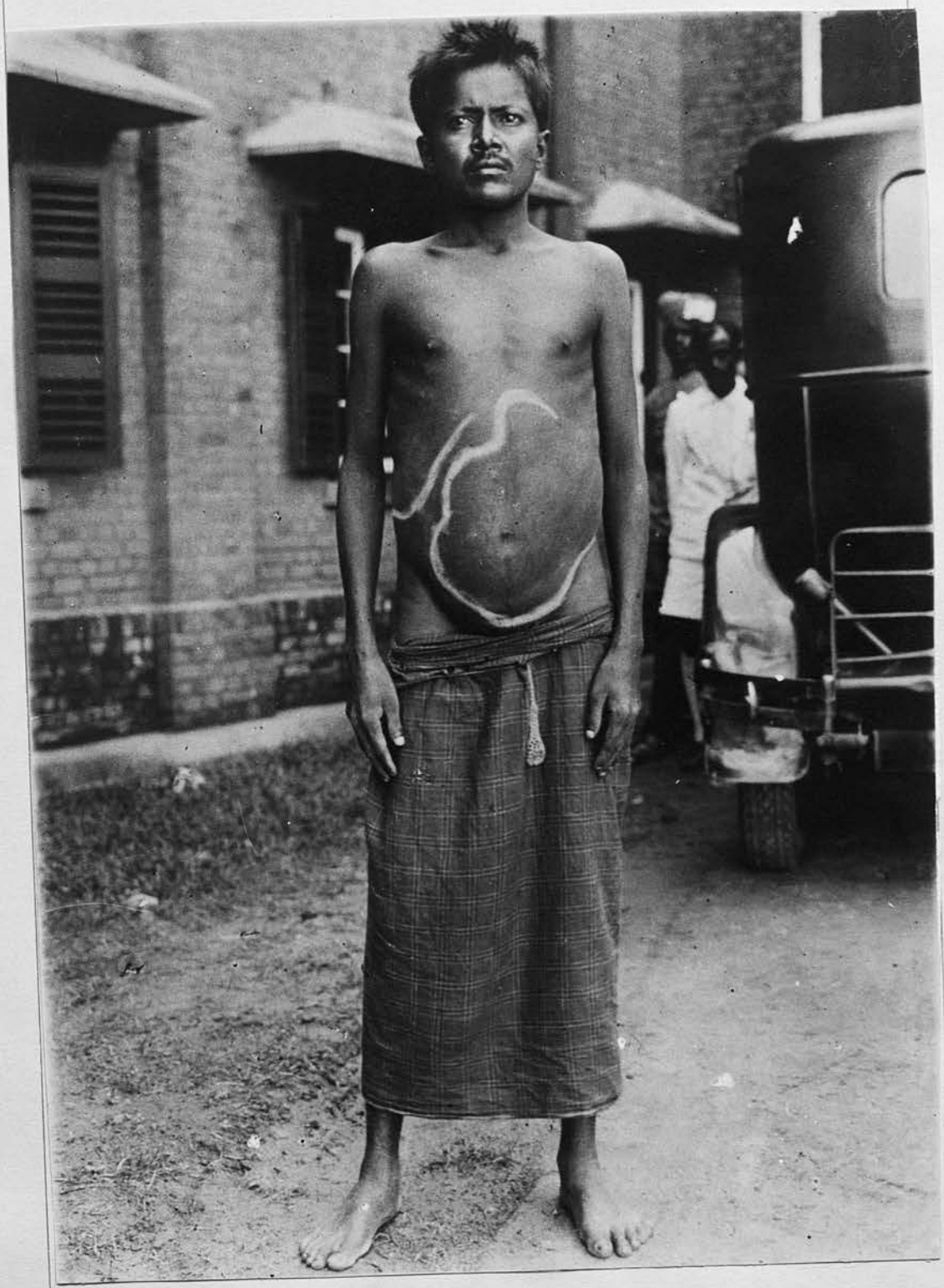
Aldehyde Test +
Chopra's Test +

Treatment.

26.11.36. Intravenous injections of 0.15 gm. Urea Stibamine daily for three days.

29.11.36. Intravenous injections of 0.2 gm. Urea Stibamine daily for five days.

3.12.36./



PHOTOGRAPH OF BAKSHU MIA (CASE NO.4).

Note the huge enlargement of his spleen which stretches down as far as the pubis. The liver is also very enlarged and there is considerable emaciation which is disguised by the protuberant abdomen.

3.12.36. Patient improved. Temperature normal. Spleen greatly reduced in size, and is now palpable at the umbilicus.

Discharged owing to lack of accommodation.

Summary.

This case was rather remarkable in several ways. His spleen was the largest I have seen (see photograph). On admission he could just walk unaided.

He had a clean tongue, a tendency for the hair of the scalp to fall out, and a dry scaly condition of the skin.

He was discharged sooner than I wished, on account of shortage of accommodation.

CASE NO.5.

TEK BAHADUR GURUNG. AGE 28 YEARS.

Complaint: Fever and Large Spleen.

History.

The patient says that he was well until one and a half years ago, when, while he was on leave, he became feverish and had a rigor. Then, at the end of his furlough, he came back to Dehra Dun where he again had fever after an interval of some months. In Dehra Dun he was admitted to hospital three times on account of fever and weakness.

One and a half months ago his fever returned and has remained with him "off and on".

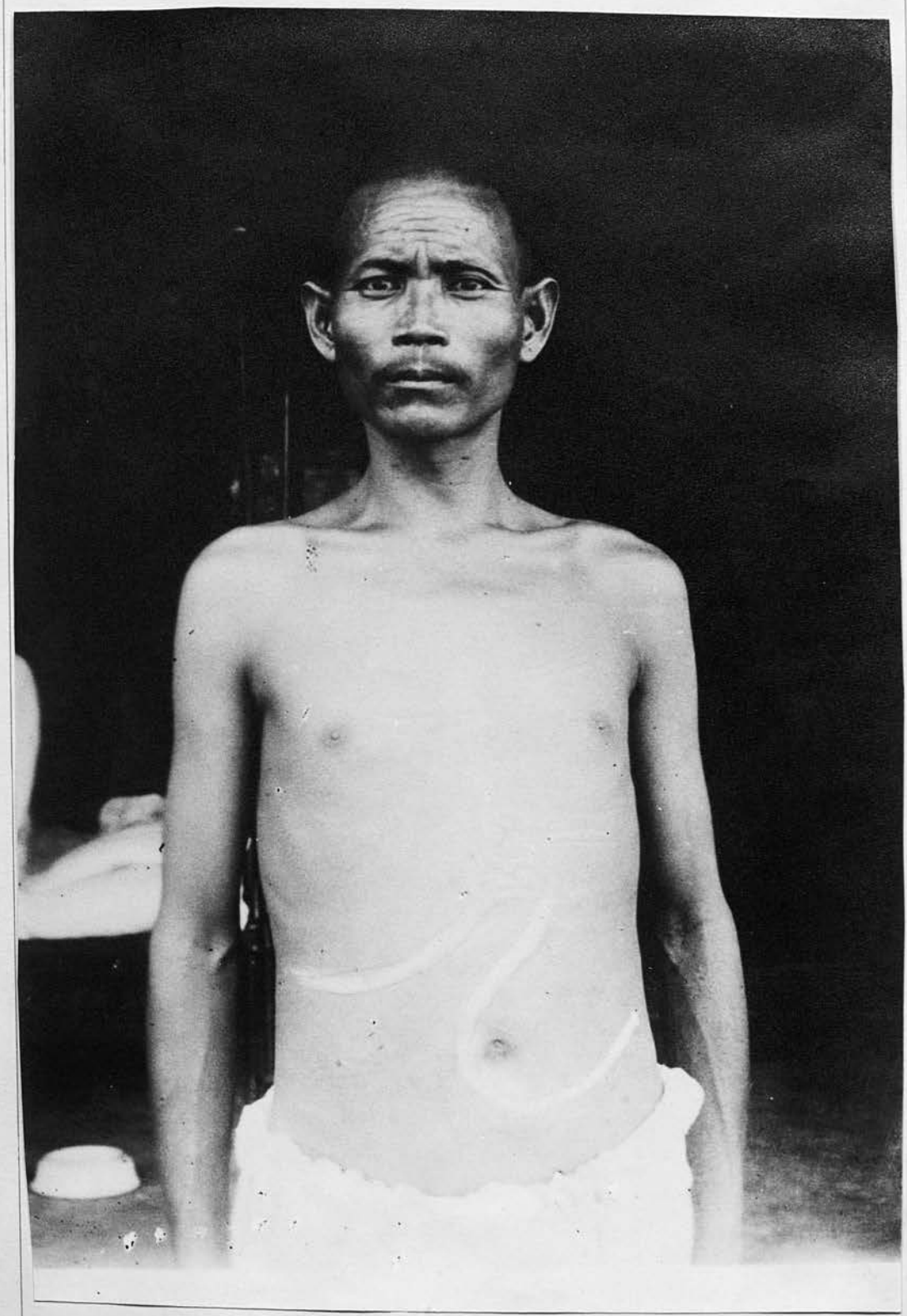
Three days ago he reported sick in Chittagong, on account of fever and was admitted.

He feels weak and unfit for his work. He has gradually been getting thinner, but his appetite is very good. Bowels are normal with a tendency to looseness.

Previous History.

Malaria M.T. Dehra Dun 1933. (9 days in hospital).
Malaria B.T. Dehra Dun 1934. (7 days in hospital).
Malaria (clinical relapse) Dehra Dun 1936.
(40 days in hospital).
Ankylostomiasis, Dehra Dun 1936 (5 days in hospital).
Ankylostomiasis, Dehra Dun 1936 (30 days in hospital).

28.10.36./



PHOTOGRAPH OF TEK BAHADUR GURUNG.

Note the enlarged spleen as demonstrated by the chalk marks. This patient being a sepoy and not such an advanced case as the previous ones shows only slight emaciation.

Examination. 28.10.36.

Temperature 100 F.

Patient emaciated and gives the impression of having been ill for a very long time.

Circulatory System.

Pulse 76 per minute, regular in time and force. Heart not enlarged. No murmurs present.

Respiratory System.

Respirations 18 per minute. Chest wall thin. Expansion fair. No dulness on percussion. Breath sounds vesicular. No accompaniments.

Alimentary System.

Tongue very clean and moist. Abdomen full. No tenderness but spleen enlarged two fingers breadths below the costal margin.

Haemopoietic System. Anaemic and pale.

Other Systems - Nothing abnormal to note.

INVESTIGATIONS.

28.10.36. White Blood Count 2,600 per c.mm.

Differential Blood Count:-

Polymorph Leucocytes	48%
Small Lymphocytes	46%
Large Lymphocytes	6%

Aldehyde Test:- Strongly positive.

Widal Reaction:-

T	300
A	800
B	70
T,O,	0
X_2	0
X_{19}	0
XK	0

Treatment. Calcium Lactate gr x T.I.D.

30.10.36. Blood negative for malarial parasites on three occasions since admission.

Splenic puncture was performed at 10 a.m.

Leishman Donovan Bodies were seen on microscopical examination of the smears.

31.10.36. Intravenous injection Urea Stibamine 0.05 gm.

Aldehyde test again positive. Three control tests negative.

Red Blood Count 2,820,000 per c.mm.

1.11.36. Urea Stibamine 0.10 gm. I.V.

3.11.36. Urea Stibamine 0.15 gm. I.V.

Mist. Iron Tonic ℥ i T.I.D.

To have nourishing diet containing high percentage of vitamins.

5.11.36. Urea Stibamine 0.15 gm. I.V.

6.11.36. Temperature normal. Spleen smaller.

7.11.36. Urea Stibamine 0.15 gm. I.V.

9.11.36. Urea Stibamine 0.2 gm. I.V.

White Blood Count 1,600 per c.mm.

11.11.36. Urea Stibamine 0.2 gm. I.V.

13.11.36. White Blood Count 3,800 per c.mm.

Urea Stibamine 0.2 gm. I.V.

15.11.36. Urea Stibamine 0.2 gm. I.V.

Differential Blood Count:-

Polymorph Leucocytes	50%
Small Lymphocytes	38%
Large Lymphocytes	12%

17.11.36./

A. F. B-181.

CLINICAL CHART.

(To be attached to the case sheet.)

British Indian Military Hospital at Chittagong

No. _____ Rank _____ Name Tek Bahadur Gurung Unit 2/2nd G.R. Age 28 Service 10 yrs

Disease _____ Date of Admission _____ Date of Discharge _____ Result _____

Dates of Observation.	26 10/36	27	28	29	30	31	1 11/36	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Day of Disease.	1	2	3	4	5	6	1	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Temperature, Fahrenheit.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.
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Pulse per Minute	84/82	74/78	72/76	74/74	72/70	68/72	74/82	72/76	70/78	70/72	72/72	70/72	70/72	70/72	70/72	70/72	74/78	74/78	66/68	70/68	70/96	76/72	70/76	70/72	70/74	70/72	70/76	70/72	70/72	70/72	70/72
Respirations per Minute.	20/20	20/20	18/18	18/18	18/18	18/18	18/22	20/20	18/18	18/18	18/18	18/18	18/18	18/18	18/18	18/18	18/20	18/20	18/18	18/18	18/20	20/20	18/18	18/18	18/20	18/18	18/20	18/18	18/18	18/18	18/18
Motions.	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/1	1/0	1/0	1/0	1/0	1/0	1/0

Signature _____ In charge of case.

MFP—662 O I (E)—(E-247)—27-7-35—100,000.

17.11.36. Urea Stibamine 0.2 gm. I.V.

19.11.36. Urea Stibamine 0.2 gm. I.V.

21.11.36. Urea Stibamine 0.2 gm. I.V.

23.11.36. No further injections to be given. Weight decreased by 1 lb.

25.11.36. Aldehyde Test positive.

White Blood Count 1,600 per c.mm.

28.11.36. Condition satisfactory. No temperature. Weight stationary.

30.11.36. Weight up two lbs. (111 lbs.)

4.12.36. White Blood Count 4,000 per c.mm.

9.12.36. Aldehyde Test faintly positive.

White Blood Count 5,200 per c.mm.

Proceeded on four months leave.

Summary.

The patient was not diagnosed at once but was treated for malaria and ankylostomiasis for several months prior to his admission to the Military Hospital, Chittagong.

A large rise in the Widal Reaction was well demonstrated in this patient, and was found to be a fairly common phenomenon among kala azar patients.

He received twelve injections of Urea Stibamine, and made an absolute recovery. The injections were given every second day.

Since discharge from Hospital, he has been under observation for three months and has not relapsed. Before discharge he put on 4 lbs. in weight.

CASE NO.6.

KHARAK SINGH.

Admitted: 9.4.35.

Complaint: Weakness. Bleeding from the nose.

History.

The patient was received from the Out-patient department with a note that he had been treated in the medical ward two months previously for worms, and was returned for further investigation.

The patient said he had been having fever every day for two months unaccompanied by rigors. For the past five days the fever had been more marked and he felt very weak. For the same number of days he had bleeding from his nose, especially in the evenings. He had never vomited and his bowels and bladder gave him no trouble.

Previous History.

The patient was admitted to hospital in November 1934 suffering from malaria (B.T.) and ascariasis. In December of the same year he was re-admitted on account of ankylostomiasis and discharged in January 1935. He says he has had no other illness.

Examination:

The patient is rather thin and appears to have lost/

lost weight. There is a slight tinge of jaundice present. He is a difficult subject to obtain a history from as he contradicts himself repeatedly.

Alimentary System.

Tongue fairly clean and moist. No abdominal tenderness. Abdomen rather protuberant and flabby. It moves freely on respiration. On palpation there is a hugh spleen which reaches to the umbilicus. The liver is also slightly enlarged. There is no free fluid.

Respiratory System.

Respirations 24 per minute. Chest wall very thin and there appears to be some wasting of the muscles. Expansion is not very good. There is a fairly resonant note all over. The breath sounds are vesicular and there are no accompaniments.

Circulatory System.

Temperature 98 F. Pulse 80 per minute and regular in time and force. The heart is not enlarged and the apex beat is in the fifth space $3\frac{1}{2}$" from the midsternal line. There are no murmurs.

Nervous System.

Pupils equal and react normally. No motor or sensory loss. Knee jerks normal.

Haemopoietic System. The patient is pale and his conjunctivae are anaemic.

Rifleman Kharak Singh

CHART.

(To the case sheet.)

A. F. B-181.

~~British~~ Indian Military Hospital at Dehra Dun.

Unit 1st/2nd Gurkha Rifles Age 19 years Service

Date of ~~Discharge~~ Admission 9.4.35 Result Died

	9	10	11	12	13	14	15	16	17							
	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.
	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.	A.M. P.M.
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	1/1	1/1	1/1	1/0	1/1	1/1	1/1	1/1								

Died at 1.30 A.M.

Other Systems. Nil to note.

Treatment and Progress.

Temperature of 99 F. Pulse 92 per minute and regular. Patient is very pale and is so weak that he staggers at times when he walks. He has had no more bleeding since admission. His spleen is a little below the umbilicus, and his liver is considerably enlarged.

12.4.35. No ova seen in stool.

Blood report:- No malarial parasites seen.
Red Blood Count 2,515,000 per c.mm.
White Blood Count 2,400 per c.mm.

Differential Blood Count:

Polymorph leucocytes	51%
Lymphocytes	49%
Large Mononuclears	9%

14.4.35. Temperature of 99.6 F. Pulse 86 per minute.

A local injection of Novocain (about 2 ccs.) was injected under and into the skin of the area which had been selected by percussion as the most suitable for the spleen puncture. The skin had previously been sterilized with spirit.

The patient was asked to take a deep breath, and a needle 1½" long was pushed through the abdominal wall into the spleen. A syringe was attached to the needle and a very small quantity of blood was sucked into the barrel. This blood was used to make six blood slides which were examined microscopically.

The/

The patient behaved very well throughout the operation and did not complain of pain. His pulse was strong and regular.

17.4.35. The Orderly Officer was called out to see this patient four hours later. On arrival he found him in a state of complete collapse with distension of the abdomen. The end of the bed was raised, and hot water bottles were applied. He expired almost immediately.

Leishman Donovan Bodies were isolated by the Laboratory from the blood smears provided.

Post Mortem Report.

External Examination:- The abdomen was very distended and serous fluid at once gushed out on opening. This later became blood stained and the abdomen was found to be full of blood clots. On the postero-lateral border of the spleen there was an abrasion measuring about two inches. Blood was oozing from this. The mark of the needle where splenic puncture had been done was about four inches anterior to this, and showed no laceration of the spleen substance.

Cause of Death: Shock and haemorrhage following spontaneous rupture of a very much enlarged and softened spleen.

Summary.

This was a young Gurkha with a spleen much larger than the history suggested. He was in the Indian Military Hospital, Dehra Dun for only eight days, and died before receiving specific treatment. He was the only fatal case that I have treated.

The post mortem examination revealed that death was not due to the splenic puncture, but I have ever since regarded the operation as a serious one.

CASE NO.7.

DHAN BAHADUR. AGE 17 YEARS.

Admitted: 12.2.35.

Complaints: Fever and Weakness.

History.

Patient has been unwell during the last six months suffering from intermittent attacks of fever and a growing feeling of weakness and lack of energy.

Examination. Temperature 98.4 F.

Alimentary System.

Tongue clean and moist. Abdomen - spleen markedly enlarged about two finger breadths below the costal margin. Liver also readily palpable.

Circulatory System.

Pulse 80 per minute and regular in time and force. Heart not enlarged. No murmurs present.

Respiratory System.

Respirations 20 per minute. Chest expansion normal. Resonant percussion note. Vesicular breath sounds.

Other Systems. Nil to note.

Treatment and Progress.

14.2.35. Splenic puncture performed. Result negative. No L.D. bodies seen.

CLINICAL CHART.

(To be attached to the case sheet.)

A. F. B-181.

~~British~~ / Indian Military Hospital at Dehra Dun

No. _____ Rank Rifleman Name Dhan Bahadur. Unit _____ Age 17 Service _____

Disease Kala Azar. Date of Admission _____ Date of Discharge _____ Result _____

Dates of Observation.																															
Day of Disease.																															
Temperature, Fahrenheit.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.
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Pulse per Minute	70/82	74/90	70/72	74/76	70/70	72/74	70/72	72/74	70/72	72/70	70/76	74/76	70/74	72/80	96/82	86/80	84/94	90/100	88/100	90/92	86/80	84/98	96/90	84/88	82/90	78/80	76/80	74/76			
Respirations per Minute.	18/22	20/24	18/18	18/20	18/18	18/20	18/20	18/18	18/18	18/18	18/18	18/20	18/20	18/22	26/22	22/20	20/24	20/26	22/24	22/20	20/20	18/24	22/20	20/20	20/22	20/20	18/18	18/20			
Motions.	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/1	1/0	0/1	1/0	1/0	1/0	0/0	1/1	0/1	1/0	0/0	1/1	1/0	1/0	1/1	1/0	1/0	1/0	1/0	0/0	0/1			

Signature _____ In charge of case.

MFP—662 C I (E)—(E-247)—27-7-35—100,000.

15.2.35. Sputum examined for B. tuberculosis. None seen. Spleen and liver still markedly enlarged.

19.2.35. Patient complained of cough. On auscultation there were a few sibilant rhonchi at the right base.

20.2.35. Blood pressure 120/68 mm. of Hg.

21.2.35. Complained of cough. Examination of chest revealed nothing to note.

25.2.35. Splenic puncture performed. Result negative.

28.2.35. Red Blood count 2,700,000 per c.cm.
White Blood count 2,187 per c.cm.

Differential count:

Polymorphonuclears (neut.)	51%
Small lymphocytes	40%
Large mononuclears	6%
Eosinophil polymorphs:	3%

Proportion of whites to reds = 1 : 1234.

1.3.35. Intravenous injection. Neostibosan gr.3. No reaction. General condition better.

3.3.35. Tongue clean and moist. Patient looked less anaemic. Liver slightly reduced in size. Intravenous injection. Neostibosan gr.3. No reaction.

4.3.35. Temperature normal after injection.

6.3.35. Neostibosan gr.5.

7.3.35. Neostibosan gr.5. Size of spleen increased.

13.3.35. Slight cough. Temperature 101 F.

14.3.35. Condition improved. Temperature normal. Spleen still very large. Neostibosan gr.3.

16.3.35. Patient pale. Slight rise of temperature daily. Neostibosan gr.5.

20.3.35. Spleen down to umbilicus. Epistaxis twice.

23.3.35. Differential blood count:-

Polymorphs	63%
Small lymphocytes	31%
Large mononuclears	2%
Eosinophils	3%
Basiphils	1%

Aldehyde test - Positive.

25.3.35. Patient anaemic but well nourished. Liver - eight ounces daily.

27.3.35. Following splenic puncture Leishman-Donovan bodies were isolated.

28.3.35. Neostibosan 0.2 gm. intravenously.

30.3.35. Neostibosan 0.2 gm.

1.4.35. Neostibosan 0.2 gm.

3.4.35 Neostibosan 0.2 gm. Spleen and liver greatly reduced in size. Weight increased.

5.4.35. Neostibosan 0.2 gm.

7.4.35. Neostibosan 0.2 gm. Patient much improved. Spleen now just palpable. Aldehyde test weakly positive. Patient fit for discharge but to attend daily for observation and tonic treatment.

Summary.

A young Gurkha sepoy treated in Dehra Dun. His spleen was two finger breadths below the costal margin with a history of six months duration. He had a very clean tongue throughout. Splenic puncture was negative on two occasions, but positive on the third attempt. The blood showed a rise in eosinophils which was probably due to infection with worms. He was treated with 12 injections of neostibosan and made a good recovery. No relapse took place in the next two years.

CASE NO.8.

SARBA SINGH. AGE 30 YEARS.

Admitted: 2.3.35.

Hospital: I.M.H. Dehra Dun.

Complaints: Fever, Rigors and Pain in the back.

History.

Patient has not been well for the last six months during which time he has been on furlough. At intervals he has been suffering from rigors and fever accompanied by pains in his back. This pain has been less severe lately. On the evening before admission he vomited.

Previous History. 1933 Malaria (M.T.)
1934 Bacillary dysentary.

Examination.

Circulatory System.

Pulse 86 per minute and regular in time and force. Heart nil to note - no enlargement, no murmurs.

Respiratory System

Respirations 20 per minute. Expansion normal. Resonant percussion note. Vesicular breath sounds accompanied by occasional rhonchi bilaterally.

Alimentary system.

Tongue furred but moist. Spleen enlarged three finger breadths below the costal margin.

CLINICAL CHART.

(To be attached to the case sheet.)

A. F. B-181.

~~British~~ Indian Military Hospital at Dehra Dun

No. _____ Rank Rifleman Name Sarba Singh Unit _____ Age 30 yrs Service _____

Disease Kala Azar. Date of Admission _____ Date of Discharge _____ Result _____

Dates of Observation.																														
Day of Disease.																														
Temperature, Fahrenheit.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.
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97°	·8 ·6 ·4 ·2																													
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Pulse per Minute	84/100	90/94	96/102	96/102	90/82	84/90	100/104	96/100	98/94	90/86	78/80	74/72	66/70	72/88	86/90	80/86	72/84	70/68	72/92	80/84	60/66	70/62	68/66	70/67	66/64	68/70	72/78	76/64	80/78	68/70	68/64
Respirations per Minute.	18/26	18/20	22/22	24/24	20/20	20/22	22/24	22/24	22/22	22/24	20/24	24/26	22/24	20/26	18/20	18/20	18/22	20/18	18/22	18/24	18/20	20/20	18/18	18/24	18/24	20/22	22/22	20/20	18/20	18/18	18/18
Motions.	1/0	1/0	1/0	1/0	0/1	1/0	1/1	0/1	1/0	1/0	1/0	1/1	1/0	1/0	1/0	1/0	0/1	1/0	1/0	1/1	0/1	1/0	1/0	1/0	1/0	1/1	0/1	1/0	1/0	1/0	1/0

Signature

In charge of case

MEP—600 C.I.(T)—17 DA[illegible]

Other systems. Nil to note.

Investigations.

A blood film was examined microscopically for Leishmania and malaria parasites without finding any.

3.3.35. Red blood count 3,900,000 per c.cm.
White blood count 4,400 per c.cm.
Differential blood count:-
Polymorphs 52%
Lymphocytes 41%
Large mononuclears 4%
Eosinophils 2%

Temperature 100 F.

5.3.35. Stool examination - no ova seen.
Erlich's diazo reaction negative.

6.3.35. Widal reaction.
B. typhosus 35
B. paratyph. A nil in twenty five
B. paratyph. B. 25
T.O. nil in twenty five.

Blood culture sterile after 24-48 hours.

7.3.35. Patient looks ill and very pale. Spleen is increased in size and reaches half way down to the umbilicus. Temperature 102 F. Pulse 66 per minute.
Treatment - Pulv. Ipecac. Co. (nocte)
Glucose one ounce.

12.3.35. Temperature 100.5 F. Pulse 84 per minute.
Faeces show no ova: no cysts.
Treatment - Urotropine gr.10 t.i.d.
Glucose - to be continued.

16.3.35. Spleen is now very large. Urine, faeces and Widal reaction negative.

20.3.35. Sputum negative for B. Tuberculosis.

21.3.35. Splenic puncture performed. No L-D bodies isolated. Urine and faeces negative.

23.3.35. Temperature persistently swinging.

28.3.35./

28.3.35. Splenic puncture again performed. Leishman-Donovan bodies isolated in large numbers.
Red blood count 3,400,000 per c.cm.
White blood count 3,480 per c.cm.
Differential blood count:-

Polymorphs	48%
Lymphocytes	43%
Large mononuclears	8%
Eosinophils	1%

29.3.35. Intravenous Neostibosan gr.3 - no reaction.

31.3.35. Same gr.5

2.4.35. Condition slightly improved. Spleen still very large but does not seem to be increasing.

4.4.35. Neostibosan gr.5.
Patient still rather pale and weak.

6.4.35. Neostibosan gr.5.

8.4.35. Neostibosan gr.5. Spleen slightly reduced in size. Patient feels better. Temperature normal.

10.4.35. Neostibosan gr.5. Eating well and gaining in weight.
12.4.35. Neostibosan gr.5.
14.4.35. Neostibosan gr.5. Spleen now two finger breadths below the costal margin.

16.4.35. Neostibosan gr.5. Is taking nourishing diet. Gaining in weight.

18.4.35. Neostibosan gr.5. Injections stopped.

26.4.35. Spleen is now only just palpable. Patient feels very well. Fit for discharge.

Later History.

Patient had a slight relapse on return from four months furlough. Recovered rapidly on treatment.

10.1.37. Patient seen again. Now in excellent health, and says he has had no more relapses.

Summary.

A rather older Gurkha than the previous two.

Splenic/

Splenic puncture was negative the first time it was carried out, but was positive a week later. He had a clean tongue and a spleen three fingers below the costal margin. He was treated with ten injections of neostibosan and after discharge had a slight relapse. However, I met the patient again in Chittagong two years later, and found him very fit.

CASE NO.9.

KARBIR ALE AGE 23 YEARS.

Admitted: 17.2.36.

Hospital: Indian Military Hospital, Roorkee.

Complaint: Fever.

History.

The patient says he has not been well for the past two days. At first he had a rigor followed by fever but did not sweat at all. The fever left him but returned the next day preceeded by a rigor.

He has not vomited, and his bowels are regular. No cough. No trouble with his water.

Previous History. Bacillary dysentery 1930.
Scabies 1933.
Malaria (Clinical Relapse) Jan.1936.

During the past six months he says he has suffered from attacks of fever.

Examination. Temperature 103 F.

Circulatory system.

Pulse 120 per minute and regular in time and force. Heart not enlarged. No murmurs present.

Alimentary System.

Tongue clean and moist. No sore throat. Abdomen is not tender. Spleen very easily palpable and reaches half way to the umbilicus. Liver slightly enlarged.

Respiratory System.

Respirations 30 per minute. Breath sounds vesicular. No accompaniments. Has just had an attack of epistaxis.

Treatment and Progress.

18.2.36. Mist. Quinine t.i.d. (30 gr. quinine daily).

19.2.36. Temperature 101 F. Pulse 96 per minute. Patient feeling fairly well. No complaints except fever. Third and final injection of quinine hyd. gr.5 given intramuscularly.

20.2.36. Temperature still remains elevated. Patient feels well however.
Blood count: R.B.C. 3,380,000 per c.mm.
W.B.C. 5,000 per c.mm.

Slides show slight variation in size and shape of red corpuscles. Poor haemoglobin content. Very few white cells were seen. Those present were in apparently ordinary proportions. No Leishman-Donovan bodies were seen. No malarial parasites present.

Treatment. Patient received ¼ lb. liver and a drachm of marmite daily as well as 30 gr. of quinine by mouth.

21.2.36. Splenic puncture performed. Slides were stained with Leishman and Giemsa stains. Leishman Donovan Bodies were seen in large numbers.

22.2.36. Intramuscular injection 0.15 gms. Urea Stibamine. Well marked haemic murmur in pulmonary area
Aldehyde Test +
Blood Pressure 100/65.
Patient passed a round worm in his stool today.

23.2.36. White Blood Count 2,400 per c.mm.
Temperature normal.
Intravenous injection Urea Stibamine 0.15 gm.
Blood taken off for an Aldehyde Test which was positive.

25.2.36./

CLINICAL
(To be attached t

No. 7037 Rank Rifleman Name Karbir Ale. age 23

Disease Kala Azar. Date of Admission 1

Dates of Observation.																
Day of Disease.																
Temperature, Fahrenheit.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Time. A.M. P.M.	Tim A.M.
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Pulse per Minute	116	120/116	90/98	96/116	104/110	86/82	80/108	82/90	80/80	76/74	74/74	74/70	72/70	70/72		
Respirations per Minute.	28	30/30	26/24	24/28	26/24	24/24	24/26	22/20	20/26	20/24	20/20	20/18	18/20	18/18		
Motions.	1	1/0	1/1	1/1	0/0	0/1	1/0	0/1	1/1	0/0	0/0	0/1	0/1	1/6		

MFP—662 C I (E)—(E-247)—27-7-35—100,000.

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No. 7037 Rank Rifleman Name Karbir Ale. U

Disease Kala Azar. Date of Admission Date

Dates of Observation.	20 2/36				21			22			23			24		
Day of Disease.																
Temperature, Fahrenheit.	Time. 8 12 A.M.P.M.	Time. 4 8 A.M.P.M.	Time. 12 4 A.M.P.M.	Time. 8 12 A.M.P.M.	Time. 4 8 A.M.P.M.	Time. 12 4 A.M.P.M.	Time. 8 12 A.M.P.M.	Time. 4 8 A.M.P.M.	Time. 12 4 A.M.P.M.	Time. 8 12 A.M.P.M.	Time. 4 8 A.M.P.M.	Time. 12 4 A.M.P.M.	Time. 8 12 A.M.P.M.	Time. 4 8 A.M.P.M.	Time. 12 4 A.M.P.M.	
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Pulse per minute	104/108	110/108	110/110	104/104	100/106	108/108	104/106	110/108	108/106	86/98	82/94	88/86	82/94	108/108	104/90	
Respirations per minute.	26/24	24/24	24/24	24/24	24/24	24/24	24/24	26/24	24/24	20/24	20/22	22/22	20/24	26/26	22/24	
Motions.	0/0	0/0	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	1/0	0/0	1/0	1/0	0/0	

MFP—319 C 1[illegible](E)—(E-85)—3-8-36—100,000.

25.2.36. Temperature still irregular.
Liver and spleen remain the same size.
Intravenous injection Urea Stibamine.

27.2.36. Intravenous injection Urea Stibamine.
Temperature now normal. Appetite increased.
Spleen much reduced in size. Liver remains the same size.

Urea Stibamine intravenously 0.2 gm.
Liver 3 IV. daily.

29.2.36. Spleen further markedly reduced in size.
Temperature normal.
Presence of Leishman Donovan Bodies confirmed by Brigade Laboratory.
Sixth intravenous injection Urea Stibamine 0.2 gm.

2.3.36. Intravenous injection Urea Stibamine 0.2 gm.
Patient has gained 4 lbs. in weight in four days.
Red Blood Count 3,940,000 per c.mm.
White Blood Count 6,600 per c.mm.

3.3.36. Five round worms were passed after course of Santonin.
Temperature is still normal.
Urea Stibamine to be withheld in the meantime.

5.3.36. Spleen is not palpable except on very deep respiration.
Liver reduced in size, but still easily palpable.
General progress satisfactory.

Santonin gr.IV to be taken every second day for three days.

10.3.36. Spleen not palpable. Liver greatly reduced in size and now nearly normal.
Red Blood Count 4,330,000 per c.mm.
White Blood Count 5,000 per c.mm.
Haemoglobin 88%

15.3.36. Red Blood Count 5,090,000 per c.mm.
White Blood Count 5,200 per c.mm.
Haemoglobin 98%

16.3.36. Discharged.

Summary.

The history in this case was rather indefinite but was probably of six months duration. The spleen was enlarged to just short of the umbilicus. He had a few respiratory symptoms and epistaxis was a marked feature at the commencement. The aldehyde test was positive and Leishman Donovan bodies were seen after puncturing the spleen at the first attempt.

The white cell count dropped suddenly from 5,000 per c.mm. at the time of first observation to 2,400 per c.mm. later on.

This case was complicated by ascariasis. Several parasites were passed.

A total of seven injections of Urea Stibamine were given and the patient made a good recovery.

CASE NO.10.

MAN BAHADUR THAPA. AGE 26 YEARS.

Admitted: 15.11.35.

Hospital: Indian Military Hospital, Roorkee.

Complaint: Fever and Rigors.

History.

The patient was well until three days ago when he had a rigor which was followed by fever. He has also been suffering from a sore throat and cough, and today he vomited once.

Examination. Temperature 105 F.

Circulatory System.

Pulse 110 per minute and regular in time and force. Heart, apex beat not palpable. Both sounds closed.

Alimentary System.

Tongue clean and moist. Abdomen. Spleen is very much enlarged being palpable about a hand's breadth below the costal margin. It is firm in consistence, and is not tender.

Respiratory System.

Respirations 28 per minute. Chest gives a resonant note on percussion. Vesicular breath sounds accompanied by bilateral rhonchi.

CLINICAL CHART.

(To be attached to the case sheet.)

A. F. B-181.

~~British~~ Indian Military Hospital at Roorkee

No. 1580 Rank Rifleman Name Man. Bahadur. Unit 1/2nd Gurkha Rifles Age 26 Service

Disease Kala Azar. Date of Admission 15/11/35 Date of Discharge Result

Dates of Observation.	13/11	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1/12	2	3	4	5	6	7						
Day of Disease.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25						
Temperature, Fahrenheit.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.	Time. A.M.P.M.
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Pulse per Minute	100	64/120	116/124	110/112	96/108	106/100	100/98	96/106	80/98	84/96	110/108	98/88	96/88	100/108	96/102	88/104	84/104	88/98	84/80	72/74	80/76	74/78	72/72	72/74	70/70						
Respirations per Minute.	24	18/30	22/30	22/28	24/26	26/26	24/24	26/26	24/26	24/26	28/28	26/26	26/24	24/28	24/26	24/26	24/26	22/24	22/20	18/20	20/20	20/18	18/20	18/20	18/18						
Motions.	0	1/1	1/0	1/1	1/1	1/0	1/1	1/0	E/0	1/1	1/0	0/0	1/0	E/1	1/0	1/0	1/1	1/1	1/0	1/0	1/0	1/1	0/1	1/1	1/0						

Signature In charge of case.

MFP—662 C I (E)—(E-247)—27-7-35—100,000.

Other Systems - Nil to note.

Treatment and Progress.

A stimulant expectorant mixture was given and also two tablespoonfuls of Castor Oil.

17.11.35. Mis. Quinine 1/3 t.i.d. (30 gr. quinine daily).

20.11.35. Temperature still remains above normal. Patient complains of pains in his bones. Spleen is very much enlarged. Rhonchi readily auscultated on both sides.

No Malarial Parasites seen on examination of blood slides.

Tongue is thickly coated and a little dry.

21.11.35. Patient states that he has been in residence in Landikotal, Delhi, Dehra Dun, Simla and Nepal.
Blood. R.B.C. 3,400,000 per c.mm.
W.B.C. 3,000 per c.mm.

Aldehyde test negative. Blood sent for culture and Widal reaction. Liver palpable.

Patient's complexion is a dark dusky colour suggestive of kala azar.

23.11.35. Put on 'Seriously Ill' list.
Differential blood count:

Polymorphonuclear leucocytes	18%
Large lymphocytes	62%
Small lymphocytes	20%
Eosinophil leucocytes	Nil

No Leishman-Donovan bodies seen.

26.11.35. White blood count 2,000 per c.mm.

27.11.35. Leishman-Donovan bodies seen in blood films.

28.11.35. Splenic puncture performed and Leishman Donovan bodies seen.

20.11.35.

Widal (25.11.35)	Widal (20.11.35)
T = 1 in 35	T = 1 in 35
A = 1 in 135	A = 1 in 135
B = 1 in 60	B = 1 in 70
T.O. = Nil	T.O. = Nil

Urea Stibamine 0.15 gm. injected intravenously.

CLINICAL CHART.

(To be attached to the case sheet.)

A. F. B-131.

~~British~~ / Indian Military Hospital at Roorkee.

No. 1580 Rank Rifleman Name Man. Bahadur. Unit 1/2nd Gurkha Rifles Age 26 Service

Disease Kala Azar. Date of Admission 15/11/35 Date of Discharge Result

Dates of Observation.	21/11		22			23			24			25			26			27			28			29			30		
Day of Disease.	9		10			11			12			13			14			15			16			17			18		
Temperature, Fahrenheit.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 12 4 8 12 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.	Time. 4 8 12 4 A.M.P.M.	Time. 8 12 4 8 A.M.P.M.
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Pulse per minute	98/94	96/104	108/96	84/96	108/104	100/88	108/104	96/98	102/100	98/90	96/116	88/96	86/94	94/96	102/108	100/108	106/106	108/96	100/102	106/108	108/88	96/104	108/90	86/104	104/108	106/102	98/88	96/84	/ / /
Respirations per minute.	24/24	26/28	28/26	24/26	28/28	26/24	32/30	26/24	28/26	24/26	26/28	24/24	24/26	26/28	28/28	28/28	28/28	28/24	26/26	28/26	26/24	26/26	28/26	24/26	26/26	28/26	24/22	20/20	/ / /
Motions.	0/0	E/0	0/0	1/0	1/0	0/0	1/0	1/0	1/0	0/0	1/0	0/0	1/0	0/0	E/0	0/1	0/1	0/0	0/0	0/0	0/1	0/0	0/1	0/0	0/1	0/1	1/0	0/1	/ / /

Signature In charge of case.

MFP—319 C I(E)—(E-85)—3-8-36—100,000.

1.12.35. Temperature now normal.
Urea Stibamine 0.15 gm. injected intravenously.

Red Blood Count 2,380,000 per c.mm.
White Blood Count 1,600 per c.mm.

3.12.35. Urea Stibamine 0.2 gm. injected intravenously. No temperature. Spleen shows marked reduction in size.

5.12.35. Urea stibamine 0.2 gm. injected intravenously. Spleen further reduced in size.

7.12.35. Urea stibamine 0.2 gm. injected intravenously.

9.12.35. Urea stibamine 0.2 gm. injected intravenously.

11.12.35. Urea stibamine injected intravenously 0.2 gm. (7th injection).

15.12.35. Fit for discharge. Spleen still just palpable.

Summary.

This patient gave a history of only five days duration. The spleen was a hand's breadth below the costal margin which suggests that the illness was of longer duration. The aldehyde test was negative. This , in the first three months of this disease is the usual result.

The blood showed a typical diminution in the number of polymorphonuclears and an increase relatively of lymphocytes.

Leishman Donovan Bodies were seen in blood films as well as in smears from splenic puncture. There was a noticeable rise in the Widal.

The patient was given seven injections of Urea Stibamine and made an uneventful recovery.

Number	Name	Sex	Duration of Disease	Place	Occupation.	Age	Size of Spleen	Type of Fever	L.donovani Spleen Pte.	Emaciation	Size of Liver	Red B.C.	White B.C.	Aldehyde Test	Chopra Test	Blood Ratio.	Treatment	Result
1	Sharif Jan	F.	8 months	Chittagong	Wife of contractor.	30 yr.	Greatly enlarged	Remittent	Not done	Marked	Easily palpable.	2,560,000	1,800	Positive	Positive	1:1422	Urea Stibamine	Greatly improved.
2	Ahmad Hussain	M.	1 year	Chittagong	Agriculture.	12 yr.	Greatly enlarged	Remittent	Not done	Extreme	Easily palpable.	3,100,000	2,800	Positive	Positive	1:1107	Urea stibamine	Greatly improved.
3	Abdul Huq.	M.	3½ yrs.	Chittagong	Agriculture.	10 yr.	Greatly enlarged	Continuous	Not done	Extreme	Easily palpable.	2,500,000	4,400	Positive	Positive	1:586	Urea stibamine	Greatly improved.
4	Bakshu Mia	M.	1 year	Chittagong	Agriculture.	25 yr.	Greatly enlarged	Remittent	Not done	Extreme	Easily palpable.	2,370,000	2,800	Positive	Not done	1:846	Urea stibamine	Greatly improved.
5	Tek Bahadur Gurung	M.	1½ yrs	Chittagong	Sepoy.	28 yr.	Greatly enlarged	Intermittent	L.donovani seen	Marked	Easily palpable.	2,800,000	1,600	Positive	Not done	1:1750	Urea stibamine	Cured.
6	Kharak Sing	M	2 months	Dehra Dun	Sepoy.	19 yr.	Greatly enlarged	Intermittent	L.donovani seen	Absent	Easily palpable.	2,515,000	2,400	Positive	Not done	1:1048	No specific treatment	Died.
7	Dhan Bahadur	M.	6 months	Dehra Dun	Sepoy.	17 yr.	Enlarged	Remittent	L.donovani seen	Marked	Easily palpable.	2,700,000	2,180	Positive	Not done	1:1230	Neostibosan.	Cured
8	Sarba Sing	M.	6 months	Dehra Dun	Sepoy.	30 yr.	Enlarged	Continuous	L.donovani seem	Absent	Not palpable.	3,900,000	4,400	Positive	Not done	1:886	Neostibosan	Cured.
9	Kirbir Ale	M.	6 months	Roorkee	Sepoy.	23 yr.	Greatly enlarged	Remittent	L.donovani seen	Absent	Palpable.	3,280,000	5,000	Positive	Not done	1:656	Urea Stibamine	Cured.
10	Man Bahadur Thapa.	M.	3 days	Roorkee	Sepoy.	26 yr.	Enlarged	Remittent	L.donovani seen	Absent	Not palpable.	3,400,000	3,000	Negative	Not done	1:1133	Urea Stibamine	Cured.

Summary of ten Cases of Kala azar.

Complications of Kala Azar.

Septic conditions, bronchitis, pneumonia, diarrhoea, and cancrum oris, are the commonest complications. In addition, subcutaneous haemorrhages and especially epistaxis are fairly often seen. Rao (53), Smith and Lal (I.M.G. 1934) have reported an interesting case of a Hindu aged twenty five years, who, while suffering from kala azar, developed an ulcer on the posterior margin of his anus. This ulcer spread rapidly and became raised and fan-shaped. It yielded Leishman-Donovan bodies on examination, and was cured by injections of neostibosan.

Reference to the records of the Civil Hospital, Chittagong, in connection with the occurrence of complications revealed the following statistics:-

(1)	Incidence of Cancrum Oris in all Kala Azar patients treated by the hospital.	3.4%
(2)	Incidence of Cancrum Oris in all Children suffering from Kala Azar and treated by the hospital.	12.7%
(3)	Incidence of diarrhoea and intestinal symptoms in all Kala Azar patients.	17.3%
(4)	Incidence of bronchitis and chest complications.	30.8%
(5)	Incidence of other complications.	35.8%

These consisted of ascites, anasarca, nephritis, huge spleen, fractures, abscesses, and other unconnected complications.

CANCRUM ORIS.

Special study has been made of cancrum oris as it was a very frequent complication in Bengali children admitted to the General Hospital, Chittagong. Six cases are described in detail below.

The age of the patients varied between 2½ and 8 years. Two cases occurred in girls and four in boys. In three of the cases emaciation was a marked feature and the other three were ill nourished.

It was found difficult to obtain an accurate history of the duration of the illness. Every effort was made, however, to find out the duration of the face lesion, and the average for this was three months.

Each case was examined carefully for Leishman-Donovan bodies. Scrapings were taken from the healthy margin of the lesions and examined after staining with Leishman or Giemsa stain. In spite of a careful search no Leishman-Donovan bodies were seen. In two cases, however, long tapering bacilli were noticed in large numbers. The majority of cases showed a very mixed infection of bacilli and staphylococci.

An irregular type of fever was present in all cases. In most it was remittent in type but intermittent and continuous temperatures were also seen. At times the fever was high, 103 to 104 F but more often/

often a low fever varying between normal and 101 F was present.

All cases except one showed marked enlargement of the spleen. The only one who did not have a palpable spleen was a very acute case which died before receiving specific treatment.

The liver was also enlarged, in some cases two finger breadths below the costal margin, with the exception of the acute fatal case already mentioned.

In only one case was a red blood count carried out. This showed marked anaemia. White blood counts were made in all except one case, and exhibited a leucocytosis which was constant. Counts varied from 6,800 per c.mm. to 16,200 per c.mm. The average white count was 11,700 per c.mm. These findings differ somewhat from those of Sir Leonard Rogers (Tropical Medicine page 82) who states that a leucopenia is the rule.

Differential blood counts showed an increase in the polymorphonuclears. In one case the polymorphs were 80%, but the average was less than this and some cases showed no increase. In one case, 2% basophils were present.

Chopra's test was carried out in three cases and was positive in each.

Treatment was of two kinds (1) Local and (2) Specific. The local treatment consisted in the washing/

Case No.	Age.	Place.	Sex.	Duration illness	Emaciation	Size of Spleen.	Size of liver	L.D.Bodies seen	Type of fever.	R.B.C.	W.B.C.	Aldehyde test.	Chopra test	Predominent Organism in cancrum	TReatment	Result.
1	4yrs.	Chitt.	M.	8 month	marked	very large	Easily palp.	No.	Remittent.	1,530,000	6,800.	Neg.	V.Positive	Bacillus	Urea Stib. Cod Liv.Oil. Calc.Lact.	Greatly improv.
2	5yrs.	Chitt.	M.	5 month	slight	not palpable	Not palpable	No.	Remittent	———	16,200	Not done	Not done	Mixed infection	Hydr. Perox.	Died
3	8yrs.	Chitt.	F.	2 month	marked	very large	Easily palp.	No.	Continuous	———	———	Not done	Not done	Bacillus	Urea Stib.	Cured
4	2½yr.	Chitt.	M.	1 month.	marked	just palpable	Easily palp.	No.	Remittent.	———	13,700.	Neg.	Positive	Mixed infection	Urea Stib. Hydr.Perox.	Greatly improv.
5	4yrs.	Chitt.	M.	2 month.	slight	just palpable	Easily palp.	No.	Intemittent.	———	8,700.	Not done	Not done	Mixed infection	Urea Stib. Calc.Lact. Creosote	Cured
6	2½yr.	Chitt.	F.	1 month.	slight.	just palpable	Easily palp.	No.	Intermittent.	———	13,700.	Negative	Positive.	Mixed infection	Urea Stib.	Greatly improved

Summary of Cases of Cancrum Oris.

washing out of the mouth with hydrogen peroxide and the administration of creosote T.I.D. Cod Liver Oil was given in large doses three or four times a day.

Specific treatment was given in the form of urea stibamine and was found to be effective. Daily injections of 0.025 gms. were given and increased gradually up to 0.05 gms. on the eighth day. Obstinate cases received 0.05 gms. up to the twelfth day, and then no more were given for at least a week. If improvement was not then marked, a second course was given.

As regards the results obtained, only two cases were cured, one died, and three were greatly improved. Two of the last category were ready for skin grafting but were removed by their parents before this could be done.

KALA AZAR - COMPLICATIONS - CANCRUM ORIS.

Cancrum Oris Case No.1.

NUR AHMAD. AGE 4 YEARS.

Admitted: 15.11.36.

Complaint: Pain in the arms and pain in the cheek.

History.

Patient has been born and bred in Chittagong. Eight months ago he began to suffer from attacks of fever occurring at irregular intervals, but later on the fever became continuous. Then, four months ago, a small swelling appeared on the gum of the left lower jaw which developed into a pimple and finally broke down and ulcerated. Since that time the ulcerated area has gradually and persistently increased in size until it now includes a large portion of the cheek. In the meantime, patient has been losing weight though he takes his food. There has been no associated vomiting, and the bowels are alternately constipated and loose.

Three months ago he was first brought for treatment and received three injections for kala azar. Recently patient has been much troubled by pains in his arms, as well as the persistent pain in the left cheek.

Case. 1. Boy, aged 4, showing cancrum oris.

Previous History. No illnesses apart from attacks of fever.

Examination. Temperature 98.2 F.

Examination of Ulcerated Area.

The ulcer situated on the left cheek covers an area of 1" x 1" including the left upper lip which has been completely removed thus exposing the underlying bone of the upper jaw, the gum having also been eaten away. There is some sloughing at the foot of the ulcer, the edges of which are irregular.

Although the child is able to take his food, it is stated that he is not able to drink. There is considerable associated pain.

Abdomen.

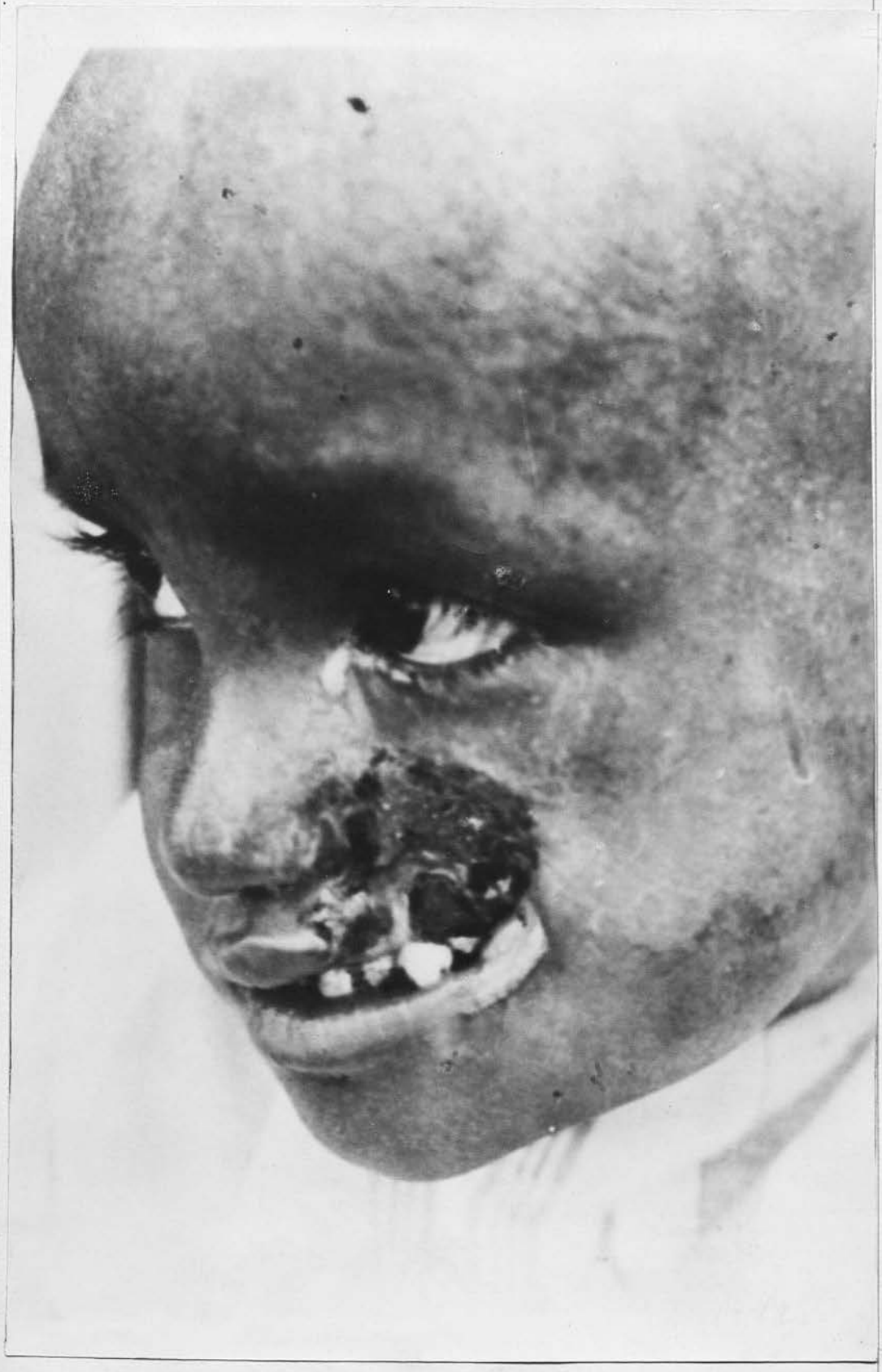
This is prominent contrasting with the general emaciation. Tongue is clean and moist. No abdominal tenderness. No free fluid. Spleen is readly palpable about three fingers breadth below the costal margin. Liver is also palpable.

Circulatory System.

Pulse 100 per min. - regular in time and force. Heart - no visible pulsations, no thrills. No enlargement. Both sounds closed in all areas.

Respiratory System.

Respirations 22 per minute. Chest wall very thin/



Case. 1. Cancrum oris.

thin, ribs prominent. Resonant percussion note. Vesicular breath sounds.

Skin normal.

The mouth was cleaned with peroxide of hydrogen, and the ulcer was dressed with electrolytic chlorine three times daily.

Mist. Creosote, two drachms thrice daily, and Calcium Lactate, gr. viii½ twice daily were given, and fifteen drops of rum were added to the feeds.

Cod Liver Oil was rubbed into the abdomen and chest, these parts being exposed to the direct sunlight.

Milk and sago were the chief foods. A first dose of 0.01 gm. Urea Stibamine was given, and thereafter 0.05 gm. ever 2nd day for 7 doses.

Tests.

Aldehyde Test +
Chopra's Test ++
Red Blood Count = 1,500,000 per c.cm.
White Blood Count = 6,875 per c.cm.
Haemoglobin 45%

Differential Blood Count:

Polymorph leucocytes	65%
Small lymphocytes	34%
Large lymphocytes	1.1%

Blood count taken four weeks later showed R.B.Cs. 2,160,000 per c.cm. W.B.Cs. 5,400 per c.cm.

Differential Blood Count:

Polymorph leucocytes	42%
Small lymphocytes	48%
Large lymphocytes	8%
Basiphil leococytes	2%

Progress.

General condition much improved. Ulceration became more healthy and slightly smaller with few signs of healing. Patient was ready for skin graft but was removed by parents on 13.12.36.

Summary.

This patient was a month in hospital and showed a marked improvement when taken away by his parents. An opportunity of skin grafting was not allowed.

Scrapings from the margin of the lesion on the mouth showed numerous large bacilli, but no Leishman Donovan bodies.

CANCRUM ORIS CASE NO.2.

ASUMIA. AGE 5 YEARS.

Admitted: 2.11.36.

Complaint: Ulcer in mouth and cheek. Weakness and wasting.

History.

Five months ago the patient had an attack of dysentery associated with fever which has since persisted intermittently. There was no vomiting. Two months ago he had whooping cough.

During the past fifteen days patient has been very ill. A small ulcer which started in his mouth very rapidly enlarged until it involved his nose and cheek.

Family History.

The father is a cultivator. There is one other child of one year. Three other children have died, one of dysentery.

Examination.

The child is very emaciated. There is a large ulcer involving the left side of the nose, the septum and the whole of the left cheek, an area of about 2" x 3". The base which is formed by the bone of the maxilla and teeth of the upper jaw is covered with/

Case. 2. Advanced Cancrum Oris. Photograph taken four hours before death.

with necrotic stinking tissue of a greenish colour.

Alimentary System.

Abdomen is normal in size. Spleen and liver are not palpable. There is a dry sore on the right buttock.

Circulatory System.

Pulse 90 per min. and regular in time and force. Heart - no enlargements, no murmurs.

Respiratory System.

Patient has a slight cough. Expansion normal. Resonant percussion note. Vesicular breath sounds with occasional accompanying crepitations.

Other Systems - Nil to note.

Investigations.

White Blood count 16,200 per c.cm. Examination of film scrapings taken from margins of ulcer. Large number of bacteria seen. Mixed infection of staphylococci and streptococci and large bacilla.

Treatment.

No specific treatment given. Eroded area cleansed with H_2O_2 and sterile saline dressing applied.

4.11.36. Patient died.

Summary.

This boy was admitted in a very grave condition and it was obvious from the start that his chances of recovery were very small if at all existent. He died on the third day after admission. It is possible that this case was not one due to kala azar. The history suggests a lowering of resistance due to dysentery and whooping cough.

CANCRUM ORIS CASE NO.3.

MUSTAPHA KHATOON (Female) AGE 8 YEARS.

Admitted: 11.11.36.

History.

During the past two months, patient has been ill suffering from continuous fever which was at times associated with rigors. She has been often troubled with headaches and has lost all appetite. There has been no vomiting. Patient has had a growing feeling of weakness. During the last two months there has been intermittent bleeding from the gums and tongue, her whole mouth being sore.

Examination. Temperature 99 F. Patient shows severe emaciation.

Alimentary System.

Tongue clean and moist. Both liver and spleen are readily palpable, the spleen reaching nearly to the umbilicus.

Circulatory System.

Pulse 90 per minute, regular in time and force. Heart - no enlargement. Both sounds closed.

Respiratory System.

Respirations 20 per minute. Expansion normal. Resonant note or percussion. Vesicular breath sounds.

The/

The skin of the abdomen shows considerable pigmentation.

On the lip there was a small commencing ulcer, and on her cheek a smaller one was also seen.

Investigations.

Microscopic examination of a scraping taken from the ulcers reveal staphylococci and numerous bacilli, but no Leishman Donovan bodies.

An examination of a blood film shows a preponderance of mononuclears.

Treatment.

13.11.36. Urea Stibamine 0.05 gm. 1st dose & 2nd doses.
" " 0.01 gm. 3rd " " 4th "
" " 0.15 gm. 6th " " 7th "

given on alternate days.

Progress.

The ulcers healed up after five injections. Spleen reduced in size but still palpable. Patient increased in weight. Fit for discharge on 2.12.36.

Summary.

An older child than the others. She presented an early ulceration which was obviously going on to cancrum oris. She was a long standing kala azar patient with more acute symptoms in the past two months. A case of this kind was found easier to cure than the more advanced forms. Scrapings taken from the healthy tissue surrounding the lesion on the lip yielded staphylococci but no Leishman Donovan bodies.

CANCRUM ORIS CASE NO.4.

RAJATA BHUSHAM (Male) AGE 2½ YEARS.

Admitted: 10.12.36.

History.

One month ago patient developed a small ulcer on the inside of the gum. This rapidly spread to the lip and perforated it. The child now suffers from irregular fever.

Examination.

On the right side of the nose there was a hole about the size of a rupee penetrating into the buccal cavity. The base and edges were necrotic and a foul smell came therefrom. The child was markedly emaciated.

Alimentary System.

Spleen was readily palpable below the costal margin. Liver enlarged.

Other Systems. Nothing abnormal to note.

Investigations.

W.B.Cs. 13,750 per c.cm.

Differential Blood Count:

Polymorph leucocytes	80%
Small lymphocytes	19%
Large lymphocytes	1%
Eosinophil leucocytes	Nil

Chopra's Test ++

Aldehyde Test Negative.

Treatment.

Gargles of H_2O_2.

Urea Stibamine on 14.12.36. .01 gm. continuing on every second day with .05 gm.

Progress.

Patient improved considerably under treatment but as soon as the ulceration healed, the parents insisted on removing the child. Condition on discharge greatly improved, but not completely healed.

Summary.

Another patient removed before he had received sufficient treatment. The ulceration was not so severe as seen in cases 1 and 2. A large increase in the polymorphs was seen on examination of the blood and there was a moderate leucocytosis. Chopra's test was positive and the aldehyde test negative.

CANCRUM ORIS CASE NO.5.

SULTAN MAHOMMAD. AGE 4 YEARS.

Admitted: 5.1.37. Chittagong.

Disease: Kala Azar with Cancrum Oris.

Complaints: Fever, pain in mouth.

History.

Patient has been ill for the past two months suffering from irregular attacks of fever which occurred more or less every three days. One month ago his cheek began to swell, and since then the swelling has gradually increased in size, while recently there has been a discharge of pus and sloughy material.

Family History.

There are three children altogether. Mother and father alive, no history of kala azar in family.

Previous History - Fever one year ago.

Examination.

Patient showed marked emaciation. There was a small umbilical hernia.

Alimentary System.

Both cervical and sublingual glands were readily palpable. The spleen was enlarged, reaching half way to the umbilicus. The liver was also palpable. The right/

CHART. (ie case sheet.)

A. F. B-181.

~~British~~ / Indian GENERAL ~~Military~~ Hospital at Chittagong

Unit _____ Age 4 years Service _____

Sultan Mohammad

of Discharge _____ Result _____

			5	6	7	8	9	10	11	12					
Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.	Time.
A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M.	A.M.P.M
			120/90	94/96	90/108	128/100	98/92	112/92	92/94	98/114					
			30/28	28/28	30/34	32/26	26/28	30/28	26/26	24/26					
			0/1	0/0	0/0	1/0	0/1	0/0	0/0	1/0					

right cheek was markedly swollen and inflamed. Inside the cheek there was a black necrotic ulcer about the size of a rupee the floor of which was sloughing and from which there was discharged a foul smell. The cheek was very tender to the touch.

Circulatory System.

Pulse 114, regular in time and force. Heart not enlarged. No murmurs present.

Respiratory System.

Respirations 26 per minute. Resonant percussion note. Vesicular breath sounds accompanied by occasional crepitations. W.B.C. 8,700.

Treatment and Progress.

6.1.37. Urea Stibamine daily starting with 0.025 gm. and going on with 0.05 gm. for 10 doses. Calcium Lactate. Creosote.

Scrapings from edge of ulceration.

Mixed infection with many types of bacteria. No Leishman Donovan bodies.

Progress.

26.1.37. General condition much improved. Spleen reduced in size. Temperature remains normal. Ulceration in right cheek practically healed. Discharged on account of lack of accommodation.

Summary.

The boy suffered from a severe but comparatively early cancrum of the right cheek. If untreated this would undoubtedly have progressed and eroded away the cheek. A rapid improvement took place with treatment.

CANCRUM ORIS CASE NO.6.

RAJATA KHATOOM (Female) AGE 2½ YEARS.

Admitted: 5.1.37. Chittagong.

Disease: Kala Azar with Cancrum Oris.

Complaint: Blood stained discharge from nose, ulcer on chin. Ulcerated hole in right nostril.

History.

One month ago patient suddenly developed fever accompanied by a rash behind the ear and on the face. This was only slight and disappeared after seven days.

She was then troubled with bleeding from her gums and nose where an ulcer had been gradually extending from the mouth. For a considerable time she has been suffering from constant discharge from the ear.

Previous History. Fever. Scabies. Dysentery.

Examination.

There was an ulcerated sinus extending from the lower end of the right nostril and communicating with the right alveolus. It was covered with slough and of blackish colour and emitted an offensive odour. The sloughing extended over the whole front of the lower and upper gums.

Alimentary System.

There were several palpable cervical glands. Spleen/

Spleen was enlarged about two fingers breadth below the costal margin. Liver was palpable about one finger's breadth below.

Circulatory System. Temperature 100.8 F.

Patient has had irregular fever for seven weeks - the temperature being sometimes normal and at other times up to 101.8 F.. Pulse 108 regular. No enlargement of heart. No murmurs.

Respiratory System.

Respirations 24 per minute. Resonant percussion note. Vesicular breath sounds.

Other Systems - Nil to note.

Investigations.

Urine Specific gravity 1012. Nil abnormal.
Aldehyde Test - negative.
Chopra's Test - positive.
White Blood Count 13,700 per c.cm.
Differential Blood Count:
Polymorph leucocytes 80%
Small lymphocytes 19.1%
Large mononuclears 1%

Treatment.

Urea Stibamine daily starting with .025 to .05 gm.

Progress.

25.1.37. Patient much improved. Ulceration almost healed now. Temperature has been normal for past week. Patient fit for discharge.

Summary.

Typical case of cancrum oris of moderate severity. Although the history given was only a month's illness, the patient admits having had fever before. The chopra test, size of spleen and blood confirmed that this was a case of kala azar complicated by cancrum oris.

PROGNOSIS OF KALA AZAR.

The mortality of kala azar used to be stated by various authorities as 80 to 90 per cent. During the past fifteen years, however, antimony compounds have been used and the prognosis is much improved. A fair estimate for the present day would be 5 to 10% deaths in civil cases and 1 to 3 % deaths in military cases.

On examination of the records of kala azar, patients admitted to the Civil Hospital, Chittagong, over a period of six months, I found that the mortality was 7.4%. This figure, however, included deaths from complications.

Diagnosis.

The diagnosis of kala azar in areas where the disease in endemic is easy. In places where the disease is uncommon, it may be a long time before it is suspected.

My first cases in Dehra Dun were not diagnosed until eight or ten days after admission, whereas they are usually diagnosed much earlier.

A long history of irregular fever with intervals of pyrexia, a large spleen, some loss of weight and perhaps enlargement of the liver, and a clean tongue, should make one suspect kala azar.

A/

A blood examination revealing anaemia and leucopenia, a positive Chopra or Aldehyde test and absence of malarial parasites in the blood in addition to the above features are sufficient for diagnostic purposes.

Proof can occasionally be obtained in examination of blood films in which in about 20% of cases, Leishman-Donovan bodies are found.

A surer method is splenic puncture. In kala azar patients the pelp is found to contain many Leishman-Donovan bodies.

The differential diagnosis is not always easy. Blood diseases such as leukaemia can be excluded by the microscope. Some, however, e.g. splenic anaemia are hard to distinguish and only the search for Leishman-Donovan bodies decides the diagnosis.

Chronic malaria is often hard to distinguish. The absence of parasites in films of blood examined on several occasions and lack of response to quinine exclude it.

Enteric fever may be hard to distinguish from kala azar. Both diseases cause enlargement of the spleen, irregular and perhaps continual fever, and leucopenia.

The Widal reaction, too, may show a considerable rise in both diseases, but is not maintained in kala azar, whereas a steady rise up to a point is found in enteric fevers.

Tuberculosis/

Tuberculosis at times closely resembles kala azar. There may be anaemia with moderate leucopenia, wasting, enlargement of spleen and irregular fever in both. Each in addition may have chest symptoms. The Chopra and Aldehyde tests, splenic punctures and the usual enormous splenic enlargement should prevent doubt for very long.

The history and the Wassermann reaction are usually enough to distinguish kala azar from syphilis.

TREATMENT OF KALA AZAR.

(i) Specific treatment.
(ii) General treatment.

(1) Specific treatment in adults now-a-days consists in the intravenous administration of one of the pentavalent antimony compounds. Von Heyden 471, Urea Stibamine and Neostibosan (Von Heyden 693) are the best known of these drugs. I have used the latter two and have a preference for Neostibosan.

In the cases described, three Sepoys were treated with Urea Stibamine and two with Neostibosan, while one died before receiving specific treatment. Two Bengali children, one adult female and one adult male were also treated with Urea Stibamine.

Two/

Two methods of administration were employed. In one the intravenous injections were given every second day from 3 to 5 weeks. In the other method described by Napier and Mullick (54) the injections were given daily up to eight or ten injections and repeated if necessary. The former method is more suitable for military patients where accommodation is not an urgent matter and a permanent cure is essential. The latter form of administration is better for civil patients, where they can only stay for a limited period, owing to shortage of beds.

In children the injections were given intramuscularly in to the buttock unless the venous route was easily available.

For an adult a preliminary dose of 0.10 gm. was given and this was followed by a dose of 0.2 gm. two days later, and thereafter every second day for ten to twenty injections. In the rapid intensive administration these doses were given daily.

The two brothers (Cases Nos.2 and 3 of series) aged ten and twelve years, received doses of 0.05 gm. for three days, then 0.10 gm. for three days, and then 0.15 gm. for three days.

Children below four years of age should be given smaller doses, e.g. 0.01 gm. for the first dose and 0.05 gm. for subsequent doses, either daily till eight to ten doses have been administered, or every second day for ten or more doses.

In/

In the General Hospital, Chittagong, the following routine methods of treatment were carried out, and gave satisfactory results:-

(1) Routine treatment of an adult:-

Urea Stibamine (intravenous injections)

1st day	0.05 gm.
2nd to 3rd	0.10 gm.
4th to 6th	0.15 gm.
7th to 12th	0.20 gm.
13th day onwards	0.20 gm. as required.

(2) Routine Treatment of a child (e.g. 2 years)

Neostibosan (intravenous injections)

1st day	0.05 gm.
2nd day	0.05 gm.
5th day	0.10 gm.
7th day	0.10 gm.
9th day	0.10 gm.
11th day	0.10 gm.
13th day	0.15 gm.

Thereafter twice a week as found necessary.

These doses were slightly increased or decreased if the patient was older or younger than two years. Neostibosan was injected intramuscularly as intravenous injection in children is difficult.

GENERAL TREATMENT.

A good nourishing diet is essential if the patient can eat it. Usually kala azar patients have good appetites and can eat large quantities. The diet should consist of the patient's staple food with the addition of fresh vegetables and fruit. Benger's, Horlick's, or Ovaltine food can be given in addition. Marmite, I have often used and found very beneficient and also cod liver oil.

For anaemia, iron tonics should be administered in large quantities. Calcium lactate in ten grain doses may be given to prevent haemorrhages.

CLINICAL SIDE-ROOM TESTS.

Aldehyde Test.

This was performed on eleven patients including three cases of cancrum oris. It was negative in the cancrum oris cases, and also in one of the kala azar cases of less than three month's duration. The technique employed was as follows. About 5 cc. of blood was removed from a vein at the elbow and allowed to stand until the serum separated. The simplest way was to take the blood one morning, and to do the test the following morning. Sometimes, however, the blood was given only eight hours to separate. With a pipette, 3 cc. of the serum was removed and placed in a clean, small test tube. One drop of 40% formaldehyde was then added to the serum. A positive reaction consisted in the serum solidifying at once or in the first two minutes after adding the formaldehyde. A weakly positive reaction gave a thickening of the serum and solidification after five or ten minutes.

Chopra Test.

This was carried out on seven cases, three of whom suffered from cancrum oris. It was positive in all seven cases, and was performed in the following manner.

3 cc. of blood was removed from a vein as in the aldehyde/

aldehyde test and left for 24 hours. A one per cent solution of urea stibamine in distilled water was then made and 2 cc. of this placed by means of a pipette in a test tube. Finally two drops of separated serum were allowed to flow down the test tube into the urea stibamine solution. A positive result was obtained when a flocculent precipitate formed within ten minutes. (vide Chopra, Gupta, David (55) and Napier (56)).

Chopra (57) in his recent book on therapeutics has modified his technique and describes his test as follows. 'Whole serum and serum diluted 1 in 10 with distilled water are put in miniature test-tubes (2½ to 3 inches long made by sealing one end of a piece of glass tubing 4 to 5 mm. in diameter) with a capillary pipette. A 4% solution of urea stibamine made with distilled water is then slowly run along the side of the tubes. A heavy coarsely-flocculent precipitate forms when the antimony solution comes in contact with the serum.....

In very early cases, 1 in 10 dilution of the serum should be employed sparingly as it may give negative results and whole serum should be used. A correct diagnosis can be made by this test in 88.2 per cent of cases as compared with 83.5 per cent of the aldehyde test.'

In/

In the Civil Hospital, Chittagong, I examined the records of eighty-one admitted cases of kala azar and found that the Chopra test was positive in every one. Aldehyde tests carried out on the same patients showed 37 positive and 44 negative. This large number of negative results is difficult to understand as it is not in agreement with the results obtained by the majority of investigators. As mentioned above, all my cases were positive except a very early one of less than three month's duration.

Spleen puncture.

This operation was carried out in six cases. Leishman-Donovan bodies were obtained on every occasion. There was one fatality, but this was proved by the post-mortem examination to be due to a spontaneous rupture of the spleen (see case report). The technique employed was as follows:-

The patient was given calcium lactate gr.10 three times a day for two days prior to the operation. He was made to lie on his back on the bed and told to take a big breath just before the puncture was made.

A needle two inches long, and of medium bore was sterilised along with a 5 cc. record syringe, and both were allowed to become absolutely dry. A spot was chosen about half an inch below the costal margin for the puncture to be made, and the spleen was carefully palpated/

palpated to make sure that this was suitable. The skin of the abdomen was thoroughly cleaned with iodine or methylated spirits and an assistant steadied the spleen with his hands.

The needle attached to the syringe was then inserted through the skin and then onwards in an upward and backward direction into the spleen. The plunger was then withdrawn and suction applied. Usually it needed to be withdrawn only a slight distance and on the first trace of blood appearing in the syringe the needle was withdrawn and a small pad of cotton wool soaked in collodion applied. A binder was then applied tightly round the abdomen and the patient urged to remain quiet.

Meanwhile the contents of the needle was squirted on to as many slides as possible, and allowed to dry. These smears were stained by either Leishman or Giemsa stains and examined for leishmania.

Recently a very detailed description of the technique of spleen puncture was published by Napier (58) in which he advocates the use of a special syringe which can be manipulated by one hand.

In the General Hospital, Chittagong, during the period 1.7.36 to 31.12.36 only six splenic punctures were performed. On these, four were positive and two negative.

In/

In my experience, a puncture could occasionally be negative on the first or second occasions, but was positive if repeated three times. Generally, it is not advisable to carry out splenic punctures more than is absolutely necessary to establish a diagnosis.

DERMAL LEISHMANIASIS.

Symptomatology.

A description of the clinical picture of this condition was given by Brahmachari (12) in 1922, and since that time Acton and Napier (43) and Napier and Das Gupta (13 and 14) have added to this and divided the disease into many types.

(1) Depigmented Areas. These may be very small or large enough to cover one side of a limb. In the beginning they are small, but gradually enlarge and coalesce. Finally the lesions become macular and slightly raised.

(2) Erythema. This varies in intensity, but is usually seen on the cheeks, lips and nose.

(3) Nodules. These are soft granulomatous growths, yellowish-pink in colour. They vary in size, but are usually as large as a split pea. Sometimes these nodules join and form plaques. They are anaesthetic and painless, and do not tend to break down. They appear on all parts of the body, but mostly on the face.

(4) Verrucose type. This consists of warty growths at the root of the nails of fingers and toes, and thickening of the distal phalanges of the digits.

(5)/

(5) Papillomatous type. The papillae of the skin are hypertrophied producing a rough, dry area of minute papillomatous growths.

(6) Hypertrophic Type. In this type the lips, eyelids, and nose become greatly hypertrophied and form swellings which do not pit on pressure.

(7) Xanthoma Type. Raised orange-coloured plaques on the bend of the elbow, axilla, inner side of thigh, outer canthus of eye, chin and mouth. They are painless and do not ulcerate.

(8) Mucous membrance lesions. A few cases have been described with nodular areas on the mucous surfaces of the lips and cheek. They did not as a rule ulcerate. One case, however, in a Hindu aged 20 had a cauliflower-like growth on his hard pulate, the centre of which ulcerated.

(9) Small Ulcerated Lesions. A case has been recorded of a small ulcer on the nose associated with other lesions typical of this condition.

(10) Extensive Erythema. A few cases have presented erythema all over the body, or at any rate all over the lower limbs in addition to nodules.

(11) Peri-onychial induration. Resembles verrucose type, but more generalised thickening rather than warty growths.

(12)/

(12) Fibroid Type. (Smith & Halder (15)). In this there is marked thickening of the phalanges suggesting dactylitis. The swelling is confined to the soft tissues. I have seen one case of this type in Chandraghona, Bengal.

Of all these types, the first three, namely depigmented areas, erythema, and nodules are common. Nos. 8, 9, 10 and 11 are rare.

CASES OF DERMAL LEISHMANIASIS.

GABA CHOWDHURI. AGE 55 YEARS.

Admitted: 2.11.36.

Home near Dacca.

Complaints: Weakness, fever, itchiness.

History.

Patient has had trouble during the past nine years. At first he suffered from fever which was not constant, there being frequent intervals of freedom. At that time he lost weight, but he is quite fit now. Then also he was troubled with swelling of his ankles. He was treated for a while in Dacca hospital and received two intramuscular injections. Eighteen months ago he first noticed swellings appearing on his fingers, the first to appear being that on his right index finger. They then began on his toes. These swellings have never been painful but patient is conscious of a cold sensation in his fingers. One year ago there was spontaneous bleeding from the fingers.

Patient has had no cough. His bowels are regular.

Previous History. Was in Dacca Hospital where he suffered from fever and rigors, and a large painful spleen.

Case of Gaba Chowdhuri showing lesions of Dermal Leishmanoid on fingers, toes and legs.

Family History.

Married. Four sons and one daughter, all of whom are well. None of the family suffer from a similar complaint.

Examination. Temperature 97.8 F.

Patient appeared to be fairly well nourished and slightly anaemic.

Alimentary System.

Tongue furred, but moist. No palpable cervical, axillary or inguinal glands. Tonsils not enlarged. Teeth in good condition.

Spleen and liver both just palpable below the costal margin.

Circulatory System.

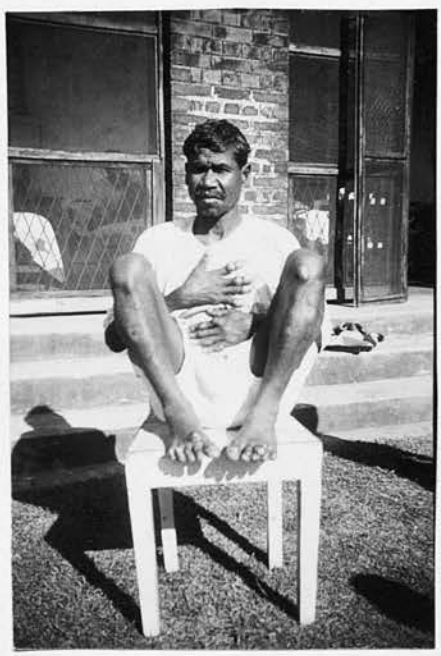
Pulse 72 per minute - regular in time and force. Heart - no enlargement. Both sounds closed.

Respiratory System.

Chest well covered. Expansion good. Resonant note on percussion with patches of hyper-resonance. Breath sounds vesicular with tendency to marked prolongation of expiration suggestive of emphysematous areas.

Nervous System.

Superficial and deep reflexes normal. No loss of power or sensation.



Case of Gaba Chowdhuri illustrating typical Dermal Leishmanoid lesions.

Examination of Lesions.

Right Foot. Every toe is affected with a large swelling. This swelling is not tender. It is firm and nodular with no fluctuation. There is no associated pain.

Above the toes on the dorsum of the foot, there is a lump covering an area larger than a rupee piled up, fungating, and of purplish colour.

Left Foot. Every toe is affected, particularly the middle toe which is distorted by a large nodular swelling. At the base of the fourth toe, over the metatarsal bone, is another large swelling.

Left Leg. There are a few small nodules over the anterior surface of the tibia, and a collection of nodules over the knee.

Right Knee. Collection of nodules over the lateral side. All these nodules occur on the bony areas, there being none in the soft tissues. At the back of both heels, there is marked thickening and cracking of the skin. There are no nodules on the body.

Left Hand. Every finger and thumb is distorted with large nodular swellings. The nails have been partially destroyed.

Right/

Right Hand. All the fingers and the thumb are affected with pinkish pimples, and very large nodules.

There is no loss of sensation. All nodules are on the exterior surfaces.

Face. There is a small nodule below the lower lip about the size of a pea. There is another small one on the left side of the nose, and another inside the right ear.

Investigations.

Urine Sp. Gr. 1010. Acid. Nil to note.

Stool: Ova of Ascaris. No cells.

W.B.Cs. 4,800 per c.cm.

R.B.Cs. 5,180,000.

Scrapings taken from one of the nodules and examined microscopically revealed the presence of L.D. Bodies.

Treatment and Progress.

After patient had received 14 injections of Urea Stibamine (2.8 gms. in all) he showed definite improvement especially as regards the nodules of the left hand which had shrunk considerably.

After 20 injections of Urea Stibamine, the swellings of fingers and toes were much reduced but still present.

ARTHINGTON HOSPITAL, CHANDRAGHONA

Name	Age	Sex	Caste	Ward	Bed	Residence	Admitted 2.11.36	Dis.
Gabba Chowdhuri							Diagn.	

Date	10						11						12						13						14						15											
	A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.			A.M.			P.M.		
	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10	2	6	10
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Temperature.

Pulse.

Respiration.

16.1.37. Patient was discharged in order to proceed to Dacca where he reported for further treatment at the Civil Hospital.

Summary.

This was the only case I have had the opportunity of seeing since arrival in Bengal. I was fortunate in being able to see the case at all as it occurred in the Baptist Mission Hospital at Chandraghona, about 32 miles up the Karnaphula river from Chittagong. The Mission doctor at first suspected the case to be one of leprosy, but on examination of smears from the fingers L. donovan bodies were seen in large numbers. I was given every facility to observe the case.

The history is a typical one of undiagnosed or at any rate insufficiently treated kala azar leading to skin manifestations seven years later.

On examination, the appearance of his fingers and toes was most striking and answered the description of the "fibroid type" of dermal leishmaniasis described by Smith and Halder.

I was able to obtain both ordinary and cine' photographs of his lesions. The former ones are attached.

This case received 20 injections before he was discharged. I remember well that the Mission doctor/

doctor was rather disappointed that after so many injections he was not completely cured. In this respect it bore out the opinion of Napier and Halder (59) who found that the only satisfactory treatment of Post Kala Azar Dermal Leishmaniasis was the intravenous injection of one of the pentavalent compounds of antimony which were efficacious in kala azar. On an average 5 gms. of Aminostiburea in 27 injections lasting 123 days were necessary.

The prognosis is good in all uncomplicated cases. The main difficulty is to persuade the patient and sometimes the doctor, to carry on with the treatment long enough.

Improvement is rapid up to a point once specific treatment has started, but it must be persisted in for a long time before an absolute cure is obtained.

Diagnosis.

This is fairly easy when the condition is suspected, but at present the clinical features of dermal leishmaniasis are not sufficiently well known to prevent frequent mistakes.

The history of a suspected case is very important as the disease practically always occurs one or two years after an attack of kala azar. Insufficient treatment of the visceral condition is apt to pre-dispose towards the cutaneous form.

Nodules/

Nodules, erythematous patches, and depigmentation should always make one look for dermal leishmaniasis, and it is an easy procedure to make smears from the blood or tissue juices and stain them with Leishman or Giemsa stains. Usually when this is done, L.donovan bodies are seen in large numbers. If still in doubt, the organisms may be cultured by inoculating some blood from the skin lesions into N.N.N. medium.

The differential diagnosis from leprosy is not easy and outside Calcutta the majority of dermal leishmaniasis case are still apt to be treated for the former disease. Occasionally leprosy and dermal leishmaniasis may be present at the same time.

According to E. Muir (60) the depigmented areas and nodular types of dermal leishmaniasis are especially apt to be mistaken for leprosy. The differences are as follows:-

(1) Depigmented skin areas. In leprosy the areas are larger and fewer in number, and the skin shows signs of growth at the margin. The lesions tend to be situated more on the extensor surfaces of the body. Also early cases of leprosy are often negative bacteriologically and as regards anaesthesia. In dermal leishmaniasis the depigmented areas are smaller and more punctate. They are more numerous and tend to cluster round the nose, mouth, chin, inner sides of thighs, and the shoulder/

shoulder regions. The margin is more clearly defined and they are usually negative on examination for L.donovan bodies.

(2) Nodular Type. The distribution is similar but tends to group round the nose and mouth in dermal leishmaniasis. Also in this condition the ears are apt to be exempt, which is the reverse of the case in leprosy, where the ears are often nodular along with the nose and mouth. Usually one finds B.leprae in the lesions or L.donovan bodies as the case may be. Also the history of previous kala azar helps to differentiate.

No other condition is likely to be confused to any great extent with dermal leishmaniasis.

Treatment.

On the whole this is disappointing, but good results can be obtained if treatment is continued over a period. The best drugs to use are pentavalent compounds of antimony of which neostibosan, urea stibamine, aminostiburea are the most commonly used.

Neostibosan. This should be given in 0.3 gm. doses on alternate days or twice weekly until at least 25 injections have been administered intravenously. A more/

more concentrated method and one which also gives good results is to give twelve daily injections of 0.3 gm. neostibosan till 3.7 gms. have been given. These injections may not be sufficient and one may have to continue them until thirty or even more have been received.

Sodium antimony tartrate. This is also a useful drug but is slow in its action. Often as many as thirty injections may be necessary. The drug is best administered as for oriental sore in gr.½ to gr.1½ doses dissolved in 5 c.cm. of sterile distilled water and injected intravenously.

Fouadin. This is a tri-valent aromatic compound of antimony and has been reported on favourably by Napier and Halder (I.M.G. July 1930). It is injected intravenously in an 8% solution. About twenty injections are necessary giving 4 c.cm. at each injection.

Aminostiburea.

Another pentavalent compound of antimony. It was used by Napier in 150 cases with considerable success. The injections were given intravenously twice weekly, the maximum dose being 0.2 gms.

Acid berbeine sulphate. This has been tried in the treatment/

treatment of dermal leishmaniasis. It causes shrinkage and disappearance of the gross swellings, but is not a practical form of treatment owing to the mode of administration.

Potassium iodide. This is an excellent additional drug for treatment. It is preferably administered in a course before the antimony preparation is given, but can be given at the same time.

Doses of 5 to 15 grs. three times a day can be given for a week depending on the reaction of the patient. This should then be followed by the antimony treatment if not already given in conjunction.

Summary.

The best treatment is to give a preliminary course of iodides followed a week later by neostibosan administered every second day. Progress is at first marked, but slows up after the first five or six injections. The final improvement is not generally obtained until at least 25 injections of one of the antimony preparations has been given. According to Smith and Halder (61) the effect of potassium iodide is less marked in those cases with isolated nodules and purely depigmented cases. The results of iodide treatment are best in the xanthoma and fibroid types.

ORIENTAL SORE.

Symptomatology. Typical sores appear first as small red papules which gradually increase in size and finally, after a varying period of months, turn bluish in colour, soften in the centre, break down and ulcerate. There is no associated pain and no itchiness.

The number of sores on one patient varies from one to seventeen or even more, but single sores are rather uncommon and a typical case usually presents not less than three or more than eight.

In Indian troops the majority of sores become secondarily injected as patients rub leaves, grass or cow-dung into them when out of hospital. When septic infection occurs, the sores become painful, the surrounding tissues become swollen and pus forms. The sores do not appear all at once and in the early stages of treatment, fresh sores frequently occur. All sores, however, do not conform to the type description. For example, large spread-out lesions appear (see photograph) which do not show much ulceration, at any rate not for a considerable time. The lesion consists more of a thickening of the skin with a raised margin and much scaliness. Other lesions are nodules which never ulcerate.

The/

Two typical oriental sores. The right foot and left arm of two different patients are shown.

Examples of less common types of oriental sore. The lesions are spread out and scaly without ulceration. The skin is considerably thickened.

The distribution of the sores is characteristic. They occur on the backs of the forearms, the backs of the hands, the fronts of the forearms and wrists, fronts of legs and ankles, on the face and neck. The distribution corresponds to the areas most exposed to sandfly bites.

The sores run a very chronic course, and, if untreated, usually heal in about a year. A certain amount of immunity is produced on recovery from infection and second attacks are practically unknown. In certain endemic areas in Persia the inhabitants are said to inoculate their children from these sores at an early age, so that they will not later on develop disfiguring scars on their faces.

On healing, even after treatment, a considerable amount of scar tissue is produced and in the case of the large and more chronic sores, these lesions are permanent.

In the sixty-four cases studied, circumstances made it possible to demarcate to the minimum incubation period. In 56 per cent it was three months or more. In 19 per cent, it was four months or more. Cases however, have been quoted in which the incubation was much more - even as long as three years. Napier says the incubation period is usually considered to be between six weeks and four months. (Napier and Halder (59)).

CASE NO.1.

CHUR SINGH. (Sapper) AGE 24.

History.

Patient was sent to Quetta in June 1935 and returned to Roorkee in November 1935. Three months ago he developed several sores, 1 on the left elbow, 1 on the nose, 2 on the back of the right hand and 1 on the back of the left hand.

Examination.

The lesions on the left hand and elbow had broken down forming ulcerated areas about ½" in diameter with irregular edges. Those on the right hand and nose had not broken down, being raised papules of a somewhat bluish colour. There was no pain or itchiness associated with any of the sores. Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Patient received intravenous injections of Antimony tartrate on alternate days starting with gr.½ and increasing the dose up to gr.1½.

23.3.36. Received subcutaneous injections Emetine gr.½ infiltrating tissues round margins of ulcers.

27.3.36. Subcutaneous injection Emetine.

10.4.36. Subcutaneous injection of orisol infiltrated into tissues round margins of sores.

14.4.36. I.V. injection Antimony tartrate gr.1½.

16.4.36. I.V. injection Antimony tartrate gr.2 in 5 c.cs.

18.4.36 I.V. Injection Antimony tartrate gr.2.

21.4.36. I.V. injection Antimony tartrate gr.II.

23.4.36. " " " " gr.II.

25.4.36. " " " " gr.II.

27.4.36. All sores completely dried up and healed. Discharged as cured.

Summary and Treatment.

11 intravenous injections Antimony tartrate (15½ gr.)

2 subcutaneous injections Emetine (gr.1)

1 subcutaneous injection Orisol (2 cc.)

Summary.

A typical case of oriental sore, showing Leishmania tropica bodies and cured after two month's treatment. This was one of the first cases admitted to the I.M.H. Roorkee. The treatment was mixed owing to the slow response obtained with antimony injections, and emetine and orisol were given a trial.

CASE NO.2.

SHIVE SAHAI. AGE 22 YEARS.

History.

Patient is a private servant who was formerly in service at Lahore. He came to Roorkee eight months ago. He then became troubled with sores which broke out on the back of his left hand, there being now ten in number. Similar eruptions appeared on the back of his left elbow, and he has had four on his neck and face, these sores forming crusted masses.

Examination.

Ten sores were present, some as large as a rupee and some smaller than a four anna piece. All were dirty and septic. No L.tropica were seen on examination of scrapings.

Treatment and Progress.

14.2.36. Patient received three injections of Antimony tartrate I.V. at intervals of one day, commencing with a dose of gr.¼ then gr.½ to gr.1. Follwing the second injection an eruption appeared resembling measles, whereupon patient had a rest of ten days. Later, he received two further injections. All the ulcers became dry except those on the left hand which remained raw and red.

2.3.36. Injection given, 1½ gr.

After/

After ten injections he had greatly improved, and stopped attending.

Summary.

This patient was the bearer of one of the Royal Engineer Officers in Roorkee. He acquired the disease in Lahore, and not Quetta, where practically all the other patients became infected. He had ten sores, but although they were clinically typical, Leishmania tropica bodies were not seen in the scrapings from the margins. The initial dosage of antimony was smaller than the dosage given in subsequent cases. In spite of this he developed an erythematous rash which interrupted treatment for ten days. He ceased to attend before he was completely cured but showed great improvement. Apart from saline dressings the only treatment was antimony.

CASE NO.3.

NARAIN DUTT. AGE 21 YEARS.

History.

Patient first noticed some small ulcers on his left foot 1½ months ago. There have been no similar eruptions elsewhere. He has felt no pain and has no sensation in association with these ulcers.

Examination.

Two small lesions with raised margins. One of them on the back of the left foot had ulcerated. No Leishmania tropica bodies were identified in scrapings.

Treatment and Progress.

21.2.36. Course of four alternate daily I.V. injections of antimony tartrate, followed by rest of 10 days, after which he received one further injection of gr.1. Dressings of normal saline were applied to the ulcerated areas. The tissues around the site of injection on the left arm became gangrenous, and patient complained of pain in right arm.

3.3.36. Lesions both showed signs of improvement.

9.3.36. Discharged as cured.

Summary.

Acquired infection in Quetta. Neither of his ulcers were severe and they reacted well to treatment with antimony. Leishmania tropica bodies were not seen.

CASE NO.4.

CHANGE SINGH. AGE 25 YEARS.

Admitted: 10.2.36.

History:

Patient, one month ago, noticed a pimple on the back of his right hand. This papule became soft and broke down to form an ulcer. A second ulcer developed on the back of his right wrist. He has only felt very slight pain in association with the ulcer and has not experienced any loss of sensation. No Leishmania were found in scrapings.

Treatment and Progress.

Patient received a course of six intravenous injections of antimony tartrate given on alternate days. The first dose consisted of gr.$\frac{1}{4}$, the second gr.$\frac{1}{2}$ and all subsequent doses gr.1. There was great improvement. After a rest period, he received four more injections. Thereafter two doses of emetine, gr.$\frac{1}{2}$, were subjected into the edge of the ulcer. 11.4.36. Discharged - cured.

Summary of Treatment.

10 Antimony tartrate injections.

2 Emetine hydrochloride injections.

Summary.

Patient had two fairly large ulcers which when seen first were secondarily infected. As a result of this, progress was slow. Emetine appeared to be helpful in hastening healing.

CASE NO.5.

ABDUL KARAIN. AGE 46 YEARS.

Admitted: 12.2.36.

History.

One month ago patient was troubled with sores, two appearing on the back of his left hand, three on the back of the right hand, and later on, the dorsum of both feet: four on the left and three on the right, then four on the right ankle and one on the left leg.

Examination failed to show Leishman bodies.

Treatment and Progress.

23.2.36. Patient received six I.V. injections of antimony tartrate, one on every alternate day, starting with a dose of gr.$\frac{1}{4}$, then gr.$\frac{1}{2}$, finally gr.1.
Saline dressings were applied to the ulcerated areas.
The lesions on the feet healed most satisfactorily.

20.3.36. Received a subcutaneous injection of Emetine gr.$\frac{1}{2}$ into the edge of the sore. Saline dressing applied.

27.3.36. Subcutaneous inhection Emetine.

17.4.36. Discharged - cured.

Summary.

The patient was a private servant - the bearer of/

of a Royal Engineer Officer - who accompanied his master to Quetta. He became heavily infected and had at least seventeen sores, many of these were septic and rather chronic. They healed with eight Antimony and two Emetine injections.

CASE NO.6.

GARWAR SINGH. AGE 24 YEARS.

Admitted: 19.2.36.

History.

Three months ago patient developed two sores on the back of his left hand. At this time he was in Quetta. Both sores started as papules, subsequently became soft and broke down.

Treatment and Progress.

23.2.36. Patient received three I.V. injections of Antimony tartrate, one on every second day in doses of gr.$\frac{1}{4}$, gr.$\frac{1}{2}$, gr.1.

2.3.36. Condition showed improvement.

20.3.36. After six I.V. injections, condition showed marked improvement, the ulcers having dried up.

6.4.36. Discharged - Cured.

Summary.

Patient suffered from two comparatively small ulcers which healed up in a month, with six injections of antimony.

CASE NO.7.

BISHAN SINGH. AGE 20 YEARS.

Admitted 1.2.36.

History.

Patient went to Quetta in July 1935. Patient noticed one and a half months ago that he had a sore on the middle of his left forearm. There was no associated pain, but sensation was lost in the affected region. Subsequently further sores appeared, first on the left wrist and then on the back of the right hand and on the left foot.

Examination.

Microscopic examination of a scraping taken from a sore failed to demonstrate Leishmania tropica bodies.

Treatment and Progress.

21.2.36. Patient received ten I.V. injections of antimony tartrate, one on every alternate day, commencing with gr.$\frac{1}{4}$, then gr.$\frac{1}{2}$ to gr.1. Dressings of normal saline were applied to the wounds.

2.3.36. Condition showed improvement.

20.3.36. Progress very slow. Had received fourteen I.V. Injections. Received a subcutaneous injection of Emetine gr.$\frac{1}{2}$ into the edge of the ulcers.

23.3.36. Received 2nd subcutaneous injection Emetine.

27.3.36. Subcutaneous injection Emetine gr.$\frac{1}{2}$.

ORIENTAL SORES.

Hands of Bishan Singh showing large chronic ulcers, with secondary infection.

7.4.36. No further injections, progress satisfactory.

29.4.36. Ulcer on hand completely healed.

Differential Blood Count:

Polymorph leucocytes	54%
Small lymphocytes	32%
Large lymphocytes	10%
Eosinophil leucocytes	4%

Discharged - Cured.

Summary of Treatment.

Sixteen intravenous injections
Antimony Tartrate (gr.$14\frac{3}{4}$)

Three Subcutaneous injections Emetine (gr.$1\frac{1}{2}$)

Summary.

A very chronic case. Patient did not assist in his treatment. He rubbed filth into the sores on several occasions and they became very septic. Treatment was prolonged and he was not discharged till 90 days from the commencement.

Parasites were not found.

CASE NO.8.

SERGEANT A.E. AGE 30 YEARS.

Admitted: 21.2.36.

History.

Four months ago patient was troubled with sores which appeared first on the back of his left hand and wrist, and then on his neck and right arm. These sores were never painful, there being complete loss of sensation associated with them.

Examination.

Fifteen sores were present. Leishmania tropica were seen in large numbers on microscopical examination.

Treatment and Progress.

Patient had been treating himself with Germaline and boracic powder. Received injections of Antimony Tartrate on alternate days commencing with gr.$\frac{1}{4}$ intravenously, and then up to gr.1. Saline dressings were applied.

20.3.36. Progress satisfactory. Received 6th and final injection of antimony tartrate.

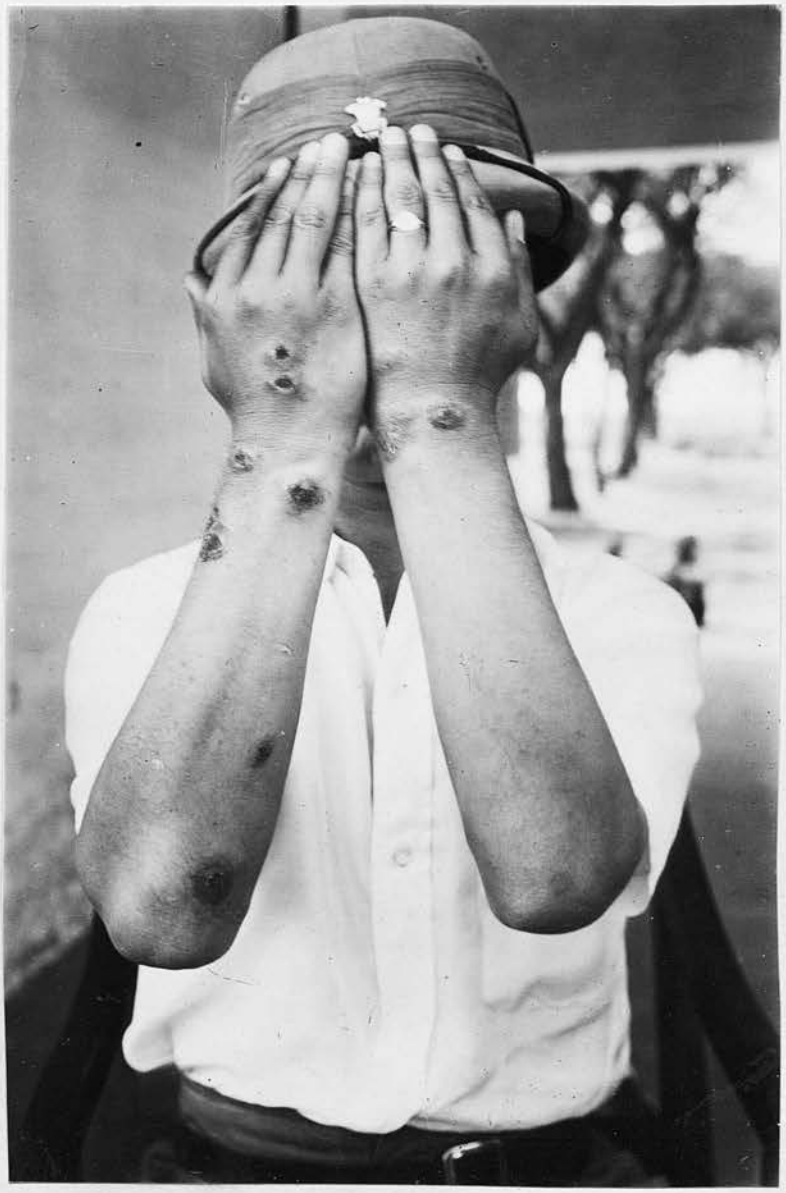
25.4.36. Discharged - cured.

Summary of Treatment.

Six intravenous injections antimony tartrate.

Saline dressings, iodine, and dusting powders.

ORIENTAL SORES.



Sergeant A.E.

Typical oriental sores are illustrated.

Summary.

One of the most successful cases. Patient carried out his instructions conscientiously. Sores were aseptic though large and extensive. Leishmania tropica bodies seen in scrapings. Local dressings played a large part in the treatment of this case.

CASE NO.9.

BHAIRAB DATT. AGE 21 YEARS.

Admitted: 17.2.36.

History.

Patient was troubled four months ago by a sore like a boil on the back of his left hand. Later, similar eruptions occurred, two on the back of his left wrist and three on the inner side of his right ankle.

Treatment and Progress.

Patient received intravenous injections of antimony tartrate, one on every alternate day commencing with gr.$\frac{1}{4}$, then gr.$\frac{1}{2}$ to gr.1.

The sores themselves were dressed with normal saline.

27.3.36. Received subcutaneous injection of orisol into margins of ulcers.

31.3.36. Showed marked improvement. Second injection of Orisol given.

17.4.36. Discharged - cured.

Summary.

Patient came under treatment at a fairly late stage. He had six sores on the exposed parts of the body. No Leishmania tropica bodies isolated. He received eight intravenous injections of antimony tartrate and two subcutaneous injections of orisol. Cured in two months.

CASE NO.10.

ABDUL JABBAR. AGE 27 YEARS.

Admitted: 17.2.36.

History.

Patient was recently stationed in Quetta, and two months ago developed two sores on the back of his left hand, two on right elbow and one on right foot. He has felt no pain nor any loss of sensation in association with these eruptions.

Examination. Leishmania tropica were found in scrapings.

Treatment and Progress.

Patient received I.V. injections of Antimony tartrate on every second day commencing with gr.$\frac{1}{4}$, then gr.$\frac{1}{2}$ to gr.1.

Progress was satisfactory, the ulcerated areas drying up.

17.4.36. The two sores on the back of the left hand had broken down owing to patient having taken off the bandages. The sore on the right foot had healed. Intravenous injection antimony tartrate gr.1.

21.4.36. Injection Antimony Tartrate gr.11.
23.4.36. Injection Antimony Tartrate gr.11.
24.4.36. Admitted to Hospital for supervision and further injections.

Case 10. Sores on right elbow and left hand.

30.4.36. White Blood Count = 6,100 per c.cm.

Differential Count:-

Polymorph Leucocytes	36%
Small Lymphocytes	34%
Large Lymphocytes	26%
Eosinophil Leucocytes	4%

Discharged - cured.

Summary.

Very chronic case. Patient frequently opened his bandages and the sores all became infected. Antimony injections produced a marked improvement at first but when the lesions became septic, a great deal of the improvement was nullified.

Treatment which consisted of antimony injections and orisol lasted 101 days.

Leishmania tropica bodies were isolated in scrapings from the edge of the ulcers. This is a little surprising considering the septic state. Attempted culture of L.t. bodies from scrapings proved negative.

CASE NO.11.

SARGAN SINGH. AGE 22 YEARS.

History.

Patient was stationed in Quetta for two months and became troubled with sores, first appearing on the back of his right elbow, and subsequently on his forehead. There was no associated pain.

Examination.

Four sores present - two on back of right elbow and two on forehead. Leishmania tropica bodies were not identified.

Treatment and Progress.

Patient received intravenous injections of antimony tartrate at daily intervals commencing with dose of gr.¼.

18.3.36. A new sore developed on the forehead and increased in size.

20.3.36. Received subcutaneous injection of emetine gr.½.

23.3.36. Injection emetine gr.½.

27.3.36. Injection emetine gr.½.

17.4.36. One ulcer on the right elbow and one on the forehead had dried up and looked healthy.

21.4.36. Injection Antimony tartrate gr.11.

23.4.36. Injection Antimony tartrate gr.11.

25.4.36. Injection Antimony tartrate gr.11.

27.4.36. The two sores on the elbow were healed.

Discharged - cured.

Summary.

Suffered from four sores of fairly long duration. Cured in two months with nine injections of antimony and three of emetine. No Leishmania tropica bodies were seen.

CASE NO.12.

RAM SINGH. AGE 24 YEARS.

Admitted:- 21.2.36.

History.

Patient was troubled four months ago by a sore on the back of his right hand which was at first like a small papule and then became more like a boil. Subsequently he developed similar eruptions on his left wrist and right knee, these ulcers sometimes drying up and then again becoming wet and raw.

Examination.

Five sores present which look red and moist. Leishmania tropica bodies were not identified.

Treatment and Progress.

Patient received two injections of antimony tartrate at daily intervals commencing with gr.$\frac{1}{4}$ then gr.$\frac{1}{2}$. There was slight improvement in the condition.

20.3.36. Subcutaneous injection of Emetine gr.$\frac{1}{2}$ into the edges of the ulcers.

26.3.36. W.B.Cs. 8,000 per c.cm.

23.3.36. Subcutaneous injection of emetine into margins of ulcers.

27.3.36. Subcutaneous injection of emetine.

Daily saline dressings applied.

3.4.36. Subcutaneous injection of orisol infiltrated into tissues at margins of sores.

Case 12. Oriental sores on right hand and left wrist.

7.4.36. Subcutaneous injection of orisol given.

17.4.36. Two sores on right knee, one on left wrist and one on the back of left hand had all dried up.

1.5.36. Discharged - cured.

Summary.

Patient had five sores which were all septic. He did not react well to antimony and so emetine and orisol were given. He took over two months to cure and received six antimony, three emetine and two orisol injections.

Leishmania tropica bodies were not seen.

CASE NO.13.

TRILOK SINGH. AGE 23 YEARS.

Admitted: 21.2.36.

History.

Patient went to Quetta in June 1935 returning the following November. He developed various sores, two on the back of his right hand, one on his right knee and four on his neck and head. These sores caused considerable itching, but there was no loss of sensation associated.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Eight sores were present, several of which have a dirty septic appearance.

Treatment and Progress.

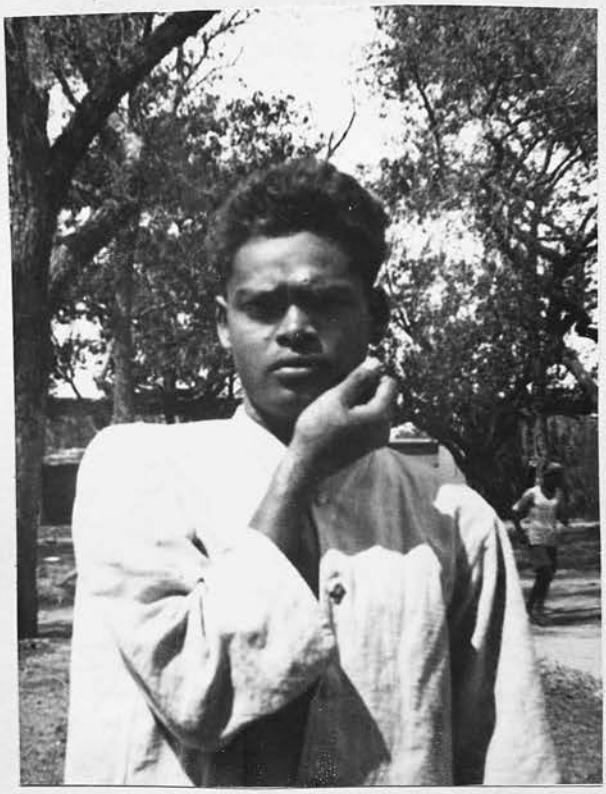
Patient received injections of Antimony tartrate on alternate days starting with gr.$\frac{1}{4}$ up to gr.1.

2.3.36. Condition of lesions improved after three injections.

20.3.36. Injection of Emetine gr.$\frac{1}{2}$.

23.3.36. Injection of Emetine gr.$\frac{1}{2}$.

27.3.36. Injection of Emetine gr.$\frac{1}{2}$.



Case. 13. Oriental sores on forehead and wrist.

10.4.36. All ulcers drying though some showed a tendency towards cracking on the hands, face, and neck.

14.4.36. Injection antimony tartrate, gr.1.

18.4.36. Injection Antimony tartrate gr.11 in 5 c.cs.

21.4.36. Injection Antimony tartrate gr.11.

23.4.36. Injection Antimony tartrate gr.11.

25.4.36. All ulcers dried up.
Patient said that he suffered from some fever and giddiness, after receiving his injection.

25.4.36. Injection antimony tartrate gr.11.

27.4.36. Ulcers all healed.

Discharged.

Summary.

A chronic case which was first treated when eight sores were well established. Practically all of them were septic and patient made no effort to keep them clean. Eventually the dressings were sealed and he was kept under close observation in hospital.

He received antimony and emetine injections, the former in large doses. Leishmania tropica bodies were seen in considerable numbers in scrapings taken from one of the smaller and less septic sores.

CASE NO.14.

HAREN SINGH.

Admitted: 12.2.36.

History.

Patient went to Quetta in June 1935 returning in November 1935. Ten days ago he developed a sore on the back of his right elbow and one on the medial side of his right ankle.

Examination.

Two sores were present ¼" to ½" in diameter slightly raised above the surrounding tissue and with dry reddish centres.

Leishmania tropica bodies were not identified.

Treatment and Progress.

Received I.V. injections antimony tartrate on alternate days starting with gr.½.

20.3.36. Received three I.V. injections. Ulcers dried up and healed completely.

Discharged - cured.

Summary.

Patient had two small sores which healed rapidly with antimony injections. Leishmania tropica were not seen.

CASE NO.15.

RAGHBAR DATT.

History.

Patient went to Quetta on 1.6.35 returning on the 8.11.35. One week ago he was conscious of sores developing, one on his left hand and one on the left side of his neck.

Examination.

Two small sores present about ¼" in diameter of slightly bluish tinge, and showing no ulceration. Leishmania tropica bodies were not identified.

Treatment and Progress.

4.3.36. Received injection of antimony tartrate gr.½.

6.3.36. Injection I.V. of antimony tartrate gr.1 given.

20.3.36. Injection antimony tartrate - progress had been very satisfactory.

27.3.36. Subcutaneous injection orisol infiltrated into tissues at margin of sores.

31.3.36. Subcutaneous injection orisol.

17.4.36. The sore on the back of the left hand was very small and had completely dried up.

25.4.36. The ulcer on the hand had completely healed being white and dry.

Discharged - cured.

Summary./

Summary.

An Indian officer. Both sores were small and comparatively clean and aseptic. Healing took place in about a month after three intravenous injections of antimony tartrate, and two subcutaneous injections of orisol.

CASE NO.16.

DHORAM SINGH.

Admitted: 4.3.36.

History.

Patient went to Quetta in July 1935 returning in November. Later he developed two small ulcers.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received I.V. injection of Antimony tartrate gr.½.

9.3.36. Received his third I.V. injection of Antimony tartrate gr.1.
Ulcers healing satisfactorily.

13.3.36. Progress good.
Received daily saline dressings.

1.4.36. The sores dried up completely.

Discharged - cured.

Summary.

Two small sores, one on the right wrist and one on the right foot were present. Neither was severe. Both healed rapidly after three antimony injections. Leishmania tropica bodies seen.

CASE NO.17.

DINA NATH.

Admitted: 4.3.36.

History.

Patient went to Quetta in July 1935 returning in November. Ten days ago he developed some spots on his right elbow.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Two small sores present on right elbow.

Progress and Treatment.

4.3.36. Received injection antimony tartrate gr.$\frac{1}{8}$.

6.3.36. Second injection antimony tartrate gr.1 given.

9.3.36. Third injection antimony tartrate gr.1 given.

13.3.36. Patient went on leave.
The sore was small and was healing satisfactorily.

2.7.36. On the right elbow there was a large ulcer about $1\frac{1}{2}$" x $\frac{3}{4}$" in diameter. There was also an ulcer on the left forearm.
Received I.V. injection Antimony tartrate gr.1.

4.7.36. Ulcers were drying up. Daily dressings of saline applied only.

15.7.36. Discharged.

Differential Blood Count:

Polymorph Leucocytes	32%
Large Lymphocytes	6%
Small Lymphocytes	52%
Eosinophils	10%

Summary.

One of the three relapse cases which occurred in this series. At first a straightforward case of two sores which healed up with four injections, but later broke down.

Leishmania tropica seen. High eosinophilia.

CASE NO.18.

JHANDA SINGH.

Admitted: 18.2.36.

History.

Patient went to Quetta on 1.6.35 returning to Roorkee on 8.11.35. A month ago he developed one sore on the index finger of his right hand.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Progress and Treatment.

Received injections of Antimony tartrate on alternate days starting with gr.¼ and increasing the dosage to gr.1.

18.3.36. Ulcer drying up. Received fifth I.V. injections.

20.3.36. Daily saline dressings only.

22.3.36. Discharged - cured.

Summary.

Patient had only one sore. It healed in 30 days with five injections of antimony. Leishmania tropica were isolated.

CASE NO.19.

BHAGAT SINGH.

Admitted: 18.2.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. Two months ago he developed two sores on the back of his right hand.

Progress and Treatment.

Received I.V. injections of antimony tartrate starting with gr.$\frac{1}{4}$ to gr.1 on alternate days.

20.3.36. Received fifth injection and showed marked improvement.

27.3.36. Received a subcutaneous injection of orisol infiltrated into the margins of the ulcers.

31.3.36. Showed marked improvement since orisol injection. Daily dressings.

10.4.36. Ulcer had now completely healed.

Discharged - cured.

Summary.

Two fairly extensive sores were present. Healing took 58 days and five injections of antimony and one of orisol. Leishmania tropica were not isolated in scrapings taken from the margins.

CASE NO.20.

FAZAL DIN.

Admitted: 4.3.36.

History.

Patient went to Quetta on 1.6.35 and returned to Roorkee on 8.11.35. Twelve days ago he developed an isolated sore on his left foot.

Treatment and Progress.

4.3.36. Received injection Antimony tartrate gr.½.

6.3.36. Second injection Antimony tartrate gr.1 given.

9.3.36. Ulcer showed marked improvement. Saline dressings only.

13.3.36. Ulcer completely healed.

Discharged - cured.

Summary.

Very early case with only one sore. This healed rapidly with only two injections of antimony. No Leishmania tropica were isolated.

CASE NO.21.

NARANJAN SINGH. AGE 28.

Admitted: 4.3.36.

History.

Patient went to Quetta on 1.6.35 returning to Roorkee on 8.11.35. Ten days ago he developed a sore on the outer aspect of his left ankle and then another on the front of his left elbow.

Examination.

Two large sores present, both of which have ulcerated.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Five intravenous injections of tartrate of antimony were given between the 4th and 17th March. Subcutaneous injections of emetine gr.$\frac{1}{2}$ at the margins of a sore were given on the 27th and 31st. Three orisol injections were afterwards given.
27.4.36. Discharged - cured.

Summary.

A chronic, septic case. Treatment was mixed in/

in an endeavour to hasten the healing process. Both sores healed after two month's treatment with antimony, emetine and orisol, and saline dressings.

CASE NO.22.

GURDIAL SINGH. AGE 22 YEARS.

Admitted 4.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. Nine days before admission he developed a small sore on his left forearm and another on his right wrist.

Examination:- Leishmania tropica were not found.

Treatment and Progress.

Received six doses of tartrate of antimony between 4th and 20th March. Moderate improvement.
27.3.36. Orisol injected into margin of sores on three occasions.
1.5.36. Discharged - cured.

Summary.

Two very chronic ulcers. Took 70 days to heal and then relapsed. Six antimony and three orisol injections were given.

No Leishmania tropica were seen.

Case 22. Oriental sores on right arm and left elbow.

CASE NO.23.

WALI MOHD. AGE 22 YEARS.

Admitted: 4.3.36.

History.

Patient went to Quetta in July 1935 and returned to Roorkee in November. One week later he developed four sores on his left forearm.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Patient received an injection of Antimony tartrate gr.½.

6.3.36. Received second injection of Antimony tartrate gr.1.

9.3.36. Showed improvement. Third injection Antimony tartrate gr.1 given.

26.3.36. Tenth injection of antimony. Sores much improved.

30.4.36. Discharged - cured.

Summary.

Case of four sores on left forearm. Became septic owing to carelessness of patient. Leishmania tropica seen early on in the disease. Sores healed after ten injections of antimony, but relapsed after discharge from hospital.

CASE NO.24.

KHUSHI MOHD. AGE 30 YEARS.

Admitted: 2.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. One week later he developed an isolated sore on the back of his neck.

Examination. Leishmania tropica bodies were identified on examination of scrapings taken from a sore.

Summary.

A very satisfactory case. Came for treatment early. Sore was fairly aseptic throughout and responded well to treatment. Leishmania tropica seen in large numbers.

Cured by three intravenous injections of tartrate of antimony (gr.½ then gr.1).

CASE NO.25.

BACHAN SINGH. AGE 23 YEARS.

Admitted: 4:3:36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. Five days ago he developed a single sore on the back of his left hand.

Examination.

Leishmania tropica bodies were not identified.

Treatment and Progress.

4:3:36. Received I.V. injection Antimony tartrate gr.$\frac{1}{2}$.

6.3.36. Second I.V. injection Antimony tartrate gr.1 given.

13.3.36. Discharged - cured.

Summary.

Very satisfactory early case. Demonstrates the ease with which early cases can be cured.

CASE NO.26.

KUNWAR NATH SINGH.

Admitted: 4:3:36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. One month ago he developed a sore on the back of his hand and then two on his left forearm, one on the right leg and one on the left leg.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Received intravenous injections of antimony tartrate on alternate days starting with gr.¼ to gr.1.

20.3.36. After five injections showed improvement.

27.3.36. Received subcutaneous injection of orisol into margins of ulcers.

31.3.36. Condition greatly improved. Second injection of orisol given.

17.4.36. The large sore on the back of the left forearm was quite dry and white, while that on the back of the left hand had almost disappeared, those on the legs having already healed completely.

Discharged - cured.

Summary.

Heavily infected case with five advanced sores on various parts of his body. Leishmania tropica were easily demonstrated. Good response to treatment with antimony, but in order to hasten the healing process, two orisol injections were given. Considering the number and state of the sores, 43 days can be considered to be a comparatively rapid cure.

CASE NO.27.

MEHMA SINGH.

Admitted: 4:3:36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November 1935. One month ago he developed a single sore on his right elbow.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Started intravenous injections of Antimony tartrate on alternate days commencing with gr.¼ and increasing the dosage to gr.1. Great improvement after three injections.

27.3.36. Received subcutaneous injection of emetine gr.½ into margins of ulcer.

3.4.36. Subcutaneous injection of orisol infiltrated into margins of sores.

7.4.36. Injection of orisol given.

10.4.36. Injection of orisol given.

17.4.36. Both the original sore on the right elbow and another which he developed on the right wrist showed improvement, being quite dry. Subcutaneous injection orisol.

21.4.36. Subcutaneous injection orisol.

23.4.36. Subcutaneous injection orisol.

24.4.36. Wounds were dry. Subcutaneous injection orisol.

1.3.36. Injection antimony tartrate gr.11.

3.3.36. Injection antimony tartrate gr.11.

7.3.36. Discharged cured.

Summary.

Five Antimony tartrate injections.
One Emetine injection.
Seven Orisol injections.

At commencement of treatment only one sore was present, but a second developed on the right wrist. Leishmania tropica were demonstrated.

A disappointing case. Too many different drugs were used. It demonstrates, however, that berberine sulphate (orisol) is not always so successful as one is led to believe in the literature. Seven injections did not produce a cure, and antimony was resorted to again before cure was effected.

CASE NO.28.

GURDIAL SINGH.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning in November. In August he developed various sores which he stated followed an occasion when he was badly bitten by a fly. He had one sore on his right arm, one on his left hand, one on his left elbow and one on his left flank.

Examination.

Four rather large sores present which have ulcerated. Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received I.V. injections Antimony tartrate commencing with gr.½ to gr.1.

20.3.36. Received 2nd injection I.V. Improvement was slow. Some inflammation of arm.

26.3.36. Leucocytes 7,600 per c.cm. Inflammation of arm cleared up.

23.3.36. Subcutaneous injection of emetine gr.½ given, infiltrating solution into tissues round margins of ulcers.
[redacted] The emetine tended to cause the tissues to become somewhat blue and necrotic.

3.4.36. Subcutaneous injection orisol infiltrated into tissues at margins of ulcers.

7.4.36. Injection Orisol.

10.4.36. Injection Orisol.

17.4.36. Patient had still three sores, one on each arm and one on the back of the left hand. These were all dry though the tissues were of a somewhat bluish colour. They improved during last week.

1.5.36. The ulcers on the two arms had healed. That on the back of the hand had improved.

28.5.36. Discharged - cured.

Summary.

Two intravenous injections antimony tartrate,
One subcutaneous injection Emetine hydrochloride,
Three subcutaneous injections orisol.

Seven months elapsed before treatment was started, sores therefore extensive. Treatment was mixed, but healing obtained in this case mainly by orisol.

Leishmania tropica present.

CASE NO.29.

KERNAIL SINGH.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. Two months later he developed two sores on his left forearm and one on his right cheek.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Intravenous injections of antimony tartrate on alternate days commencing with gr.½ and increasing the dosage to gr.1 were started.

20.3.36. Had received four I.V. injections. A fresh sore had developed on the right cheek.

27.3.36. Injection of Orisol given subcutaneously infiltrating margins of sores.

31.3.36. Great improvement, the ulcers drying up. Second injection of orisol.

17.4.36. All three sores quite dry. Injection of orisol.

24.4.36. Discharged - cured.

Summary. An ordinary case. Cured in 50 days with antimony and orisol. Leishmania tropica present.

CASE 29. Oriental sore on right cheek.

CASE NO.30.

FAZAL ILAHI.

Admitted: 4.3.36.

History.

Patient went to Quetta on 31.5.35 returning in November 1935. Twenty-five days after his return he developed a sore on his right cheek and two on his left elbow.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and progress.

Injections of antimony tartrate on alternate days commencing with gr.$\frac{1}{4}$ and increasing to gr.1 were given. Great improvement followed. Orisol was afterwards used.

5.6.36. Discharged - cured.

1.5.36. The sore on the left elbow was almost cured but required observation.

Summary.

Three intravenous injections of antimony tartrate, and
Four subcutaneous injections of orisol were given.

A very chronic septic case. Sores did not respond well to treatment which lasted over 3 months. Leishmania tropica isolated. Patient was keen to interfere with the dressings.

CASE NO.31.

BHAWAN SINGH.

Admitted: 17.3.36

History.

Patient went to Quetta in June 1935, returning to Roorkee in November. He developed a sore on his right foot which he described as "boot bite" and another on his left forearm.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

17.3.36. Received magnesium sulphate fomentations.

20.3.36. Ulcers much cleaner and showed signs of healing.

27.3.36. Received injection of Orisol into margin of ulcer.

31.3.36. Ulcer appeared to be drying up. Second injection of Orisol given.

7.4.36. Injection of Orisol.

10.4.36. Injection of Orisol.

17.4.36. The sore on the right foot was dry and clean looking.

Discharged - cured.

Summary.

A case treated with four subcutaneous injections of orisol only. Healed in three weeks. Leishmania tropica seen.

CASE NO.32.

DURGA SINGH.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning in September. In December he developed two sores both on the left hand.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Received injections of antimony tartrate on alternate days commencing with gr.$\frac{1}{2}$ and increasing the dosage to gr.1. Attended for saline dressings.

31.3.36. Ulcers were very small. Fourth antimony injection given.

3.4.36. Discharged - cured.

Summary.

Two medium sized sores present which healed in a month, after four injections of antimony tartrate. Leishmania tropica seen.

CASE NO.33.

RAM AUDH.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. In December he developed a sore on his left forearm which he thought was caused by a bit of wood which scratched it.

Examination.

One ulcer present. Leishmania tropica bodies were not identified.

Summary.

A satisfactory case. Only one sore present which, though neglected for months before treatment was started, healed in a month with four antimony injections.

CASE NO.34.

ISHWARI DATT.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. In December he developed his first sore which was soon followed by the eruption of numerous others.

On examination nine sores were found and from several Leishmania tropica was obtained.

Summary.

This patient was badly infected with nine sores on different parts of his body. He did not come for treatment till three months from the onset. Cured in 44 days with six injections of antimony tartrate. Leishmania tropica were seen.

CASE NO.35.

MUNESHWAR SINGH.

Admitted: 18.2.36.

History.

Patient went to Quetta in July 1935 returning in November. In January, he noticed a sore on the right elbow and subsequently others developed.

Examination.

Four sores present ½" to ¾" in diameter. These have ulcerated, the edges being red raised, and there was a considerable exudation of pus. Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Received injections of Antimony tartrate on alternate days commencing with gr.½ and increasing to gr.1.

20.3.36. Has received five I.V. injections. Further injection given. Although a few sores were dry and healed, others remained moist.

23.3.36. Emetine gr.½ given infiltrating margins of ulcers.

27.3.36. Subcutaneous injection emetine gr.½.

3.4.36. Injection orisol infiltrated into tissues at margins of ulcers.

7.4.36. Injection orisol.

Case 35. Sores on each wrist.

10.4.36. Injection orisol. Patient had now only two unhealed ulcers, one on each forearm. These were dry but progress was slow.

14.4.36. Injections resumed.

22.4.36. Patient complained that after the last two injections of antimony tartrate he had suffered from an abnormal degree of thirst, from aching pains in the joints and an inability to get up immediately after the injection. He had no fever.

24.4.36. Now in hospital for one month and five days requiring constant supervision as he was very apt to pick off the scabs, and on one occasion an orderly actually cut off the top of a sore with scissors. All the ulcers were dry and were dressed with bandages, the knots of which were fixed with sealing wax to prevent patient from tampering.

25.4.36. Injection antimony tartrate gr.11.

30.4.36. Differential leucocyte count:-

Polymorph Leucocytes	58%
Small Lymphocytes	18%
Large Lymphocytes	20%
Eosinophil Leucocytes	4%

White Blood Count - 8,200 per c.cm.

1.5.36. Wounds all dry.
Patient discharged - cured.

<u>Summary</u>.

Twelve intravenous injections of antimony tartrate,
Two subcutaneous injections of emetine hydrochloride, and
Three subcutaneous injections of orisol were given. Patient was cured.
The Wassermann reaction was negative.
The four sores present were all septic and patient made no effort to keep them clean. At one time, an orderly snipped off the tops of the healing sores with scissors.

CASE NO.36.

SITA RAM SINGH.

Admitted 4:3:36.

History.

Patient went to Quetta in July 1935 returning in the same month. Only a week ago he developed three sores all on his right leg.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a score.

Treatment and Progress.

4.3.36. Received I.V. injections Antimony tartrate on alternate days commencing with gr.½ and increasing the dosage to gr.1.

20.3.36. Had received four I.V. injections.

27.3.36. Received a subcutaneous injection of orisol infiltrated into tissues at margins of sores.

31.3.36. Daily dressings with saline only.

10.4.36. Subcutaneous injection of orisol.

17.4.36. The three small sores on the lateral side of the right leg had all now dried.

27.4.36. Discharged - cured.

Summary of Treatment.

Four intravenous injections Antimony tartrate gr.½
Two subcutaneous injections Orisol (6 c.cm.)

Summary.

A mild case treated within a week of commencement with antimony and orisol. Patient cured in just under two months.

CASE NO.37.

BANTA SINGH.

Admitted: 4.3.36

History.

Patient went to Quetta in June 1935 returning in November. One month ago he developed a single sore on the bend of his right elbow.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received an I.V. injection of Antimony tartrate gr.$\frac{1}{4}$.

6.3.36. Received 2nd I.V. injection of Antimony tartrate gr.$\frac{1}{2}$.

13.3.36. Third I.V. injection Antimony tartrate gr.1.

17.3.36. Showed improvement.

27.3.36. Received subcutaneous injection of orisol infiltrating tissues at margins of sores.

31.3.36. Subcutaneous injection Orisol.

17.4.36. Subcutaneous injection Orisol.

24.4.36. Ulcer was now completely dried up and healed.

Summary of Treatment.

Three intravenous injections Antimony Tartrate (gr.2$\frac{1}{2}$)
Three subcutaneous injections Orisol (5 c.cm.)

Summary.

Only one sore present. When he came for treatment it was the size of a rupee and had a margin of red infected tissue. The base was necrotic and sloughing.

Leishmania tropica obtained from puncture of the marginal skin.

Cured with antimony and orisol in 53 days.

CASE NO.38.

MANGAL SINGH.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning to Roorkee in November. Two months ago he developed a sore on his left forearm and on the left ankle.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received I.V. injections of Antimony tartrate starting with gr.¼ and increasing the dosage to gr.1.

20.3.36. Had received three I.V. injections and daily dressings of saline.

27.3.36. Received subcutaneous injection of Orisol infiltrated into tissues round ulcer margins.

31.3.36. Subcutaneous injection of Orisol.

10.4.36. Third subcutaneous injection of Orisol given.

13.4.36. Fourth subcutaneous injection of Orisol given.

17.4.36. The sore on the left ankle having been rubbed by the boot had broken down and become secondarily infected. Subcutaneous injection Orisol.

21.4.36. Subcutaneous injection Orisol.

23.4.36. Subcutaneous injection Orisol.

24.4.36. The ulcer on the ankle was still moist being secondarily infected.

25.4.36. Subcutaneous injection Orisol.

27.4.36. I.V. injection Antimony tartrate gr.11.

Investigations.

30.4.36. White Blood count 5,200 per c.cm.

Differential Blood Count:-

Polymorph Leucocytes	46%
Small Lymphocytes	32%
Large Lymphocytes	8%
Eosinophil Leucocytes	14%

1.5.36. The sore on the ankle was still soft although showing improvement. There was also a small sore on the knee.
I.V. injection Antimony tartrate gr.11 in 5 c.c.

4.5.36. I.V. injection Antimony tartrate gr.11 in 5 c.c.

7.5.36. I.V. injection Antimony tartrate gr.11 in 5 c.c.

Condition much improved. Continued with saline dressings only.

2.6.36. Discharged.

Summary of Treatment.

Eight intravenous injections Antimony tartrate (gr.12½)

Eight subcutaneous injections Orisol (12 c.cm).

Summary/

Summary.

A very chronic case. Both sores became very septic. Patient frequently interfered with the dressings and eventually his bandages were sealed with sealing wax to prevent this. Orisol in this case proved a definite failure (8 injections) and cure was obtained by large intravenous injections of antimony tartrate.

Leishmania tropica were demonstrated from the lesion on the forearm which was less septic than the one on the ankle.

CASE NO.39.

SIRI RAM.

Admitted: 10.3.36.

History.

Patient went to Quetta in June 1935 returning in November. Three months ago he developed multiple sores on both feet and legs which remained small. On admission there were ten sores present, four on the right leg, one on the left leg, one on the left wrist and four on the right forearm.

Examination.

Leishmania tropica bodies identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

13.3.36. Received I.V. injections of Antimony tartrate on alternate days commencing with gr.½ increasing the dosage to gr.1.

15.3.36. Patient received 2nd I.V. injection.

27.3.36. Received subcutaneous injection Emetine gr.½ infiltrated into margins of ulcers.

17.4.36. The four small sores on the right leg and one on the left leg were now merely tiny pimples.

17.4.36. Discharged as cured.

Summary of Treatment.

Two intravenous injections Antimony tartrate (gr.1½)
One subcutaneous injection emetine (gr.1)

Summary. This case received insufficient treatment. Relapsed three weeks after discharge. L.t. bodies seen.

CASE NO.40.

SHANKER DATT.

Admitted: 4.3.36.

History.

Patient went to Quetta in June 1935 returning in November. One month ago he developed a sore on the back of his right hand, another on his left wrist.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received I.V. injections Antimony tartrate commencing with gr.½ and increasing the dosage to gr.1 on alternate days.

20.3.36. Had received five I.V. injections and showed marked improvement.

27.3.36. Received subcutaneous injection of Emetine gr.½ infiltrated into margins of ulcers. Second sore developed on the cheek.

3.4.36. Subcutaneous injection orisol infiltrated into tissues at margin of ulcer.

7.4.36. Subcutaneous injection of Orisol.

10.4.36. Subcutaneous injection of Orisol.

17.4.36. Improvement has been most marked since the giving of the Orisol injections.

24.4.36. Both the sore on the wrist and that for the face were now dry. Attended for dressings of saline only.

14.5.36. Discharged as cured.

Case. 45. Sores on each wrist, and a recent sore on the face.

Summary of Treatment.

Five intravenous injections of Antimony tartrate (gr.4⅓)
One subcutaneous injection of Emetine (gr.⅓)
Three subcutaneous injections of Orisol (6 c.cm.)

Summary.

Three moderate sized ulcers present. Leishmania tropica seen in large numbers. Treatment lasted 70 days and consisted in injections of antimony and orisol with one of emetine.

CASE NO.41.

CHHEDI SINGH.

Admitted 4.3.36.

History.

Patient went to Quetta in June 1935 returning in November. Twenty days ago he developed what he described as a "Boot bite" sore on his left foot on the toe.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

4.3.36. Received I.V. injections of Antimony tartrate on alternate days commencing with gr.$\frac{1}{2}$ and increasing the dosage to gr.1.

20.3.36. Had received four I.V. injections and ulcers were almost healed. Attended daily for dressings with saline.

27.3.36. Discharged - cured.

Summary of Treatment.

Four intravenous injections Antimony tartrate (gr.3$\frac{1}{2}$)

Summary.

Successful case - it demonstrated the value of early treatment and the effectiveness of antimony when sores have not become septic and chronic. Leishmania tropica present.

CASE NO.42.

BUDHE KHAN. AGE 32 YEARS.

Admitted: 18.2.36.

History.

Patient went to Quetta in May 1935, returning in September. Whilst there he developed numerous sores, two on the forehead, one on the left cheek, two on the right cheek, three on the right arm, and one on the back of the right hand. There was no associated loss of sensation.

Examination.

Nine sores present, most of which looked red and septic.

Leishmania tropica bodies could not be demonstrated on microscopic examination of scrapings from sore.

Treatment and Progress.

23.2.36. Received I.V. injections of Antimony tartrate on alternate days starting with gr.½ and increasing the dosage to gr.1.

2.3.36. Condition improved after receiving 3 injecs.

20.3.36. Had now received altogether six I.V. injections but showed no further improvement.

23.3.36. Subcutaneous injection emetine gr.½ given infiltrating tissues at margins of ulcers.

27.3.36. Second subcutaneous injection Emetine administered.

31.3.36. There were two tiny fresh papules on the right cheek. Subcutaneous injection emetine given into the rather moist sore on the right forearm.

Case. 42. Sores on right elbow and back of forearm. (This patient had numerous sores elsewhere).

3.4.36. Subcutaneous injection Orisol infiltrated into tissues at margins of ulcers.

10.4.36. Progress had been retarded since the scabs were removed by Hospital Orderly. Was the worst case in Hospital. All ulcers were dry except one on the forearm which was very raw looking, being secondarily infected. Had been receiving Mag. Sulph. dressings formerly, but continued with saline dressings.
Received subcutaneous injection Orisol. (Second injection).

14.4.36. I.V. injection Antimony tartrate gr.1½

16.4.36. I.V. injection Antimony tartrate gr.11 in 5 c.cs.

18.4.36. I.V. injection Antimony tartrate gr.½.

Investigations.

Wassermann Reaction negative.

21.4.36. I.V. injection Antimony tartrate gr.11.

22.4.36. Patient complained that after the last injection of Antimony tartrate gr.11 he vomited. The same evening he suffered from a sensation of giddiness and at night he had pains in all his joints.

23.4.36. I.V. injection Antimony tartrate gr.11.

1.5.36. All the sores were dry and covered with layers of white skin lying level with the surrounding healthy skin.

Investigations.

2.5.36. Differential Blood Count:-

Polymorph Leucocytes	52%
Small Lymphocytes	20%
Large Lymphocytes	18%
Eosinophil Leucocytes	10%

2.5.36. Discharged.

Summary of Treatment.

11 intravenous injections Antimony tartrate (gr.15½)
3 subcutaneous injections Emetine hydrochloride (gr.1½)
2 subcutaneous injections Orisol (4½ c.cm.)

Summary.

A very chronic septic case. No Leishmania tropica seen in spite of frequent searching. Once when the sores had reached a fair degree of recovery the scabs were stupidly removed by an orderly.

Note the fairly large eosinophilia and the negative Wassermann. Treatment was intense, but rather mixed and lasted two and a half months.

CASE NO.43.

BACHITTAR SINGH. AGE 22 YEARS.

History.

Patient went to Quetta in June 1935 returning in November. Four months ago he developed an isolated sore on the right forearm. There was no associated loss of sensation.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

23.2.36. Patient received I.V. injections of Antimony tartrate every second day starting with gr.½ and increasing dosage to gr.1.

2.3.36. Condition was improving. Had received three I.V. injections.

20.3.36. Had received five I.V. injections and showed marked improvement.

27.3.36. Received subcutaneous injection Orisol infiltrating tissues at margins of ulcers.

31.3.36. Subcutaneous injection Orisol given.

10.4.36. Daily dressings with saline only.

17.4.36. The sore on the back of the right forearm was now fairly dry but still large and irregular.
Subcutaneous injection of Orisol infiltrated into margins of ulcers.

24.4.36. The sore on the right forearm was now completely healed showing a firm white scar with no scabbing.

Discharged - cured.

Summary of Treatment.

5 intravenous injections Antimony tartrate (gr.4½)
3 Orisol injections(7 c.cm.)

Summary.

Single sore case. Leishmania tropica seen.

Cured in two months with antimony and orisol.

CASE NO.44.

NURAHMAD. AGE 30 YEARS.

Admitted: 9.3.36.

History.

Patient was sent to Quetta in July 1935 returning in November. In January last a tiny papule appeared on his knee and gradually became bigger. Then a similar papule developed on the other knee and these gradually formed ulcers. There was no pain associated.

Examination.

Leishmania tropica bodies identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

9.3.36. Subcutaneous injections of Emetine given round the ulcer.

20.3.36. Had received three subcutaneous injections of Emetine constituting altogether gr.1½ Both ulcers were much better but were still in a moist condition. He had, however, suffered from considerable pain since receiving injections and there was some blueness of the tissues round the edges of the ulcers.

23.3.36. Subcutaneous injection Emetine.

27.3.36. Subcutaneous injection Emetine.

31.3.36. Tissues around ulcers were looking rather bluish. Received daily dressings of saline only.

Case 44. Chronic sores on the knees.

Investigations.

17.4.36. Wassermann Reaction negative.

10.4.36. Both sores on each knee healed.
Discharged - cured.

Summary of Treatment.

Five subcutaneous injections Emetine (gr.3½).

Summary.

Two rather severe ulcers were treated successfully with emetine infiltrations. A certain amount of pain was experienced immediately after the injections. Leishmania tropica were seen. The Wassermann reaction was negative.

CASE NO.45.

JAI GORIND. AGE 38 YEARS.

Admitted: 5.3.36.

History.

Patient was sent to Quetta in July returning in November. One month ago he developed a sore on his left knee and then another on his right thigh. There was no associated pain.

Treatment and Progress.

26.3.36. Received subcutaneous injections of Emetine into the edges of the ulcers.

20.3.36. Patient had received three subcutaneous injections of Emetine gr.½. The ulcerated areas showed marked improvement, the surface was drying up and the edges were creeping inwards.

23.3.36. Further subcutaneous injection Emetine gr.½ given.

27.3.36. Subcutaneous injection Emetine.

31.3.36. The ulcer on the knee was looking most unhealthy, secondary infection was marked and there was considerable pus. Patient remained in bed, having daily dressings of saline only.

3.4.36. Subcutaneous injection Orisol infiltrated into tissues at margins of ulcers.

7.4.36. Subcutaneous injection Orisol.

11.4.36. I.V. injection Antimony tartrate, gr.1.

14.4.36. I.V. Injection Antimony tartrate, gr.11.

16.4.36. I.V. Injection Antimony tartrate, gr.1.

Case 45. A diffuse type of sore on left knee.

Investigations.

Wassermann Reaction negative.

18.4.36. I.V. injection Antimony tartrate, gr.11.
21.4.36. I.V. injection Antimony tartrate, gr.11.
22.4.36. Patient complained that after the last two injections of Antimony tartrate gr.11 he became momentarily senseless and later suffered from an undue thirst and from aching pains throughout his body, there being slight pain also in the arm.

24.4.36. There was slight leakage of Antimony tartrate into the tissues of the right elbow when last injected. Ulcers are practically healed. To attend for dressings daily.

25.4.36. Both the ulcers on the knee and on the buttock were now completely healed.

Discharged - cured.

Summary of Treatment.

5 intravenous injections Antimony tartrate (gr.7)
5 subcutaneous injections Emetine hydrochloride (gr.5)
2 subcutaneous injections Orisol (4 c.cm.)

Summary.

A very chronic septic case. Treated with emetine, orisol and finally large doses of antimony which produced toxic symptoms.

Leishmania tropica bodies were not isolated.

CASE NO.46.

KARTAR SINGH.

History.

Patient went to Quetta in June 1935 returning in November to Roorkee. Six days ago he developed a single sore on his left elbow where the thought he was bitten by a fly.

Treatment and Progress.

4.3.36. Received an I.V. injection Antimony tartrate gr.½.

6.3.36. I.V. Injection Antimony tartrate gr.1.

9.3.36. Marked improvement, ulcer dried up.

13.3.36. Discharged - Cured.

Summary of Treatment.

Two intravenous injections Antimony tartrate (gr.1½).

Summary.

Clinically this looked like an oriental sore. The rapid response to small doses of antimony and the absence of Leishmania tropica makes one suspect that it was not a true case of oriental sore.

CASE 47.

RUR SINGH. AGE 30 YEARS.

Admitted: 10.3.36.

History.

Patient was working in Quetta from July until November, 1935. Five months ago he first noticed the presence of three tiny sores, one on his right leg and two on his right arm.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

13.3.36. Received I.V. injections of Antimony tartrate on alternate days commencing with gr.$\frac{1}{2}$ and increasing the dosage to gr.1.

20.3.36. Patient had been given two I.V. injections.

27.3.36. Subcutaneous injection Emetine gr.$\frac{1}{2}$ infiltrated into tissues round sores.

31.3.36. Subcutaneous injection Emetine gr.$\frac{1}{2}$.

17.4.36. The sore on the back of the knee and those on the arm were now completely healed though still of a slightly bluish tinge.

Discharged as cured.

Summary of Treatment.

2 intravenous injections Antimony tartrate (gr.1$\frac{1}{2}$)
2 subcutaneous injections Emetine (gr.3$\frac{1}{2}$)

Summary.

Three sores were present. Treatment which effected a cure in just over a month, consisted of antimony and emetine injections. Leishmania tropica were seen.

CASE NO.48.

SARUP KHAN. AGE 30 YEARS.

History.

Patient was sent to Quetta in June 1935 returning in November. In the following January he became conscious of a small sore on his right cheek after which many others made their appearance. Until now he has one on his forehead, the right side of his neck, the left elbow, the left forearm, the right foot, two on the left foot and one on the right hand. All these sores had ulcerated and become wet and septic.

Treatment and Progress.

20.3.36. Patient received one I.V. injection of Antimony tartrate gr.1.
Saline dressings were applied to ulcers.

Examination.

Microscopic examination of scrapings from ulcers failed to demonstrate L.t. bodies.

23.3.36. Subcutaneous injection Emetine given infiltrating tissues round edges of ulcers.

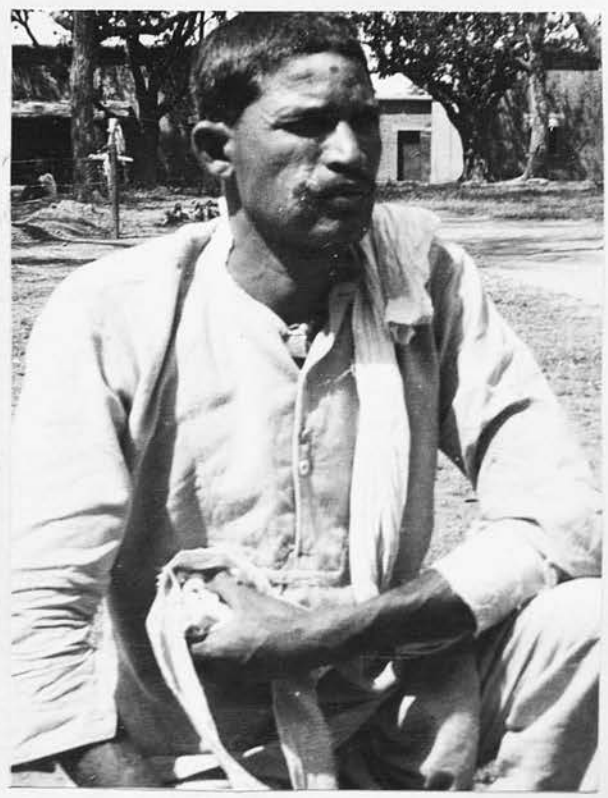
27.3.36. I.V. injection Antimony tartrate gr.1.

31.3.36. Emetine injection given today. Continued saline dressings.

3.4.36. Third subcutaneous injection Emetine gr.$\frac{1}{2}$.

10.4.36. I.V. injection Antimony tartrate given.

17.4.36. Both the ulcers at the edge of the mouth and that on the forehead had completely dried and were much better. The ulcer on/



Case. 48. Sore at angle of mouth. There are also sores on forehead and wrist.

on the wrist had dried up and healed. One on the left ankle was dry, but had broken down again owing to the rubbing of the boot. One on the neck was dry.
I.V. injection Antimony tartrate given.

21.4.36. I.V. injection Antimony tartrate gr.11 in 5 c.cs.

22.4.36. Patient complained that after the last injection of Antimony tartrate gr.11 he vomited, the vomit consisting of blood stained water.
Subsequently he suffered from a feeling of dryness in the chest accompanied by abnormal thirst, while at night he had rigors and a general feeling of coldness.

23.4.36. I.V. injection Antimony tartrate gr.11.

24.4.36. Admitted to Hospital, the sore on the ankle having persistently broken down owing to the rubbing of his boot. Dressed with bandages the knots of which were sealed with sealing wax to prevent any tampering. All the remaining ulcers were better.

25.4.36. I.V. injection Antimony tartrate, gr.11.

27.4.36. I.V. injection Antimony tartrate, gr.11.

30.4.36. I.V. injection Antimony tartrate, gr.11.

Investigations.

White Blood Count - 6,000 per c.cm.

Differential Count:-

Polymorph Leucocytes	50%
Large lymphocytes	14%
Small lymphocytes	28%
Eosinophil leucocytes	8%

1.5.36. I.V. injection Antimony tartrate, gr.11.

11.5.36. I.V. Injection Antimony tartrate, gr.11.

14.5.36. Discharged.

Case. 48. Sores on left elbow and right cheek.

Summary of Treatment.

11 intravenous injections Antimony tartrate (gr.18)
2 subcutaneous injections emetine hydrochloride (gr.1½)

Summary.

Ten sores were present which in most cases became septic. Large doses of antimony were given and resulted in toxic symptoms. The blood count and differential count are fairly representative of the condition of the blood in oriental sore.

CASE 49.

THAKUR PARSHAD SINGH. AGE 24 YEARS.

History.

Patient was working in Quetta from May till November. About 2½ months ago he first noticed three small raised pimples on his left arm. There were a great number of mosquitoes in Quetta and he thought he might have been bitten. These sores were neither painful nor itchy, and they became bluish in colour.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

23.3.36. Received a subcutaneous injection of Emetine into each of the three papules.

27.3.36. Subcutaneous injection of Emetine given.

31.3.36. Continued with saline dressings only.

3.4.36. Subcutaneous injection Orisol infiltrated into tissues at margins of ulcers.

17.4.36. Subcutaneous injection Orisol.
The three small unbroken sores on the left forearm showed improvement.

24.4.36. Ulcers all completely dried and healed.
Discharged - cured.

Summary of treatment.

2 subcutaneous injections Emetine hydrochloride (gr.1).
2 subcutaneous injections Orisol (3 c.cm.)

Summary.

Three small sores present. Cured in a month with infiltrations of emetine and orisol. Leishmania tropica isolated.

CASE NO.50.

DIWAN SINGH.

History.

Patient went to Quetta in June 1935 returning in November. Three months ago he first noted the appearance of two pimples, one on his left cheek and one on his left wrist. These slowly increased in size finally breaking down to form small ulcers.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

27.3.36. Patient received subcutaneous injections of Orisol which was infiltrated into the margins of the ulcers.

31.3.36. Subcutaneous injection of Orisol.

10.4.36. Continued with daily dressings of saline only.

24.4.36. Both ulcers now healed leaving dry white scars.

Discharged - cured.

Summary of Treatment.
Two subcutaneous injections Orisol (5 c.cm.)

Summary.
Three small sores were cured with two injections of Orisol. This was one of the most successful Orisol treated cases. Leishmania tropica were seen.

CASE NO.51.

ISHAR SINGH. AGE 22 YEARS.

Admitted: 20.1.35.

History.

Patient was in Quetta from July 1935 until the following November. Whilst he was there in October he became conscious of a small sore on his right forearm which gradually increased in size and ulcerated. Another sore developed on his thumb.

Summary.

A chronic septic case. Leishmania tropica was not found in spite of repeated search.

Patient was treated for 114 days before a cure was effected. He received thirteen intravenous injections of antimony tartrate and four subcutaneous injections of Emetine.

CASE NO.52.

DIWAN SINGH. AGE 32 YEARS.

Admitted: 22.12.36.

History.

Patient was sent to Frontier and was camping near Peshawar during October 1935. Four months before admission he developed a small sore on the bridge of his nose, then, fifteen days later, he developed several sores on his feet. All of these gradually grew larger and ulcerated. On 22.12.36 he was admitted to Hospital.

Summary.

This patient arrived in Roorkee from the frontier suffering from oriental sore.

He had thirteen intravenous injections of antimony tartrate and made a good recovery.

CASE NO.53.

MOHD SHAH. AGE 27 YEARS.

History.

Patient was sent to Quetta in June 1935 returning in November. It was not, however, until March 1936 that a swelling appeared on his upper lip. At first there was a good deal of associated itching, but he applied some sulphur to the swelling after which it felt more comfortable. The swelling, however, gradually increased in size and became very tender causing considerable difficulty in eating.

2.5.36. Discharged - cured.

Summary of Treatment.

Seven subcutaneous injections Orisol (10 c.cm.)

Summary.

Patient developed a single sore on his lip 3½ months after leaving the endemic area. A cure was obtained with seven infiltrations of orisol which however were very painful in that area. Blood examination revealed a reduction in the proportion of polymorphonuclear leucocytes, and a slight eosinophilia.

Leishmania tropica were present.

CASE NO.54.

HARI SINGH. AGE 24 YEARS.

History.

Patient was sent to Quetta in June 1935 returning in November. On 26th February 1936 he noticed a small papule situated on his right elbow. This gradually increased in size and finally broke down to form an ulcer.

Leucocytes 7,400.

Summary.

All the sores present were small. Leishmania tropica were not isolated.

A cure was effected after six intravenous injections of antimony tartrate, and three subcutaneous injections of emetine.

CASE NO.55.

KAKA SINGH.

History.

Patient was sent to Quetta in June returning to Roorkee in November 1935. In February he became conscious of a papular lesion on his right elbow and then later a second one appeared on his back, over the right shoulder blade. These gradually increased in size, and finally broke down and ulcerated.

Examination.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

Patient was a difficult one. The ulcer on the back which he was unable to reach did very well. Elbow was dressed with a bandage, the knots of which were sealed to prevent interference.

White Blood Count = 6,200 per c.cm.

Differential Blood Counts:-

	27.4.36.	14.7.36.
Eosinophil Leucocytes	4%	4%
Small Lymphocytes	18%	34%
Large Lymphocytes	22%	28%
Polymorph Leucocytes	56%	34%

Summary./

Summary.

A very chronic case. The sore over the right shoulder blade was very extensive and required large doses to infiltrate it with orisol. Two blood examinations were made showing in the second one a reduction in the proportion of polymorphs, and an increase in the proportion of small leucocytes. Leishmania tropica seen in large numbers.

Ten intravenous injections of antimony tartrate and eight subcutaneous injections of orisol were given before a cure was effected.

CASE NO.56.

BANKE SINGH.

History.

Patient went to Quetta in July 1935 returning to Roorkee in November. In February 1936 he developed an isolated sore on his left foot.

Summary.

Only one small sore present. Leishmania tropica not isolated.

Leucocytes:-	5,700 per c.mm.
Polymorphonuclears	50%
Small lymphocytes	35%
Large lymphocytes	7%
Eosinophils	8%

Cured after six infiltrations with orisol.

CASE NO.57.

KARTAR SINGH.

Admitted: 2.3.36.

History.

Patient was sent to Quetta in June 1935 returning in November. Early in February he noticed a small sore on his foot and later two papules made their appearance on the fingers of his left hand.

Leishmania tropica bodies were identified on microscopic examination of scrapings taken from a sore.

Treatment and Progress.

2.3.36. Treatment with antimony began.

17.3.36. Emetine infiltrated into tissues at margins of ulcer. Repeated on 27th.

24.4.36. A new sore made its appearance on the ankle. This was treated with injections of orisol infiltrated into the margins of the ulcer.

1.5.36. Patient had deliberately knocked off the scabs of both ulcers on the fingers. Bandages were applied, the knots of which were sealed.

Investigations.

2.5.36.	Polymorph Leucocytes	60%
	Small Lymphocytes	18%
	Large Lymphocytes	16%
	Eosinophil Leucocytes	6%

Summary and Treatment.

Ten intravenous injections of antimony tartrate,
Three subcutaneous injections of emetine hydrochloride and
One injection of orisol were given.
Patient interfered with dressings and treatment lasted $3\frac{1}{2}$ months.

CASE NO.58.

PREM SINGH.

History.

Patient was sent to Quetta in June 1935 returning to Roorkee in November. In April 1936 he observed two sores, one on his right elbow and two on the left foot.

31.5.36. Discharged - cured.

Patient received three intravenous injections of antimony tartrate and one subcutaneous injection of orisol.

Summary.

Considering that both sores were septic they healed remarkably quickly. Leishmania tropica was present in secretion from ulcers.

CASE NO.59.

ANDHA BIRARI. AGE 25 YEARS.

History.

Patient was sent to Quetta in June 1935 returning in November. While there during July, he observed the eruption of five small sores. Since that time further sores have made their appearance, until at time of admission he had nine in different parts of his body.

Investigations.

Leishmania tropica was abundant.

Leucocytes: 5,600.	
Polymorph Leucocytes	54%
Small Lymphocytes	20%
Large Lymphocytes	16%
Eosinophil Leucocytes	10%

2.7.36. Differential Count:-

Polymorph Leucocytes	42%
Small Lymphocytes	24%
Large Lymphocytes	20%
Eosinophils	14%

30.7.36. Discharged - cured.

Summary.

A very severe case. Nine sores were present in different parts of the body. Leishmania tropica were present in large numbers. Treatment which lasted for three months consisted of an intensive course of antimony tartrate - gr.11 being injected at each dose until reduced again to gr.1 owing to toxic symptoms.

Nine injections were given.

CASE NO.60.

SUCHA SINGH.

History.

Patient was sent to Quetta in July 1935 returning to Roorkee in November. It was not until June 1936 that he noticed some small papules appearing, first on his knee and subsequently on his hand. There was no associated itchiness and no pain.

Examination.

There were three sores on the left knee and leg, six on the right knee and leg and one on the back of the right hand. These sores were bluish in colour, the margin being irregular and raised, while the centres were ulcerated, the bases being below the level of the rest of the tissue. Leishmania tropica was recovered. An aldehyde test proved to be negative.

Intravenous doses of 0.3 grms. of neostibosan were given on nine successive days. Patient seemed to dislike the injections, but did not appear to have actual pain. Treatment began on 6.7.36 and patient was discharged cured on 15.7.36.

Summary.

This was the only case in the series which I treated with neostibosan. The rapid progress which the patient made suggests that this drug should be tried further.

CASE NO.61.

PITAMBAR ITWARI. AGE 24 YEARS.

History.

Patient was sent to Quetta in August 1935 returning to Roorkee in the following November. In December he noticed two papules on his mouth which gradually grew bigger but caused him no pain and did not break down.

Examination.

There were two lesions about ½" in diameter situated one on the lower lip and one at the corner of the mouth. These lesions were round in shape, somewhat raised and dry and white.

Differential leucocyte Count:-

Polymorphs	52%
Monocytes & large lymphs.	24%
Small lymphocytes	14%
Eosinophils	10%

He received nine intravenous injections of antimony tartrate (½ - 1 gr. in 5 c.c. water). He responded well and was discharged cured in less than three months.

Summary.

Patient had two sores on the mouth, from which Leishmania tropica were not isolated.

CASE NO.62.

WALI MOHD. AGE 26 YEARS.

History.

Patient went to Quetta in July 1935 returning in November 1935. It was not until March 1936 that he became aware of a small papule on his left forearm. This was slightly painful, gradually became bluish in colour and then broke down.

Examination.

There were four lesions on the left forearm which were scabby and crusted over. Leishmania tropica was identified in scrapings.

Differential Blood Count:-

Polymorphs	60%
Monocytes	12%
Small Lymphocytes	20%
Eosinophyls	8%

Summary.

Received nine intravenous injections of antimony tartrate and had improved greatly when I was transferred to another station.

CASE NO.63.

CHANDRA MA SINGH. AGE 22 YEARS.

History.

Patient was sent to Quetta in August 1935 returning in November. Four months after his return he noticed the appearance of some sores on his right forearm. There was no associated pain nor itchiness.

Examination.

There was a red raised swelling about 1" in diameter on the right forearm, the centre of which was breaking down and another smaller one lower down the arm. Leishmania tropica was found in scrapings.

Differential Blood Count:-

Polymorphs	54%
Mononuclears	18%
Small lymphocytes	22%
Eosinophils	6%

Summary.

Great improvement followed nine injections of antimony tartrate.

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ge	Minimum incubation period.	Number of Sores.	Leishmania tropica found.	Age of sore at commencement of treatment months	Duration of Treatment Days	Number of Injections and Total Dosage. Antimony No.	Antimony gr.	Emetine No.	Emetine gr.	Berberine sulphate No.	Berberine sulphate c.cm.	Local Treatment	Results of Treatment
4	14 days	5	Yes	3	63	11	15¼	2	1	1	2	Saline	Cured
2	___	10	No	6	35	10	9½					Saline	Ceased to Attend
1	2 months	2	No	1½	23	5	4½					Saline	Cured
5	3 months	2	No	1	56	10	8¾	2	1			Saline	Cured
5	2 months	17	No	1	65	8	6¾	2	1			Saline	Cured
4	In Quetta	2	No	3	31	6	4¾					Saline	Cured
)	1 month	8	No	1½	90	16	14¾	3	1½			Saline	Cured
)	In Quetta	15	Yes	4	63	6	6¼					Saline	Cured
1	In Quetta	6	No	4	60	8	9¼			2	6	Saline Iodine Boric Acid	Cured
7	1 month	5	Yes	2	101	14	17¾			2	6	Saline	Cured
2	1½ months	4	No	2	66	9	11¾	3	1½			Spirit Saline	Cured
4	In Quetta	5	No	4	64	6	6¼	3	1½	2	6	Saline	Cured
1	14 days	8	Yes	3	65	11	15	3	1½			Saline	Cured
.	3 months	2	No	10/30	35	3	2½			2	6	Saline	Cured
.	4 months	2	No	7/30	50	2	1½			2	4	Saline	Cured
.	4 months	3	Yes	---	57	3	2½					Saline	Cured
.	4 months	2	Yes	10/30	30	4	3½					Saline	Relapsed
.	3 months	1	Yes	1	30	5	4½					Saline	On leave
.	3 months	2	No	2	58	5	4½			1	3	Saline	Cured
.	3½ months	1	No	10/30	10	2	1½					Saline	Cured
.	3½ months	2	Yes	10/30	51	5	4½	2	1	4	9	Saline	Cured
.	3½ months	2	No	9/30	70	6	5½			3	8	Saline	Cured
.	3½ months	4	Yes	7/30	57	8	10½					Saline	Relapsed
.	3½ months	1	Yes	7/30	16	3	2½					Saline	On leave
.	3½ months	1	No	5/30	19	2	1½					Saline	Cured
-	2½ months	5	Yes	1	43	5	4½			2	5	Saline	Cured
-	3 months	2	Yes	1	104	5	4½	1	½	7	14	Saline	Cured
--	In Quetta	4	Yes	7	64	2	1½	1	1½	3	6	Saline	Cured
--	2½ months	3	Yes	1½	50	4	3¼			3	6	Saline	Cured
--	3 months	3	Yes	25/3	104	3	2½			4	8	Saline	Cured
--	3½ months	2	Yes	1	21					4	10	Saline	Cured
--	1 month	2	Yes	3	30	4	3½					Saline	On leave
--	1 month	1	No	3	30	4	3½					Saline	Cured
--	1 month	9	Yes	3	44	6	5½					Saline	Cured
--	3 months	4	Yes	1	58	12	18½	2	1	3	6	Saline	Cured
--	4 months	3	No	7/30	58	4	3½			2	6	Saline	Cured
--	3 months	1	Yes	1	53	3	2½			3	5	Saline	Cured
--	2 months	2	Yes	2	104	8	12½			8	12	Saline	Cured
--	1 month	10	Yes	3	34	2	1½	1	1			Saline	Relapsed
--	3 months	3	Yes	1	70	5	4½	1	½	3	6	Saline	Cured
--	3 months	1	Yes	20/30	24	4	3½					Saline	Cured
52	4 months	9	No	5	72	11	15½	3	1½	2	4½	Saline	Cured
22	14 days	1	Yes	4	62	5	4½			3	7	Saline	Cured
30	1 month	2	Yes	3	55			5	3½			Saline	Ceased to attend
58	3 months	2	No	1	52	5	7	5	2½	2	4	Saline	Cured
--	4 months	1	No	6/30	10	2	1½					Saline	Cured
30	In Quetta	5	Yes	5	35	2	1½	2	3½			Saline	Cured
30	2 months	10	No	2	55	11	18	2	1½			Mag. sulph foment& Sal.	On leave
24	4½ months	3	Yes	2½	32			2	1	2	3	Saline	Cured
--	4½ months	3	Yes	3	28					2	5	Saline	Cured
22	In Quetta	2	No	3	114	13	15½	4	2½			Saline	Cured
32	------	4	No	4	105	13	15½					Saline	Cured
27	3½ months	1	Yes	15/30	73					7	10	Saline	Cured
24	3½ months	2	No	4/30	50	6	5½	3	1½			Saline	Cured
30	3 months	2	Yes	2	97	10	9½			8	16	Copper sulph Saline	Cured
--	3½ months	1	No	1	70					6	6	Saline	Cured
--	3 months	3	Yes	1	106	10	9½	3	1½	1	2	Saline	Cured
--	5 months	2	Yes	10/30	40	3	2½			1	3	Saline	Cured
25	In Quetta	9	Yes	9	97	9	13½					Saline	Cured
--	11 months	10	Yes	15/30	10	NEOSTIBOSAN	2.7 Gm.						Still under treatment
24	6 months	2	No	5	85	9	8½					Saline	Cured
26	4 months	4	Yes	1½	66	9	8½					Saline	Still under treatment
22	5 months	2	Yes	2	85	10	9½					Saline	Still under treatment
24	1 month	13	No	6	24	5	4½					Saline	Still under treatment.

PROGNOSIS.

The prognosis is very good. All sores heal eventually even if untreated. Treated sores usually heal within three months, untreated sores in about a year. Unfortunately in most cases scars are left behind which tend to be permanent. Scaring is worse after chronic septic sores.

LABORATORY INVESTIGATIONS.

Every case of suspected oriental sore was examined for Leishmania tropica. In the sixty-three cases treated, thirty-six showed Leishman-Donovan bodies. These bodies were not always identical in shape. There was the round or oval thick type to which the majority belonged and the flattened type, the ends of which were almost pointed. They were very numerous in the large endothelial cells. In spite of careful search no bodies were ever seen in peripheral blood films.

The specimens were obtained by undermining the margins of the sores with either an ordinary hypodermic needle, or a fine glass pipette, the point being directed towards the healthy tissue. It was very unusual to obtain positive results from tissue which was heavily infected with sepsis. The most satisfactory from this point of view were the small early sores before they had broken down. As a rule they/

they were literally swarming with leishmania.

Leishman's stain was commonly used but Giemsa was also employed and found very satisfactory.

Blood. This was fully examined in about fifteen cases. The red corpuscles were present in normal numbers, and showed no abnormality. The haemoglobin was also normal.

The white corpuscles showed a constant slight increase, eight to eleven thousand per c.cm.

The differential counts revealed in every case an eosinophilia of from 4 to 14 per cent. There was an increase in the number of small lymphocytes on an average of 6 per cent. The large lymphocytes and monocytes counted together on an average were 8 per cent above the normal, a typical count being as follows.-

Polymorphonuclears (neutrophil)	50
Small lymphocytes	23
Large lymphocytes & monocytes	17
Polymorphonuclears (eosinophil)	10

The aldehyde test was carried out on six cases with a negative result.

Wassermann reaction carried out on two very chronic cases was negative.

DIAGNOSIS.

When the disease occurs in an endemic area the diagnosis is usually easy, but when it occurs in a patient who has travelled far from the source of his infection, it is often not suspected.

In an endemic area multiple painless sores appearing on the exposed parts of the body and running a chronic course should always be considered as possible oriental sores. The proof of this depends on microscopic examination of the serous exudate obtained by means of a large bore needle or glass pipette. In most cases L. tropica will be seen in large numbers lying free or in the endothelial cells. An eosinophilia and slight rise in the total number of leucocytes are the additional aids to diagnosis.

The disease in India must be distinguished from tropical ulcer, dermal leishmaniasis, tertiary syphilis, and occasionally blastomycosis.

Tropical ulcer occurs in Assam and Southern India where oriental sore in unknown. It starts as a painful pustule which spreads sometimes in a serpiginous manner. No leishmania are found on examination of the secretion.

Dermal leishmaniasis presents on occasion considerable difficulty in differential diagnosis. Both conditions show leishmania on examination which are indistinguishable/

indistinguishable in appearance. The nodules of dermal leishmaniasis occasionally break down and ulcerate and so resemble oriental sore very closely. The history of previous Kala azar, the geographical area in which the disease occurs, and transmission tests by means of sandflies always remove any doubt which might arise from the clinical appearances.

Tertiary syphilis gives rise to scattered lesions which however do not necessarily confine themselves to the exposed parts of the body. The Wassermann reaction is normally sufficient to distinguish the doubtful cases.

In blastomycosis, miliary ulcers or sinuses may appear on the skin or pharyngeal mucous membrane. These lesions are commonest on the gluteal region. Yeast-like fungi are seen on examination of scrapings from the diseased areas.

TREATMENT OF ORIENTAL SORE.

In recent years a great deal of work has been done on this subject. I would therefore like to mention briefly the more important contributions before discussing my own experiences.

R.L. Varma (62) described how he dissolved ¼ gr. of berberine sulphate in 1 cc. of distilled water and after distillation injected it into the tissue surrounding the sores of a patient. He managed to cure all his patients by this means with two or at the most three infiltrations. He suggested this treatment as worth trying in Kala azar.

In 1929 A.L. Devi (63) reported treatment of 12 cases infiltrated by this method on the suggestion of the Director of the Calcutta School of Tropical Medicine. He found that the sores healed up 'as if by magic' after one or two injections only.

Das Gupta (64) recorded treatment of a case with Orisol (2% berberine acid sulphate). He cut out the lesions after infiltration and stained sections. Examination of these sections at intervals revealed a rapid disappearance of Leishmania after 45 hours and none were present after four days. In support of his findings he presented several very instructive photographs. From his investigations he concluded that/

that 2 per cent solution of the acid salt gave the best results and should be used to infiltrate the hyperaemic area round each sore. Two to three cc. should be injected into several points. Large sores might require second injections on the 4th or 5th day.

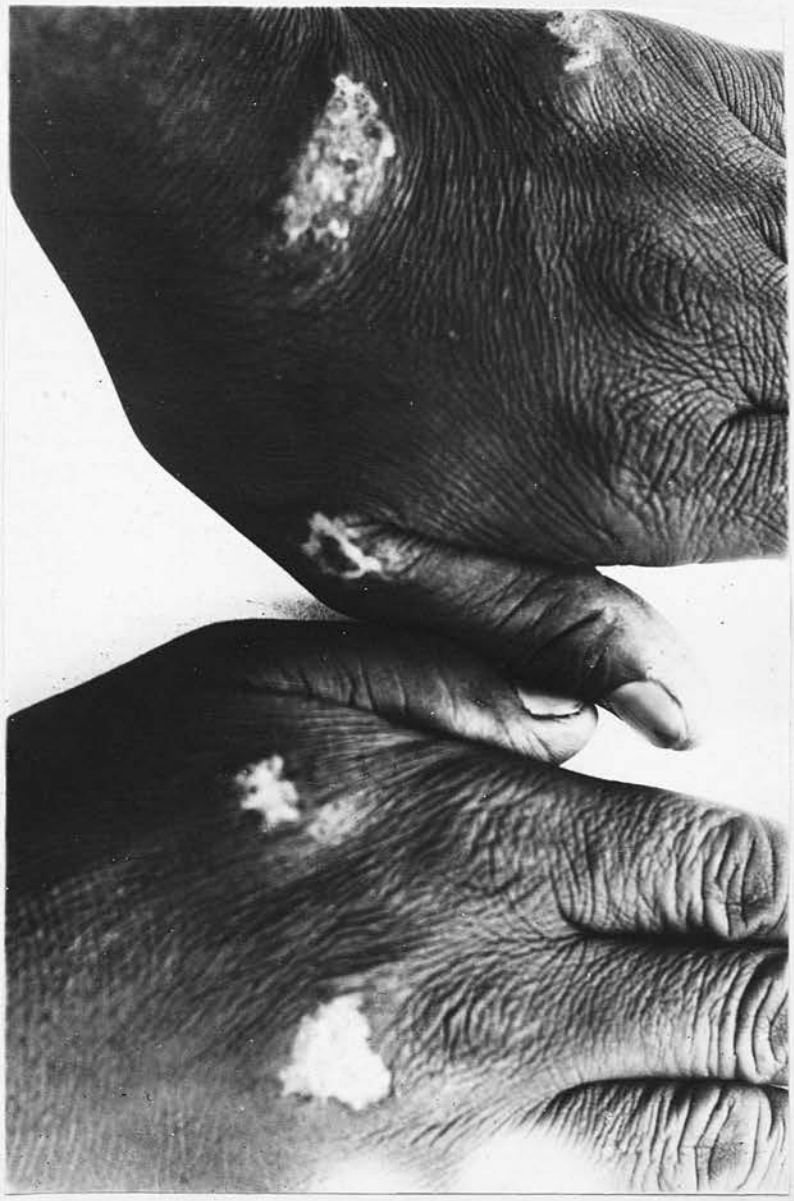
He also stated that unless the sores were numerous (which in his experience was uncommon) all sores should be infiltrated with berberine acid sulphate instead of intravenous Antimony compounds.

Chatterjee (65) quoted 24 cases treated with Orisol. He recommended that to cure a case presenting two sores only 12 infiltrations or 48 punctures were required, i.e. 24 punctures for each sore and a total of 24 cc. of 2 per cent Orisol during a period of 24 days.

Probably the best and certainly one of the most detailed contributions with regard to treatment in recent years was given by Varma (66) in 1934. He described a series of 78 cases consisting of 100 sores. He treated half of these with 1 per cent and half with 2 per cent berberine sulphate.

The injections were given at intervals of one week. He found that four or five injections of 1 per cent solution were required and four to six injections of 2 per cent solution. Early sores were easily cured with not more than four injections of 1 or 2 per cent solution. The quantity given was at the most/

Case. 7. Four weeks after commencement of treatment. There was secondary infection and treatment was carried out for 90 days before cure was effected. Patient frequently rubbed filth into the sores.



Case. 7. Five weeks after the commencement of treatment.

Case. 7. At conclusion of treatment.

The conspicuous scars are well illustrated.

most 4 cc. of 1 per cent solution or 2 cc. of the 2 per cent solution. Any increase above this dosage resulted in dullness or heaviness of the head, dryness of the mouth and disinclination to work.

Certain cases he found unsuitable for berberine sulphate treatment such as sores on the eye-lids, nose, lips, forehead or multiple sores.

Fifteen cases were treated by him with tartar emetic solution. Intravenous injections of 2 per cent solution in sterile distilled water were given at intervals of three days. The dosage used was 1 c.c. increased to 2 c.c. then 2.5 c.c. and finally 3 c.c. After that 3 c.c. doses were used until 12 injections had been administered. By this method he cured 10 cases out of the fifteen in six weeks.

He believed that there was a general reaction in the bodies of patients suffering from these sores which was ordinarily not noticed. The causal organism produced a toxin which circulated in the blood. In support he stated that immunity was produced after the first infection as demonstrated by the damsels of Bagdad and Mosul who used this knowledge to save themselves from disfiguring sores. The immunity however was not produced unless the sore ran its full course. Thus a vaccine did not produce immunity.

Warma also mentioned in his support of the theory of toxaemia the work of Noguchi (67) who, in 1924/

1924, found that the serum of L. tropica obtained from an actively immunised rabbit caused agglutination in dilutions of 1 in 80 or 1 in 200 with L.tropica but had no effect on other Leishmania.

He also quoted the skin test of Ray (1929) who took the requisite antigen and put one drop into the skin and obtained a red raised reaction. He was of the opinion that oriental sore vaccine was of considerable value in treatment of sores of all types and especially in chronic cases. The actual method employed was to inject 0.5 c.c. of vaccine subcutaneously into the arm. This was repeated with 1 c.c. at intervals of 4 to 7 days till the sores healed.

He ended his paper with the following conclusions

(1) A general reaction took place in the body for which vaccine treatment gave encouraging results.
(2) Vaccine treatment should be given to acute inflammatory or septic cases and berberine withheld.
(3) The maximum amount of berberine sulphate which should be infiltrated was 4 c.c. of 1 per cent solution.
(4) Tartar emetic was more successful than organic preparations of antimony.

The following are my own experiences of treatment of oriental sore. A full account of each of the 63 cases has been given under the heading of symptomology. It is unfortunate that the treatment had to be mixed a good deal but as the early return to duty of/

of the troops was of primary importance this mixing of treatment could not be helped. Antimony, emetine, and orisol were used on patients of the same type and infected under the same conditions. Neostibosan was also used but only in one case for reasons of economy.

The treatment consisted of two distinct kinds:-

(a) Specific treatment and

(b) Local treatment, the two always being administered in conjunction with each other.

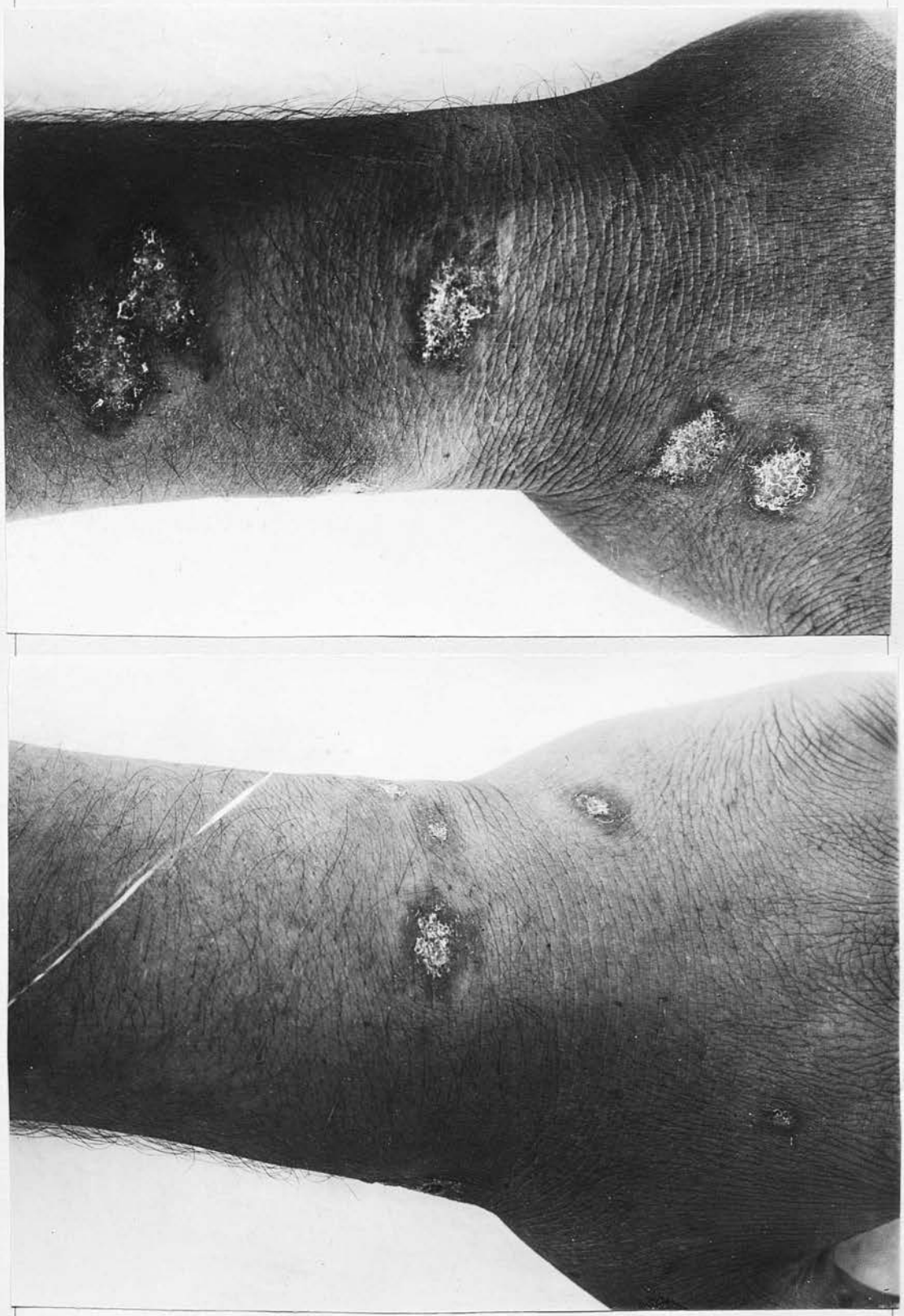
Local Treatment.

The majority of cases were treated with dressings of gauze soaked in normal saline, the wound having been previously cleaned with spirit. Finally a bandage was applied. This dressing was changed twice a day - outdoor patients attending in the morning and evening. Septic cases were sometimes fomented with magnesium sulphate or boric acid. At times the dressings were soaked in hypertonic saline but this made no appreciable difference. Iodine was painted over the healing areas in several cases and was found very successful, but this was only used when definite signs of healing had been seen.

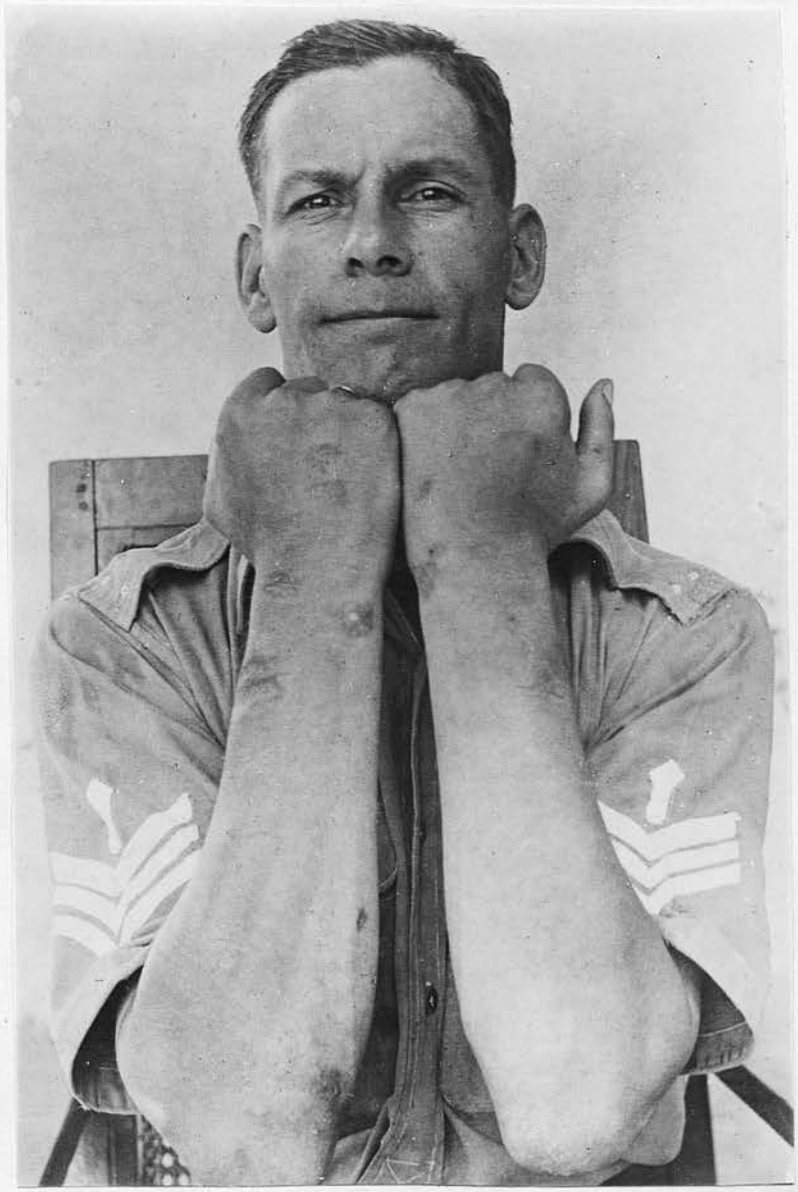
Specific treatment.

Potassium antimony tartrate. This was used in varying strengths which can be seen on reference to the table. For a soldier of average weight and in good/

Case. 8. Three weeks after the commencement of treatment.
Cure followed after treatment for two months with antimonium potassium tartrate and local dressings.



Case. 8. Six weeks after the commencement of treatment. Note the scaly nature of the lesions of hands and wrists in process of healing.



Case. 8. Condition on discharge. Note the scarring and slight degree of pitting.

good health apart from the sores, the most effective dosage was as follows:- A preliminary dose of gr.½ of potassium antimony tartrate in 5 c.cm. sterile freshly prepared distilled water was given intravenously, and this was followed three days later by a dose of gr.1 in 5 c.cm. of the same solvent. Thereafter twice-weekly doses of gr. 1½ were injected until the end of the month, when the patient was given a rest for one week. Then the injections were resumed until definite signs of healing were well established. Local treatment was rigidly carried out throughout.

At one time gr.2 of potassium antimony tartrate were given twice weekly, but this produced toxic symptoms, viz.- coughing, burning sensation in the throat, nausea and vomiting. Two men actually coughed up a little blood. Thus although the treatment did seem to hasten the rate of healing, it was too dangerous to continue. The men were always excused duty on the days on which they attended for treatment.

The time taken for cases to heal varied greatly. Some healed up rapidly after three or four grains with the addition of the local treatment. Others required more than eighteen grains. The chronic cases were all secondarily infected. The first signs of healing were usually a drying up of the moist lesion followed by the formation of a hard crust which later peeled off leaving a white scaly and often itchy area.

In/

In addition the removal of the crust usually left a hollow behind and the ulcers eventually healed leaving marked scarring. Several men among the number sent to Quetta had suffered from oriental sore before, but none of these became infected a second time.

Emetine hydrochloride - Only one cure was obtained by using this drug alone in conjunction with local treatment. A reference to the table will show that twenty cases were treated with it, but, although some improvement was noted at the time, this improvement was only temporary.

The usual dosage was gr.½ emetine hydrochloride in 3 c.cm. sterile distilled water for one large sore. This was repeated once a week. Some patients were given as much as gr.2 at a time according to the number of sores treated. The drug was administered by injection into the edge of the sores and the surrounding tissues, the first signs of healing being the creeping in of the ulcer margin. Many cases however, showed a false improvement. The margin of the apparently healthy tissue crept in but later on turned a bluish colour, softened and ulcerated again. It was noted in treating cases with emetine that unless the limb on which the ulcer being treated was placed on a firm support, the patient was apt ~~to~~ suddenly to move it, jerking the needle out, so that a stream of emetine

was/

was directed upwards, more often than not into the doctor's eye. This resulted later in a painful conjunctivitis. Used in conjunction with antimony in certain chronic cases it gave good results, but was of very little use by itself.

Orisol - This was used in twenty cases. On the whole the results were disappointing. Four cases were cured by this treatment alone in addition to local treatment. The minimum amount required was 5 c.cm. to cure two sores.

The dosage used was 1 c.cm. to 3 c.cm. per sore according to its size. It was a satisfactory form of treatment for single or small sores but difficult and expensive in cases of multiple sores. Injections were made into the margins of the sores in four places so as to cover and infiltrate the whole area. A few cases showed a rapid improvement by drying up and forming a scab which, when it fell off, left a healed area. Other cases, the majority, showed no appreciable change. The patients complained of pain at the time of injection but this soon disappeared.

Neostibosan - Owing to the cost of this drug only one case was treated with it. He was given nine intravenous injections of gr. 0.3 neostibosan on consecutive days. In addition his sores, nine in number/

number were dressed with normal saline changed twice daily. He improved so much at the end of his course that he was allowed to leave hospital and attend for dressings. In the table are given details of the cases treated.

SUMMARY AND CONCLUSIONS.

Descriptions of 10 cases of Kala azar, 1 case of cutaneous Leishmaniasis, and 64 cases of Oriental Sore are given. These are all cases which have been for some time under my personal care or observation. During my service at Chittagong, however, I had almost daily opportunity of seeing several fresh cases as out-patients or as patients in the Civil Hospital or Assam-Bengal Railway Hospital and this experience has influenced my conclusions.

I. KALA AZAR.

(1) Kala azar has a wider distribution than is generally believed. I have seen cases in Dehra Dun in the Western United Provinces which is a semi-hill station. Judging from the number of cases occurring in Gurkhas on return from furlough it seems more than probable that this disease occurs in Nepal.

(2) Certain symptoms and signs appear to be overrated and others not given sufficient prominence. The 'double remittent' type of fever is more often than not absent. In my series of cases only two demonstrate this feature, and I have seen it present in other diseases e.g. tuberculosis. The Chief Medical Officer of the Assam-Bengal/

Bengal Railway and the Civil Surgeon Chittagong who both treat very large numbers of Kala azar patients put very little reliance on this symptom.

Pigmentation is another sign which is not reliable. It is hard to make it out in a dark-skinned individual and it is very often present in malarial cachexia. A clean tongue was almost invariably present in all the cases which I examined.

A feature which is seldom mentioned is the brittle state of most Kala azar patients' hair. In many cases it tends to fall out, especially in women.

(3) The importance of full examination of the blood cannot be emphasised too much. The principal points to note are the marked leucopenia, the reduction in proportion of polymorphs and relative increase in mononuclears and lymphocytes. The proportion of whites to reds should always be estimated. The ~~normal~~ proportion as generally quoted is 1 white to 1500 reds. In my experience it is even less. Eosinophils are often absent but associated worm infections cause them to appear in quite considerable numbers.

(4) Present day treatment of Kala azar in India is not as thorough as it should be. The majority of/

of large hospitals favour the rapid method of injections. The patient, too, is not admitted to hospital as a rule unless complications are present.

The result is that the patient ceases to attend and only received a sufficient number of injections to improve but not to cure his condition. This leads to relapses and I believe to increased incidence of dermal leishmaniasis.

Whenever possible the patient should be kept in bed and given intravenous injections of neostibosan or urea stibamine every second or third day until at least fifteen injections have been administered. Nourishing diets rich in vitamins should be given. This prolongs the period of treatment but produces a cure rather than a temporary improvement.

(5) Judging from the number of admissions nowadays as compared with ten years ago the disease appears to be decreasing.

II. KALA AZAR WITH CANCRUM ORIS.

(1) This is a common and serious complication of Kala azar. Although quite often seen in adults it is four times as common in children in whom it is present in about 12 per cent of cases.

(2)/

(2) Cancrum oris is not due to the presence of Leishmania donovani in Kala azar patients. In spite of careful examination no Leishmania were seen in scrapings taken from the lesions though mixed infections were common. It is due to the same causes which produce this condition in other diseases e.g. diphtheria, measles, typhoid etc. Probably lowered resistance due to prolonged fever allows the bacteria normally present in the mouth to erode and invade the tissues of the mouth and face.

(3) Blood counts show certain constant features. The white blood corpuscles are increased in number to between 7,000 and 16,000 per c.mm. The increase in leucocytes is due to the increase in polymorphonuclears. The haemoglobin is ~~also~~ reduced.

(4) The prognosis in Cancrum oris is bad. The majority of cases die in a few weeks from toxaemia or intercurrent infection. Those in hospital often show a marked improvement under treatment but do not remain long enough to reap the full benefit.

(5) The most effective treatment consists in intramuscular injections of neostibosan in children, and intravenous injections of urea stibomine in adults. Extensive erosions should be treated with/

with skin grafts once the ulceration has become as nearly as possible aseptic.

III. DERMAL LEISHMANIASIS.

(1) This is a much commoner disease than the number of hospital admissions would lead one to believe. Now that the disease is better known more patients are coming for treatment.

(2) The disease can easily be mistaken for leprosy and unless scrapings are examined from the lesions many patients will be wrongly diagnosed. Owing to the much more favourable prognosis in dermal leishmaniasis this mistake should be carefully guarded against.

(3) The chronic nature of the disease and the large number of injections which are often required to effect a cure should be carefully noted. Treatment will always be successful even in the most stubborn cases if persisted in.

(4) There is always the danger of spread of Kala azar by means of sandflies feeding on these lesions. It is a danger to the public therefore to allow those patients to go about untreated.

IV. ORIENTAL SORE.

(1) Oriental sore is caused by a leishmania closely allied to Leishmania donovani but less virulent and only capable of producing skin lesions. It is/

is transmitted by a sandfly which is distinct from the sandfly transmitting Kala azar, and this sandfly is only capable of transmitting Leishmania tropica.

(2) Each bite of an infected sandfly produces a sore at the area bitten. It is not a systemic disease whereas Kala azar is a systemic disease.

(3) Antimony in either its trivalent or pentavalent form is the most effective and cheapest drug in the treatment of Oriental sores.

The dose of potassium antimony tartrate should be regulated according to the weight of the patient and in any case should never exceed gr.2 at one time. It must be carefully injected owing to the sloughing it causes if allowed to escape into the tissues. If an accident of this kind does occur then iodex is a useful application and gives some relief.

Neostibosan is expensive but is not so liable to cause sore arms or sloughing.

(4) In chronic cases emetine hydrochloride gr.½ to gr.1 injected into the margins of the sores hastens the healing process produced by the antimony. This treatment is however rather painful.

(5) Orisol (berberine sulphate) was not so successful as one might expect from the results claimed for it. For single sores or small lesions before they/

they have broken down, this drug gives good results. This latter conclusion was also arrived at by Napier (Knowles (68)) some years ago. Results with large or multiple sores are almost always disappointing.

(6) Local dressings play a very important part in the rapidity of cure. There were many examples of patients who kept their dressings and sores clean, and healing occurred in from three to six weeks. There were many examples of others who were careless or ignorant and allowed their sores to become secondarily infected. They then took even as long as four months to cure.

Normal saline is a very satisfactory dressing – followed by iodine once healing has started.

(7) Early treatment is most essential. The old-standing case is hard to cure: the recently developed case is comparatively easy to cure.

(8) The total dosage of antimony required to effect a cure can be reduced by the use of supplementary emetine or orisol and rigid local treatment.

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