

The temperature is generally controlled also within 24 hours. But sometimes the patients may get a rise after 24 hours and thereafter the temperature is permanently controlled. In the beginning we thought this might be due to the action of the drug not commencing till after 24 hours, but the truth seems to be that the drug begins to act at once and the destruction of the parasites is so extensive that the dead parasites, acting as foreign proteins in the blood, being on a rigor with a rise of temperature. This seems to be analogous to the Jarisch-Herschheimer reaction in syphilis, following after the injection of salvarsan. The truth of this statement is best illustrated in the temperature chart of Case 13 of our series. It was a case of quartan infection and there was a rise of temperature regularly every 72 hours before the commencement of the treatment. Plasmochin was then administered and within 24 hours of the last rise the temperature went up once again before it was permanently checked. Every temperature chart tells a similar story.

The first few of our cases invariably complained of some dull aching pain in the epigastric region. However when we administered the drug after meals, none of them complained of this epigastric pain. In none of our series, fortunately, did we observe any cyanosis or pallor.

One case, a patient who came to the hospital for malaria and diarrhoea was put on this treatment; his malaria was controlled, but he developed pneumonia and died. An autopsy was not obtainable.

In some of our cases where it was possible to keep in touch with the patients, they have informed us, even after two months, that they have been completely free from malaria during this period after discharge from hospital.

We have long been on the look out for some drug which will completely sterilize the blood of the malarial infection and get rid of crescents. In vain have we tried quinine, mercurochrome, antimony tartrate, etc., to get rid of crescents from the blood. Other workers in the field have tried malarial vaccines but without success. Last year, mercurochrome was tried in our wards, and the results which were disappointing, were published by our colleagues, Dundas and Telang, in the *Indian Medical Gazette* for March, 1926. Last year we tried antimony tartrate injections but failed to rid the blood of crescents.

Conclusions.—Our conclusions are that Plasmochin completely sterilizes the blood of malarial infection and controls the temperature within 24 to 48 hours. The results obtained are lasting and immediate. Crescents are removed from blood completely within a week. The advantages of Plasmochin are:—

It is a sure and quickly acting remedy.

It removes crescents from the blood.

It is administered orally.

It has no unpleasant taste or odour, and hence children and even fastidious adults will take it.

Being a synthetic drug, there is no fear on the grounds of expense and shortage of supply.

It has no untoward or after effects. (Even when given to patients in poor health, weighing only 5 or 6 stone, in doses really meant for Europeans weighing on an average about 10 stone, no untoward effect was observed.)

Dr. Horlein, Director of the drug department of the Elberfeld factory where Plasmochin was evolved, points out that quinine is so unpleasant to take, has such troublesome after effects and is so expensive that the ever optimistic chemist felt that a drug should be evolved which would destroy the malarial crescents which infect mosquitoes and yet be free from the drawbacks of quinine. Our observations indicate that in Plasmochin this ideal is well realised.

The days of quinine are numbered. By virtue of its surpassing merits Plasmochin has successfully challenged the place of quinine. The prophetic vision of Paul Ehrlich is being realized by the evolution of synthetic drugs and it is certain that they will hold sway in future. Ehrlich, after 605 unsuccessful attempts gave to the medical world his 606th successful attempt, called salvarsan, for syphilis. In subsequent years, his school gave us Bayer 205 for trypanosomiasis; and it is a tribute both to Ehrlich and synthetic chemistry that the new drug should be evolved in his fatherland. Our experience with Plasmochin makes us realize that Plasmochin is for malaria what Bayer 205 is for trypanosomiasis. We are confident that the medical world will welcome the new remedy with the same enthusiasm and frankness with which they received Bayer 205, and will be more than gratified at the results. Plasmochin is sure to advance not only the cause of cure but also of prevention. Medical men practising in malarial countries, who have seen the ravages wrought by malaria, will feel grateful to the Elberfeld factory for this epoch-making discovery.

FURTHER OBSERVATIONS ON THE SERUM TEST FOR KALA-AZAR WITH ORGANIC ANTIMONY COMPOUNDS. A SIMPLE BLOOD TEST FOR KALA-AZAR.

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In a paper entitled "A preliminary note on the action of antimony compounds on blood.

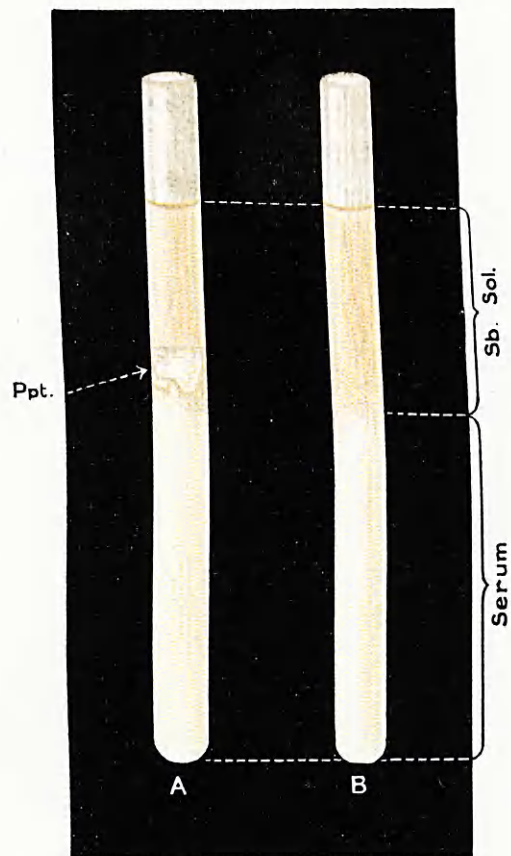


Fig. I.—*Serum Test.*
 (A) Kala-azar serum—note the precipitate at the junction.
 (B) Non-Kala-azar serum—no precipitate at the junction.

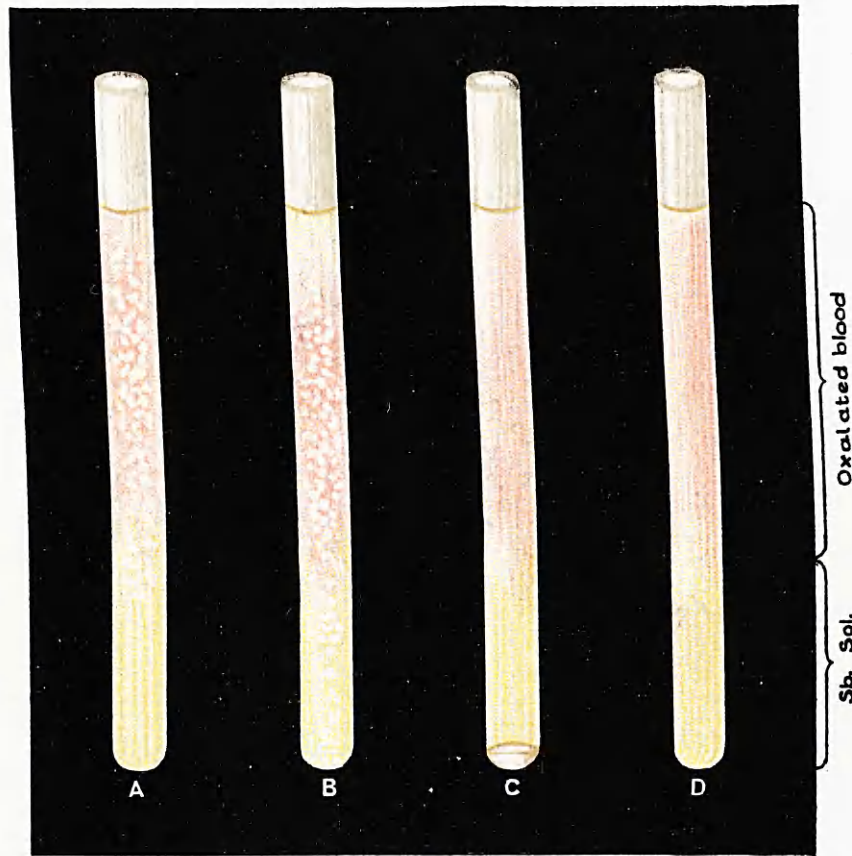


Fig. II.—*Blood Test.*
 (A) Kala-azar blood—immediately after antimony solution is added—note flocculent precipitate forming.
 (B) Same—after a few minutes—precipitate settling down.
 (C) Same—after a few hours—precipitate settled down at the bottom.
 (D) Non-Kala-azar blood—no precipitate is formed.

A new serum test for kala-azar," published in the *Indian Medical Gazette* for June 1927, we pointed out that the precipitation, produced when solutions of certain organic compounds of antimony were brought in contact with the serum of kala-azar patients, was of a specific nature and that it could be used as a diagnostic test for kala-azar. The technique of this test was described and its advantages over the aldehyde test were discussed in that paper.* (Plate IX, fig. A and B.) Napier in a paper entitled "A new serological test for kala-azar," which appeared in the *Indian Medical Gazette* for July, 1927, extended these observations to a large number of kala-azar cases and controlled the efficacy of this test by means of spleen puncture examinations of patients, in addition to the aldehyde test which was mostly used in our series of cases. He corroborated our conclusions regarding the specific nature of this test. He also tried different dilutions of these compounds and concluded that it was preferable to use weaker concentrations of antimony com-

sake of convenience. The test can be applied quite as effectively to fresh serum, and this in our opinion is an advantage as it makes the reaction a quick and simple diagnostic measure. We did not find any particular advantage in keeping the serum for 24 hours in a cool room.

Since our first paper was published we have largely extended our observations to kala-azar and other sera and are carefully inquiring into the composition of the precipitate formed and the causes of this precipitation by working out such factors as the hydrogen-ion-concentration, the viscosity, the conductivity, the gold number, etc., of different sera. The details of this work we hope to publish shortly. In this paper we give further data to show the efficiency of this test, and its advantages over the aldehyde test. We also describe a very simple blood test for the diagnosis of kala-azar which can be easily performed with little equipment or cost.

In Table I we have given details of 129 sera which we have examined by this test. We found the urea antimony compounds gave the best

TABLE I.

1	2 Kala-azar.				3 Leprosy.				4 Malaria.				5 Normal blood and other cases like filaria, syphilis. (etc.)				Remarks.
	No. done.	+++	±	—	No. done.	+	±	—	No. done.	+	±	—	No. done.	+	±	—	
Amino-stiburea, Stiburea and Urea-stibamine ..	70	70	—	—	35	—	2	33	14	1	—	13	10	1	—	9	
Aldehyde reaction..	70	60	4	6	35	7	4	24	14	—	1	13	10	—	—	10	

pounds than those that were recommended by us. In most of his experiments, serum was kept for 24 hours in a cool room before the application of this test.

Our observations show that although 0.005 per cent. solutions of antimony compounds give a positive reaction immediately, it is advantageous to use 1 to 4 per cent. solutions as the precipitate thrown down with weaker solutions is not so dense, flocculent and distinctive. With weaker solutions there is a possibility of overlooking the early cases of the disease. Further we are of opinion that it is unnecessary to keep the serum in a cool room for 24 hours unless it is for the

reaction for the purpose of this test and in this series of cases we have used them entirely. The three preparations, urea-stibamine, stiburea (urea-stibamine, Union Drug Co.) and amino-stiburea were equally effective. It will be observed that of the 70 kala-azar sera tested with the antimony test, all (100 per cent.) gave strongly positive reactions; when the same sera were tested with the aldehyde test only 60 (85.6 per cent.) gave strongly positive reactions (Column 2). Out of the remaining 10, four gave a doubtful positive aldehyde reaction and six were entirely negative; among the latter, five were sera from patients with early kala-azar ranging from 3 weeks to 2 months in duration. The sera of these patients gave a strongly positive antimony test, while the aldehyde reaction was absolutely negative. The final diagnosis of these five early cases was confirmed by peripheral blood cultures for flagellates. The sixth case was a patient with a history of fever of two weeks duration in whom unfortunately the medical practitioner in charge

* *Technique*—The serum separated from the blood is pipetted out in a capillary tube and put into a Dreyer's tube. A 4 per cent. solution of one of the antimony compounds—preferably urea compounds—is slowly added along the side of the tube to form a layer on the top. With kala-azar serum a thick flocculent precipitate forms at once, while with the other sera there is either no precipitate whatever or only a slight precipitate at the junction of the two.—(Chopra, Gupta and David: *I. M. G.*, Vol. 62, No. 6, June 1927.)

started antimony injections before the blood could be taken for cultural examination. This case was clinically kala-azar, reacted well to antimony injections and was cured after the course.

In column 3 the results obtained with sera from 35 lepers in different stages of the disease are given. It will be seen that 33 (94.29 per cent.) gave a definitely negative antimony test and the remaining two gave a doubtful positive reaction. When the same sera were tested with the aldehyde test, 24 (69.5 per cent.) were negative and of the remaining eleven, 7 (20 per cent.) gave a positive, test and four (11.4 per cent.) were doubtfully positive. Dr. Muir informs us that some of the advanced leprosy cases give a strongly positive aldehyde reaction, though they are definitely non-kala-azar. We are grateful to Dr. Muir for supplying us with a number of sera from such cases which we have included in Table I. Though the aldehyde test in five such sera was positive the antimony test was definitely negative with three, and in the remaining two a slight opalescence or a faint precipitate was noticed at the junction of the two fluids, which dissolved on standing for some time, generally half an hour. These we have classed in the table as \pm or doubtfully positive reactions. The appearance of the precipitate was totally different from the thick flocculent precipitate occurring with kala-azar sera.

Column 4 gives the results of our observations with 14 sera from patients suffering from malaria. It will be seen that 13 were definitely negative, while 1 gave a moderately positive antimony test. This patient gave a previous history of having had 60 antimony injections and he also gave a doubtful aldehyde test. We have already observed in our previous paper regarding this test that rarely cases of chronic malaria with enlarged spleen give a positive antimony test. It is difficult to say with any degree of certainty whether there is any kala-azar element in these cases or not, but the density and the character of the precipitate, if carefully observed, help in differentiating them from true cases of active kala-azar.

Column 5 gives the results obtained with 10 sera from patients suffering from filariasis, syphilis, skin diseases, etc. It will be seen that one case gave a positive antimony test. This was a case of acute streptococcal dermatitis who gave no previous history of injection of antimony; the aldehyde test was negative with all.

A Simple Blood Test for Diagnosis of Kala-azar.

While working at the antimony test we have been trying to simplify it so that any medical practitioner could perform it in the field and confirm the diagnosis he has made clinically without any elaborate technique. In this we have fortunately succeeded.

Technique.—All that is required are a 2 per cent. solution of potassium oxalate, a 4 per cent.

solution of a urea antimony salt such as urea-stibamine, two small test tubes and a few Dreyer's tubes, which simply consist of 2-inch pieces of glass tubing 3 to 4 mm. in diameter sealed at one end. Both the potassium oxalate and antimony solutions once made can be stored for a month or even longer in glass stoppered bottles. One or two drops of blood obtained from a finger pricked with a needle are allowed to mix well with about 0.25 c.c., of a 2 per cent. solution of potassium oxalate. This can be easily done by putting the mouth of the small test tube containing the oxalate solution firmly against the tip of the cleaned and pricked finger from which the blood is oozing and inverting the tube 2 or 3 times over it. Alcohol should not be used for cleaning the finger as if some of it gets into the oxalated blood solution a precipitate is formed.

A little of this solution is transferred into a Dreyer's tube and a 4 per cent. solution of the antimony compound is added by means of a capillary pipette along the side of the tube. The heavy antimony solution sinks to the bottom, and in cases of kala-azar a flocculent precipitate forms almost immediately at the junction of the two fluids (Fig. II A). This precipitate soon settles down at the bottom of the tube with the red corpuscles entangled in it (Fig. II, B and C). In very early cases of kala-azar the precipitate may take 10 to 15 minutes, very rarely 1 to 2 hours to appear, but in well developed cases it appears almost immediately after the solutions are mixed. The precipitate is obvious to the naked eye but the use of an ordinary magnifying hand lens is helpful in doubtful cases.

It should be mentioned here that solutions of potassium oxalate stronger than 2 per cent. by themselves form a precipitate with the antimony compounds even in the absence of kala-azar blood. Solutions weaker than 2.0 per cent. do not give satisfactory results. 0.25 c.c., of oxalate solution is just enough for one or two drops of blood; the greater the quantity of oxalate solution, correspondingly larger would be the amount of blood that will be required.

This simple test has great possibilities as it can be applied in the field on a very large scale in areas in which kala-azar is prevalent. The test, like the antimony serum test, is given by early cases of the disease and we have no doubt it will help the kala-azar centres in the rural areas to diagnose very early cases of the disease. Further possibilities of this test are under investigation.

Table II gives the results of 138 cases examined with the blood test. Column 2 shows that all the 54 kala-azar patients gave strongly positive antimony reactions (100 per cent.), when the same patients were tested with the aldehyde reaction, 51 (94.4 per cent.) gave strongly positive reactions and the remaining 3 were

TABLE II.

1	2 Kala-azar.				3 Leprosy.				4 Malaria.				5 Normal blood and other cases like filaria, syphilis (etc.)				Remarks.
	No. done.	+++	±	-	No. done.	+	±	-	No. done.	+	±	-	No. done.	+	±	-	
Amino-stiburea Stiburea and Urea-stibamine	54	54	—	—	20	—	—	20	14	—	—	14	50	—	—	50	
Aldehyde reaction..	54	51	3	—	20	—	2	18	14	—	—	14	50	—	—	50	

doubtfully positive. Column 3 gives the result of blood examinations of 20 lepers. All gave negative results; the same specimens examined with the aldehyde test gave 18 negative and 2 doubtfully positive reactions. Columns 4 and 5 give the result of blood examination of cases of malaria and miscellaneous diseases. In all these the blood test as well as the aldehyde test were negative.

SUMMARY AND CONCLUSIONS.

1. Further observations on 129 sera show that the serum antimony test for kala-azar is of great diagnostic value.

2. The percentage of positive reactions with this test with kala-azar sera is higher than with the aldehyde reaction performed with the same sera.

3. Its advantages over the aldehyde test are firstly, that a smaller quantity of serum is required, secondly, that it gives immediate results, and thirdly, it is positive in early cases of the disease when the aldehyde test is still negative or doubtful.

4. Some of the advanced cases of leprosy—definitely non-kala-azar—give a positive aldehyde reaction, but the antimony test is generally negative.

5. Rarely, chronic cases of malaria with enlargement of the spleen may give a positive antimony test; the precipitate however is not so dense and flocculent as is the case with kala-azar serum.

6. A still simpler and more rapid diagnostic test for kala-azar has been worked out. One or two drops of blood from a finger prick are received into 0.25 c.c. of a 2 per cent. solution of potassium oxalate and the test performed in the same way as with the serum. The results obtained with this test run parallel with those obtained with the serum test. This test is simple, rapid and economical, and is capable of application in the field on a very large scale.

REFERENCES.

1. Chopra, R. N., Gupta, J. C. and David, J. C. (June 1927). "A preliminary note on the action of

antimony compounds on the blood serum. A new serum test for kala-azar." *Indian Med. Gaz.*, Vol. 62, No. 6.
 2. Napier, L. E. (July 1927). "A new serological test for kala-azar." *Indian Med. Gaz.*, Vol. 62, No. 7.

SOME OBSERVATIONS ON APPENDICITIS AMONG INDIAN WOMEN.

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Is appendicitis common among Indian women?

There is a belief in some quarters of the medical world that appendicitis is not common among Indians.

With a view to collecting information as to the frequency of the disease among *Indian women*, we set about collecting specimens and trying to ascertain the causative factor in each case. The task was greatly facilitated by the fact that the senior author was able to provide the appendices in sterile tubes, removed under such aseptic precautions as a modern surgeon is capable of. Details were also available of the patients' histories and of the nature of the operations undergone.

A series of 25 such removed appendices was examined microscopically and bacteriologically. One interesting feature which immediately presented itself was the frequency of roundworm infection (*Oxyuris vermicularis*) of the appendix; no less than 14 out of the 25 appendices showed from 1 to 7 roundworms apiece.

A second feature was the presence in 23 of faecal matter, varying in amount; some appendices showed the presence of faeces throughout the whole lumen; in others there were faecal collections either at the tip or in the middle, producing bulbous expansions, with corresponding injection of the blood vessels on the peritoneal surface.