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EDWARD JENNER THE DISCOVERER
OF VACCINATION

by

C. J. S. THOMPSON. M. B. E.

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EDWARD JENNER THE DISCOVERER OF VACCINATION

BY

C. J. S. THOMPSON. M. B. E.

Curator of the Wellcome Historical Medical Museum.

LONDON.

The close of the 18th century, saw the dawn of a new era in preventive medicine, and one that will ever be memorable for discovery of vaccination by Dr. Edward Jenner, whose name will ever live as the vanquisher of smallpox, which for centuries before his time had ravaged the world.

The practice of *inoculation* for the prevention of disease goes back to a period of great antiquity, and as a protection against smallpox it appears to have had its origin in India, where inoculation with actual virus taken from the pustule is said to have been known over 1000 years before the time of Christ.

The practice passed from India to China, where as early as the 14th century, there is record of a kind of inoculation having been used for smallpox. Savage races in various parts of Africa appear also to have known and practised inoculation to protect them from this dread disease. From Asia and Africa the knowledge of inoculation passed into Europe by way of Greece and the coast of the Bosphorus to Constantinople, where it was well known at the latter part of the 17th century.

In the early 18th century, it reached Western Europe, and in 1721, an arm to arm variolation was practised in England. In London a hospital was established in 1746, for systematically carrying out inoculation, but the risks attending it prejudiced the majority of people against the practice. To discover some safer method of preventing smallpox and its terrible effects

became the object of scientific and medical men of the period.

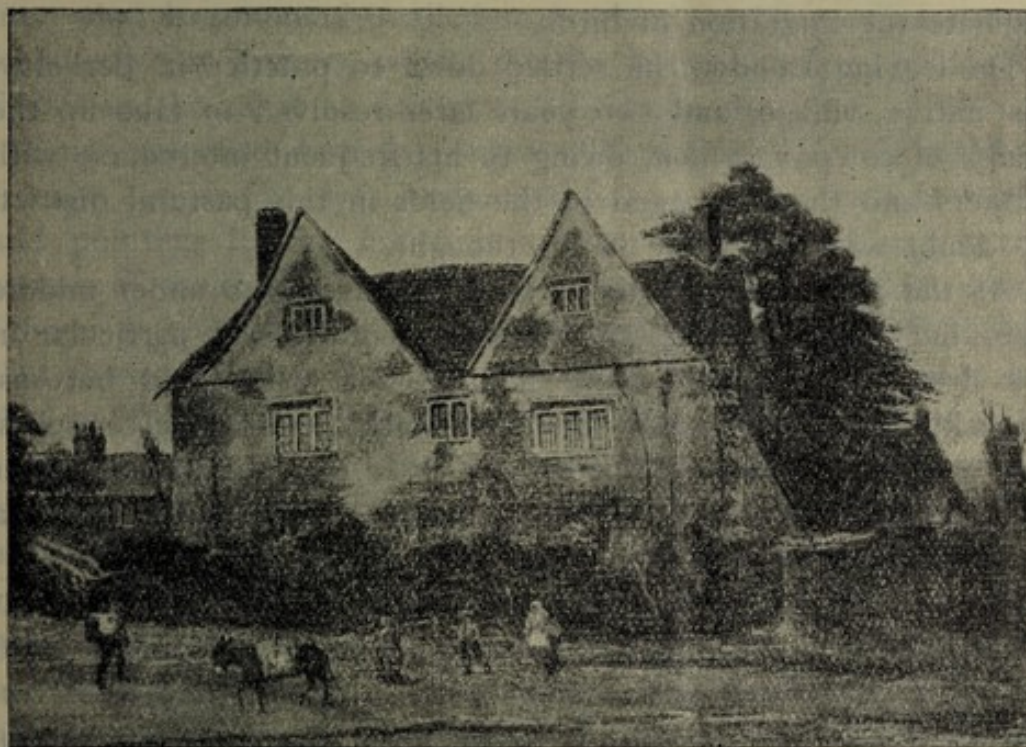
Edward Jenner, who was destined to solve the problem, was born on May 17, 1749, at the Vicarage of Berkeley, in Gloucestershire, and was the third son of the Rev. Stephen Jenner, M. A. a clergyman and vicar of that place.

It was at this time that inoculation was being vigorously advocated as a preventive of smallpox, and was being constantly practised in England. When he was but 8 years of age, Edward Jenner's parents decided that he should be inoculated. For six weeks, he tells us, he was bled, purged, kept on a low diet, and dosed with medicine, and was then removed to one of the so-called "inoculation stables" and haltered up with others in a terrible state of disease. He was fortunate to escape with a mild attack, but it affected his health for many years afterwards, and it is probable that the experience he then went through made such an impression upon his mind, that he eventually began his investigations on some less dangerous method of preventing the disease.

At the age of 13, he decided to follow the profession of medicine, and was apprenticed by his father to Messrs Ludlow, a firm of surgeons in Sodbury, near Bristol, with whom he remained for six years. It was during this period of apprenticeship that one day a young country-woman came to seek medical advice, and the subject of smallpox having been mentioned, she said "I cannot take it for I have had cowpox." This statement seems to have aroused interest and made a deep impression on the mind of Edward Jenner, and doubtless set him thinking why this should be. It marked out for him a new line of research for future exploration.

On attaining the age of 21, he came to London and entered as a house-pupil with the famous surgeon, John Hunter, in whose family he resided for 2 years, and became his favourite assistant. Hunter's firm and independent character produced a lasting impression on Jenner, who followed in his footsteps in his thirst for knowledge, honesty of purpose, and powers of versatility. He assisted in forming the great Anatomical Museum which now forms part of the Royal College of Surgeons in London. It is said he often discussed the subject of smallpox

with the great anatomist and organic philosopher when relating his hopes and fears of the possibility of substituting vaccination for inoculation. Hunter's characteristic reply was: "Don't you think Jenner has what he wanted? He has a hand for a surgeon." A keen lover of natural history, from his boyhood, in connection with which he carried on experiments illustrative of the structure and functions of animals, and with much ingenuity he solved the problem in ornithology by ascertaining the laws which



The old vicarage, Berkeley, where Dr. Edward Jenner was born.

with the great anatomist, and on one occasion when relating his hopes and fears of the possibility of substituting vaccination for inoculation, Hunter's characteristic reply was "Don't *think*, Jenner, but *try*."

A keen lover of natural history from his boyhood, in conjunction with Hunter, he carried on experiments illustrative of the structure and functions of animals, and with much ingenuity he solved the problem in ornithology in ascertaining the laws which regulate the migration of birds.

On leaving London, he settled down to practice in Berkeley, his native village, and two years later resolved to take up the study of cowpox, which, owing to his frequent intercourse with farmers and those engaged in the fields in this pastoral district, no doubt was constantly in his thought.

At the age of 31, Jenner is described as a man under middle size, but robust, active and well formed. He was particular in his dress, and usually wore a blue coat with gold buttons, buckskins, well polished jockey boots with handsome silver spurs, and carried a smart whip with a silver handle. His hair, after the fashion of the time, was done up in a club, and he wore a broad brimmed hat.

From this description, one can picture Jenner and his great friend Gardner, as they rode together on the country road between Gloucester and Bristol, conversing as they went respecting his future hopes with regard to the object of his research, a subject that was then uppermost in his active mind.

First giving his friend the result of his study into the natural history of cowpox, Jenner gave his opinion as to its origin, which he believed at that time to be from the heel of the horse, specifying the different kinds of disease which attacked milkmen when they handled infected cows.

He dwelt upon that variety which appeared to afford protection against smallpox, and with deep and anxious emotion mentioned his hope of being able to propagate that variety from one human being to another, until he had disseminated the practice all over the world to the total extinction of that terrible disease. We can imagine him drawing his horse closer to his friend's and bending over with impressive words, saying "Gardner,

I have entrusted a most important matter to you which I firmly believe will prove of essential benefit to the human race. I know you, and should not wish what I have stated to be brought into conversation, for should anything untoward turn up in my experiments, I should be made — particularly by my medical brethren, — the subject of ridicule, for I am the mark they all shoot at."

It was just at that time that Jenner concluded his researches into what is commonly called in England the "Grease", a disease well-known to farriers, which attacks horses' heels, and identified it as the same as Cowpox and Smallpox.

This happened one day when accompanied by his nephew George Jenner, he was examining a horse with diseased heels, and pointing to the infected part, he cried; — "There is the source of smallpox. I have much to say on that subject, which I hope in due time to give to the world." He satisfied himself that the two forms of disease had been hitherto confounded and that only one gave protection against smallpox.

It was not until 1780 that he was enabled, after much study and enquiry, to unravel many of the perplexing obscurities in connection with the truth of the traditions respecting cowpox.

Jenner's next step was to ascertain that the true cowpox itself only protects when communicated at a particular stage of the disease. Just at this time, however, there was little chance of studying cowpox in that part of the country as few cases had occurred in Gloucestershire. He had, therefore, no opportunity of inoculating the disease and so putting his theories to the test; but he steadily pursued his investigations, and in 1788 he had a drawing made of the hand of a milkmaid with cowpox, which he took with him to London to show Sir Everard Home, who agreed that it was both interesting and curious, and the subject began to be talked about in medical circles in London.

On March 6, 1788, Jenner married Miss Catherine Kingscote, the daughter of Mr. Anthony Kingscote, with whom he had been long acquainted and their first child Edward was born in January 1789.

While investigating the subject of vaccine inoculation, Jenner



"Dr. Edward Jenner [inoculating his son Edward, at the age of 18 months with swinepox matter, November, 1789, from the original picture by Munro S. Orr, in the Wellcome Historical Medical Museum. Copyright".

made some experiments with swinepox, which he believed to be of similar origin to common variolae.

In order to prove this, in 1790, he took an important and heroic step. Finding no other subject, he resolved to inoculate his own son Edward, (who was then a baby about 18 months old) with some swinepox matter which he had collected. We can imagine that Jenner watched the result with the greatest anxiety and noticed that the progress of the disease seemed similar to that arising from the insertion of true smallpox matter when the attack was slight. No harm apparently resulting to the child, on April 7th 1791, he again inoculated him, and although a vesicle appeared and there was some erysipelas, it quickly faded away, and the child showed no signs of indisposition the whole time.

Thus, for the time, Jenner's researches were at a standstill. In 1796, however, the opportunity occurred for a most important experiment. He was informed that cowpox had broken out in a farm near Berkeley, and a dairymaid name Sarah Nelmes had contracted the disease. Jenner at once seized the opportunity and resolved to put his theories to a practical test.

It was on May 14th, just 125 years ago, that he took some matter from a pustule on the girl's hand and inserted it by means of superficial incisions into the arm of a healthy boy about 8 years of age, named James Phipps. This historic incident has been wonderfully represented by Guilio Monteverde, the famous Italian sculptor. Jenner seated on a small couch, his features showing evidence of his intense absorption in his subject, is holding the struggling boy on his knee, grasping his arm with his left hand while he makes his incisions with a lancet on the upper arm.

The experiment was successful, and even surpassed Jenner's anticipations, the result being described as similar to that produced by inoculation with variolous matter. The whole died away, leaving scabs and subsequent eschars.

After a period of six weeks had elapsed. Jenner determined to put his theory to the test by inoculating the boy with smallpox matter, and on July 1st, of the same year, by means of punctures and slight incisions, he inoculated him with variolous lymph

and was delighted to see that no smallpox followed. This culminating point in Jenner's researches was the result of more than thirty years reflection and study.

The historic result which he communicated to his friend Gardner, may be told in his own words:—

"As I promised" he writes, "to let you know how I proceeded in my inquiry into the nature of that singular disease the cowpox, and, being fully satisfied how much you feel interested in its success, you will be gratified in hearing that I have at length accomplished what I have been so long waiting for, the passing of the Vaccine Virus from one human being to another by the ordinary mode of inoculation.

A boy by the name of Phipps was inoculated in the arm from a pustule on the hand of a young woman who was infected by her master's cows. Having never seen the disease but in its casual way before, that is, when communicated from the cow to the hand of the milker, I was astonished at the close resemblance of the pustules. But now listen to the most delightful part of my story. The boy has since been inoculated for the smallpox, which, as I ventured to predict, produced no effect. I shall now pursue my experiments with redoubled ardour. Believe me, Yours very sincerely, Edward Jenner, Berkeley, July 1796 19th, ~~1796~~.

With characteristic caution and accuracy, Jenner decided to confirm his experiments and make his discovery certain before putting the facts to the world, so he resolved to repeat it, but unfortunately the disappearance of cowpox in the dairies again caused a delay. In the meanwhile, he resolved to prepare a paper on the subject to send to the Royal Society of London.

Early in the year 1797, owing to another outbreak of cowpox in the district, Jenner's opportunity again occurred. He confirmed his previous experiments and inoculated three other persons with success. He then completed his paper and revised it for publication, sending the manuscript to the Royal Society. It was submitted to the Council, which on consideration, after some time, returned it to him as they thought the evidence was not strong enough to warrant publication in their "Transactions". Jenner with unshaken faith and in the firm conviction that his



"Dr. Edward Jenner performing his first vaccination on James Phipps May 14, 1796. (From the original statue in bronze by Guilio Monteverde in the Wellcome Historical Medical Museum. Copyright)."

results were conclusive, resolved to publish the paper himself, and thus make his discovery known to the world.

Before doing this, he journeyed to London with his wife and daughter on April 24, 1798, for the purpose of exhibiting cowpox, and demonstrating to his professional colleagues the accuracy of his researches and the truth of his assertions. He remained in London until July 14th, and left on that day bitterly disappointed, as he had been unable during the three months' visit to find a single person who would submit to vaccination.

About the end of June 1798, his manuscript was printed with additions in the form of a pamphlet entitled:—

“Enquiry into the Causes and Effects of the Variolae Vaccinae, a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of Cowpox”.

In this historic treatise, which led to such important results, Jenner began by describing the disease of the horse called by farriers the “Grease”, which he describes as “an inflammation and swelling in the heel, from which issues matter possessing properties of a very peculiar kind. It is capable of generating a disease in the human body (after it has undergone the modification which I shall presently speak of) which bears so strong a resemblance to the smallpox, 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. The office of milking is here performed indiscriminately by both men and maid servants. One of the former having perhaps 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 matter adhering to his fingers. Should this be the case, it commonly happens that a disease is communicated to the cows, and from the cows to the dairymaids, which pretty rapidly spreads until most of the cattle and domestics of the farm feel its unpleasant consequences”.

Jenner thus accounts for the origin of cowpox, the characters of which he then describes in detail. He believed that Virus from the horses' heels was intensified by being passed through

the cow, on the ground that the horse so rarely affects his dresser with sores, while the milkman rarely escapes infection from the cow.

Among the cases which he describes, is that of his second son, Robert Fitz-Harding Jenner, an infant of eleven months, and of several other children who were vaccinated on April 12, 1798 with matter from the arm of Hannah Exell. It is particularly specified that Robert Jenner did not receive the infection. He concludes his remarks with the assertion, that the cowpox protects the human constitution from the infection of smallpox is proved by the facts adduced.

That the disease commonly called the "Grease" was the source of cowpox was subsequently corrected by Jenner. It was shown later that the horse is liable as well as the cow to an eruptive disease of a variolous character, and that this disease when communicated to man, protects him from smallpox even though it has never passed through the cow.

While he was in London concerning the publication of his pamphlet, Jenner had called on Mr. Cline, a surgeon in Lincolns Inn Fields and left with him some of the cowpox virus for trial. Having a young patient suffering from an affection of the hip joint, Cline thought that the counter irritation excited by the cowpox might prove beneficial, and in July 1798, he inserted some of it into the patient's hip by means of two punctures. The result corroborated Jenner's experiments; the child sickened on the seventh day and the fever subsided on the eleventh. The patient was afterwards inoculated with smallpox matter in three places without contracting the disease, and Cline writing on August 2, 1789, to Jenner states:—

"I think the substitution of the cowpox poison for smallpox promises to be one of the greatest improvements that has ever been made in medicine. The more I think on the subject, the more I am impressed with its importance".

Cline convinced from the success of his first trial of the inestimable value of Jenner's discovery, advised him to leave the country and take a house in the West End of London, where he felt sure he would reap a reward of at least £ 10,000 a year as the result of his practice, but the glowing prospect did not

the cow, and the gland, that the horse so rarely affects this disease with sores, while the milkman rarely escapes infection from the cow's udder at dairymen's visits.

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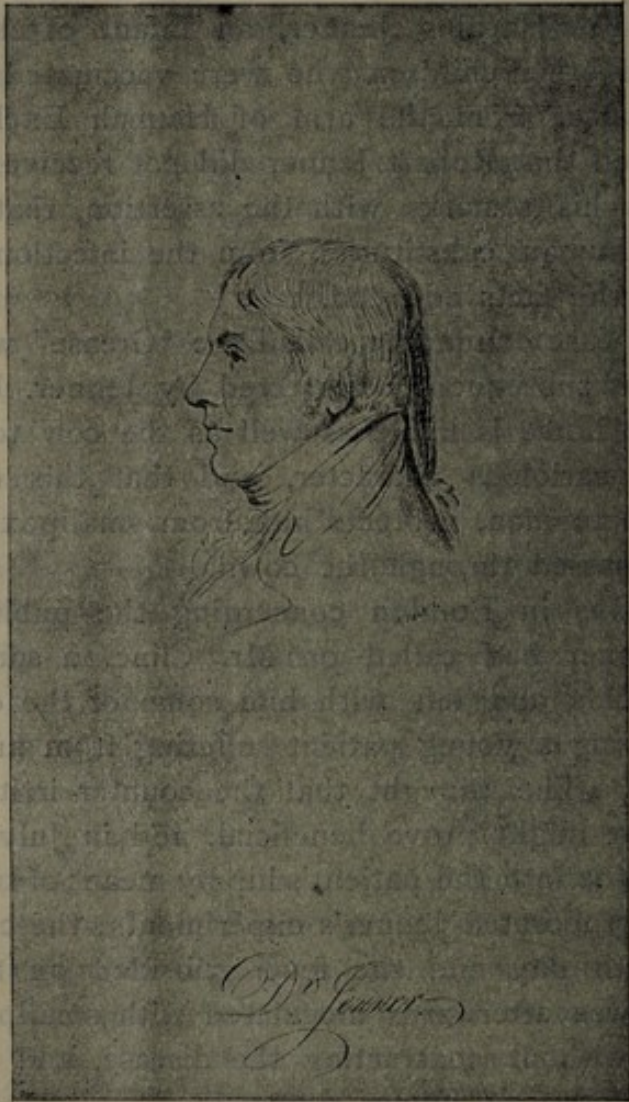
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"Edward Jenner at the age of 35".

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appeal to Jenner, and his simpleness of mind and unselfish nature is evidenced in a charming letter which he wrote from Cheltenham on September 29th, concerning Cline's suggestion. He says: —

"It is very clear from your representation that there is now an opening in town for any physician whose reputation stood fair in the public eye. But here, my dear friend, is the rub. Shall I, who even in the morning of my days sought the lowly and sequestered paths of life, the valley and not the mountain, shall I, now my evening is fast approaching, hold myself up as an object for fortune and for fame? Admitting it as a certainty that I obtain both, what stock should I add to my little fund of happiness?

My fortune with what flows in from my profession, is sufficient to gratify my wishes; indeed, so limited is my ambition, and that of my nearest connexions, that were I precluded from future practise, I should be enabled to obtain all I want. As for fame, what is it? a gilded butt, for ever pierced with the arrows of malignancy. The name of John Hunter stamps this observation with the signature of truth. However, this I promise you, that as soon as my engagements here cease, you shall see me in Town. In my last letter I told you how much I was perplexed; my perplexity really amounts to agitation. On the one hand unwilling to come to town myself for the sake of practice, and on the other, fearful that the practice I have recommended may fall into the hands of those who are incapable of conducting it, I am thrown into a state that was at first not perceptible as likely to happen to me; for, believe me, I am not callous to all the feelings of those wounds which, from misrepresentation might fall on my reputation; on the contrary, no nerves could feel more acutely; and they now are actually in a tremor from anticipation.

How very few are capable of conducting physiological experiments! I am fearful that before we thoroughly understand what is cow-pox matter, and what is not, some confusion may arise; for which I shall, unjustly, be made answerable. In the first place, instances will occur where

those who have truly had the disease shall be subjected to the common process of inoculation, inflammation, vesication, and even pus will appear on the wounded part. The axilla will show that the lymphatics have been active and the system may even, in a very limited degree, feel the consequence. What would the enemies to the improvement of science say to this? I leave you to answer this question. But the very same thing has happened again and again to those who have had the small-pox; and do not those (nurses for example) who are much exposed to the contagion of smallpox

(The remainder of this letter is unfortunately lost.)

As has ever been the case at the advent of great discoveries, the publication of Jenner's successful results was the signal for an outburst of adverse criticism. The first to denounce Jenner's discovery was Dr. Ingenhousz, a well-known scientist of the time, who was a strong opponent of the cowpox theory, and claimed to bring certain cases to light where smallpox had been contracted after inoculation by cowpox. The leading scientific and medical men in London next took up the subject and several questioned the accuracy of Jenner's observations and stigmatised his doctrines as conjectural and ridiculous. Meanwhile, Ingenhousz who proved a formidable antagonist, did much to weaken Jenner's position. Others such as Pearson and Woodville, although adopting Jenner's ideas, endeavoured to exploit them on lines of their own, which proved a failure. Their experiments were unfortunately attended with somewhat serious results, with the effect of stopping the progress of Jenner's own researches for a time. Both, being physicians to the Smallpox Hospital in London, held important positions, and it is said that the experiments they commenced to carry out on vaccination were so carelessly performed, that they were practically useless. It was further said that the vaccine they used was actually disseminating the disease they wished to prevent.

On hearing this, Jenner, fearing that their failures would seriously rebound upon him, decided to leave his country home and come to London. In the early part of the year 1799, he came to the metropolis and at once set to work to rescue his disco-

very from destruction, and to expose the errors which had been committed by his imitators. He soon gathered round him a numerous band of enthusiastic supporters, and they at once set to work to try and counteract the evil done to their cause.



"Edward Jenner".

(From an oil painting in the Wellcome Historical Medical Museum, Copyright.)

Meanwhile, Jenner was invited to be in the vicinity of the investigation of the vaccination of his own for the inoculation and appointed a vaccine Board, of which he made himself the Principal, and the Duke of York consented to become the Patron. He condescendingly wrote to Jenner offering to make him an "extra corresponding physician," but he naturally, regarding this, declined the offer, and returned to Berkeley in order to complete a second paper on which he was engaged in reply to the criticisms of his opponents. This done, it was shortly after published with the title:

very from destruction, and to expose the errors which had been committed by his imitators. He soon gathered round him a numerous band of enthusiastic supporters, and they at once set to work to try and counteract the evil done to their cause.

Writing to his friend Gardner on March 7th, 1799, he reveals the condition and agitation of his mind at this period, in a letter from which. I have extracted the following:

“There never was a period in my existence when my situation called so loudly for the assistance of my literary friends as the present. Though my barque will, with flying colours, reach the shore at last, yet it is now in a storm.

I am beset on all sides with snarling fellows, and so ignorant withal, that they know no more of the disease they write about than the animals which generate it. . . . Standing as I do before so awful a tribunal, my friends will volunteer their counsel and *immediately* appear in court. . . .”

He first took up his residence in Norfolk Street, London, and on the 23rd had an interview with Dr. Woodville, who informed him that he had vaccinated upwards of 200 patients. He remained in London until the 14th June 1799, and during his stay had many and important interviews with most of the leading medical men resident in London, and eventually went back to Gloucestershire to procure fresh cowpox virus from the country.

In 1799, Woodville had tried a succession of arm-to-arm vaccinations, and found that the virus could be passed from one person to another and still yield the same result. This method of human vaccination proving successful, it became commonly adopted in practice.

Meanwhile, Pearson who was ambitious to be in the forefront of the investigations, decided to establish an institution of his own for the inoculation of cowpox, and appointed a Vaccine Board, of which he made himself the Principal, and the Duke of York consented to become the Patron. He condescendingly wrote to Jenner offering to make him an “extra corresponding physician”, but he naturally resenting this, declined the offer, and returned to Berkeley in order to complete a second paper on which he was engaged in reply to the criticisms of his opponents. This done, it was shortly after published with the title:

“A Continuation of Facts and Observations relative to the Variolae Vaccinae”.

Soon after the publication of this pamphlet, Jenner again returned to London and communicated with Lord Egremont asking for an interview, so that “he might submit a plan by which the country might derive the advantage of his discovery and profit by his advice”. At this time, he also had audience with the Duke of Clarence, and eventually submitted a scheme for the establishment of a public institution for vaccine inoculation. He ultimately succeeded in inducing the Duke of Clarence and Lord Egremont to withdraw from Pearson’s projected institution, and was presented by Lord Berkeley to King George III, the Queen and the Prince of Wales, who expressed great interest. Their encouragement gave him fresh hope, and materially aided the spread of the vaccination propaganda throughout the country.

The practice of vaccination was introduced and first taken up in America by Dr. Waterhouse of Cambridge, Massachusetts. He made it known in an article he published in the “Columbian Sentinel” in March 1797, entitled “Something Curious in the Medical Line”. Thus with characteristic energy and enterprise, did the Americans grasp a discovery which had only just been announced in the land of its birth, and at a meeting of the American Academy of Arts and Sciences, presided over by John Adams, then President of the United States of America, the subject was brought forward and attentively considered, and no time was lost in endeavouring to procure a supply of vaccine lymph. It was not until June 1800, however, that a supply was sent to America, and on July 8th, of that year, Waterhouse vaccinated one of his sons of the age of five. This boy was the first person to be vaccinated in America. The result proving successful as compared with Jenner’s experience, Waterhouse vaccinated several other members of his family, and also subjected them afterwards to smallpox inoculation. The children resisted the disease even when subjected to the most crucial tests to the delight of Waterhouse, who exclaimed: — “One fact in such cases is worth a thousand arguments”.

Waterhouse did a great deal to further the practice of vaccination and was anxious that its effects should be diffused

throughout the entire continent of America. His efforts attracted the attention of Thomas Jefferson, then President of the United States, who took a considerable interest in the subject. Jefferson had some of the members of his family vaccinated in August 1801 at Washington, and from his own family he supplied Dr. Gantt with a small quantity of vaccine lymph. Thus the seeds of vaccination were planted in the capital of the United States.

The news of Jenner's discovery next spread over the continent of Europe, and vaccination was demonstrated in Vienna by De Carro in 1799. Towards the end of the year 1799, Jenner's "Inquiry" was translated into German by Ballhorn, who together with Stromeyer introduced the practice of vaccination into Hannover.

Valentin and Desoteux were the first to call attention to the subject in France, and in 1800 Liancourt established a Vaccine Institution by subscription, obtaining considerable financial support from Lucien Bonaparte, who was then Secretary of the Interior.

François Colon, a physician of Paris, had his own son vaccinated, a baby of eleven months, in order to encourage those who hesitated. With enthusiasm worthy of the cause, he wrote a pamphlet which had a wide circulation, in which he offered to inoculate the poor gratuitously, and all soldiers and their children who had not had smallpox, on a simple letter of recommendation from beneficence committees, from different administrations and constituent bodies. "I will entertain at my house" he says, "and attend three intelligent nursing mothers with their children during the whole period of inoculation; I invite all my colleagues to study my inoculation, and to be convinced by the testimony of their own eyes of the usefulness and advantage of inoculation. I shall be very pleased to enter into correspondence with all doctors of provinces who wish to know and to propagate this method of inoculation. I will send them some Virus Vaccine, which may be useful to them. In order to inspire the public with confidence, I will give to those who wish it a receipt for what I receive as my fees, with a promise to restore it at sight to those who suffer from smallpox after having been inoculated by me. As a guarantee of this promise I will, if they wish it, sign a deed in the presence of a lawyer with a mortgage on an

unencumbered real estate, binding me to refund in the above mentioned cases as far as I shall be called upon to make good my promise".

It may be interesting here to note that the word "Vaccination" was first applied to Jenner's method of cowpox inoculation in France.

In January 1800, Jenner's original treatise, "The Inquiry into the Causes and Effects of the Variolae Vaccinae" was translated into French by the Count de la Rocque, and five years later Napoleon Bonaparte demonstrated his confidence in Jenner's theories by issuing an order that all soldiers in his army who had not suffered from smallpox, were to be vaccinated. This was the first instance of compulsory vaccination.

Towards the close of 1800, vaccination was introduced into Holland by Dr. Davids, of Rotterdam. He first journeyed to Paris for the purpose of seeing the practice carried out, where he obtained some virus, which he took back to Rotterdam, but his first attempt failed. Subsequently, he received a supply from England through Boulogne, which proved efficient, and he communicated his success to Jenner in the following letter dated March 24th 1801, Rotterdam. It is addressed:

"To the Benefactor of Mankind, Dr. Jenner.

Sir:

I was happy enough to introduce cow-pox through the whole country with the greatest success, and the name of Dr. Jenner is adored. In a few days my translation of your essay on the cow-pox will be published.

The cow-pox inoculation was introduced just at the moment the smallpox made ravages through the whole country; but thank God, not one is infected after the vaccine.

I will take the liberty of sending you one of my translations, and in the preface you will find an observation about an Arabian manuscript found in the Leyden Bibliothec.

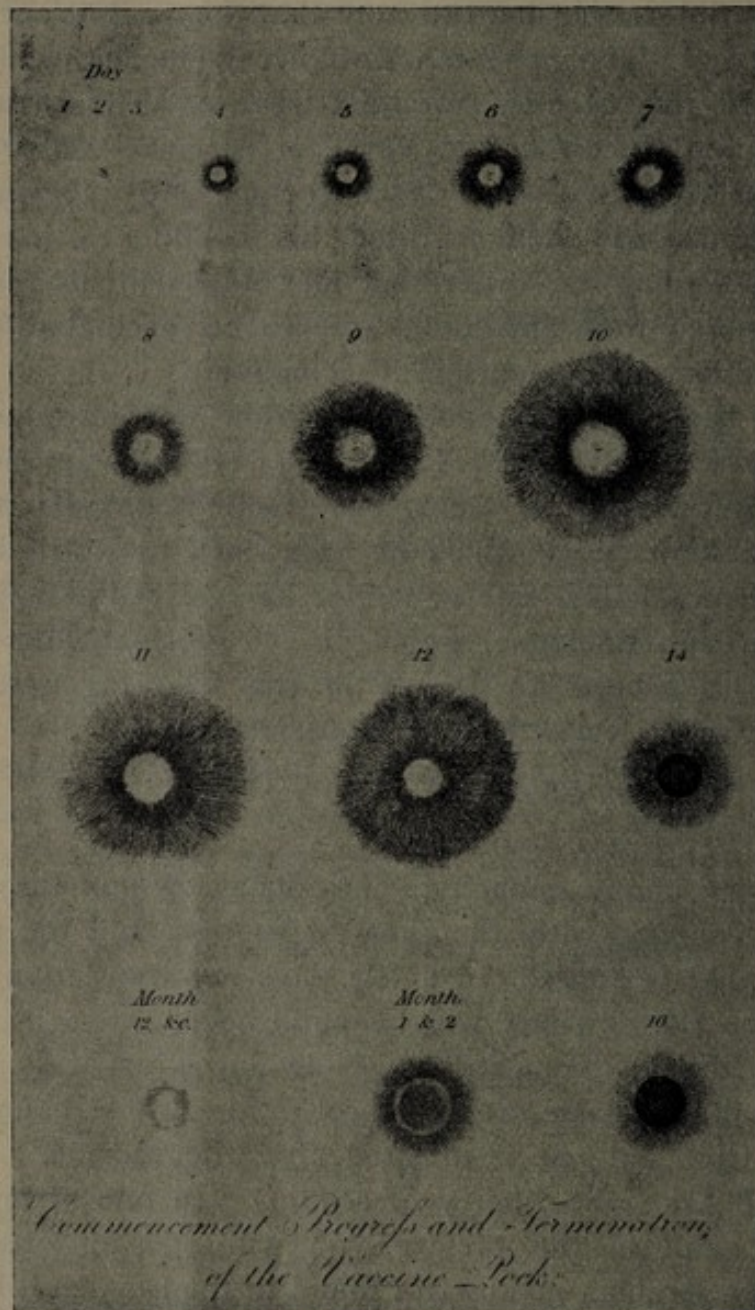
In the spring I should be very happy to have a little fresh matter from the cow.

After assuring you of my sincere feelings and respect,

I remain, Sir,

Your most obedient humble servant,

L. DAVIDS. M. D."



"The Commencement, Progress and Termination of the Vaccine Pock, from the report of the Royal Jennerian Society 1816".

Dauids translated Jenner's pamphlet "The Inquiry" into Dutch which was published about this time, and soon became known throughout the Netherlands.

The importance of vaccination was also soon realised and taken up with enthusiasm in Switzerland, Italy and Spain. In the latter country its importance was recognised, and the Government in 1803 despatched an expedition for the purpose of introducing the practice of vaccination throughout the Spanish possessions of the Old and New Worlds, where smallpox was constantly raging. The vessel in which the expedition sailed, carried 23 unvaccinated children, who were to be vaccinated on the voyage in order to preserve the lymph active by passing it from arm to arm.

Italy was not slow to follow Spain in adopting Jenner's discovery, and the practice was successfully exploited by Sacco of Milan in 1801. He laboured with unwearied activity, becoming the Director of Vaccination, and in a few years had vaccinated 20,000 of his countrymen. Much of the vaccine used was obtained from an animal that had natural cowpox, which was discovered after a prolonged search in Lombardy.

In Sicily and Naples, where smallpox was rife, vaccination was received with great enthusiasm, religious ceremonies being formed for the purpose of receiving the "blessed Vaccine" as it was termed.

In Russia, Jenner's discovery was taken up and practised with great success and among its most earnest supporters was the Empress Alexandra, who personally urged her subjects to be vaccinated, and ordered that the first child to submit to the operation should receive the name of "Vaccinoff" and be educated at the public expense. The fortunate child who was thus duly named, became a kind of national hero, and after vaccination, was conveyed to St. Petersburg in one of Her Majesty's Imperial coaches. He was educated in the Foundling Hospital in the capital and afterwards received a pension for life. The Empress in commemoration of this, afterwards presented Jenner with a valuable diamond ring. Thus Jenner's influence and popularity grew apace, especially on the continent of Europe.

On his petition the Emperor of Austria and the King of Spain

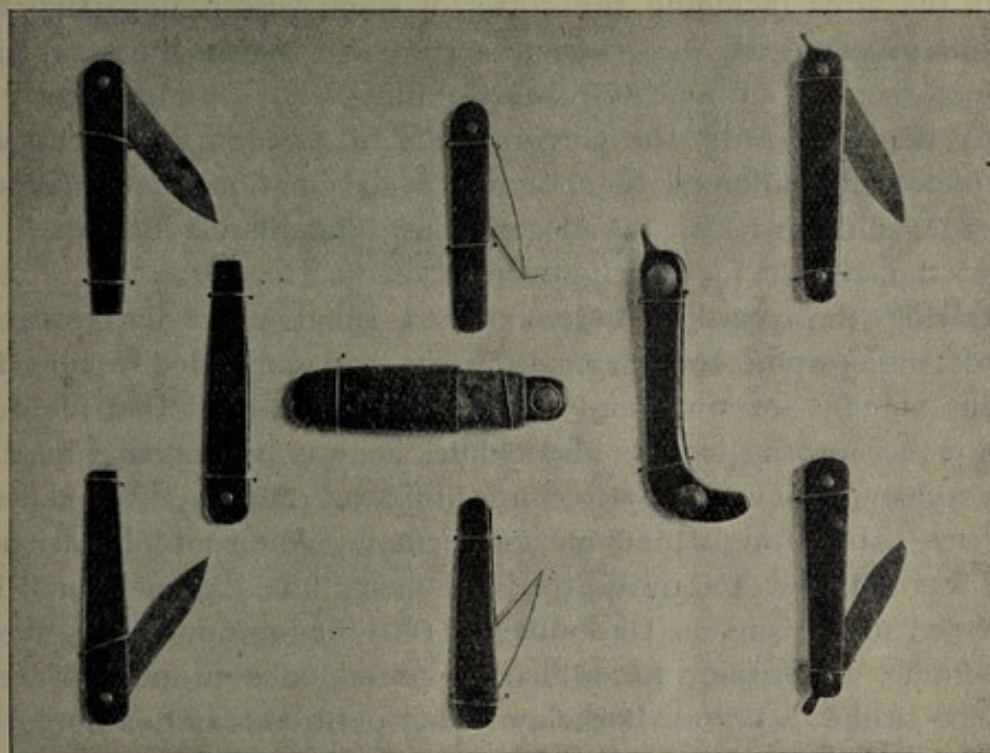
released several Englishmen who had been taken prisoners of war. In France, where a Dr. Wickman remained a prisoner, Jenner was applied to by one of his friends to present a petition to Napoleon soliciting the doctor's liberation. He goodnaturedly undertook the task and drew up a petition to the Emperor just at the time when he was exhibiting his greatest animosity towards Britain. The petition was forwarded, and it so happened it was handed to him when he was seated in his carriage together with the Empress Josephine waiting for their horses to be changed. Glancing at it, he exclaimed to the coachman "Away! Away!" but the Empress examining the paper said: — "But stay, you see from whom this comes. Jenner!" Napoleon's manner is said to have immediately changed, and he replied, "What that man asks is not to be refused", and so Dr. Wickham obtained his release. Napoleon liberated several other persons and sometimes whole families from time to time, at Jenner's request, and it is said he never refused a petition sent to him by the discoverer of vaccination, whom he held in high esteem.

The success of vaccination in the French army led Napoleon later on to issue a decree that 10,000 francs should be placed at the disposal of the Minister of the Interior for the propagation of vaccination.

Directly Jenner's discovery was known in India, intense anxiety was shown to obtain virus to carry out vaccination in that country, where smallpox was so prevalent, and where its effects had been so deadly. The difficulty was in forwarding the vaccine such a great distance in those days, so that it could reach its destination in an active condition. Trials were made of various methods. Threads dipped in the virus were enclosed between glass plates, linen was impregnated, lancets of silver, steel, gold ¹), and ivory were tried in turn, and after a series of trials, ivory was found to be the best in all respects for transporting the vaccine. On ivory lancets, therefore, it was

1) Jenner alludes to the gold bladed lancets for the transmission of the lymph in a letter from Berkeley on December 7, 1803, as follows: —

"Pray request him (Mr. Fewster) to send me on the point of two or three toothpicks or on the gold lancet I enclose, a little of the vaccine matter he is now using, which I believe is from my original stock".



"Lancets used by Dr. Edward Jenner for vaccination".

first despatched from Breslau to Moscow, and other prepared lancets of silver, silver-gilt and ivory, also lint impregnated with vaccine enclosed between pieces of glass, then coated with wax, were conveyed across the Bosphorus, through the Desert to the banks of the Tigris, where they were received on March 31, 1802. They were then forwarded by Dr. Short who received them there, to Mr. Milne, surgeon to the British Consul at Bassora or Basra. On June 17th he successfully vaccinated 40 persons with the virus including the crews of some vessels departing for Bombay. Thus it was carried across the ocean by man, and before the end of June it reached India.

In the year 1803, the Governments of Sweden and Denmark so effectually enforced the practice of vaccination, that smallpox became unknown in these countries, and they remained free from the disease for nearly twenty years.

During the years that Jenner had spent upon his research work on cowpox and vaccination, he had expended a considerable amount of time and money, with the result that his own affairs became neglected. Meanwhile, he was hoping that his discovery might eventually recoup him and be made a financial success. His straightened means becoming known to his friends he was advised to apply to Parliament for a grant which he decided to do, and on December 9, 1801, he journeyed to London to frame a petition, for which he obtained a promise of assistance from Admiral Berkeley. The petition came before the House of Commons in the March of the following year, and was presented on the following grounds:—

First, that Jenner had discovered that cowpox was inoculable from cow to man,

Secondly, that persons so inoculated were for life perfectly secure from smallpox.

Jenner further claimed that he had not made a secret of his discovery, that the progress of smallpox had already been checked, and that he had been put to much expense and anxiety.

The matter was referred to a Committee, and in June 1802, a report was laid before the House of Commons, which ultimately granted £ 10,000 to Jenner, and he returned to his country home at Berkeley.

Shortly after this, some of Jenner's leading supporters in London endeavoured to form a Jennerian Institution for promoting universal vaccination. The idea was taken up with enthusiasm, and the Queen became the Patron, and King George III granted permission for the society to be called "The Royal Jennerian Society for the Termination of the Smallpox". An influential Board of Directors, together with a Medical Council were appointed, Jenner was elected the first President, and Dr. John Walker appointed Resident Vaccinator.

Thirteen vaccinating stations were opened in London, and in eighteen months, it was announced that 12,288 inoculations had taken place, and 19,352 charges of cowpox virus had been supplied to different parts of the British Empire and foreign countries.

Although this institution was most successful at first, in six years its popularity seemed to wane owing to friction among the staff. In the end, Jenner came to a disagreement with the chief vaccinator, who resigned his office, and in 1808 the Society practically collapsed.

Jenner's name being now well-known and established, he decided to leave the country and to commence practice in London. He took a house in Hertford Street in the West End of London, but soon found out, however, that being celebrated as a discoverer did not mean that he would make a successful medical practitioner, and he was disappointed in the results. So after a few years trial, he gave it up, and returned to his native village.

In a letter he wrote to his friend a few years after his residence in London, he says:

"I have now completely made up my mind with respect to London. I have done with it, and have again commenced the village doctor. I found my purse not equal to the sinking of the £ 1000 annually (which has actually been the case for several successive years) nor the gratitude of the public deserving of such a sacrifice. You heard, after what I have done, the toils I have gone through, and the anxieties I have endured in obtaining for the world a greater gift than man has ever bestowed on them before (excuse this burst of egotism) to be thrown by with a bare remuneration of my expenses."

About this time, failures of vaccination multiplied considerably, and some of Jenner's best friends began to lose confidence. His time at Berkeley was largely taken up in replying to correspondence and endeavouring to account for the numerous failures reported. He had always been aware that smallpox could occur after vaccination, but that if it did occur, he believed that the vaccination could not have been properly performed. He still continued to vaccinate all the poor who applied to him on certain days, so he had sometimes as many as 300 persons waiting at his door.

Owing to the frequent complaints that reached Jenner of persons practising vaccination who did not implicitly follow his directions, and thus failing through ignorance, on July 1st, 1801, he published a statement in which he laid down what he called the "Golden Rule", which he hoped would tend to make practitioners more careful in their practice.

He declaimed against allowing an unlimited time for taking the vaccine virus from the pustule, maintaining that this ought to be done at an early period of its formation and before the appearance of the areola. He also insisted on the rule that when the pustule was excited, it should be permitted to go through all its stages in an uninterrupted manner. If any deviation appeared in its progress, he always forbade the employment of virus from such a pustule for further inoculations. Jenner's method of vaccinating was based almost exactly on the earlier practice of inoculation, the cowpox matter being inserted under the skin of the arm by a lancet point. Notwithstanding the success and support that his discovery was now receiving in all parts of the world, there were still many prejudiced against it who opposed the practice, and demonstrations, caricatures and broadsides were published by the anti-vaccinators. Some of the theories put forward against vaccination were of the most absurd description. People actually alleged that those inoculated with cowpox might assume "the bovine features of the animals themselves." Another anti-vaccinist records in a pamphlet the story of a lady, who complained, that since her daughter was inoculated, she "coughed like a cow," and "had grown hairy all over her body." Others declared that inoculation with cowpox had been discontinued in

some parts of the country because those who had been inoculated in that manner "bellowed like bulls." It was stigmatised by others as the "damnest thing ever proposed" and the "most degrading relapse of philosophy that ever disgraced the civilised world." Pictures, coloured prints and pamphlets ridiculing vaccination were published in Great Britain and France, but notwithstanding all opposition the propaganda made steady progress and soon every country vied with another in honouring its discoverer. Jenner was elected a member of nearly all the leading scientific societies in Europe, and presented with the Freedom of the cities of London, Dublin, Edinburgh and Glasgow. The Medical Society of London conferred on him a gold medal at their Anniversary Festival when Dr. Lettsom who was then President, delivered an oration on vaccination.

In July 1806, the subject was again brought before the British House of Commons, and the question was raised whether a sufficient reward had been bestowed on the original discoverer of vaccine inoculation. The matter was referred to the Royal College of Physicians, who after conferring with other medical faculties in Scotland and Ireland, reported in favour of a further grant being made to Edward Jenner, with the result that it was agreed to award him £ 20,000.

Jenner, who was in London at the time, awaited with anxiety the result of the debate, and the relief to his mind was incalculable. He conveyed the news to his sister, Mrs. Black, in the following letter,

"Pray excuse this shabby bit of paper which I catch up to tell you that Parliament last night voted me the sum of £ 20,000 for making public my Vaccine Discovery. The debate continued two hours and a half, during which much eloquence was displayed by Lord H. Pettey, Mr. Wilberforce, Mr. Windham, Mr. Whitbread, Mr. Smith and others.

Truly yours,

E. JENNER.

All going on well here.

The Government having decided to support vaccination, thought the time had now come to found an establishment to revive and carry on the work of the Royal Jennerian Institution, and Jenner was asked to draw up a plan to prepare an estimate of the cost. The illness of his son necessitated his return to Berkeley, which interrupted this scheme, but the warrant for instituting a National Vaccine Establishment was obtained in his absence, and he was appointed Director.

Unfortunately, dissent again crept in at the outset, which ended in Jenner's resignation of the post, although he continued to give the institution the benefit of his advice when it was needed.

In moments of relaxation from his cares and responsibilities, Jenner occasionally wrote some verse for the amusement of his friends. He had a keen sense of humour, and the following lines written by him reflect the geniality of his character. They are entitled:

MY SPANISH CIGAR.

Soother of my anxious hours,
 Parent of a thousand pleasures
 With gratitude, I own thy powers
 And place thee mongst my choicest treasures.

Soft tipt art thou with glow-worm light,
 Ah! on thee rather would I gaze,
 Than on the ruby blushing bright
 Or the rare diamond's mimic blaze.

Thou can'st the keenest pangs alarm
 That care obtrudes upon my heart
 At thy command — my little charm!
 Quick from my bosom they depart.

In 1810, many domestic trials came upon him. Among these the death of his son distressed him very deeply, and materially affected his health. He went to Bath to endeavour to recruit it, and on his return was called upon to attend the Earl of Berkeley who had been taken ill, and he visited him up to the time of his death.

The following year he suffered another bereavement in the

loss of his sister, which was also a great grief to him. On May 26th of the same year, while he was staying in London, he was summoned to attend the Hon. Robert Grosvenor, who had developed a serious attack of smallpox. He had been vaccinated by Jenner ten years previously. The onset of the disease was very rapid, and in four days he became worse, and serious symptoms manifested themselves. He was attended by Sir Henry Hallford, one of the most famous physicians of his time, Sir Walter Farquhar and Jenner, and although a fatal termination of the case was regarded as inevitable, he eventually recovered. The publicity given to the matter unfortunately served to revive the agitation against vaccination and caused quite a panic among those who had had their children vaccinated. A fresh burst of criticism, together with a summons to give evidence before the House of Lords in connection with the Berkeley Peerage, seems to have greatly unnerved Jenner and aged him considerably. In 1814, he visited London for the last time, when he was presented to the Allied sovereigns, and the Emperor of Russia then on visit to England.

The following year he received another blow in the loss of his wife, who died after a long illness. Stricken with grief, Jenner retired to Berkeley, which he did not leave again — except for a day or two — until his death on January 26th, 1823. He wrote in last letter to his friend as follows:

“I have had an attack from a quarter I did not expect the “Edinburgh Review”. These people understand literature better than physick, but it will do incalculable mischief. I put it down at 100,000 deaths at least. Never was I involved in so many perplexities”.

His sensitive nature was shaken by the attacks constantly made upon him, and his life's work. The day following this letter, he retired to rest, apparently in his usual health, and the next morning rose and came down to his library, where he was stricken with an attack of apoplexy, and paralysis of the right side while sitting in his favourite chair. He never rallied, and died the following morning on January 26th, 1823. He was laid to rest in the family vault in Berkeley Church, Gloucestershire, in the village of his birth, on February 3, 1823.

The simplicity of Jenner's character and his dislike of osten-



„Chantry Cottage, Berkeley, where Dr. Edward Jenner lived and died“.

tation and flattery is shown in the wish recorded by him in a letter that the inscription on any memorial erected to him after his death should read:

"In Memory of Edward Jenner. L. L. D. F. R. C. S. etc.
who was born May 17, 1749, and died. . . ."

Not a word more.

In attempting to estimate Jenner's great achievement, it should be remembered that his discovery did not so much lie in the fact that persons who had been infected with cowpox escaped variolae, but that the matter taken from a human being suffering from cowpox had the power of protecting another individual from that disease. The lives that his discovery has been instrumental in saving form the most eloquent tribute to his memory, and the principles that he so strenuously advocated and established still remain the one efficient means of protection against one of the most dreadful diseases that afflict mankind.

The value of Jenner's great discovery has not yet reached its full limit. The principle of vaccination which he first exploited against smallpox, has been closely followed by later investigators in the prevention of other diseases.

Thus Pasteur was eventually led to his discovery of a vaccine to protect animals against anthrax which culminated in the greater achievement of his anti-hydrophobic serum.

The vaccination of soldiers in the British army against typhoid fever during the recent Great War proved of the greatest value, and comparatively few [suffered from the disease after the inoculation. It would further appear from recent research work by Raw in the treatment of tuberculosis, that again the principle of vaccination is likely to be followed with success.

These brilliant discoveries since made in the field of preventive medicine have added still greater lustre to the fame of Edward Jenner, who will ever be remembered as among the greatest benefactors of mankind.

So we must concede that in his great work towards the close of the 18th century, he laid the foundation of an epoch in medicine, which is hardly less important than that of Pasteur and Lister, with whose names that of Jenner will for ever be linked.

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