

**A paper on vaccination, read by Mr. John Badcock, (St. James's Street, Brighton,) before the members of the Brighton Literary and Scientific Institution.**

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### **Publication/Creation**

Brighton : Printed by W. and C. Fleet [for Brighton Literary and Scientific Institution?], [1842.]

### **Persistent URL**

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A P A P E R  
ON  
V A C C I N A T I O N ,

READ BY  
MR. JOHN BADCOCK,

*(St. James's Street, Brighton,)*

BEFORE THE MEMBERS OF THE  
BRIGHTON  
LITERARY AND SCIENTIFIC  
INSTITUTION.

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## ON VACCINATION.

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Of all the diseases in the vast and melancholy catalogue of ills which flesh is heir to, few are more virulent or of more fatal effect than the small-pox. It is, therefore, a solemn duty, incumbent on all connected with medical practice to listen, with no ordinary attention, to any and every suggestion calculated, in however small a degree, to diminish the ravages of so terrible a scourge; and happy, indeed, shall I be, if my humble endeavours shall be deemed to have effected ever so little for our knowledge concerning what appears to be the only means of protection against its violence. We have to be thankful that that Almighty and Infinite Being, who has inflicted on mankind so awful a manifestation of His power, has also, in these latter days, through the illustrious and thereby immortalised Jenner, communicated to us the means of combating a disease, which for centuries had pursued its terrible course unimpeded. Yes, indeed, vaccination can be regarded only as the direct gift of Heaven; but, like all other divine gifts, it has been rendered by scepticism less availing than it might have been. It is our duty, on all fitting occasions, to diffuse the blessings of vaccination to the utmost of our ability, and to neglect nothing calculated to improve its efficiency.

It was with a strong impression of this obligation, and with a sincere desire to promote the welfare of society, by contributing to the best of my humble ability to our knowledge of the subject, that I undertook those investigations which, in the course of this paper, I shall have the honor of laying before you; and I am induced to make them known to you in the earnest hope that they will attract the attention of those who are possessed of greater ability to render them useful to mankind.

I may avail myself of the present opportunity of returning my sincere thanks to those talented medical gentlemen who, with that ardour in the pursuit of interesting scientific investigation which characterises their profession, have so kindly afforded me that assistance in my investigations without which they would have been far less worthy of your attention.



It is my intention in this paper, first to advert to the state of our knowledge, with regard to small-pox, previous to the introduction of the practice of vaccination, and then to proceed to the detail of my own experiments.

Some estimate of the immense debt of gratitude which we owe to that benefactor of the human race, Dr. JENNER, for that discovery which has immortalised his name,—the discovery of the protective influence of vaccination against small-pox,—may be formed by referring to the melancholy accounts furnished to us of the terrible ravages, before *his* time, of that dreadful disorder,—for it is stated that, in London and its immediate vicinity, *three thousand lives were annually sacrificed to it.*

To mitigate, in some degree, the severity of small-pox, the practice of inoculation was introduced into England, about the year 1717, by Lady Montagu: in a letter from Adrianople to a friend in this country she says,—“I am going to tell you a thing that will make you wish yourself here. The small-pox, so general and so fatal amongst *us*, is here entirely harmless by the invention of ingrafting, which is the term they give it. There is a set of old women who make it their business to perform the operation every autumn, in the month of September, when the great heat is abated. People send to one another to know if any of their family has a mind to have the small-pox. They make parties for this purpose, and when they are met (commonly 15 or 16 together) the old woman comes with a nut-shell full of the matter of the best sort of small-pox, and asks what vein you please to have opened. She immediately rips open that you offer to her, with a large needle (which gives no more pain than a common scratch), and puts into the vein as much matter as can lie on the head of her needle, and after that binds up the little wound with a hollow bit of shell: and in this manner opens four or five veins. The Grecians have commonly the superstition of opening one in the middle of the forehead, one in each arm, and one on the breast, to mark the sign of the cross, but this has a very ill effect, all these wounds leaving little scars, and is not done by those who are not superstitious, who choose to have them in the legs, or that part of the arm that is concealed. The children or young patients play together all the rest of the day, and are in perfect health to the eighth. Then the fever begins to seize them, and they keep their beds two days, very seldom three. They have very rarely above 20 or 30 in their faces, which never mark; and in eight days’ time, they are as well as before their illness. Where they are wounded, there remain running sores during the distemper, which I don’t doubt is a great relief to it. Every year thousands undergo this operation; and the French Ambassador says pleasantly, that they take the small-pox here by way of diversion, as they take the waters in other countries. There is no example of any one that has died in it, and you may believe I am well satisfied of the safety of the experiment, since I intend to try it on my dear little son. I am patriot enough to take pains to bring this useful invention into fashion in England; and I should not



fail to write to some of our doctors very particularly about it, if I knew any one of them that I thought had virtue enough to destroy such a considerable branch of their revenue for the good of mankind. But that distemper is too beneficial to them not to expose to all their resentment the hardy wight that should undertake to put an end to it. Perhaps, if I live to return, I may, however, have courage to war with them."

Indeed, she recommended it by her own example;—the first person inoculated with small-pox in England was her own daughter.

Though the mildness of the disease communicated by inoculation, compared with that caught in the natural way, was such as to reduce the number of *fatal* cases from one to six, to one to three hundred, still was the degree of risk sufficient to alarm the anxious parent, when the life of a beloved child was at stake; nor was inoculation always able to prevent those unsightly scars and deformities, and the subsequent injury to general health, which are so frequently the lamentable results of a severe form of this *truly malignant* disorder. But the positive evil arising from the partial adoption of inoculation for the small-pox was a more extensive propagation of the disease in the natural way, and a single individual, interested in the welfare of *one child*, may have occasioned the death of thousands.

Such was the condition of medical science relative to this disease, when the comprehensive mind of *Dr. Jenner* discovered the *protective* influence of *vaccine*. His investigations concerning the nature of vaccine or *cow-pox* commenced about the year 1776. His attention to this singular disease was first excited by his having observed that, among those whom he inoculated for the small-pox, many were insusceptible of that malady. He was informed that these persons had *had* the casual cow-pox, a disease which had been known in the dairies from time immemorial, and concerning which, a vague opinion that it had the property of preventing the small-pox had long prevailed.

During the investigation of the casual cow-pox, he became impressed with the idea that this disease might be propagated by inoculation, first from the cow to man, and then from one human subject to another.

The first experiment which he made was in the spring of the year 1796, on a lad named Phipps, with virus taken from the hand of a young woman who had accidentally caught the disorder from a cow. As the indisposition which attended this inoculation was so exceedingly slight as to be barely perceptible, he scarcely felt certain of having secured the boy against small-pox; but, on his being inoculated, several months subsequently, he proved to be completely protected; he was inoculated with active *small-pox* matter, for the fourth time, in the month of May, 1805, also without any effect. *Dr. H. Jenner*, now residing at Berkeley, informed me in a letter which I received from him about eighteen months since, that Phipps was then alive and well, and following the employment of a gardener in his family.



The practice of vaccination, introduced by Dr. Jenner nearly fifty years ago, is now carried on in all parts of the world, with the most happy effect; shielding millions of lives against the dire pestilence of small-pox, and, under proper and judicious management, leaving in the system nothing prejudicial to health. In admitting the blessing conferred on suffering humanity by Jenner's invaluable discovery, it may not be amiss to enquire whether we avail ourselves, to the fullest extent, of the advantage which it holds out to us. In my humble opinion we do not.

I think that we have not attached sufficient importance to the practice of vaccination, nor carried out the discoverer's views in that respect, and perhaps we may in some measure attribute to this cause the increase of small-pox within the last few years.

I have very good authority for stating that, during infancy, the process of vaccination is frequently very much interfered with by dentition and infantile disorders, and, from this cause alone, is not uncommonly imperfect. Dr. Heine, in his treatise on small-pox and vaccination in Wurtemberg, gives the results of many cases tending to prove that cow-pox is not so well developed in early infancy; that indeed immunity from cow-pox infection may then, to a certain extent, exist, and that, therefore, too early a vaccination of children cannot be regarded as proper *in all cases*, and especially within the *first year*. But, in the situation in which most of us are placed, having to bring up our families in thickly populated towns, where the small-pox is almost always present, it is quite necessary to have our children vaccinated at a very tender age, or they would be exposed to very considerable risk.

In such cases, I consider it our duty to avail ourselves of the valuable test of *revaccination*, when they grow older, and I have adopted that precaution in my own family.

I will now lay before you the opinions of some men of the highest professional reputation, in support of revaccination, beginning with that of Mr. Erasmus Wilson, as given in a lecture delivered, last summer, at the Middlesex Hospital. Under the head of extension of vaccine protection, he thus commences:—

"Whether vaccination, when properly and efficiently performed, be capable of prolonging its influence indefinitely, is a question of much importance, but one which cannot at present be answered. Were it, indeed, effectual, our sole anxiety would be to secure the perfection of vaccination; but, in a state of doubt, it becomes doubly necessary to be vigilant in our performance of the operation, and to take such steps as may best anticipate any probability of failure.

"We have seen that the causes of interference in relation to vaccination are very numerous; that the subject vaccinated may be too young; that he may be in a state of health unfavourable to the success of the operation; or that the lymph may be incompetent, either as being obtained too late, or from an imperfect vesicle. With all these chances of failure before us, we shall not be surprised to find that an impression, unfavourable to the



powers of vaccination, exists in the minds of practitioners. For the purpose of meeting this difficulty, re-vaccination has been suggested, and on the continent extensively practiced. Re-vaccination promises to us more than one advantage; it is a simple and harmless operation in itself; and, if the vaccinated person be susceptible of its influence, it may be regarded as determining, firstly, the unprotected state of the individual; and, secondly, his future protection. An infection, of whatever nature, introduced into the animal system, induces such a modification in that system, as to render it insusceptible of the future influence of that infection. But a question difficult of solution is,—for what length of time is the system protected? The physiological changes that are known to be constantly taking place in the system, together with observation, would lead us to infer that the period of existence of the influence is variable; at one time, and more rarely, extending over the whole of life, but more frequently restricted to a limited period. The admission of a possibility of the decline of the vaccine influence leads us at once to the necessity of re-vaccination, and leaves us no other question to determine than the periods at which the operation should be performed. I should advise that vaccination be repeated every seven or every ten years. If the system receive not the inoculated virus, it may be regarded as protected, and no inconvenience results to the subject of operation: while, on the other hand, if the operation be successful, the inconvenience will be temporary and trifling, but the advantages great. Such were also Dr. Jenner's views: he considered that if the constitution show an insusceptibility of the vaccine influence, it commonly stands in the same relation to the small-pox; and he recommended this test, whenever any doubt existed."

At a meeting of the Royal Chirurgical Society, in February, 1841, Sir Benjamin Brodie in the chair, a very elaborate and valuable paper on small-pox was read, from the pen of Dr. Gregory, physician to the Small-pox Hospital.

From that paper it appeared that during the previous month (January) a greater number of patients had been admitted into that *excellent* institution, than in any month since its establishment, *a period of more than 100 years*, the first sixty of which were *previous* to Jenner's discovery of the protective influence of vaccination!!!"

"With regard to the protective influence of vaccination, an extensive series of statistical facts had proved that of every 100 persons who had been seized with small-pox subsequent to vaccination, only seven died; whilst, of the unprotected, 45 in 100 fell victims to this dreadful disease. \* \* It likewise appeared, from the very animated discussion that followed, that re-vaccination ought to be performed as a fresh protection in *ALL* cases; but more especially when any doubt existed concerning the *complete* success of the previous operation: the period of life at which the re-vaccination is performed was regarded as not important. The most proper period for the vaccination of an infant was con-



sidered to be about the *fourth month*, at which time the subject is free from dentition and other contending influences in the system, and before which time the child has not arrived at that degree of plumpness which is requisite for the introduction of the limph.

This was considered to explain the causes of failure of the operation, on more than one occasion, in the case of the *Princess Royal*, who, singularly enough, was born during a small-pox epidemic.

The subject of vaccination became one of interest to me from circumstances which I am about to mention.

Towards the end of the year 1836, I suffered severely from a dangerous attack of small pox, and my mind having previously been impressed with an idea that the *old vaccine* had lost its protective influence by passing through so many constitutions, during the long period of forty years, I was exceedingly anxious to procure some fresh from the cow, for the purpose of having my own children re-vaccinated. On enquiry, I found that the true disease so seldom prevails among cattle, that but few medical men have any acquaintance with it; and I also learned, from very excellent authority, that disastrous consequences have arisen from inexperienced persons communicating other pustular diseases of the animal in mistake. The only satisfactory mode of obtaining, with certainty, the *true vaccine* that presented itself to my mind was, therefore, to inoculate a healthy cow with small-pox matter, as the result of that operation, if any, must be cow-small-pox. I must here mention that this method of obtaining vaccine is opposed to Dr. Jenner's theory; for he informs us that the origin of vaccine was a disease on the heel of the horse, called the *grease*, and communicated to the cow by the milkers. But perhaps it will be best to quote his own words:—"The *grease*," says Dr. Jenner, in a work published in 1798, "is an inflammation and swelling in the heel, from which issues matter possessing properties of a very peculiar kind, which seems capable of generating a disease in the human body (after it had undergone the modification which I shall presently speak of) which bears so strong a resemblance to the small pox, that I think it highly probable it may be the source of that disease. In this dairy county (Gloucestershire, and the surrounding counties), a great number of cows are kept, and the office of milking is performed indiscriminately by men and maid-servants. One of the former having been appointed to apply dressings to the heels of a horse affected with the *grease*, and not paying sufficient attention to cleanliness, incautiously bears his part in milking the cows with some particles of the infectious matter adhering to his fingers. When this is the case, it commonly happens that a disease is communicated to the cows, and from the cows to the dairy-maids, which spreads through the farm until most of the cattle and domestics feel its unpleasant consequences. This disease has obtained the name of cow pox. With respect to the opinion adduced, that the source of the infection is a peculiar morbid matter arising from the horse, although I have not been able to prove it from actual experiments



conducted immediately under my own eye, yet the evidence I have adduced appears sufficient to establish it."

But this doctrine of Jenner's does not appear to be well supported. It is well known that the lower animals have a variolous disease, resembling our small pox, and it is more than probable that the cows were labouring under that disorder or human small pox. In searching for information on this subject, I found the following in an old work written by Dr. Fuller:—"Mr Mather, in his letter from Boston, in New England, saith that Dr. Leigh, in his Natural History of Lancashire, reporteth that there were some cats known to catch the small pox, and pass regularly through the state of it; and at last he telleth us, we have had among us the very same occurrence. For, in like manner, there was, about the year 1710 or 1711, upon the South Downs in Sussex, a certain fever raging epidemically among the sheep, which the shepherds called the small pox; and truly in most things it nearly resembled it. It began with a burning heat, and unquenchable thirst; it broke out in fiery pustules all the body over. These matured, and, if death happened not first, dried up into scabs about the 12th day. It could not be cured, no nor in the least mitigated, by phlebotomy, drinks, or any medicines or methods they could invent or hear of. It was exceedingly contagious and mortal, for, where it came, it swept away almost whole flocks; but yet it could be in no wise accounted the same as our human small-pox, because it never infected mankind."

Having, as I have already stated, lost some of my confidence in the old vaccine, and being desirous of avoiding the risk of taking the casual disease from the animal, I solicited some of my medical friends to inoculate a cow of mine with small-pox, but their want of leisure from professional duties disappointed me in that respect, and, after waiting nearly three years, I undertook the experiment myself.

On the 13th of December, 1841, I commenced operations on a fine young cow, with small-pox matter taken from a strong healthy girl, and was singularly successful. My own little boy was the first vaccinated from the cow, and from him and successive vaccinations I have carefully kept up the supply of vaccine. In these proceedings the utmost caution was observed for the public safety, as well as to make the experiment interesting to the profession. Three days after inoculation with small pox, the cow was inspected by medical men, the vesicle was watched in its progress, and the lymph taken in their presence. I also placed all my cases of vaccination under the inspection of medical practitioners, and a great number of them visited my little boy during the progress of the disease. After my success in this experiment, my next was to inoculate a pony with small pox, but without any result. I was equally unsuccessful with three cows which I inoculated with grease (the reputed source of Dr. Jenner's vaccine), for in all I failed to produce any thing like a vaccine vesicle. It was not until some time after the commencement of my investigations, nor, in fact, before I had suc-



ceeded in my object, that I became acquainted with the experiments of Mr Ceely, of Aylesbury, made in the year 1839, and so beautifully illustrated in the eighth volume of the Transactions of the Provincial, Medical, and Surgical Association.

Mr Ceely, in his paper inserted in the volume of the Transactions, to which I have just alluded, has treated the subject most scientifically, and, by his experiments, has clearly established the identity of cow-pox with small-pox. In correspondence with him, I was astonished to find that an anecdote which he had heard of a relative of mine, the late Mr Allsop, Surgeon, of Watlington, had led him to investigate the subject.

In conclusion, I may again refer to a portion of Mr Erasmus Wilson's Lecture, shewing his opinion of the identity between the two diseases:—"We may," says this clever surgeon, "regard *vaccine* in another and its true light, namely, as identical with variola, and consequently the operation as the same with inoculation with small-pox; the only difference being the greater mildness of *vaccine*, resulting from its transmission through the cow. In this sense it is clear that variolation, after vaccination, is re-vaccination in all excepting in name."

Among the chief advantages to be derived from my method of obtaining vaccine lymph, may be reckoned the avoiding of the filthy association of the grease of the horse, and the power of producing fresh vaccine at pleasure, thus satisfying the prejudices of those who are fearful of the deterioration or contamination of the old vaccine. This speedy conversion of a direful poison into a benign lymph cannot be too highly appreciated when viewed in reference to distant parts of the globe, where, on the breaking out of small-pox, the old stock of vaccine matter is not to be procured.

It has been my desire to give a brief history of the origin of inoculation with the small-pox and cow-pox, and, by comparison, to set forth the superlative advantages of the latter; and it has also been my object, in doing so, to shew how all prejudices against vaccine may be removed by establishing the identity of the true disease.

There still remain advocates of the practice of inoculation with small-pox virus, and likewise some who object to the old *vaccine* virus, from the impression that it is impure, and liable to introduce other diseases into the system; again, there are others who entertain the opinion that its protective power has become modified by its transmission through so many constitutions. This latter suspicion led me to attempt the experiment of producing a fresh stock.

In conclusion, I repeat my acknowledgments to my professional friends for the assistance they have so kindly rendered me in putting my new vaccine to the test, and for so freely giving me their testimony of its efficiency; and I thank you for the indulgence with which you have heard my remarks on a subject which I have endeavoured, I know not how successfully, to invest with as much interest as possible.

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Mr Badcock having concluded, Mr Seymour observed that the Institution must, with himself, feel much indebted to Mr Badcock for his very important and scientific paper, which contained facts for its basis, the results of comprehensive and interesting experiments, and introduced to this Society with an inductive reasoning which was highly satisfactory, logical, and convincing. Further, he held in his hand a book which contained correspondence from a large number of the first medical men from all parts of the kingdom, approving the experiments, and testifying to their value; and though time would not allow him to enter into that series of correspondence, he would just mention one circumstance of our distinguished townsman and eminent physician, Sir M. Tierney, who had so strongly felt the value of pure vaccine virus that he requested Mr Badcock to vaccinate a young lady, who was his particular friend, with this new matter; and, indeed, no improvement had been made from the time of Jenner until the discoveries of Mr Badcock and Mr Ceely, whom Mr B. had alluded to this evening. Their experiments set the matter at rest; it was now a science, that they could produce pure lymph at will. They need no longer use the grease from the horses' heels. He was surprised, from the great importance of the question, there were not more medical men present to take part in the discussion. Why should they withhold the benefit of their opinions, for a more valuable paper had never been submitted to that Society.



