

or spleen smear, or on definite clinical grounds. (3), (4), (5). The other three laboratory procedures scarcely require extended comments, except to emphasize the necessity in certain cases of repeated and careful cultures of the urine and fæces and microscopical examinations of the blood.

Illustrating some of the difficulties encountered and the value of thorough investigations of all cases along the lines indicated, during the past four years we have had five cases in which a true typhoid fever was followed by the development of kala-azar, and three in which the reverse occurred, and a kala-azar infection while undergoing treatment was complicated by typhoid.

An interesting series came from one institution:—

At about the same time two students came to the Medical College Hospital, one of whom had typhoid fever which was diagnosed by blood culture. This patient died.

The second had a typical typhoid fever which was diagnosed by agglutination tests and later kala-azar supervened, and Leishman-Donovan bodies were found on puncture of the spleen.

Later, a third student was admitted with a primary kala-azar diagnosed by puncture of the spleen, in whose case all examinations for typhoid were negative.

(For Charts *vide* p. 327.)

#### COMMENTS.

The methods for arriving at a diagnosis in patients with typhoid-like fevers are discussed, and illustrations of the difficulties are cited.

Particular emphasis is laid on methods involving culture of the blood and examination of its serum reactions with special reference to cases of typhoid and kala-azar.

The value of Dreyer's standard method of carrying out the agglutination reaction is noted. It eliminates untrustworthy results, and while requiring care in the preparation of bacterial emulsions and the use of special apparatus, in an institution where many agglutinations have to be carried out, it is, if anything, more expeditious than other methods.

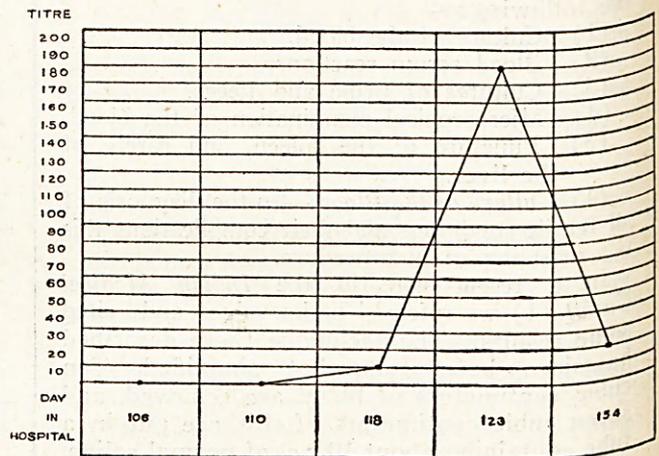
The routine complete examination of cases of typhoid-like fever has brought to light the occurrences of some interesting associations between typhoid and kala-azar. In two of the five cases in which an attack of kala-azar supervened after typhoid it was noted that the agglutinins for *B. typhosus* had disappeared within a short interval. While in certain cases a primary *Leishmania donovani* infection may have an onset clinically resembling that of typhoid fever, followed by an interval and then followed by a further febrile illness, in others there may be a primary true typhoid infection succeeded (after a lapse) by kala-azar. In cases where

the initial febrile attack is diagnosed as typhoid fever by agglutination tests a curve should be sought for, as a low titre might be the residue of some previous infection.

Two temperature charts are shown on p. 327—one, in Charts I and II, of a case in which typhoid fever, diagnosed as such by blood culture, was followed by typical kala-azar which yielded to treatment with antimony. In this case the agglutinins for *B. typhosus* had disappeared when the kala-azar supervened.

The other chart is that of a patient diagnosed as kala-azar by the aldehyde test who, while undergoing treatment, developed typhoid fever as shown by a positive blood culture. This patient's agglutination curve is shown in Chart III.

CHART III.



Agglutination curve of Case II.

Our thanks are due to the Principal of the Medical College for permission to make use of clinical notes and temperature charts.

#### REFERENCES.

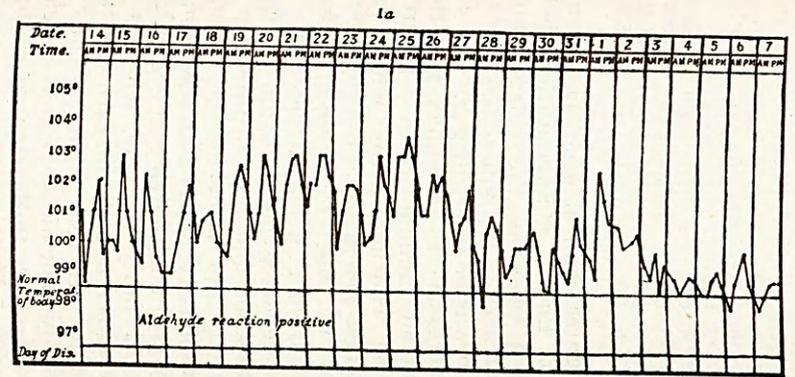
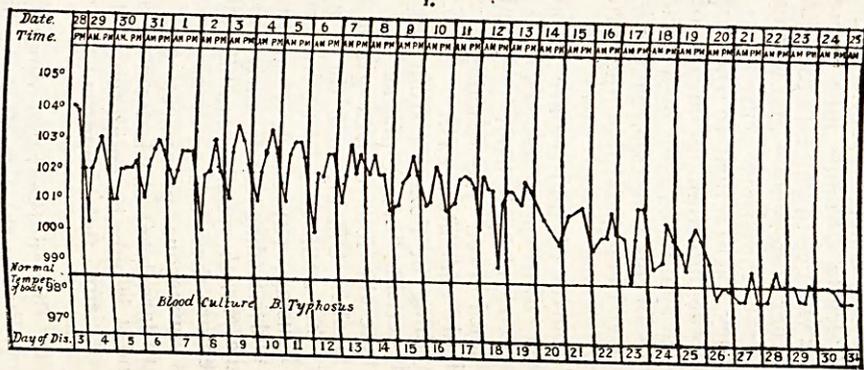
- (1) *Indian Medical Gazette*, Vol. LIX, No. 2, p. 557.
- (2) *Journal of Pathology and Bacteriology*, Vol. XXVIII, No. 4, p. 541.

#### TUBERCULOSIS IN BENGAL.

By Dr. E. MUIR, M.D., F.R.C.S. (Edin.).

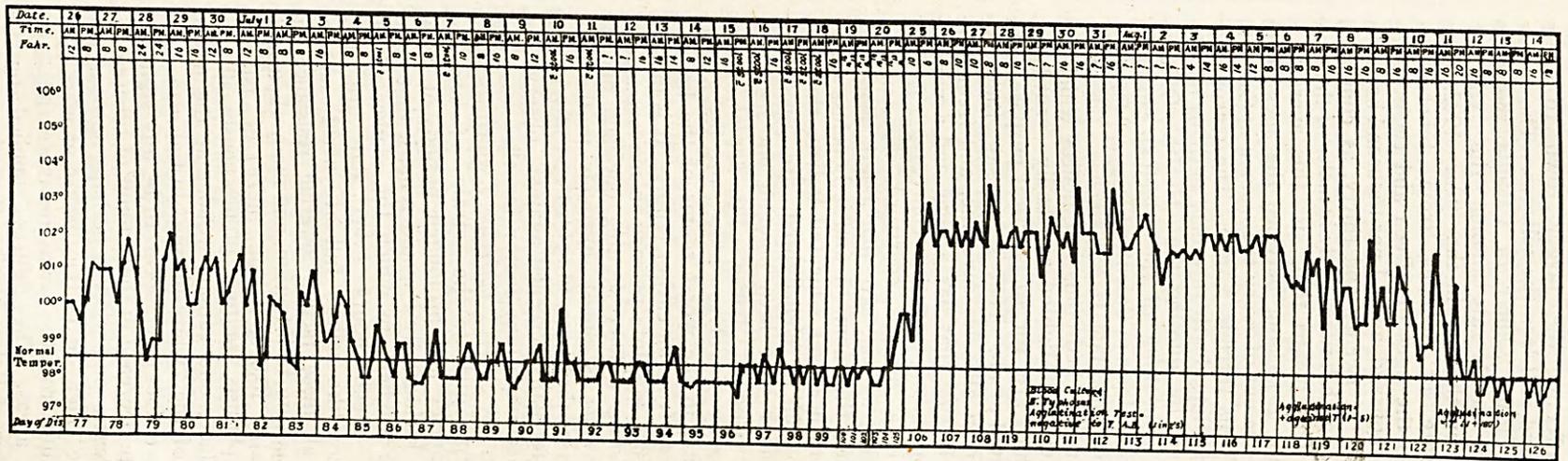
WHILE malaria is the most prevalent and perhaps fatal disease in the country districts of Bengal, tuberculosis is undoubtedly the most fatal disease in the larger towns. The reports of the Health Officer of Calcutta show an average mortality during the years 1919 to 1923 of 2,104 or about 2.3 per thousand of the population. The reports of the Director of Public Health, Bengal, show during the years 1921 to 1924 an average death rate of 0.95 per thousand in the towns of Bengal and 0.037 per thousand in the rural areas of Bengal. These figures point to the conclusion that

### CHART I.



Case I. First Admission : Typhoid Fever; Second Admission : Kala-Azar.

### CHART II.



Case II. Typhoid Fever developing in Kala-Azar.

tuberculosis is a disease primarily of the large cities, affecting the larger towns to a less extent and still less the villages. The report of the Health Officer of Calcutta shows an appalling death rate among the younger females in the city in the year 1922. The death rate of females from tuberculosis between the ages of fifteen and twenty was 7.2 per thousand, and 7.1 per thousand between the ages of twenty and thirty, as compared with 1.2 and 1.8, respectively in males of the same ages. This means that, if this average is kept up, in passing between the ages of 15 and 30 one out of every ten women in Calcutta dies of this terrible plague. The reasons for this appalling death rate may perhaps best be explained by quoting the Health Officer's words. Speaking of the principal causes of the tuberculosis in Calcutta he says, "Of these the most important is *bad housing*. There are thousands of bedrooms in Calcutta which are not merely ill-lighted and badly ventilated, but which are, for all practical purposes, not ventilated at all. That is to say they are shut in on all sides save one, and frequently the only side that has a door and a window in it opens on to a tiny courtyard. Even if there is a spacious courtyard, the conditions are almost as bad, save that a little more light gets into the room. I find it hopeless to try and convince even educated Indians that such rooms even if well-lighted are insanitary. Now, as I have been pointing out for years, in the case of females the *pardah* system necessarily involves more or less strict seclusion in the worst rooms of the house". To quote from an earlier report "It is difficult to secure absolute privacy in narrow streets and *gullies* without shutting out light and air. The *zenana* is almost invariably in the inner portion of the house, ill-lighted and ill-ventilated but effectually screened against observation. Another important factor in the case of females is *early marriage*, which subjects immature girls to the strain of repeated pregnancies and prolonged periods of lactation. Incidentally I would remark that many of the kitchens in which the ladies of the house spend hours every day are dark dungeon-like cellars full of acrid smoke. With all these factors lowering resistance and predisposing to infection, and many thousands (probably 10,000, if not more) of patients with phthisis *spitting* promiscuously all over the place, one cannot wonder at the prevalence of the 'white-plague' in Calcutta."

There does not appear to be any sign of a definite decrease in the amount of tuberculosis in Calcutta and what is perhaps most serious is the fact that the disease appears to be spreading from the towns and increasing in the rural areas. The figures supplied by the Director of Public Health, Bengal, for 1921 to 1924 are as follows:—

	Rural Areas.		Towns.		Total for Bengal.	
	Deaths.	Rate per mille.	Deaths.	Rate per mille.	Deaths.	Rate per mille.
1921 ..	1,394	0.03	2,661	0.9	4,055	0.1
1922 ..	1,496	0.03	2,981	1.0	4,477	0.1
1923 ..	2,079	0.04	2,863	0.9	4,942	0.1
1924 ..	2,326	0.05	3,251	1.0	5,577	0.1

These figures confirm what has often been noticed, viz., that as communications between the larger towns and the villages improve there is a tendency for tuberculosis to spread from the towns to the villages. To explain this it is necessary to remember that there is an undoubted immunity to tuberculosis produced in endemic areas which is not enjoyed in non-endemic areas. This immunity is formed by numerous small infections beginning from earliest childhood, which gradually render the individual immune, provided that any one dose of infection is not massive enough to overcome the natural or acquired immunity present at the time. In this way young adults living in endemic areas are rendered fairly immune, whereas those coming from a non-endemic area and lacking this immunity are very liable, when they enter a highly endemic area and are exposed to heavy infection, to develop an acute form of the disease. It is well known that this tragedy is being enacted every day in such cities as Calcutta. Young men come from non-endemic villages to Calcutta for education, service or other employment and within a few months or years they show acute signs of the disease. They then return to their villages and spread the infection by means of their bacillus-laden sputum to their own friends and neighbours. In this way tuberculosis is being spread all over Bengal and the other provinces of India.

As new centres of industry are formed and act as fresh distributing centres of *B. tuberculosis* the endemicity is likely to continue to increase, until even the smallest villages become highly endemic areas.

Can anything be done to stem the rising tide of this terrible "white-plague"?

If we take the four causes given by the Calcutta Health Officer, and these are undoubtedly the root causes of tuberculosis, (1) bad housing, (2) careless spitting, (3) poverty, under-feeding and early marriage, and (4) the *pardah* system, can anything be done to remove these causes or any of them? Doubtless numerous prejudices and superstitions are largely at the bottom of all four causes, and it is only by enlightenment of the people that any real improvement can be expected.

In Great Britain the rapid diminution in tuberculosis during the last 50 years has been due (1) to the improved standard of living and better housing, (2) to more care being taken

with regard to sanitation and especially with regard to the spreading of the disease by bacillus-laden sputum, (3) to a greater amount of exercise and fresh air being taken, (4) to the better training of doctors in the early diagnosis and treatment of the disease, and (5) to the establishment of dispensaries and especially of sanatoria and their educational influence on the people.

The efforts which are being made to cope with this terrible disease in Bengal at the present time are not in any way commensurate with the seriousness of the problem. While other provinces have established sanatoria, however inadequate they may be for the real needs of the provinces in which they are situated, Bengal has no special sanatorium for tuberculosis at the present time, although a few hospitals have special tuberculosis wards. It is often asked what is the use of sanatoria when at the most they cannot accommodate more than a very small fraction of the patients. The answer to this question is that, useful as a sanatorium may be in the treatment of the few patients whom it can accommodate, it is much more useful as a centre of education, in spreading the knowledge of the principles which underlie the prevention and treatment of tuberculosis and in educating the medical profession. Tuberculous patients in Bengal who desire sanatorium treatment have at present to go to some distant sanatorium in the Himalayas or South India. What chance is there of a practical demonstration of the right methods of dealing with the disease? Medical students in the Calcutta Medical College seldom see tuberculosis except in the more advanced and hopeless stages, the special tuberculosis ward on the roof of the Medical College being almost entirely filled with advanced and moribund cases. If there were even one sanatorium in Bengal where about 200 patients might be treated in satisfactory climatic conditions and under a whole-time expert who had studied the disease, then we should have a centre of training both for the medical profession and for the laity which would gradually make itself felt. Doctors, who had had a course of training at such a sanatorium, would themselves soon form centres of enlightenment, and small sanatoria would soon spring up on a self-supporting basis as a result of their initiative. A course of training of two weeks' duration for the ordinary medical practitioner and of six months for those who are to act as specialists is what is advised by Dr. Frimodt-Moller of the Madanapalle Sanatorium. One cannot visit such excellent sanatoria as Madanapalle in South India and Dharampore in the Simla Hills without realising not only the vast amount of good being done, but also the much greater good which might be done were these institutions used more as

educational centres. Doubtless Bengal will waken up some time to a sense of its responsibilities in this matter; but surely the case is already so urgent that at least a preliminary effort should be made.

SEVEN-DAY DENGUE IN LUCKNOW.

By H. STOTT, M.D.,

MAJOR, I.M.S.,

Physician, King George's Hospital, Lucknow,

and

V. MANGALIK,

House Physician, King George's Hospital, Lucknow.

DURING the months of September, October and November 1925 the city of Lucknow was visited by a short epidemic of seven-day dengue fever. The first few cases occurred among the nurses at the Lady Kinnaird Hospital at the beginning of September, when about ten of them were confined to bed within the short space of three days. This was followed by a similar outbreak amongst the nurses and students of King George's Hospital. A considerable number of cases also occurred in the city and quite a number of them attended the outpatient department of the latter hospital.

The main characters of the outbreak, as illustrated by the temperature charts given, were as follows:—

(1) *The Fever.* The onset was sudden and usually unaccompanied by shivering. In most cases the temperature came down to normal on the third or fourth day, with general improvement in the condition of the patient. This was so marked that several patients at this stage asked for discharge from hospital, in fact one of the nurses so affected actually resumed duty. In nearly every case, however, the fever shewed a terminal rise on the fifth or sixth day. With only one exception, the cases terminated by crisis, usually on the sixth day.

(2) *The Rash.* About 30 per cent. of the cases shewed a generalised scarlatiniform rash on the fifth or sixth day, with the secondary rise of temperature. The rash only lasted for one or two days. As with all rashes it was more marked on fair skins.

(3) *Other Symptoms.* The tongue was clean, a clinical sign of importance in differentiating the fever from typhoid fever. Constipation was a marked feature of nearly every case. Only one case shewed catarrhal symptoms of the naso-respiratory tract. Three cases had vomiting during the fever. The pulse rate was always on the slow side—the average rates being as follows:—

Temperature.	Pulse rate per minute.
103°F. . . . .	.. .. 106
102°F. . . . .	.. .. 103
101°F. . . . .	.. .. 98.6
100°F. . . . .	.. .. 90
99°F. . . . .	.. .. 86
98°F. . . . .	.. .. 90