

the occasional occurrence of bed-sores. When such sores do occur, every precaution must be taken to guard against septic infection with spreading cellulitis and gangrene.

No mention need be made of the nursing details usual in all fever cases—attention to the regularity of the bowels, careful watch for the occurrence of bladder distention, etc., but special attention should be paid to the toilet of the mouth, as sloughing parotitis is a common complication of badly-nursed typhus fever cases.

Specific serum therapy may be of value, but in isolated cases met with in India one is unlikely to be able readily to obtain serum from a convalescent patient, and Nicolle's serum for intrathecal and subcutaneous administration is as a rule unobtainable. My own experience of Nicolle's serum has not been encouraging, but it is probable that the serum at my disposal had lost a considerable part of its potency, and it would certainly seem to be worth while to try this serum if available.

In most textbooks no mention is made of the profound mental after-effects which, in my experience, are of not infrequent occurrence. Loss of memory, nerve deafness and deficient emotional control are quite commonly found after typhus fever.

In several European cases which I followed up for two years after their original attacks of typhus fever, defective memory and slight deafness were complained of; one medical man, writing twenty months after his original attack, said: "Distinction of sounds is not so good as before my illness, and I find it harder than formerly to catch the conversation of people. I find my memory gradually coming back, but I cannot continue at serious reading for such long periods as before."

Another medical officer wrote two and a half years after his original attack: "My memory is now quite reliable, but at first I suffered from lack of recognition of time and place. Later I used to forget dinner invitations and commit social *betises* of that sort. I am still rather deaf."

In a number of the more severe cases which recovered, control of the emotions was markedly deficient up to the time of leaving hospital for evacuation to England or India, and a number of patients convalescent from typhus fever were in the habit of expressing like or dislike of their attendants and fellow convalescents in no uncertain terms.

One unfortunate European patient remained practically imbecile for three months, and when he left Baghdad after six months in hospital his mental powers were still very deficient.

It would appear, therefore, that "brain workers" convalescent from typhus fever should be urged to take a very long vacation and so far as Europeans are concerned, those

convalescent from typhus fever should be invalidated to Europe for a period covering at least two hot weathers.

REFERENCE.

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CELLULAR ELEMENTS IN CHOLERA STOOLS AND THEIR RELATIVE IMPORTANCE IN DIAGNOSIS OF THE DISEASE.

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CHOLERA has been described as an acute infectious disease caused by Koch's *Vibrio cholera* and characterised by a definite clinical syndrome. In the vast majority of cases as they appear to an ordinary observer it is not very difficult to recognise the cardinal symptoms of the disease, but to associate them with the presence of Koch's comma-vibrio is by no means an easy task. It requires a good deal of technical skill and previous experience to cultivate and isolate cholera vibrio successfully from the majority of cases. Nevertheless, in spite of all the experience and skill that is brought to bear on the investigation a comparatively large number of cases remain culturally "negative."

Is one justified in declaring that such cases are not suffering from cholera?

With a view to elucidating this point we have systematically studied for the last eight months 550 cholera cases, of all degrees of severity, admitted into the Campbell Hospital, Calcutta, and have analysed the different clinical, microscopical and cultural findings in order to determine a common and constant factor which would successfully lead to an early and easy diagnosis of practically all cholera cases—both mild and severe.

In our endeavour to find out this common factor we first established all our cases in the present series on undisputed bacteriological evidence; we then worked out the percentage of cases which showed each of the following three features:—

1. Presence of comma-vibrio in the film preparation of the stool.
2. Presence of concentration of blood as shown by its specific gravity.
3. Presence of characteristic cellular elements in the stained film of the stool.

1. *Presence of Comma-Vibrio in the Film Preparation of the Stool.*—In ordinary text-books on tropical diseases this has been emphasised almost as a constant feature of the disease and vibrios are said to occur in large numbers in the rice-water stools. This view is also held by people in touch with the current literature on the subject. In a review of an article published by Goss (1923), the reviewer observes "this (absence of vibrio in the

where no vibrios were visible, but nevertheless they were cultivated successfully on special culture-media.

For microscopical examination, films were made from fresh samples by crushing a small fragment of mucus between two clear slides and then staining the air-dried film with dilute carbol-fuchsin. This procedure proved more accurate and reliable than the ordinary method of rubbing a small bit of mucus on the slide with a platinum loop. The results arrived at are given below.

Total number of cases examined ..	495
Comma-vibrios present in ..	416
Comma-vibrios absent in ..	79

From the above it would appear that 84 per cent. of the cases investigated showed vibrios in the film.

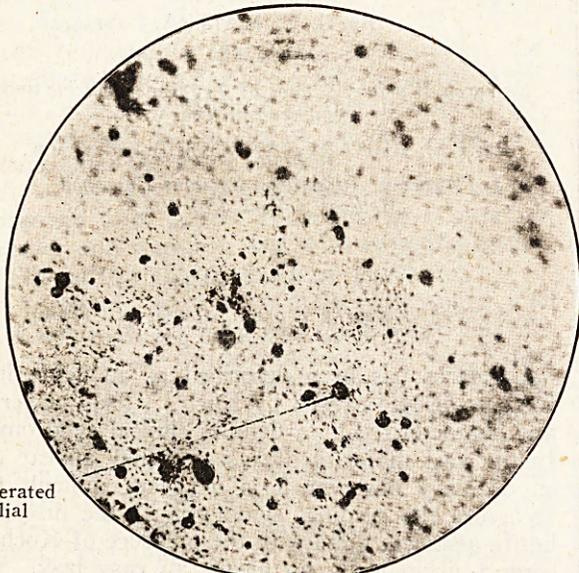
2. *Presence of Concentration of Blood as shown by its Specific Gravity.*—This was determined by the drop method as recommended by Rogers (1921).

Total number of cases examined ..	496
Number of cases showing the specific gravity to be 1,057 and upwards ..	459
Number of cases showing the specific gravity to be 1,055 and 1,056 ..	29
Number of cases showing the specific gravity to be 1,054 and below ..	8

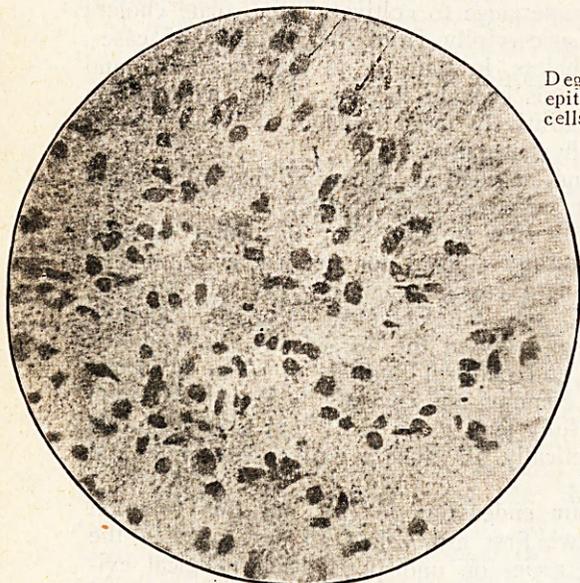
Thus a definite concentration of blood was noticed in 92 per cent. of the cases. About 6 per cent. of them were practically on the borderline, unless one was prepared to take Rogers' figure 1,054 as that representing the average specific gravity of Indian blood in health. Even then 2 per cent. of the cases failed to show any concentration. Besides, in a mild case where there is no failure of circulation and where absorption of fluid from the stomach is not hampered, this is apt to be a very inconstant feature, and much reliance cannot be put upon it as it indicates only loss of fluid which may occur in other intestinal diseases such as dysentery and ptomaine poisoning.

3. *Presence of Characteristic Cellular Elements in the Stained Film of the Stool.*—Cytological elements in the stool have furnished important clues in the diagnosis of such diseases as amœbic and bacillary dysenteries. In cholera where the disease runs a very acute course and toxins of the comma-vibrio exert a specific action on the epithelial cells of the small intestine leading to their necrosis, desquamation and evacuation with the stools, a faithful picture of the morbid changes is obtainable throughout the whole course of the disease. And this can be very easily brought about by merely staining a thin film of the stool made from a small bit of mucus, according to the procedure described under sub-heading No. 1. The cells are usually the altered epithelial cells of the small intestine with badly-stained nuclei and very little protoplasm

PLATE I.



Micro-photograph.



Smear preparation of cholera stool showing degenerated epithelial cells.

small intestine) is such an unusual condition since the stools of cholera patients generally swarm with vibrios." Our experience, however, is not in accord with that of the reviewer or of the text-book writers. During our investigation we often came across cases in the acute stage

round them. They may be few in number but are invariably present. Polynuclear cells are, as a rule, absent (*vide* plate).

Total number of cases examined ..	367
Characteristic cells present ..	359
Characteristic cells absent ..	8

They were present in 98 per cent. of the cases. Where they could not be seen they were either obscured by fæcal debris or were disintegrated by putrefactive bacteria in a stale specimen.

CONCLUSIONS.

1. In a total of 495 cholera cases diagnosed bacteriologically comma-vibrios were found microscopically in 84 per cent. of the stool films.
2. In a total of 496 cholera cases 92 per cent. showed definite concentration of blood. In 6 per cent. of them the concentration was indefinite and in 2 per cent. there was no concentration at all.
3. Cytological elements in the cholera stool are constant and characteristic and can be utilised as a reliable index in 98 per cent. of cases.

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- Goss, M., 1923. Cholera sans Vibrios. *Trop. Dis. Bull.*, May, Vol. 20, No. 5, p. 367.
 Rogers, Sir Leonard, 1921. Bowel Diseases in the Tropics. London: Hodder & Stoughton, p. 90.

A NOTE ON THE CULTIVATION OF AN ENTAMŒBA FROM A MONKEY (*MACACUS RHESUS*).

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ON the 9th May, 1925, a monkey which was experimentally infected with *Trypanosoma evansi* in the laboratory, died. The post-mortem was done within four hours of death.

On careful examination of the contents of the cæcum for intestinal protozoa very scanty, sluggishly motile entamœbæ were seen. There was no evidence of ulceration in the cæcum or in any other part of the large gut.

Four sets of culture were made in the following media:—

1. Human blood agar slant, two-thirds of the slant being covered with Locke's solution containing egg albumen in the proportion of one egg to 1 litre.
2. Ordinary nutrient agar slant + defibrinated rabbit's blood put at the bottom of the tube, covered with Locke's solution containing rabbit's serum diluted 1 in 10.
3. Locke's solution + human serum diluted 1 in 8.
4. Row's hæmoglobin medium.

The cultures were incubated at 37°C. for 24 hours. The first two culture tubes showed a few very active entamœbæ containing numerous ingested bacteria. In the fresh state the nucleus was not visible nor could the difference between the ecto and endoplasm be made out.

In an iodine preparation, however, the ring nucleus typical of the genus entamœba was easily seen. There was no growth in the culture tubes 3 and 4. A better growth was obtained after 48 hours' incubation and some of the entamœbæ in tube 2 were found to contain red blood corpuscles.

Examined on the fourth day the culture showed no entamœbæ (vegetative or encysted) even after prolonged search, there being a heavy growth of bacteria, yeasts and blastocystis.

As the parasites died out so soon a systematic study of their cytological characters was not possible nor could their pathogenicity be tested. However, from the characters noted above, i.e., (i) motility, (ii) character of ecto and endoplasm, (iii) character of nucleus, and (iv) ingestion of red blood corpuscles, I am of opinion that the entamœba cultivated was *E. nutalli* (Castellani).

It will not be out of place to mention here that the writer, whilst working with Major R. Knowles, I.M.S., has cultivated *Entamœba histolytica* both from kittens experimentally infected with this entamœba as well as from the stool of a human case of amœbic dysentery with marked success, using the technique of Boeck and Drbohlar. The kitten and human strains were kept going up to the 32nd and 13th day, respectively, by repeated subinoculation at intervals of 24 or 48 hours.

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- Boeck, W. C., and Drbohlar, J. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. XVIII, Nos. 5, and 6.
 Dobell, C. The Amœbæ living in Man, 1919. London: John Bale, Sons & Danielsson.

A Mirror of Hospital Practice.

NOTES ON TWO CASES OF ENCEPHALITIS HÆMORRHAGICA AFTER NOVARSÉNOBILLON ADMINISTRATION.

By Capt. K. SEN, M.B., Chittagong.

Case No. 1.—Died. R. R. C., aged about 27 years. Onset; on the third afternoon after his second injection of novarsenobillon (dose reported to have been 0.6 gm.), the patient felt unwell and feverish, with severe headache. He went to see his medical attendant, who was away from town. He came back, took some quinine and his usual meal and retired to bed early. At night his headache was intense with high fever (temperature not taken), his speech incoherent and he was delirious. In the early hours of the morning he had epileptiform convulsions and rapidly passed into a state of unconsciousness. The jaws were tightly locked and he passed urine involuntarily.

When I saw him in the morning he was unconscious with temperature 102°F., pulse 120,