

**Report on the outbreak of small-pox at Sankiberiah, Thannah Sultanpore, stamped out by extensive vaccine operations / by T. Edmondston Charles.**

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# REPORT

ON THE

## OUTBREAK OF SMALL-POX

AT

SANKIBERIAH, THANNAH SULTANPORE,

### STAMPED OUT

BY EXTENSIVE VACCINE OPERATIONS.

BY

T. EDMONDSTON CHARLES, M. D., M. R. C. P. LOND.,

SUPERINTENDENT GENERAL OF VACCINATION.

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REPORT

OF THE

COMMISSIONERS OF THE

AT

THE UNIVERSITY OF CHICAGO

STAMPED OUT

BY THE UNIVERSITY OF CHICAGO

BY

J. HENNINGSEN, M.D., M.A.C.T. 1917

UNIVERSITY OF CHICAGO

CHICAGO

OFFICE OF THE UNIVERSITY OF CHICAGO

1917

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# REPORT

ON THE

## OUTBREAK OF SMALL-POX AT SANKIBERIAH, THANNAH SULTANPORE.

Sankiberiah is a village, forty-eight miles south of Calcutta, in the Diamond Harbour Sub-division. Although this village was the headquarters of the epidemic, it extended in a severe form to several neighbouring villages; in the following report the operations recorded were not confined to the one village of Sankiberiah, but extended to all localities in which small-pox was to be found in the surrounding country.

Position of  
Sankiberiah.

2. At the end of March 1867 a number of the inhabitants of the village of Bhajna were inoculated. The exact number cannot now be ascertained, though two hundred may be stated as a close approximation. A considerable proportion of the inoculations seems to have communicated the disease in a severe form, and eight persons died during the following month in consequence of the small-pox thus artificially engrafted on them. There was no small-pox in the neighbourhood at the time that inoculation was practised in this village, and the very common practice of inoculating all the unprotected portion of the inhabitants was not followed. In particular, the inhabitants of Baniaparah, a suburb or continuation of Bhajna, first put off the day of inoculation for a short time, and then being alarmed at the results of the inoculation already practised refused to have inoculation performed. This remark applies also in a less degree to some of the inhabitants of Bhajna proper. In the month of April natural small-pox was communicated to several of these unprotected individuals, and the disease, originating in this way, was spread from person to person; apparently, however, it did not extend out of their village during the whole of May.

Origin of the  
Epidemic.

3. In June the contagion was conveyed beyond the limits of Bhajna, and during this and the following three months was slowly disseminated among the surrounding villages. Up till the end of September the following villages had been infected—Baniaparah, Pakoor-tollah, Ramchundernugger, Tetooliah, Mudhoosoodunpore, Shibnugger and Sankiberiah. This last village is only a mile from Bhajna, where

Progress of the  
disease.

the disease followed on inoculation. Most of the cases of small-pox occurred in four of these villages, which might be included in a circle the diameter of which was four miles. The disease was put a stop to in these villages in the end of January by extensive vaccination. The last two cases of small-pox which occurred appeared on the 2nd and 5th of February 1868.

Extent and mortality.

4. Up to this time it had attacked one hundred and forty-nine persons, of whom thirty-five had died. Of those included in the number attacked, seven had just been vaccinated, three of whom got the initiatory fever of small-pox on the fourth day. It so happened that none of these seven cases were fatal. It must also be noted that six of the deaths among these cases of small-pox were violent ones which took place during the cyclone on the 1st November 1867. Two of these persons who so died seem to have been moribund at the time of the accident, and in the other four the disease had assumed a virulent type, and was so far advanced, as to render it impossible for those affected, to move away from the danger with which they were threatened.

Actual condition when Vaccination began.

5. On the arrival of the Head Vaccinator he reported having seen thirty-seven cases of small-pox, seven of the cases being in such a condition as to render recovery hopeless. The population of the villages referred to were in an excited state, in consequence of the events which had occurred, and alarmed at the steady progress the disease was making among them. No vaccination had ever been practised among them, but as they were an extremely poor and ignorant population, and fully appreciated their present danger from small-pox, they listened readily to the promises of safety made to them, if they would accept the English prophylactic, and they allowed themselves to be vaccinated in numbers.

Commencement of Vaccination.

6. Romanauth Ghosal, one of the Head Vaccinators, belonging to the Vaccine Establishment, was deputed to stamp out this outbreak. He left Calcutta on the 17th January and reached Sankiberiah on the 21st. On his way he picked up a boy of twelve, from the nearest centre of vaccine operations, who had been previously vaccinated, and whose services had been entertained for this duty. The means of communication in this part of the country are so defective, that this boy could not be returned to his own village for seventeen days. On the 22nd, ten persons, not immediately exposed to small-pox, were persuaded to allow themselves to be vaccinated, with the view of their providing a reliable lymph supply in case of subsequent vaccinations proving not readily

available for the purpose, should small-pox supervene during the course of the vaccination. On the 23rd he began to vaccinate in the houses where small-pox existed, and on this and succeeding days fifty-three individuals were vaccinated from the boy to whom the disease had been communicated by six points of insertion; sixty-three persons in all were thus vaccinated from the vaccinifer the vaccinators had brought with them. Every one of these persons was successfully vaccinated, not even a single doubtful case having been met with.

7. As these cases became ready to supply lymph, very extensive vaccination was practised from them, so that up to the 31st January eight hundred and fifty seven individuals had been operated on. Among this number, there were only four failures and two doubtful cases. Up till the 7th February nine hundred and seventy-three more were vaccinated, among which number, there were two failures and three doubtful cases. On the 7th February the four villages in which the disease had been worst were reported absolutely safe. Small-pox had been stamped out.

Progress of  
Vaccination.

8. The safety of vaccination, the fact of its practice being so free from all distress, and the prompt way in which small-pox had ceased under extensive vaccination, was acknowledged by every one in the neighbourhood; and dozens of people from the surrounding villages had flocked to the vaccinators for protection. On the 12th February it was reported that twelve villages round Sankiberiah had been thoroughly protected by vaccination, and that there was not a single case of small-pox in the neighbourhood. In spite of this absence of small-pox, however, the people showed considerable willingness to take vaccination, and village after village continued to be dealt with, as long as the weather remained so cool as to render the operation advisable.

Further extension  
of Vaccination.

9. Romanath Ghosal, the Head Vaccinator, had at first only one vaccinator under his orders. At once on his arrival he reported the exact state of matters which he found, and the outbreak being of such large proportions, two additional vaccinators were sent to him, who joined him on the 12th February, and later on in the same month other two vaccinators joined him; so that during March and April he had five men under his superintendence.

Detail of  
Arrangements.

10. On the 12th February a report was received from the Zemin-dar at Dehi Gungadhurpore that small-pox had broken out in one of his villages. This village is situated to the north-west of Sankiberiah at a

Small-pox  
reported at Ram-  
jannagur.



distance of eight miles. Reports of the success of the vaccine operations had reached him, and he invited the vaccinators to work on his estate, begging in particular, that they would come at once to the relief of the village in which small-pox already existed.

Origin of this out-break.

11. In the beginning of February three cases of small-pox occurred at Ramjannagur. There was not much direct communication between this village and those in which small-pox existed. However, a market took place twice a week both at Koolpee and at Gungadhurpore, the former of which is quite close to Ramjannagur, and the latter to Bhajna, where the Sankiberiah outbreak originated. Both of these markets are numerous attended; the people of Ramjannagur going close to the first centre of infection, and those from the infected villages coming also close to the second centre of infection. In this way four times a week abundant facilities were afforded for small-pox to spread from one place to another, though the actual individuals who transmitted the contagion cannot now be traced.

Extent which out-break had reached.

12. The disease was confined to one house; one of the grown-up male members having been first affected, seems to have communicated it to his wife, and she again to a boy of fourteen, on whom the disease had reached the eleventh day at the time the vaccinators arrived.

Vaccination and cessation of Small-pox.

13. Two vaccinators, each provided with a child from whom to vaccinate, were deputed to work in Ramjannagur. This village was a small one, and only sixty-three unprotected individuals were found in it and were all vaccinated on the same day. On previous years inoculation had been practised in this village; but this year, hearing of the success of vaccination eight miles off, the ryots moved the landowner to apply to our vaccinators for their aid. About twenty-five villages round this one were vaccinated, and no more cases of small-pox occurred either in Ramjannagur or the neighbourhood.

Varicella at Ghatshara.

14. At the village of Ghatshara several cases of varicella occurred, and the people thinking that it was variola, took fright and sent to Sankiberiah, a distance of fourteen miles, for vaccinators. It was explained to them that vaccination did not protect against chicken-pox, but as the vaccinators were there, advantage was taken of the circumstance to protect this village and five surrounding ones against small-pox.

Total number vaccinated and results.

15. The total number vaccinated by Romanath Ghosal and the division of vaccinators under his orders amounted to seven thousand seven hundred and twenty-one, of which seven thousand six hundred and sixty-nine were

successful, thirty-one doubtful, and twenty-one failures. I beg to be allowed to lay great stress on this amount of success, and to point it out as deserving the careful consideration of the Government. It exhibits an amount of perfection beyond which excellence in vaccination can scarcely be attained to. This subject will again be alluded to in a later paragraph.

16. As is usual in the working of this department, all the villages in which vaccination was practised, were visited by one of the Superintendents of Vaccination. The distance from the places in which he was already engaged was so great that he could not follow the standing rule, of seeing every vaccination while it was in progress; but he carefully inspected every case that had been vaccinated which could be procured, and in this way saw five thousand five hundred and seventy-four individuals who had been vaccinated. In all seventy-two per cent. of the total numbers vaccinated. This want of correspondence between the numbers vaccinated and cases inspected is an apparent and not a real difference. In every large inspection the numbers fall short of the reported cases; some are away in the fields; some have gone to neighbouring villages on business or pleasure; children have gone to play at a short distance; some of the women from other causes are not visible at the time of the inspection; and so, from one cause or another, a considerable deficiency results at such inspections. It would be possible to go again and again, till every case had been inspected; but in working, this is found to be impossible, as to return, it may be miles, to inspect a dozen of cases which have evaded inspection, involves that a hundred cases requiring inspection are not overtaken. Speaking generally, the number of cases left uninspected at Sankiberiah, may be stated as being far too high to be sanctioned by any system professing to ensure to all, that protection from small-pox, which vaccination is capable of supplying. In the present instance, the large proportion inspected may be considered highly satisfactory, and such a high percentage could not have been attained to, unless the population had been unusually willing to follow the directions of the vaccinators, in staying at home during the day on which the Superintendent was to inspect their villages.

Inspection by  
the Superintend-  
ent of Vaccina-  
tion.

17. No special Superintendent being available for this work, Baboo Jadub Chunder Ghose, Graduate of the Bengal Medical College and Superintendent of the Southern Division of the Town of Calcutta, was directed to proceed to Sankiberiah and inspect the cases there. He reports that the people have thorough confidence in vaccination, that they bear testimony to the kindness and attention of the vaccinators who have

The Superintend-  
ent deputed to  
Sankiberiah.

worked among them, and are most grateful for the assistance which the Government sent them during the outbreak. He had opportunities of seeing vaccination during every day of its progress, and pronounces the vesicles to have been typically perfect; to have run the exact course which is known to be normal; the areola in appearance and course to have been strictly perfect; and the cicatrices of the less recent cases, to have been deep, well defined, and presenting characters which are said to belong only to perfect vaccination.

Reliable nature  
of above report.

18. In estimating the value of the circumstances above reported, every thing depends on the trustworthiness of the Government servants reporting. It seems superfluous for me to point out, that the report on the cases actually inspected by the Medical man deputed for the purpose, must be received as literally and strictly true. He has been in Medical charge of civil stations for ten years in the Punjab, for seven years of this time, as an extra Assistant Commissioner, he also exercised judicial functions both in civil and criminal suits. On very many occasions he has received the thanks of Government for his services, and I am glad to avail myself of this opportunity of again pointing him out as one of the very best of the graduates of the Medical College serving the Bengal Government; and in bringing it prominently to notice that on this, as on every other occasion, his duties have been discharged in an efficient and energetic manner and are worthy of acknowledgment. With regard to the Head Vaccinator Romanath Ghosal, he was specially selected for this duty, as it was evident from the first that very much would require to be left to his truthfulness and honesty, as many of the vaccinations could not be inspected during their course. It is quite at variance with every tradition of this department to place any reliance on the reports of vaccinators till they have been verified by the Superintendents; but in this individual instance, there seems no reason to question the correctness of the returns, and every possible enquiry was made to test their accuracy. Reports were received, week by week, of the amount of work done, and of the quality of the vaccinations of the week before.

Amount of suc-  
cessful cases not  
overstated.

19. Exception may be taken to the great proportion of successful cases, and the small proportion of failures, as no such success is reported in other parts of the plains of India. On this point, though I did not see one of the cases, I can speak with the utmost confidence. At the season of the year when these vaccinations were made, this success (if the vaccinators attend to the rules and precautions laid down for them) is

not exceptional among carefully trained men. The main figures correspond exactly; the decimal figures only vary to a slight extent, from the results of vaccinations, which have been minutely and carefully watched, as well by the Superintendent General as by the Superintendents of Vaccination. Such an absolute and exact correspondence of the results, as can be traced month by month, between these vaccinations which were not seen, and the vaccinations by many such batches of vaccinators, the results of which could be verified, affords strong corroborative evidence of the truth of the statements regarding the numbers operated on.

20. The nominal cost to Government of these vaccinations has been Rs. 258-6-9. This sum comprises Rs. 181-10-9, the pay of the vaccinators, Rs. 59-4, the travelling expenses of the Superintendent, Rs. 17-8 contingent charges, comprising carriage hire, reward for the child who accompanied the vaccinators, &c. This can only be looked on as a nominal and not a real cost. Although it includes every extra expense incurred for these Sankiberiah vaccinations, nothing has been placed to this account as a share of the salary of the Superintendent General; in the same way, no part of the pay of the Superintendent who inspected the cases has been debited in this account. The mere pay of the vaccinators is in the same way a defective item. The results obtained could not have been secured by sending down untrained men; vaccinators from the permanent establishment were temporarily detached from it. The difference between the value of work which they would have overtaken had they remained at their own posts, and of that performed by the untrained men by whom their places were filled, would have to be added to this account to make it anything more than a nominal charge.

The nominal cost of these Vaccinations.

21. In consequence of the extensive frauds which are constantly perpetrated by vaccinators in making false returns, it is absolutely necessary, in estimating the cost of any particular vaccinations, to make all calculations on the number of cases which have been inspected by a Medical man. Of these cases five thousand five hundred and seventy-four have been so inspected, the cost, as already stated, having been Rs. 258-6-9. The price, therefore, of each vaccination, which has been inspected, has been less than nine pie. So a fraction more than a penny for each has been paid by Government on account of vaccinations, for which it has the guarantee of a Medical man, not only that they have been actually performed, but that they have been of a perfect character; this cheapness, though a *boná fide* occurrence, is exceptional, and the explanation of this has been detailed in the previous paragraph.

Nominal cost of each Vaccination.

The first part of the paper is devoted to a general discussion of the problem of the determination of the value of the function  $f(x)$  at a point  $x$  where it is not defined. It is shown that the value of  $f(x)$  can be determined by the limit of  $f(x)$  as  $x$  approaches the point  $x$  from both sides. This is the definition of the limit of a function.

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