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# VACCINATION.



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A REPLY TO THE QUESTION

## IS VACCINATION SCIENTIFIC?

BY

**GEORGE S. GIBBS,**

FELLOW OF THE STATISTICAL SOCIETY.

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Reprinted from the

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WITH STATISTICAL NOTE.

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**I**S Vaccination scientific? The late President of the Royal Society thought it involved "a scientific principle"; but if it be true, as it certainly largely is, that "Science is measurement," then our object of research should be capable of definition. The importance of clear definition is that it relieves the mind from idle speculation. But here is our initial difficulty; for the word Vaccination has become a sort of conventional term, and is applied to many things which could not have been in the mind of Jenner.

Dr. Ballard, in his Prize Essay "On Vaccination," says, in reference to infant vaccination, that "medical man and parent alike," and again, in reference to adult vaccination, "the patient and surgeon alike, should not suppose that in the act of vaccination they were engaged in the performance of a rite, but remember seriously that the object is *the infliction of a disease.*" It might be supposed that the business of a physician, consulted by a parent as to the health of a child, would be to cure, not to inflict, disease; and equally, that the last thing a surgeon would do would be to operate in any way upon a perfectly healthy body. It is interesting to notice that, as vaccination is no part of either medicine or surgery, the author divides the objects of solicitude between the physicians and surgeons, lest he should create jealousy, and hands over the infants to the former, while the adults have to face the latter. But whatever hesitancy there may have been on this point, there is none as to the "infliction of disease." And, extraordinary as this may appear, he is supported in it by no less eminent an authority than the late Dr. Farr, who, in one of his many excellent letters to the Registrar-General, lays down some sanitary rules, and among them this:—"Fortify the body by a mild disease, if such is known, against a severe disease. Vaccination, or even Inoculation, if Vaccination had not been discovered, is properly practised under this rule." It may be allowed to conjecture that such a rule would never have issued from the clear intellect of Dr. Farr if the practice had not preceded it.

In our scientific research we have now advanced one step. Vaccination is the infliction of disease. We proceed to enquire what disease? There are three kinds connected

with the practice which may be distinguished, though not scientifically definable,—the disease *à la* Jenner, *à la* Ceely, and *à la* Cameron, all supposed to be prophylactic of smallpox. According to Jenner it was the disease of cowpox, and that not the eruption arising as an outward manifestation of bad health in the cow, but the effect of transmission from the diseased horse, by the accident of dirty grooms acting as milkmaids. He describes the effect of inoculating this disease upon the healthy human frame :—“Absorption takes place, and tumours appear in each axilla. The system becomes affected, the pulse is quickened; shiverings succeeded by heat, general lassitude, and pains about the loins and limbs, with vomiting, come on. The head is painful, and the patient is now and then even affected with delirium. These symptoms, varying in their degree of violence, generally continue from one day to three or four, leaving ulcerated sores about the hands, which, from the sensibility of the parts, are very troublesome, and commonly heal slowly, frequently becoming phagedenic, like those from which they sprang.” A little further on in the same treatise he remarks :—“But what renders the cowpox virus so extremely singular is, that the person who has been thus affected is for ever after perfectly secure from the infection of smallpox.” Vaccination of this kind is now seldom met with; but a case, a few years ago, fell under our observation in which the prediction was certainly fulfilled, for the infant succumbed in a few days, and the rarity of the occurrence was attested by the medical attendant certifying the death as from *measles*. When the gentle and reverend father meekly suggested that the measles were of an unusual kind, the reply was “Yes, they were suppressed, you see.” And so was the truth at the same time, by honest ignorance.

The disease *à la* Ceely originated about fifty years after the disease *à la* Jenner. The more frequent occurrence of smallpox after operations for cowpox gave rise to the idea that the virus was enfeebled, attenuated, or diluted beyond the point of usefulness, and that it required to be renewed or somehow strengthened. This led to the development, by Mr. Ceely, of Aylesbury, of the notion that the cowpox and smallpox were essentially identical, by inoculating matter taken from smallpox patients on cows and subsequently inoculating the human frame with the product. The result was the appearance of normal vaccine vesicles. This performance was lauded in the House of Commons, by Mr. Lowe, as the most wonderful improvement in the practice of vaccination, and was by some supposed to supply a more

reasonable basis for it than it had yet had. This disease *à la* Ceely is more frequently observable than the disease *à la* Jenner, especially in those times when the atmospheric conditions are such as to favour the spread of smallpox. So frequently does smallpox make its appearance very soon after vaccination, and so frequently does this smallpox concurrent with cowpox (so called) prove fatal, that the Registrar-General was prevailed upon to lay down a rule that such deaths by smallpox as occurred within three weeks of the operation should be recorded as *unvaccinated* smallpox, while they were really the natural and scientific result of Ceelyism.

Of the precise effects of the disease *à la* Cameron it is not possible to say very much, because it is not yet sufficiently patronised; but it may be interesting to note the cause of its invention. The more or less constant recurrence of unforeseen results in the course of operations, presumably consequent upon the accession from the numerous bodies operated on of various poison germs to unite with and accompany the virus inserted, led to extended controversies, to which lack of space forbids further allusion, and eventually to the official recognition as vaccination of the practice of taking some virus from an animal which had developed sores, as a consequence of bad health and keeping this morbid virus in motion by constantly transferring it from calf to calf. This virus is said to be innocuous. But innocuous virus is a thing scarcely known to Science, and already complaints are being heard of unexpected results.

A consideration of these circumstances will lead us readily to see that definition is not very easy. When we face the small sack of poisonous matter, delicately named a vaccine vesicle, which is to provide us with the means of inflicting disease, what knowledge can we have of its contents? How can we know what disease we are about to inflict by its aid? Does it contain a germ of the horse poison accidentally communicated to the cow nearly a century ago? Does it contain a germ of the smallpox virus inflicted on the cow thirty years ago? Does it contain a germ, the outcome of the cow's own internal disorder, said to be innocuous? Further, does it contain a germ the outcome of some internal disorder of the person on whom it is, or of the person or persons from whom the matter has been transmitted? Do medical art and surgical science, either or both, supply us with any answers to these questions? Whether they do or can is, however, of small importance as compared with the answer to the practical question, whether the multiplied

and renewed infliction, haphazard, of diseases, results in the reduction of smallpox? It is often asserted that no one ever pretended that vaccination would abolish smallpox. But Jenner told the House of Commons, in 1802, that he confidently expected the extension of the inoculation of the cowpox to do so, and in 1852 the Epidemiological Society, or rather the late Dr. Seaton, assured the House of Lords that "everybody was liable to smallpox unless vaccinated"—a dictum untrue both in what it asserts and what it implies. We have the means of testing the value of these predictions in our own country by the Death Register, which is sufficiently accurate for our purpose, since the year 1838. We find, then, from the Death Register for England and Wales, that between the years 1838 and 1853, while vaccination was voluntary, the annual smallpox mortality varied from 2712 to 16,268; and between the years 1854 and 1872, with vaccination largely increased under compulsion, from 1320 to 22,907. The variations in London for the same periods, respectively, were from 211 to 3817, and from 156 to 7876. We have at hand the record, for the years 1855 to 1873, of smallpox mortality in Scotland, which in point of population is something like London turned out into the country. Here we find that for the years 1855 to 1864, under voluntary vaccination, the variation was from 426 to 1741; and for the years 1865 to 1873, under compulsion, from 15 to 2448.

It seems difficult, in the face of these figures, to see value in vaccination as a prophylactic.

But we have another witness to call in the Reports of the French Academy of Medicine, which collect from the several Departments of France an account not only of the deaths by smallpox, but also of the cases occurring year by year. These Reports have been carefully examined and collated for the years 1865, 1866, and 1867, and each tells the same tale. There is no direct compulsion on this subject in France, and the greatest diversity of practice exists in the several Departments. Thus, the whole country being divided into two groups of Departments, *viz.*, those in which the proportions of vaccinations to births reach 50 per cent (averaging 77 per cent) and those in which the proportion is less (averaging 35 per cent), we find that for the former group the cases were (in proportion to 10,000 births), in 1865, 569 as compared with 222 for the latter, less vaccinated group. In 1866 the corresponding record is 400 to 130; and in 1867, 254 to 83. Here we have surely a clear evidence that the extension of vaccination does not necessitate a diminution of smallpox.



But if the vaccinated are in no better position than the unvaccinated with regard to attack, are they not better situated with regard to recovery? The answer of the French record is clear to the contrary. Taking the years and groups of Departments as above, the figures in regard of smallpox deaths to births are 52 to 17, 52 to 11, and 28 to 8. The less vaccination, the less smallpox mortality.

Yet further, the proportions of smallpox deaths to smallpox cases for the same groups and years are, in percentages, 9·1 to 7·7, 12·9 to 8·5, and 10·6 to 9·2; or for the three years taken together, 10·86 in the Departments most vaccinated to 8·46 in the Departments least vaccinated. These facts are so much opposed to the constant assertions made respecting the greater fatality of smallpox among the unvaccinated, on the authority of Hospital reports, that we must now endeavour to bring a little scientific measurement to bear on these.

To obtain our standard rule we must revert to the condition of things in the last century, in this country, when and where the smallpox was a more or less constant subject of controversy. The controversy arose in this manner:—Lady Mary Wortley Montague returned from Turkey imbued with the desire to introduce the Turkish method of inoculation of the smallpox as a means of averting an attack of the disorder when epidemically prevalent. All English physicians did not take kindly to the notion; and when her ladyship's influence at Court procured the release of six prisoners from Newgate, conditional on their submitting to the operations of Mr. Maitland, there were pretty lively passages of literary arms among the medical men who took an interest in the subject, the operator and his friends reporting a complete success, and others denying that the disease inflicted had any of the proper characteristics of smallpox. None of the six died, however, from the effects of the operation, and fashion and fashionable physicians speedily arranged themselves by the side of her ladyship. Among these was Dr. Jurin, some time Secretary of the Royal Society, who took the very obvious method of recommending the new practice by contrasting the small fatality resulting from it with the general fatality of smallpox occurring in the usual way. He was an industrious, clever, and honest partizan, and, by no small efforts, he collected from different parts of this country records of various epidemic attacks amounting altogether to 18,066 cases with 2986 deaths, being a fatality of 16·53 per cent. The conclusion that this should be accepted as the normal fatality of

natural smallpox was hotly contested by Dr. Wagstaffe, a well-known contemporary of Jurin, who declared that when he wrote the fatality of smallpox did "not exceed one in a hundred." And Isaac Massey, at the same period, Apothecary to Christ's Hospital, stated that in several years only one child ("and he a surgeon's patient before") had died of the disorder, although "hundreds had been down of it." Time operates with cooling wings; and we may fairly suppose all partizan heat dissipated when the writer of the article on Smallpox Inoculation for "Rees's Cyclopædia," published in 1779, stated that "From a general calculation it appears that, *in the hospitals* for smallpox and inoculation, 72 die out of 400 having the distemper in the natural way, and only one out of this number when inoculated." That is, in the smallpox hospitals in this country in the last century, all the patients being necessarily unvaccinated, the fatality was 18 per cent. We take this as our standard rule. Now the disorder of smallpox being always of the same general character, "changed in nothing," and hospital accommodation at present not being inferior to that of the last century, we might fairly expect the hospital fatality now to be about 18 per cent for the unvaccinated, and proportionately less in the total as the proportion of vaccinated patients increased, *if it were true* that these died at a lower rate than the others. On the basis of a death-rate for the vaccinated of (say) one-fourth of that of the unvaccinated, what would be the total fatality in a hospital where one-half of the patients were vaccinated? Answer,  $11\frac{1}{4}$  per cent. On the same basis, what would be the total fatality in hospitals where three-fourths of the patients were vaccinated? Answer,  $7\frac{7}{8}$  per cent. But in the Highgate Smallpox Hospital, during the sixteen years 1836 to 1851, there were 5652 patients, of whom 3094 (more than half) were classed as vaccinated, yet the fatality in the total was 19.97 per cent; and in the hospitals under the care of the Metropolitan Asylums Board, during 1870, '71, and '72, there were 14,808 patients, of whom no less than 11,174 (just over three-fourths) were classed as vaccinated, yet the fatality in the total was 18.66 per cent. That is to say, that what is proved true of the populations at large of England, Scotland, and France, is proved true also of the patients in smallpox hospitals, that the extension of vaccination has no diminishing effect upon the smallpox death-rate.

Although these hospital reports, which may be taken as typical, for almost all those published are drawn up on the same lines, reveal in this striking manner the failure of

vaccination to mitigate any more than to protect, they are constantly appealed to for proof of the value of vaccination as a life-saver from smallpox after attack, because a differential fatality is stated for the unvaccinated and the vaccinated. Thus Mr. Marson states that the unvaccinated died at the rate of 35·55 per cent, and the vaccinated at the rate of 6·76 per cent; and the Metropolitan Board state that their unvaccinated patients died at the rate of 44·80 per cent, and the vaccinated at the rate of 10·15 per cent.\* These figures are simply incredible for those who are acquainted with the nature and history of the disorder; for not only is there no reason—physiological, pathological, or other—for supposing that the vaccination of the vaccinated diminishes their own risk when attacked, but, *à fortiori*, no reason for supposing that the operations performed on their bodies could anyhow increase the risk of death for those who had not had any disease inflicted upon them.

It has been said that to question their accuracy implies a charge of conspiracy to deceive on the part of Smallpox Hospital doctors the world over; but a little consideration will show that they are the outcome of a somewhat indolent want of thought.

The disorder of smallpox is one of very various degrees of danger, according to the sparseness or abundance of the eruption, and the severest and most probably fatal cases are those of the kind called confluent, in which the pustules run together, and completely cover large portions, or the whole, of the body. Yet the classification is made according to the rule that evidence of vaccination consists in the visibility of marks,—a rule certainly misleading in the case of such a disorder, as is clearly pointed out by Dr. Russell, of Glasgow, who, in giving some information about Hospital Smallpox

\* These high percentage figures have been taken as proof that the epidemic of 1871-2 was of exceptional severity; but they are simply a statistical delusion, or, rather, the statistical proof of the existence of a delusion, seeing that no more die in the total than before. To illustrate:—In 1871-2, the proportion of vaccinated to unvaccinated patients is given as 75 per cent, with a total fatality of 19 (18·66) per cent. The relative fatality of unvaccinated to vaccinated is represented as four to one, giving percentages 44·8 and 10·15. Now, if the proportion of vaccinated to unvaccinated patients became 90 per cent while the total fatality, and the relative fatality of the two classes, remained the same, the percentage fatality of the two classes would appear as 60 and 15 respectively, although all the actual conditions affecting mortality continued unaltered. If the proportion of vaccinated patients, under the same conditions, were raised to 95 per cent, the percentage figures of the two classes would then be 68 and 17. Contrariwise, if the vaccinated declined to 10 per cent of cases, the corresponding fatalities would appear as only 20 and 5.

in that city, states that some (he does not say how many) patients who had been recorded on admission as unvaccinated, because of the absence or invisibility of marks, when they became convalescent showed marks of vaccination, "some of them very good." He amended his record in consequence, but yet left it erroneous,—a double-thonged whip for the Anti-Vaccinists; for the patients who 'died, died "unvaccinated," while those who recovered went to swell the list of "vaccinated" recoveries. An additional proof of the accuracy of this explanation is afforded by the introduction into more recent hospital reports of a column of "doubtful," or "said to be vaccinated, but having no marks"; and these classes show, as would be reasonably expected, a very high rate of fatality.

We conclude, then, that Vaccination is not scientific; that it cannot be accurately defined; that it is completely useless for its assumed purpose; that fortification of the body by disease is a mischievous myth, and that the sooner the practice is discontinued the better it will be for the health of the community.



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Author

Gibbs, G.S.

A reply to the  
question: Is vac-  
cination scienti-  
fic?

Inoculation  
Vaccination

