

to the near feet are passed along the table and the offside holes. The operator takes the pair of ropes on one side and his assistant takes those on the other. At a given signal both pull sharply together, and the animal, taken completely by surprise, is flung suddenly on its back.

By neglect of such a precaution I have seen what was nearly a very serious accident happen, and I now never deal with large animals unless they are securely fixed.

It will be seen that I have dealt above with syringe experiments only.

I have done so because I have found the results of actual bites uncertain and variable, and therefore unreliable for comparative experiments.

When a snake bites an animal it is always difficult to be sure whether or not poison is injected, while the quantity of the venom is still more uncertain.

I once saw a dog fairly bitten by a large daboia, which had poison in its glands, and yet that dog not only did not die, but was very little the worse for the bite.

It is, moreover, very difficult to make a snake bite just when it is wanted to. To this rule the vicious little *Echis* is the only exception I know.

If, however, a bite is desired, it is, I believe, a mistake to allow the snake to be handled. A handled snake quickly becomes frightened, and then endeavours to escape at all costs. Leave the reptile alone and endeavour to make the subject walk over it in search of food. This is far the readiest method of attaining the desired end. Dogs at least show no fear whatever of so dangerous an enemy as the daboia, and even after they have been threatened with a strike, they will again venture into danger after a tempting morsel.

If the subject is unwilling, it can be made to tread on the snake by tying it to a long stick and dragging it over the fatal spot.

On no account should the operator come within reach of the snake in endeavouring to make it bite a victim. I have more than once seen a snake strike round the object offered to it, at my own person, and on one occasion I was all but caught by a daboia in this way. Dr. Henderson tells me he has noticed the same thing.

Personally, I am not in favour with experiments in which the snake's jaws are artificially opened and closed on the part to be bitten. The proper co-ordination of the act is then interfered with, and the result must be correspondingly unsatisfactory. It is hardly safe to assume that in such a bite the erection of the fangs can be relied upon.

With regard to the question as to whether the cobra does erect its fangs, in delivering a bite, I am wholly with Nicholson in believing that it does, nor can I understand how anyone can examine the mobility of the parts in question and remain in doubt on this point.

I almost hesitate to offer these few notes for publication, but the knowledge that the harvest is great, and the labourers few, leads me to do it.

I offer them in the hopes that the very simplicity of the *technique* they discuss may lead other men to spend some part of the long long Indian days in this most fascinating work, and then to help forward the day when we shall have a snake-bite cure which shall be not only efficient, but also within the reach of the million.

ADDRESS DELIVERED IN THE PURI ZILLAH SCHOOL,

By C. BANKS, M.D., D.P.H.

PURI has hitherto been regarded as one of the most backward districts in Bengal in the matter of sanitary reform and in almost every other respect. Nowhere has vaccination met with so much opposition, and in no other district has the death-rate from small-pox been so lamentably great. It is to me a source of much pleasure, after a residence of 2½ years among you to observe signs of an awakening from the apathy and indifference which has, in past years, characterised the great majority of our population, and I am quite sure that the educated portion of the community, so well represented in this gathering, are partakers with me in that joy. Since my appointment as Civil Medical and Health Officer of the City of Jagannath, it has been my constant endeavour to remove or remedy sanitary defects, to introduce improvements, and to the best of my ability to preserve the community against disease and death. The system adopted may have been an objectionable one. I may have given some of you cause for offence. If so, a better opportunity for apologising may not present itself. You must give me credit for honourable intentions, forget the past, and support me in the future as far as you can possibly. It is only by working steadily and harmoniously together that we can hope to achieve satisfactory results for our labours. During the past few years Puri has undergone considerable sanitary improvement. The introduction of a system of drainage, which is gradually being extended, the construction of a cholera hospital which has proved a great boon to the town, your improved system of scavenging, better latrine accommodation, the widening of streets, the removal of obstructions have all tended to promote the health and well-being of the public. The greatest present need of the town is a new water-supply which it is beyond your circumstances to provide. I am living in hope that sooner or later we shall be able to read in one of the daily newspapers a grand report of the opening of the Puri waterworks. There are many in India, rich and increased in goods, whose interests in Jagannath and his pilgrim devotees will, I trust, touch

some tender chord in their hearts and bring forth the funds necessary.

But, gentlemen, we have reason to congratulate ourselves on what we have been able to effect under circumstances peculiar to Puri, viz., the large concourse of pilgrims who assemble at your various religious festivals, the small area over which they are distributed, and the scanty building accommodation provided for them. Amongst the preventible diseases, cholera has claimed considerably fewer victims during the past few years than formerly. The death-rate from this disease amongst pilgrims has gone down to 2:10 from 6:19, the average for 10 years, a condition of affairs which is highly satisfactory. An uncontaminated water-supply is the principal factor in the prevention of this terrible and fatal disease. There are, however, very many other fatal ailments against which a pure water-supply has no protection whatever (unless as an agent for securing cleanliness), and among this class none is so much to be dreaded as small-pox, a disease from which no less than 2,221 deaths occurred in Puri district in 1892-93 out of a total of 22,359 deaths from the same cause in the whole of Bengal. We are not, however, left helpless in trying to combat this disease. We have a preventive and that is vaccination. Darjeeling which has relied upon vaccination as a preventive, and is well protected, had only 18 deaths from small-pox in 1892-93, only 3 deaths in 1893-94, while in 1894-95 it had no deaths at all.

At no time in the history of Bengal has vaccination been carried on so vigorously as during the past two or three years, and no one who has watched the progress of events could have the audacity for a moment to assert that the results are not sufficiently convincing of the virtue of vaccination when he looks at the great diminution in the death-rate.

The total number of deaths from small-pox in the whole of Bengal during the year 1894-95 was 9,562 against 22,359 in 1892-93. The general public are beginning to appreciate the benefits of vaccination, and in proof of this I have merely to mention that in Calcutta as the result of the recent epidemic of small-pox and the scare produced the operations rose from 15,313 to 51,281 during the year 1894-95. It is unnecessary for me to go outside of our own district or town for statistics to prove my argument.

TABLE.

District of Puri.

Year.	Number of villages attacked with small-pox.	Number of cases.	Number of deaths.
1892-93	427	4,346	1,765
1893-94	606	5,853	1,661
1894-95	79	558	239

Town of Puri.

Year.	1889	1890	1891	1892	1893	1894
Number of deaths.	56	173	12	15	39	1

From the above tables it will be seen that during 1892-93 no less than 427 villages were attacked with small-pox, 4,346 persons suffered, and 1,765 died. In 1893-94, 606 villages were attacked, 5,853 persons suffered, and 1,661 died. In 1894-95 only 79 villages were attacked, 558 only suffered from small-pox, and only 239 died from the disease.

In the town there was only one death.

This large decrease in number of deaths may be attributed to two chief causes:—

1. The increased number of successful vaccination operations performed.
2. The avoidance of any delay in proceeding to those villages in which outbreaks of small-pox occurred in order to protect all unvaccinated persons.

It may interest you to know the histories of the cases of small-pox which occurred in the town during the year 1894-95.

Nila Moni, aged 6 years, was vaccinated. On the 7th day small-pox, 25 in number, appeared on her body; only one or two appeared on her face.

Madhu, a brother of the above girl, aged 5 years, was vaccinated at the same time, and seven days afterwards about 50 pox appeared on his body and face. The scars were very small. On enquiry it was found that during the *panchak* festival a relative had come from Nyaghur with a child aged 3 years who, after two days' residence in the house, was attacked with small-pox. The police did not report the occurrence. This child slept in the same bed with the two above-named children. About the 3rd or 4th day the parents removed the child to their own village.

You will observe that Nila Moni and Madhu were just vaccinated in the nick of time, and that the disease which was quietly developing within their systems was aborted. Their attacks were of the mildest possible description.

Barunda, aged 6 years, living in a house a few feet from this affected house, had small-pox about the face. She was unvaccinated.

The vaccinator found an infant, living in the same house, unprotected. This infant was vaccinated and escaped an attack.

Fakhira, male, aged 3 years, unvaccinated, was afterwards attacked and died, after an illness of 17 days. It could not be discovered how he contracted the disease; 36 children were vaccinated in that neighbourhood, five of whom lived next door to the infected house, and all escaped.

During the present year 19 cases of small-pox have occurred in the town. Of those attacked 10 were 30 years of age or over 30, and 9 were aged

respectively, 16, 10, 1, 6, 3, 3, 8, 7, and 10 years not one of whom had been vaccinated. The histories of these 19 cases are exceedingly interesting, but it would take up too much of your time to go into details regarding them.

I have mentioned the above facts chiefly to shew that unvaccinated persons contract the disease while those who are successfully vaccinated invariably escape, and this has been my experience wherever I have investigated outbreaks of small-pox in the mofussil.

In my small pamphlet on "Vaccination" of which several copies are placed at the disposal of those present who can read English, you will find some interesting information on this point in connection with an outbreak at Pipli.

I am certain if you will peruse it with unprejudiced minds you will feel convinced that by refusing to accept vaccination you are depriving yourselves of one of the greatest blessings ever offered to humanity. It is satisfactory to observe that during the year 1894-95 it was found unnecessary to bring any parent or guardian before the Magistrate for failure to have their children vaccinated. It is to be regretted, however, that the issue of so many notices is rendered necessary. Owing to the slipshod manner in which births were registered in past years, the greatest difficulty is felt in finding out very many children who are still unprotected, and are in consequence a source of grave danger to the welfare of the public, and should not be tolerated in any civilized community. We have been able to overcome this difficulty to a certain extent by the employment for a month or two of men to search for and register the names and addresses of all such defaulters. The municipal vaccinator is always on the spot ready to quench the first spark of fire that shews itself, and has been most successful in preventing the spread of small-pox in the few instances in which it was necessary to take precautionary measures.

It is always wise, however, to reduce the chances of fire to a minimum or prevent its possibility. It is of infinitely greater importance that you should secure yourselves and your families against the ravages of small-pox by the wholesale vaccination and re-vaccination of every child and adult in the town. I would esteem it a personal favour and a mark of your approval of my efforts in this direction if all of you would press the claims of vaccination upon those inhabitants of the town who are still unprotected. You should esteem it a privilege to be able in any way to do something however little, to advance the interests of your birth-place or the land of your adoption. You may not, with the means at your command, be able to attend to all the many important and pressing wants of the town, but there is no reason whatever why small-pox should be an ever-abiding disease in your midst. Allow me to read the

concluding paragraph in the pamphlet previously referred to which contains the words of a distinguished writer, and are as follows:—

"The loftiest end to be reached is its complete removal from all civilised countries and indeed from the face of the earth by universal vaccination and re-vaccination. The day is not far distant when the man, woman, and child unprotected by vaccination will properly be regarded as an enemy of the human race and treated accordingly. Evidence of the most satisfactory character as to successful vaccination should be imperatively required of all applicants for admission to schools, academies, colleges, charitable institutions, public libraries, art galleries, and places of labour legislatures, political, religious, and deliberative bodies; of every purchaser of a ticket for purpose of travel; and of every voter. In addition there should be in every district a systematic and periodical inspection of all persons registered in the Census by persons qualified and competent to perform compulsory vaccination. This is the scientific treatment of small-pox."

Degree of protection afforded to infants.

Year.	Population.	Estimated births at 40 per 1,000.	Mortality amongst infants under one year.	Surviving population under one year available for vaccination.	Number successfully vaccinated.	Proportion of persons vaccinated per 1,000 of population of surviving infants.
1887-88	864,195	34,567	5,012	29,555	1,577	53.35
1888-89	864,195	34,568	4,647	29,921	551	18.41
1889-90	863,703	34,548	5,937	28,611	494	17.26
1890-91	863,703	34,548	5,140	29,408	1,551	52.73
1891-92	916,204	36,648	6,382	30,266	1,148	37.93
1892-93	916,204	36,648	6,976	29,672	150	3.52
1893-94	916,204	36,648	8,122	28,526	579	20.29
1894-95	916,204	36,644	8,565	28,079	1,244	39.71
...	...	284,819	50,781	234,038	7,294	30.40

We are very far from having attained that end. A re-vaccination is unfortunately a thing which we seldom hear about in Puri town or district. As shewn in the above table it is estimated that in the district of Puri during the past eight years 284,819 children were born, of whom 50,781 died during the first year of their existence. Of the 234,038 who survived for one year, only 7,294 or 30.40 per 1000 are reported to have been successfully vaccinated. This condition of affairs is most discreditable, and very much to be regretted when you take into consideration the large number of children who have died from small-pox, and the much larger number who have been blemished for life, made useless

members of society, and forced to eke out their lives in darkness, while the sound of a human voice imparts no gladness to their hearts. Gentlemen, if you have any affectionate regard for the welfare of your children and desire to guard them against those misfortunes, you surely cannot better shew it than by accepting on their behalf a means of escape so simple and brought to your very doors. It is a well-established fact that children under one year of age are most apt to contract the disease in a virulent and fatal form, and that their chances of recovery are reduced to a minimum. It is also a fact that vaccination when successfully performed in infancy protects against an attack of small-pox for several years and some time for a lifetime. Even when attacked after vaccination the disease is mild and death seldom follows it. The operation should be performed between the 4th and 5th month after birth so that the trifling amount of discomfort attending vaccination may not be intensified by teething which begins soon after that age. If your children die from small-pox or suffer from permanent blindness and deafness, thereby blasting their worldly prospects the result of an attack, then you are responsible in so far as you neglected to take advantage of simple preventive means. I feel sure none of you could possibly feel happy at heart with the thought weighing upon your minds that your children's faces have been rendered ugly and repulsive through your negligence, or that you are, if not in a legal sense of the term, at least morally responsible for the death of any human being or the murderer of your own child. Our duty is to save, not to destroy human lives, and our greatest happiness should be found in trying in any way we can to prevent sickness and distress or in supporting those whose knowledge of their causes enables them to take the best possible steps to attain that object.

My experience which is very extensive proves beyond the shadow of a doubt that vaccination is the safest and surest means of preventing small-pox and the havoc which follows in its train. None of you would, I presume, for a moment doubt the veracity of my word, or that I would come before you pleading the cause of a preventive measure against small-pox about whose efficacy I had not abundant and clear evidence. Your first duty towards your medical adviser is to place your entire confidence in his advice, and your first duty towards me as your Health Officer is to believe that I shall not deceive you in making false suggestions, or recommending anything which has not been demonstrated to be the best means of preventing preventible diseases. I earnestly advise you and plead with you therefore to say farewell to prejudice and sentiment and accept vaccination as the only scientific method by which we can hope to make small-pox a matter of ancient history.

But, gentlemen, the district has also a claim upon your attention, and only so far as vaccination is concerned do I propose saying a few words. You are probably aware that in every district throughout Bengal except Puri parents are called upon to pay at the rate of two annas for every child that is vaccinated. The fee was formerly charged in Puri district also, but it came to be regarded as a serious drawback to the progress of vaccination, and moreover was a very heavy burden to many of the poorer classes who could hardly get enough to buy their daily food. The District Board came to our rescue, and we were able to introduce free vaccination at the end of the year 1893, as you will see from the following table the results justify its introduction:—

Year.	Total number of operations performed.	Number successful.	Percentage of successful cases.
1892-93 ...	14,199	13,429	94.57
1893-94 ...	16,828	16,401	97.46
1894-95 ...	20,234	19,528	96.55

As the amount contributed was comparatively small it was found impossible to employ a sufficient number of vaccinators to overtake all the unprotected children. There are every year in this district no less than 30,000 children available for vaccination; but for very many years nothing like this number has been protected. Arrears have been accumulating, and at any time there may be a terrible explosion amongst unprotected mofussil children, and our death-rate from small-pox which has been so considerably diminished may again assume serious dimensions and head the list of districts in Bengal returning deaths from this cause. The money set apart this year for vaccination in the mofussil is still utterly insufficient to enable me to effect my object. We are frequently called upon to subscribe towards the support of charitable institutions and social organisations in other parts of India, and even in other countries and give ungrudgingly. We cannot therefore reasonably refuse to extend a helping hand to those nearer our own doors. I have therefore to make an earnest appeal to your generosity for help so that the blessings of vaccination which you are now enjoying may be conveyed to every poor family in the district without the necessity for their feeling even for a single day the pangs of hunger in consequence of having to pay for protection against small-pox. I promise you, gentlemen, that whatever donations you may feel in your heart inclined to give towards such a laudable and important object shall be judiciously and carefully spent, and than myself no one shall be happier if the results achieved justify your liberality.