

CLASSICS OF SCIENCE:

Jenner on Vaccination
Medicine

Vaccination, the first inoculation for the prevention of disease, remains almost as mysterious as to its mode of action as it was in 1796. Then small-pox was considered a necessity, and people who had not yet had it were frequently inoculated with the disease so that they might have it at a convenient time and, it was hoped, in a fairly mild form. Now the disease is very rare except in communities where ignorant zeal has overridden the public demand for safety through universal vaccination.

An Inquiry into the Causes and Effects of THE VARIOLÆ VACCINÆ, A Disease discovered in some of the western counties of England, particularly Gloucestershire, and known by the name of THE COW POX. By Edward Jenner, M. D., F. R. S., etc., London: 1798.

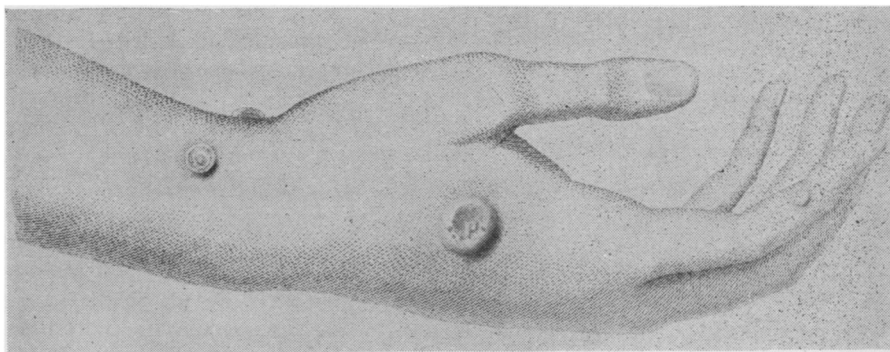
An Inquiry, etc., etc.

The deviation of Man from the state in which he was originally placed by Nature seems to have proved to him a prolific source of Diseases. From the love of splendour, from the indulgences of luxury, and from his fondness for amusement, he has familiarized himself with a great number of animals, which may not originally have been intended for his associates.

The Wolf, disarmed of ferocity, is now pillowed in the lady's lap. The Cat, the little Tyger of our island, whose natural home is the forest, is equally domesticated and caressed. The Cow, the Hog, the Sheep, and the Horse, are all, for a variety of purposes, brought under his care and dominion.

There is a disease to which the Horse, from his state of domestication, is frequently subject. The Farriers have termed it *the Grease*. It 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 has undergone the modification 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 Country 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 due attention to cleanliness, incautiously bears his part in milking the Cows, with some particles of the infectious



COW POX on the hand of Sarah Nelmes. The first vaccination was made from these sores

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 the *Cow Pox*. It appears on the nipples of the Cows in the form of irregular pustules. At their first appearance they are commonly of a palish blue, or rather of a colour somewhat approaching to livid, and are surrounded by an inflammation. These pustules, unless a timely remedy be applied, frequently degenerate into phagedenic ulcers, which prove extremely troublesome. The animals become indisposed, and the secretion of milk is much lessened. Inflamed spots now begin to appear on different parts of the hands of the domestics employed in milking, and sometimes on the wrists, which quickly run on to suppuration, first assuming the appearance of the small vesications produced by a burn. Most commonly they appear about the joints of the fingers and at their extremities; but whatever parts are affected, if the situation will admit, these superficial suppurations put on a circular form, with their edges more elevated than their centre, and of a colour distantly approaching to blue. 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 degrees 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.

Thus the disease makes its progress from the Horse (as I conceive) to the nipple of the Cow, and from the Cow to the Human Subject.

Morbid matter of various kinds, when absorbed into the system, may produce effects in some degree similar; but what renders the Cow Pox virus so extremely singular is, that the person who has been thus affected is for ever after secure from the infection of the Small Pox; neither exposure to the variolous effluvia, nor the insertion of the matter into the skin, producing this distemper.

In support of so extraordinary a fact, I shall lay before my Reader a great number of instances. . . .

Case XVI

Sarah Nelmes, a dairymaid at a Farmer's near this place, was infected with the Cow Pox from her master's cows in May, 1796. She received the infection on a part of the hand which had been previously in a slight degree injured by a scratch from a thorn. A large pustulous sore and the usual symptoms accompanying the disease were produced in consequence. The pustule was so expressive of the true character of the Cow Pox, as it commonly appears upon the hand, that I have given a representation of it in the annexed plate. The two small pustules on the wrists arose also from the application of the virus to some minute abrasions of the cuticle, but the livid tint, if they ever had any, was not conspicuous at the time I saw the patient. The pustule on the fore finger shews the disease in an (*Turn to next page*)

Jenner on Vaccination—Continued

earlier stage. It did not actually appear on the hand of this young woman but was taken from that of another, and is annexed for the purpose of representing the malady after it has newly appeared.

Case XVII

The more accurately to observe the progress of the infection, I selected a healthy boy, about eight years old, for the purpose of inoculation for the Cow Pox. The matter was taken from a sore on the hand of a dairy-maid, who was infected by her master's cows, and it was inserted, on the 14th of May, 1796, into the arm of the boy by means of two superficial incisions, barely penetrating the cutis, each about half an inch long.

On the seventh day he complained of uneasiness in the axilla, and on the ninth he became a little chilly, lost his appetite, and had a slight head-ach. During the whole of this day he was perceptibly indisposed, and spent the night with some degree of restlessness, but on the day following he was perfectly well. . . .

In order to ascertain whether the boy, after feeling so slight an affection of the system from the Cow Pox virus, was secure from the contagion of the Small Pox, he was inoculated the 1st of July following with variolous matter, immediately taken from a pustule. Several slight punctures and incisions were made on both his arms, and the matter was carefully inserted, but no disease followed. The same appearances were observable on the arms as we commonly see when a patient has had variolous matter applied, after having either the Cow Pox or the Small Pox. Several months afterwards he was again inoculated with variolous matter, but no sensible effect was produced on the constitution. . . .

Case XIX

William Summers, a child of five years and a half old, was inoculated the same day with Baker, with matter taken from the nipples of one of the infected cows, at the farm alluded to in page 32. He became indisposed on the sixth day, vomited once, and felt the usual slight symptoms till the eighth day, when he appeared perfectly well. . . .

Case XX

From William Summers the disease was transferred to William Pead, a boy of eight years old, who was inoculated on March 28th. On the

sixth day he complained of pain in the axilla, and on the seventh was affected with the common symptoms of a patient sickening with the Small Pox from inoculation, which did not terminate 'till the third day after the seizure. So perfect was the similarity to the variolous fever that I was induced to examine the skin, conceiving there might have been some eruptions, but none appeared. . . .

Case XXI

April 5th. Several children and adults were inoculated from the arm of William Pead. . . .

Hannah Excell, an healthy girl of seven years old, and one of the patients above mentioned, received the infection from the insertion of the virus under the cuticle of the arm in three distinct points. The pustules which arose in consequence, so much resembled, on the ninth day, those appearing from the insertion of variolous matter, that an experienced Inoculator would scarcely have discovered a shade of difference at that period. Experience now tells me that almost the only variation which follows consists in the pustulous fluids remaining limpid nearly to the time of its total disappearance; and not, as in the direct Small Pox, becoming purulent.

Case XXII

From the arm of this girl matter was taken and inserted April 12th into the arms of John Marklove, one year and a half old,

Robert F. Jenner, eleven months old,

Mary Pead, five years old, and
Mary James, six years old.

Among these Robert F. Jenner did not receive the infection. The arms of the other three inflamed properly, and began to affect the system in the usual manner. . . .

Case XXIII

From this child's arm matter was taken and transferred to that of J. Barge, a boy of seven years old. He sickened on the eighth day, went through the disease with the usual slight symptoms, and without any inflammation on the arm beyond the common efflorescence surrounding the pustule, an appearance so often seen in inoculated Small Pox.

After the many fruitless attempts to give the Small Pox to those who had the Cow Pox, it did not appear necessary, nor was it convenient to me to inoculate the whole of those who had been the subjects of these

late trials; yet I thought it right to see the effects of variolous matter on some of them, particularly William Summers, the first of these patients who had been infected with matter taken from the cow. He was therefore inoculated with variolous matter from a fresh pustule; but, as in the preceding Cases, the system did not feel the effects in the smallest degree. I had an opportunity also of having this boy (Barge) and William Pead inoculated by my Nephew, Mr. Henry Jenner, whose report to me is as follows: "I have inoculated Pead and Barge, two of the boys whom you lately infected with the Cow Pox. On the second day the incisions were inflamed, and there was a pale inflammatory stain around them. On the third day these appearances were still increasing and their arms itched considerably. On the fourth day the inflammation was evidently subsiding, and on the sixth it was scarcely perceptible. No symptom of indisposition followed."

To convince myself that the variolous matter made use of was in a perfect state, I at the same time inoculated a patient with some of it who had never gone through the Cow Pox, and it produced the Small Pox in the usual regular manner.

These experiments afforded me much satisfaction, they proved that the matter in passing from one human subject to another, through five gradations, lost nothing of its original properties, J. Barge being the fifth who received the infection successively from William Summers, the boy to whom it was communicated from the cow. . . .

Edward Jenner (1749-1823) might have distinguished himself in the field of natural history had he been of a more adventurous disposition. He went to London at the age of 20 to study with John Hunter, and arranged for Sir Joseph Banks the scientific specimens brought back from Captain Cook's first voyage. Jenner was asked to go on Cook's second voyage as the naturalist of the expedition, but homesickness for Gloucestershire seems to have caused him to return to his brother's home instead. Here he practiced his profession of medicine, although he did not receive his M.D. from St. Andrews until he was 43 years of age. His early scientific training is very apparent in the carefully controlled experiments by which he proved the truth of the country belief that those who had had the slight inconvenience of cowpox could not take the deadly smallpox. Jenner was 47 when he performed these historic experiments. The rest of his life was filled with the worries and honors attendant upon his great discovery.