

4. *Prisoner Harihar Pattak, age 36.*—Previous history:—Had dysentery in December 1905, August 1906, May 1907, June 1907, October 1907, August 1908, September 1908, and October 1908.

Present attack:—Admitted to hospital on 5th November 1908. No treatment was of any benefit. On 23rd December he passed 15 stools containing mucus and was apparently in a hopeless condition. Inoculated on this date.

3rd January 1909.—4 stools well formed with mucus.

13th January 1909.—Stool healthy.

Further inoculations on 6th January, 20th January and 4th February.

Gained 34lbs. in weight while under treatment.

5. *Durbich Ahir, age about 26.*—He had had repeated attacks of dysentery. Was admitted to hospital on 27th October 1908 and treated with drugs. At the end of December his condition was serious; he was passing frequent watery stools containing greenish mucus and some blood. His feet and legs were œdematous, pulse almost imperceptible. Inoculated on 31st December. His stool was quite healthy on 7th January 1909, and remained so until his release from Jail on 20th January. All œdema had at that time disappeared.

Second inoculation given on 14th January.

6. *Nanhoo Dusadh, age 32.*—Previous history:—Dysentery in July 1908, September 1908, October 1908.

Admitted to hospital on 5th November 1908, treated with drugs with no improvement until 6th February last. On this date he was inoculated, and again on the 20th February and 6th March. Discharged cured to P. D. gang on 10th March 1909.

7. *Sheo Ratan Dusadh, age 40.*—He was admitted to hospital on 16th February. He first complained of fever and was treated for this, but the next day complained of severe pain in the abdomen. On 18th he passed 8 watery stools containing mucus and blood.

Inoculated on 19th February.

20th February 1909.—Passed 30 stools with mucus and blood, no fœcal matter.

21st February 1909.—Passed 36 stools with mucus and blood.

22nd February 1909.—Passed 21 loose stools with mucus, no blood. These were fœcal.

23rd February 1909.—Passed 10 stools semi-solid, with slight mucus.

24th February 1909.—Passed 2 stools, formed, with mucus in coils.

28th February 1909.—Stool healthy.

Inoculated again on 5th March and 19th March. Discharged from hospital on 14th March 1909.

Gained 10lbs. in hospital and 7lbs. in the P. D. gang.

8. *Udit Thakur, age 52.*—Previous history:—Dysentery in September 1907, January 1908, May 1908, September 1908.

Came to hospital on 24th February 1909, complaining that he had not passed a formed stool for years. His stool was found to be loose, containing mucus, no blood.

Inoculated on 24th February 1909.

1st March 1909.—Stool well formed, with mucus.

5th March 1909.—Stool healthy.

Further inoculations on 10th March, 24th March and 10th April.

Discharged to P. D. gang on 18th April 1909.

Gained 16lbs. while under treatment in hospital and a further 4lbs. while in the gang.

CLINICAL NOTES ON SMALL-POX.*

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In the present paper I do not propose to do more than to discuss briefly certain clinical points of importance in relation to the subject of small-pox.

The first matter to which I would invite attention is the infectivity of the disease. When does small-pox cease to be infectious, what makes it infectious, when does it begin to be infectious?

As to the first of these, it is generally accepted that a patient is not to be regarded as free from infection till, as MacCombie says, "all the crusts and desiccated pustules have fallen off, and the subsequent desquamation on and around the newly-formed epidermis is complete." In this connection, however, I have repeatedly been able to point out that careful observation will in most cases be able to detect a fine branny desquamation not only "on and around the newly-formed epidermis," but also the otherwise unaffected skin areas separating the sites of the healed pustules from one another. I have seen this so marked on the shins in a case in which there were only comparatively few pustules on the legs, that friction of the skin gave it an appearance as if it had been lightly dusted with bran, but in the majority of cases it is readily enough observed in lesser degrees of distinctness. I have always regarded this desquamation with something more than suspicion and never consider a patient as free from infection till his skin is absolutely free of all suspicion of scurfing.

Next, what is it that makes small-pox infectious? All that we can say on this point is that although there can scarcely be any doubt that the contagion of variola is a living micro-organism, its nature has not yet been finally

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determined. It may be that the essential contagion consists in the spores and pansporoblasts of the *Cytoryctes Variolæ* of *Guarnieri*, penetrating into epithelial cells, escaping into the blood stream, or cast off in the contents of the ruptured pock. It may be that Ewing and other critics are right in declaring that the protoplasmic appearances noted in connection with *Guarnieri's* organism are to be more correctly interpreted as particular forms of cell degeneration. It may be that in the *Amæba Variolæ* of *W. E. De Korte*, an organism described as abundant in fresh variolous matter, and as persisting in it for many months, we have the true virus of small-pox (*Lancet*, Vol. 2, p. 1776 of 1894), or it may be that having so long escaped detection it is really a virus that is ultramicroscopic. Be all that as it may, the fact remains that it is known beyond dispute, that the virus resides in the pock, that it is abundant in the scabs shed from the pocks, and that it is by the scabs and other cast off epithelial detritus from the drying pocks that the infection is conveyed from man to man. Another point on which all authorities appear agreed is that it is not definitely known by what channel a susceptible person becomes affected. *MacCombie*, however, states that "the virus enters the body by the mucous membrane of the mouth, nose or respiratory tract; some believe also by the mucous membrane of the stomach." *Birdwood* (*Guy's Hospital Reports*, Vol. XLVIII, 1892) believed it to be received through the skin. It has been suggested that a protopustule is developed somewhere in the respiratory tract, and that it is responsible for the general infection of the body. The protopustule has, however, not yet been discovered although carefully sought for. The occurrence of protopapules on the skin is, however, not uncommon, whatever their importance, and it was on their characters that *Birdwood* based his view.

The next question is when does a patient suffering from small-pox begin to be infectious? On this point *MacCombie* says: "Small-pox patients are capable of communicating the infection to others, perhaps during the stage of incubation, certainly during the initial stage, and right through the disease till not a trace is left on the skin of desiccated pustules, or scars or of the subsequent desquamation." *Biernacki*, in *Bain's Textbook of Medicine*, says: "Small-pox is infective in the prodromal stage if not earlier," and *Goodall* and *Washbourne* in the 1908 edition of their *Manual of Infectious Diseases*, state that "the patient is most infectious during the vesicular, pustular, and scabbing stages; but he is also infectious during the prodromal and papular stages." *Ricketts* and *Byles*, on the other hand, speaking of the early fever of small-pox being at times mistaken for other febrile diseases, say that "such misinterpretations are of little moment in the earliest stage

of the illness, because the disease is seldom infectious before the outcrop of the focal rash." These views are clearly at variance, and the matter at issue is a very important one. The general impression among these practising the Eastern systems of Medicine is that small-pox is not infectious till the vesicular stage, and these last, be it remembered, are people who for generations have lived their lives in a country which is the old endemic home of Small-pox. On this point, seeing that there is this diversity of opinion, I have, with all due respect to the opinions quoted above, attempted to seek for a solution, and I would venture to lay before the section, for whatever it is worth, the conclusion which I think is reached from a study of the small-pox cases admitted to the *Campbell Hospital* during the last four years. In this matter I have taken the incubation period as averaging 12 days, and have borne in mind that most authorities also have it that this may, in very exceptional cases, be extended to as much as 16 or even 21 days or contracted to as little, as in hæmorrhagic cases, as 7 or 8 or even 5 days.

From January 1905 to the present time our Small-pox wards have been empty for only thirty-one days all told, and during this period of some four and half years, we have had two severe epidemics, and two minor outbreaks. In the course of all this, and during this period, we have had admitted to the general wards for various causes, a total of 89 cases who have subsequently been declared as suffering from small-pox. Some of these have been in the wards only for a day, others from the beginning of their incubation to the time when they shewed signs that left no doubt that they had developed variola. The detail of these is as follows:—

First and Second Medical (Male) Wards	32	cases.
Female Ward ...	24	"
"Temporary" Ward ...	25	"
Plague Ward ...	11	"
Cholera Ward ..	4	"
Surgical Ward (male) ...	3	"
Total ...	89	cases.

Of these, only those can be said to have actually contracted the disease in hospital who had been in the Hospital for 12 clear days before developing any prodromal symptoms of small-pox, except the hæmorrhagic cases to which we might, for the sake of argument, allow an incubation stage of 7 to 8 days.

On these lines, we arrive at the following as having taken the disease in the Hospital:—

In the Medical (Male) Wards	1	out of 32 cases.
" Female Wards ...	2	" 24 "
" "Temporary" Ward ...	4	" 25 "
" Plague Ward ...	none	" 11 "
" Cholera Ward ..	3	" 4 "
" Surgical Ward ...	3	" 3 "
Total ...	13	

With regard to the above, the case from the Male Medical Wards developed his first fever on the 26th February and as a hæmorrhagic case, he may have taken his infection from the cases admitted on the 20th or the 14th February or from fomites carried in with these cases. Of the two cases from the Female Wards, the first had only eight days since its first contact with the last case in the ward and the second an interval of 22 days. Both of these were obviously infected from fomites, and cannot be put down to direct infection. The four cases in the Female "Temporary" Ward all occurred in the course of about four weeks. It is not possible to say where she first got her infection from. But as the medical officers in charge of this ward also attend in the Small-pox Ward, it is possible that they may have carried infection to her. Or she may have had infection carried to her by others, such as Hospital servants or visitors. The second was a very old woman (aged about 80), and must have got her infection much as the first case and, as her eruption was advanced to the seventh day before she was transferred, it is more than likely that the next case caught its infection from her. For the fourth case no personal contact is traceable. The four cases in the Cholera Wards undoubtedly owe their infection to the following: (1) they are within a few yards of the Small-pox Hospital gate, (2) conveyances bringing small-pox cases stand close to them while waiting to be disinfected, (3) they are immediately next to the small-pox observation hut. The three cases in the Surgical Wards are all obviously quite distinct from each other and none of them can be said to have infected any other.

With all this, the striking feature is, to my mind, not that we had what we had, but that our wards escaped as they did.

The average daily strength of our individual wards from month to month, during the period under observation, has varied from 27·33 to 121·93, and the average stay of patients in hospital, including the moribund cases who die within a few hours of admission, is about eighteen days—so that we may, excluding these latter, reasonably take this figure at approximately twenty days. The male medical wards, with a strength of from 65 to 117 patients, averaging 20 days in the wards, had 32 cases of small-pox which between them spent 130 infective days in the wards, and of only one case can it be said—and that too is doubtful—that he got his infection from his fellow-patients. Similarly, the Female Ward, with an average varying from 46 to 121, harbours 20 cases over 83 infective days with only one doubtful infection; the Surgical Ward, with an average strength of from 42 to 115, has three cases, all in the middle of epidemic periods, during an aggregate of 47 infective days, counting incubation periods, and including 5 days of eruption and not a single infection. In the Female

"Temporary" Ward the detail has been already given. The Male "Temporary" Ward again gives a daily average of from 54 to 66 patients, a total of 19 small-pox cases, during 37 infective days, and not a single infection. On all this evidence it appears to me that the mere presence in the wards for three or four days, of cases not farther advanced than the fourth or fifth day of eruption, was not followed by an appearance of the disease in the hospital. It would appear farther, that in actual practice, in the earlier stages of the disease, *i. e.*, up to the fourth or fifth day of the eruption, the real danger is not from the patient himself, but from the infection which he may be carrying mechanically, and which is derived not from his own person, but from the same source of infection which is responsible for having given him the disease.

The appended tables shewing the incidence of the disease in the wards of the Campbell Hospital speak for themselves, and shew the full detail on which the foregoing remarks are based. It remains to add that the patients in these wards were not in any special way or degree protected by vaccination. In this respect they were just an average sample of the general population of the town and suburbs of Calcutta.

(To be continued.)

A NEW LACTIC ACID PRODUCING STREPTOTHRIX.*

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SINCE Metchnikoff in his book "On the prolongation of life" and other similar publications brought to the notice of the scientific world, the beneficial action of lactic acid bacilli, when taken internally, on intestinal flora-fermented milk, prepared with one or other varieties of the bacilli, has come into extensive use as an article of diet, both by patients as well as by healthy men, and the study of fermented milk has received an impetus.

Metchnikoff who had been studying for some time the flora of human intestine, when on a visit to Bulgaria, found that a much larger percentage of people there reach to old age than those of other countries, and the only peculiarity he noticed in their diet was that they are accustomed to taking curdled milk prepared with a special ferment with their daily meal. By bacteriological examination of the curdled milk which goes by the name of Youghourt, it was found that the fermentation is brought about mainly by a bacillus, since named *Bacillus Bulgaris*, and experiments made with a pure culture justified the theory, put forward by Metchnikoff, that the beneficial action of the fermented milk, is due to the healthy action which the bacilli

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