BACTERIOPHAGE IN ITS CLINICAL ASPECT.

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AN outbreak of dysentery occurred at the Khoirabari Tea Estate, commencing in May 1929. The disease was first noted in a coolie who had just arrived from his country. Previous to this there had been no cases of dysentery for some months. The infection spread fairly rapidly, eighteen cases being admitted to hospital in May; the maximum was reached with fifty-five cases in June; from that time the numbers gradually declined until October when only four new cases occurred. There were no new cases in November.

Of the total one hundred and forty-one cases, ninety-one were new coolies, fifty were old coolies; that is people who had been on the garden for at least one year. The new coolies all came from the Rewa district, and were of the Gore caste.

The garden lies in grass land just below the Bhutan foothills in the Mangaldai district; the coolie lines are fairly compact and border a small river.

The disease was evenly spread through the lines, no special group or groups of houses were implicated.

Water supply.—The water comes from the hills about two miles away, in iron pipes; it is filtered after coagulation, in Jewell filters, and distributed by stand-pipes. This supply serves two other gardens, neither of which were infected, so the water supply can be disregarded as a source of infection. Flies are suspect but in Assam they are more prevalent during the dry months than during the monsoon, and recent work in Calcutta would appear to minimise this possibility. One is left therefore with the personal and indirect contact, and this was favoured by a certain amount of over-crowding due to the sudden influx of large numbers of new coolies.

Type of dysentery.—The cases presented all the features of bacillary dysentery, both clinically and microscopically. The frequent non-fæculent stool consisting mostly of blood-stained serous fluid and mucus, and the marked toxic condition of the patients could not be mistaken. Stools were examined microscopically at intervals, in no case were entamœbæ found; nor were there any Charcot-Leyden crystals or entamœbic cysts. Erythrocytes and leucocytes were numerous. It was not found possible to examine every stool microscopically. The nearest laboratory is the Pasteur Institute at Shillong, and that is three days distant by post, so that it was not possible to confirm the findings by culture.

Bacteriophage.—It appears to have been customary in the absence of positive laboratory findings to regard dysentery as amœbic, and to rely on the response to emetine for confirmation of the diagnosis. This view is scarcely tenable in view of the laboratory findings in India. Colonel Morison in a recent paper states out of 266 cases of dysentery in Rangoon General Hospital only 12.4 per cent. had *Entamœba histolytica* or cysts; and Professor A. C. Ukil quotes Cunningham and King who give the relative distribution of the dysenteries as:—

	Per cent.
Bacillary	57.32
Amœbic	5.10
Combined	3.82
Negative	33.76

It was therefore decided to treat all cases with bacteriophage only, following the instructions for its use issued by the Pasteur Institute, Shillong. In ordinary cases two doses were given daily on an empty stomach, well diluted; the maximum number given daily in any case was four. None were given intramuscularly or intravenously. The results in general were very satisfactory. The blood usually disappeared in three to four days, and the patient became less depressed and listless. One of the most marked features appeared to be this early loss of toxicity.

Of the total number of cases, 108 who received no treatment other than bacteriophage were discharged cured, and are at the time of writing at work. The remainder did not respond so well, mucus and diarrhœa with traces of blood persisted; these were treated by emetine and salines, and in some cases intravenous organic arsenic and lavage. Of these, twelve died, the balance recovered and were discharged and are now in good health.

This gives a total of 129 cases cured, 91.3 per cent.; and a notable feature is the absence of recurrences to date.

For the purpose of comparison I collected all the other cases of dysentery which occurred on other gardens in the district during 1929, and have included them in the Table below:—

	Number of cases.	Average duration of illness.	Cured.	Died.	Percentage cured.	Percentage of deaths.
Treated by bacteriophage	141	21 days	129	12	91.3	8.5
Emetine and salines	72	18 „	63	9	87.5	12.5

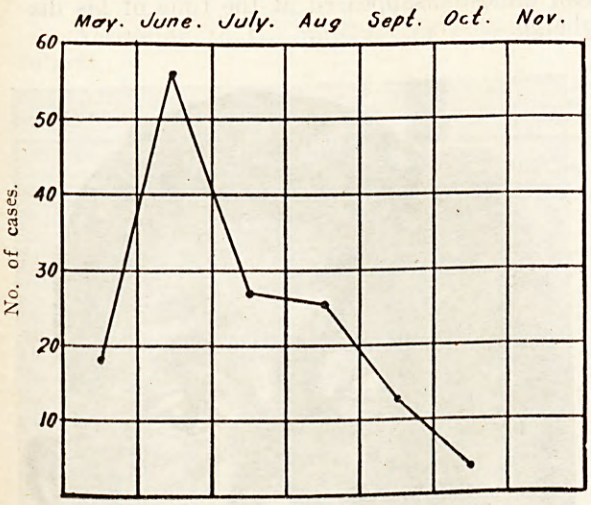

Chart showing epidemic curve.

The average duration of illness is taken from the date of admission to the date of discharge from hospital, and the practice on these gardens is never to discharge a coolie until he is fit for at least light work.

It will be seen that the results of bacteriophage compare very favourably with those results given by emetine and salines. One must also consider how the average coolie loathes injections, and how painful and depressing are emetine injections; from this point of view alone bacteriophage has much in its favour.

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THE TREATMENT OF POST-KALA-AZAR DERMAL LEISHMANIASIS.

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Introduction.

UP to the present little has been written with regard to the treatment of post-kala-azar dermal leishmaniasis. One of the main reasons for this is that on the whole the results have been disappointing. With the visceral form of the disease 12, or in some cases less, injections of one of the pentavalent compounds of antimony will usually cause complete disappearance of all the symptoms of the disease, whereas a similar number of injections will frequently make not the slightest impression on the dermal lesions. Workers in this field have, therefore, been casting round with the hope of finding some form of treatment which would be more certainly and rapidly efficacious. Our own attempts in this direction have not met with any success and we have been driven back to the conclusion that the antimony compounds, which are most efficacious in the treatment of the visceral infection, are the ones most likely to be successful in the treatment of the dermal lesions.

X-ray exposures, antimony ionisation, soamin injections, and application of antimony ointment have not proved to be of any value.

The injection of acid berberine sulphate directly into one of the larger nodular lesions causes them to shrink markedly and would probably lead to their final disappearance, but it is not a practical form of treatment as in cases in which there are large nodules there are usually a number of smaller nodules on different parts of the body; furthermore, it would be out of the question to treat the very widespread depigmented lesions in this way.

On the other hand, a very large majority of the patients treated have reacted eventually to intravenous injections of any of the antimony compounds that we use in the treatment of kala-azar; they may show signs of improvement, or actually be cured, after the usual course of injection, but as a general rule a much more prolonged course is necessary. One patient, who was under our treatment for about a year, during which time he received between 50 and 60 injections of different antimony compounds—including 12 of urea stibamine—but showed no clinical improvement, is reported by Dr. Brahmachari and Banerjea (1929) as having been cured by a course of urea-stibamine *plus* a further 9.3 grammes of this preparation, given during a period of over one year. The full amount given is not stated, but it must have been at least 12 grammes and was probably administered in not less than 60 injections. This shows that early failure should not be taken as an indication for despair.

In our out-door dispensary a few patients have been cured by sodium antimony tartrate, but the reaction is so slow that the patients seldom remain long enough under treatment for a cure to be produced. One girl who gave no history of previous treatment for kala-azar was completely cured by a course of 30 injections, but other patients who have been cured by this salt have required more injections than this.