On the history and pathology of vaccination. A review / E.M. Crookshank.

PROFESSOR E. M. CROOKSHANK

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The Committee of the London Society for the Abolition of Compulsory Vaccination, recognizing the great value and extreme importance of Professor Crookshank's recent work on "The History and Pathology of Vaccination," have desired to give, in an accessible form, such an account of its contents as should stimulate the reader to the perusal of the work itself. The following pages, abridged from the review which appeared in the "Vaccination Inquirer," are the result.

Professor Crookshank on Vaccination.*

I.

It is difficult to do justice to, and impossible to over-estimate, the importance of this work. In simple amount of labour involved it stands in our controversy, though not quite, yet almost, alone. In knowledge it is second to none, and in the unsparing nature and the uncompromising expression of its conclusions it is abreast of any. Nothing has come amiss to the passion for research developed by the learned Professor when once he was fairly started on the investigation of vaccine. Nor is the reticence which has characterized the preparation of the work the least extraordinary part of its history. The materials must for many months past have been in course of collection which were to justify such a conclusion as that (Vol. i. page 464)—

"Inoculation of cowpox does not have the least effect in affording immunity from the analogous disease in man, syphilis; and neither do cowpox, horsepox, sheeppox, cattle-plague, or any other radically dissimilar disease, exercise any specific protective power against human smallpox."

Yet all this time no sign was given to the public. Rumours reached us, it is true, that all was not well between the Professor and the Departments; but beyond this the public had nothing to go on, and it is an absolute and dead silence that has now been broken with a smashing denunciation of vaccination and all its

* History and Pathology of Vaccination. By Edgar M. Crookshank, M.B., Professor of Comparative Pathology in King's College, London. 2 vols. London: H. K. Lewis. 36s.

works. It reminds us of nothing so much as of the collection by Samuel Butler, during the ascendancy of the Parliamentary party, of the materials for his immortal satire of "Hudibras." Professor Crookshank has had a narrow escape of being an official himself. He has made reports for the Agricultural Department of the Privy Council, and has been brought into much contact with officials of the Local Government Board. Yet all the while he was the "chiel amang 'em taking notes"; and now here are the notes in print.

The history and development of such a book are themselves well worth considering. We showed on a former occasion that, as a very eminent and perfectly orthodox scientist, an author of a recognized treatise on "Bacteriology," a microbist, and a subscriber to the Pasteur fund, he could hardly have any particular leaning our way, and that therefore it was certainly from no bias in our direction that we could gain the ultimate concurrence of Professor Crookshank. The starting-place is very simple:—The book arose out of a strong and genuine and fearless *desire to know*. Desiring to know and finding none who could enlighten, there was nothing for it but independent research; and then, of course, the end of all things vaccinal was bound to follow, as the night the day. Professor Crookshank thus gives his own account of the process of his mind's development on the subject:—

"I had devoted myself for some time to pathological researches in connection with the communicable diseases of man and the lower animals, when the discovery of an outbreak of cowpox, in 1887, led me to investigate the history and pathology of this affection. At that time I accepted and taught the doctrines, in reference to this disease, which are commonly held by the profession, and are described in the text-books of medicine.

"In endeavouring to discover the origin of this outbreak, it was proved beyond question that the cows had not been infected by milkers suffering from smallpox.

"While attending at the National Vaccine Establishment of the Local Government Board I was unable to obtain any exact details, clinical or pathological, of the source of the lymph which was employed there. From my experience of this and other vaccination stations, I found that both official and unofficial vaccinators were completely occupied with the technique of vaccination, to the exclusion of any precise knowledge of the history and pathology of the diseases from which their lymph-stocks had been obtained.

"I gradually became so deeply impressed with the small amount of knowledge possessed by practitioners, concerning cowpox and other sources of vaccine lymph, and with the conflicting teachings and opinions of leading authorities, in both the medical and veterinary professions, that I determined to investigate the subject for myself."

The result is indicated in the title of the work. Hunting with tireless energy, and doubtless at great expense, among the antiquarian booksellers of London and Paris, the whole history of vaccination was traced anew, and the conclusions of White and Creighton amply confirmed. Inoculation, the precursor of vaccination, did not escape a renewed questioning, and, on the whole, comes well out of the ordeal, Professor Crookshank thinking that it has at all events a scientific basis, and being even willing, in certain few cases of exceptional exposure, such as nurses in smallpox hospitals, and under exceptional precautions, to advise the renewal of the practice. But for vaccine science has no plea to urge. Whatever cowpox may be, it is certainly not smallpox, and hence its alleged prophylaxy against that disease is destitute of scientific sanction. And worse than that, whatever *vaccinia* may be, *vaccine* is certainly many things. Hence the vaccine vesicle is not specific. The Professor seems to have soon found himself surrounded—crowded out—with various vaccines. He tells us of smallpox as a source of vaccine lymph, of cattle-plague as a source of vaccine lymph, of sheep smallpox as a source of vaccine lymph, of goatpox, of cowpox, of grease, of horsepox, all as sources of "vaccine lymph." And stating all these divergencies, and dissecting them with merciless criticism in his first volume, he secures his route against attacks from behind by reprinting in his second volume a copious selection from the original writings of each successive time, so that he is able to give chapter and verse for every statement made, and the grounds of every conclusion. Thus it comes to pass that we have in this work a new assertion and most elaborate support of the following main propositions, wherein we have endeavoured to summarize, in our own words, the teaching of the work as a whole :—

1. That the original legend of the safety of the cowpoxed as against attacks of smallpox was comparatively modern at the time when it attracted Jenner's attention,

and was due to the cowpoxed having on certain occasions shown themselves proof against, not the natural invasion of smallpox, but its artificial inoculation ; and that even this small immunity was by no means universal among them.

2. That Jenner was by no means the first to notice this theory of the dairymaids, and not even the first to artificially communicate cowpox to the human subject with a view to prophylaxy against smallpox ; having, in fact, been forestalled by Jesty and several others.

3. That, regarded as a specific against smallpox, vaccination was historically a failure from the beginning, and pathologically can never, in the nature of things, be aught else to the end.

4. That the connection now alleged between smallpox and cowpox is not that which was alleged by Jenner. Jenner held that smallpox in man and cowpox in the cow had a common origin in the grease of the horse ; whereas the fashionable theory among the modern cowpoxers is that cowpox and smallpox are identical.

5. That neither the original theory of Jenner nor its amended modern form can hold water, the actual pathological relationship between the two diseases being really *nil*.

6. That the so-called "variolous test" was ambiguous from the beginning, its authority, so far as it had any, being due to Woodville's experiments coupled with the wide diffusion of the Woodville lymph, said lymph being not "vaccine" lymph, even in any of the many modifications of which "vaccine" is capable, but thorough-going smallpox lymph.

7. That mitigation of smallpox by vaccine there never was and never can be. The idea of it originated as a counsel of despair at the bedside of the Hon. Robert Grosvenor, who did not *quite* die of smallpox, though he came as near it as he knew how, just ten years after having been vaccinated by Jenner himself.

These propositions are by themselves a formidable indictment to urge against a state-endowed and state-enforced practice. Yet is there no shrinking and no

hesitation in insisting on all the matter they contain, which we find summed up in this concise and incisive form :—

"As the result of an investigation into the history, and especially the pathology of 'vaccination,' I feel convinced that the profession has been misled by Jenner, Baron, the Reports of the National Vaccine Establishment, and by a want of knowledge concerning the nature of cowpox, horsepox, and other sources of 'vaccine lymph.' Though in this country vaccine lymph is generally taken to mean the virus of cowpox, yet the pathology of the disease and its nature and affinities have not been made the subject of practical study for nearly half a century. We have submitted instead to purely theoretical teaching, and have been led to regard *vaccination* as inoculation of the human subject with the virus of *a benign disease of the cow*, whereas the viruses in use have been derived from several distinct and severe diseases in different animals."

The second volume of this remarkable work enables all who may be so minded to trace from the commencement the history of vaccination, as that history is recorded in works of great value, and not less inaccessibility. Sir John Simon is fond of urging other people to study "that masterpiece of medical induction," Jenner's *Inquiry;* and here Sir John may find a much-needed opportunity of taking his own advice for consumption on his own premises. For the volume leads off with a reprint of Jenner's *Inquiry* in full, with the addition of a most valuable set of foot-notes. These notes show the differences between the text of the *Inquiry* as finally printed and the original form in which the paper was written for and rejected by the Royal Society. The writings of Pearson and Woodville are next requisitioned into the volume, and thus we can judge for ourselves as to the merits of the spontaneous cowpox, and get behind the north wind in the matter of the Variolous Test. A great literary prize has been secured by Professor Crookshank in a copy, here reproduced, of "A Conscious View of Circumstances and Proceedings respecting Vaccine Inoculation," an anonymous but most able production, printed in 1800, and which may fairly claim to be the father of anti-vaccination works. Following on this we have the remaining works published by Jenner himself, the letter of John Birch on the many failures of cowpox, an attack by which Jenner and his doctrine were all but defeated : M.

Bousquet on the Passy Cow; John Badcock's original pamphlet; the chief works of Mr. Ceely; the vastly important contribution of M. Auzias-Turenne on small-pox and cowpox, wherein some of Dr. Creighton's conclusions are foreshadowed; Professor Crookshank's own account of the outbreak of cowpox in Wiltshire; and many other most valuable reprints. The selection is by itself enough to show that it is by a comprehensive study of both sides of the question in the literature of Europe, and from its earliest commencement to the present time, that Professor Crookshank has arrived at the conclusions we have indicated above. It is no mere tyro who "dabs at some things, carps at others, and flounders in all," but a highly trained mind, acting on elaborate investigation, in a field of which its possession is recognized and authoritative, that has come once more to the conclusion that vaccination is futile.

Here, then, is the irony of the situation. In virtue of every authority that medical monopoly can confer, Professor Crookshank is entitled to teach; yet to accept his instruction is a crime. The medical profession has duly licensed him to give his advice, and proceeds to prosecute all who take it. And men are to be fined and imprisoned, nursing mothers to be locked up in stone cells on bread and water diet, honest citizens with a record blameless before the law are to be sent to herd with criminals, because they agree with Professor Crookshank, or at all events hold that he has made out a case which to them is unanswerable. Can the force of legislative folly further go?

II.

When we turn from the general survey which we gave above of the conclusions at which Professor Crookshank arrives, and allow ourselves to examine more in detail the process by which those conclusions are reached, we are at once struck with the thorough completeness of the methods employed. In his every aspect Edward Jenner is taken as a subject for the minutest dissection.

His every footstep down the path of time is dogged with steady pertinacity; every legend, every tradition tending to exalt him into saint or hero is tracked and overtaken and made to stand and deliver whatsoever truth it contains with tireless and passionless precision. As a consequence, Professor Crookshank, like an invading army, leaves ruin and desolation behind him. His path is strewn with the wrecks of the fables he has exploded and the blunders he has exposed. And very early in the legendary life of Jenner does the process begin. The first and most unmitigated piece of fairy lore is the ridiculous fable that Simon has evolved out of a piece of rant by Baron, and handed on to a wondering world in the words:—

"Thirty years elapsed before the fruit was borne to the public; but incessantly he thought and watched and experimented on the subject."

On which our only comment need be that the whole thing is false. It is founded on a statement of Baron's, that whilst Jenner was yet a youth, his attention was riveted by a dairymaid's expression of her faith in cowpox as ensuring her against smallpox. As against this wild assertion, Professor Crookshank gives an admirably clear statement of both the positive and the negative rebutting evidence. Fosbrooke, who as a biographer of Jenner preceded Baron, and wrote in Jenner's own lifetime, makes no mention of the story, but does state that up to the year 1795 Jenner had time to indulge in his turn for poetry, because "he was not then burdened with the labours which vaccine has generated." As the *Inquiry* was published in 1798, this at once boils down the thirty years to three; and, so far as experiment goes, it is equally easy to show that the three years must be further reduced to three months, a point which Professor Crookshank does not insist upon. For the chronology of the earliest vaccinations stands thus:—

The first experiment—	
James Phipps (*Vaccinia*)	May, 1796.
The second experiment—	
John Baker (*Horse-grease*)	March, 1798.
Jenner's *Inquiry* published	June, 1798.

So much for the thirty years of thought and experiment. We wonder whether we have now heard the last of it.

But, rapid as this procedure was, is was all too slow for the thinker of thirty years. For in the latter part of 1796, or the beginning of 1797, the *Inquiry* had already taken shape, and had been presented to, and rejected by, the Royal Society. Of this paper, the original MS. has been discovered by Professor Crookshank in the College of Surgeons' Library. To that library it had been presented by Sir James Paget, and seems to have been considered of so much value by the authorities of that institution that it was allowed to lie about uncatalogued in a drawer. The discovery is of importance as showing that at the end of 1796 Jenner was prepared to advocate the substitution of vaccine for smallpox inoculation on the strength of *one experiment only !*

Nothing could be more clear and unhesitating than the account which Jenner gives of the origin of this lymph, which it is proposed to substitute for the old inoculation. The disease whence it is derived only arises because the milkers have been tending the heels of horses with the "grease," and so transferred the contagion on their hands. This disease is by no means a mild one, according to Jenner's account. On the contrary, he speaks of ulcerated sores which are very troublesome, and frequently become phagedenic, and commonly heal slowly. But, in spite of all, he is fully satisfied,—

"Without further research I should therefore not in the least hesitate to inoculate adults and children not very young with the matter of cowpox in preference to common variolous matter."

And then in this MS. he goes on to speak of the benefits of this "discovery." But some other hand, perhaps that of Woodville, has altered the word "discovery" into "investigation," and thus it stands in the published *Inquiry*. On this alteration Professor Crookshank makes the following pertinent critique :—

"I was struck by the substitution, in a different hand, of the word *investigation* for *discovery*. Some friendly critic had evidently read the manuscript and made this correction, among others. Had Jenner made a discovery, and, if so, what was it? He had not discovered that cowpox produced an immunity from smallpox; for,

assuming such to be the case, it was the discovery of the dairy-maids. He had not discovered that cowpox could be intentionally communicated from cow to man, for this had been practised by Jesty and others. He was not the first to employ the test of variolous inoculation after cowpox, for this had been performed upon Mrs. Jesty; and, as for the test of exposure to infection, this had been carried out repeatedly. The correction of his critic was therefore fully justified. Jenner had made no discovery, but he had carried out an investigation from which he was led to observe a similarity between inoculated cowpox and inoculated smallpox, and to express a belief in the origin of cowpox and smallpox and many other diseases, from horse-grease. Apart from these speculations, a Dorsetshire surgeon had done almost as much as Jenner. Both had proposed to introduce cowpox inoculation as a substitute for smallpox inoculation, for which the surgeon was threatened with the loss of his practice and Jenner with the loss of such scientific credit as he had hitherto possessed." (Vol. I, p. 264.)

The next piece of legendary lore which the Professor exposes is the variolous test as applied to the Woodville lymph. There can be no doubt that, in the year 1799, both Pearson and Woodville did get hold of the genuine "spontaneous cowpox"—Woodville from Gray's Inn-lane, and Pearson from New-road, Paddington. But the crucial point is to follow; with this lymph they experimented *at the smallpox hospital*. And very great at first their success appeared; so much so that Jenner was at length induced to come up to London by the solicitations of his nephew, who was much alarmed lest his uncle's pre-eminence in matters vaccinal should be lost. Meantime something had gone wrong with the Woodville contagium, for Jenner no sooner arrived in London than he was met with Woodville's assertion that one of his patients had taken the cowpox *by effluvia*, and had it *in the confluent way!*. And soon after, when Woodville published his reports, he described cowpox as an eruptive disease of great severity, causing appreciable danger, and one case having terminated fatally. Clearly, then, there was something wrong, and the question, "What was the matter with the Woodville lymph?" is one of the most important in the whole history of vaccine. The matter was that cowpox and smallpox had somehow got inextricably mixed up, and those who had this severe eruptive disease, this "cowpox in the confluent way," had clearly been infected with smallpox. Hence at once the severity of their sufferings and their

immunity under the variolous tests. A severity (due to smallpox) which, according to Baron, nearly ruined vaccination, procured for them an immunity (due also to smallpox) under the variolous test which appeared conclusive to many hitherto hesitating minds, and gave to vaccination just what it wanted most, a few months' start of the truth. And from that day, and ever since, truth has been hobbling after it the wide world over, lame but tireless, and bound to run it to its earth at last. How the two contagia came to be mixed or confounded may well be a subject of dispute. Did the persons who came to be vaccinated to this smallpox hospital catch smallpox in the ordinary way, and so have it, as it were, superimposed upon the vaccine contagium? or were the two contagia mixed *ab initio* by the use of dirty or contaminated lancets? On this point our author does not seem to express any very positive opinion, nor is the point of very great importance. The main thing to remember is that, so far as the variolous test was really applied to the Woodville cases, it was wholly vitiated by the concurrent presence of smallpox contagion. And thus it comes to pass that the same energy wherewith Pearson disseminated this virus all over England, and to many parts of the Continent, was employed in spreading no less widely the fallacies with which it was inextricably blended.

The theory of "Spurious vaccination" is another Jennerian product into whose origin our author elaborately examines, though here little is added, because little remained to add, to the account of it given by Mr. White in his "Story of a Great Delusion." The stages of its evolution were these:—Jenner knew, none better, that the simple faith of the dairymaids would not hold water, since cases were not rare of smallpox after cowpox. But this he got over by discrimination between a true (and protective) and a spurious (non-protective) cowpox. And when, further, even some who had certainly had the true cowpox yet took the smallpox, a further discrimination came to the rescue, and it was declared that the same disease might at different periods be now the true and now the spurious cowpox, so far as prophylaxy wes concerned. Hence all failures could be

accounted for. Did a man take smallpox after cowpox? Then he must have had either the wrong disease to start with, or the right disease taken at the wrong time. To such an argument no direct answer is possible; and on it Jenner lived, and by it he baffled his enemies through the remainder of his lamentable, shuffling, contemptible existence. The rest of the tale Professor Crookshank tells much as it had been told before. How Birch attacked Jenner, and was by Jenner evaded, and how Jenner rose to fame and fortune at the expense of a deluded nation, which, with an infatuation unparalleled in the history of credulity, was rewarding the man at the very time when his failures were written in glaring characters over the whole face of the land, are here well and fully narrated; and, though they are no longer new, we look to the status of the learned Professor to get them read in new quarters, with much result of new enlightenment. Concerning Birch, we regret that his pamphlet, "Serious Reasons for Uniformly Objecting to the Practice of Vaccination," should have been interpolated into the first volume, where it makes the narrative drag, instead of being, as we venture to think it should have been, printed along with the other reprints in the second volume.

So far we have accompanied the Professor in his examination of the life and actions of Jenner, and a larger field remains when we turn to the detailed and exhaustive criticism to which he subjects his published works. On the rejection of his paper by the Royal Society, Jenner determined to publish his investigation in pamphlet form on his own responsibility. But first, to strengthen his position, he waited long for the recurrence of cowpox to give him opportunity for further experiment. No such chance occurred, however, till the spring of 1798, and then at last a mare in the neighbourhood took compassion on the difficulty he was in, and kindly provided him with his heart's desire, in the shape of a pair of greasy heels. From these heels Thomas Virgoe and some other farm servants were infected, and in their turn passed on the complaint to the cows on the farm. Here, then, was a chance for Jenner. He could inoculate one child direct from the

hands of Virgoe with humanized grease, and another child from an infected cow with bovinized grease, and see what came of it. Death came of it. The selected children were respectively John Baker for the humanized, and William Summers for the bovinized variety. Jenner of course meant, on their recovery, to inoculate them both with smallpox, but this was rendered impossible by the illness and ultimate death of Baker. And on this point, odd as it may seem that we should have anything to say on his behalf, we cannot but think that an injustice is done to Jenner when he is accused of "suppressing," in the *Inquiry*, the fact of Baker's death. The truth is, we think, that Jenner was in too much of a hurry to allow him to know anything of the fatal termination of Baker's illness in time for inclusion in that work. Baker was operated on on March 16, and the *Inquiry* was published on June 21, so that at at the time when it was passing through the press the boy may have been ill, and still his death may have occurred too late to find a record in that book. That the death is frankly admitted in the *Further Observations*, when Jenner might have held his tongue, does not seem to us to point to any very special deceit in this particular matter. Hence the words of the *Inquiry* respecting Baker's inoculation—

"This would now have been effected, but the boy was rendered unfit for inoculation from having felt the effects of an infectious fever in a workhouse soon after this experiment was made"—

may, we think, have been written, and even printed, whilst the boy was ill indeed, but not yet dead. Jenner's record is black enough, in all conscience, and we would not willingly make it any blacker than it is.

William Summers, who was the chosen recipient of the bovine variety of grease, quite recovered, and from him a stock of arm-to-arm inoculations was initiated, which seems, however, to have died out at the fourth remove.

Another leading fact brought out by the comparison of the unpublished with the published *Inquiry* is the care shown in the latter to whittle away the severity of the new inoculation. The means to this end are the assignment of all severe symptoms to accidental

irritation of the sores, and a modification of those phrases which seem to indicate severity of the illness as described in the first paper. And another matter on which Professor Crookshank is justly emphatic is the gradual though rapid growth of the doctrine of spurious cowpox.

"I wish to insist upon the gradual assumption of the existence of a spurious cowpox. The farmers and cow doctors knew nothing of this spurious cowpox. Jenner was alone responsible for assuming the existence of two kinds of cowpox, a true and a spurious. And this assumption was extended in *Further Observations* to include not one, but several kinds of so-called spurious cowpox."

The growth of this device, for we can call it by no milder name, is fully traced by our author from its first hesitating appearance in the *Inquiry* to the completed form of it in the *Origin of the Vaccine Inoculation* where we find Jenner laying it down, without reason given or ground assigned :—

"I now discovered that the virus of cowpox was liable to undergo progressive changes, from the same causes precisely as those of smallpox, and that when it was applied to the human skin in its degenerated state it would produce the ulcerative effects in as great a degree as when it was not decomposed, and sometimes far greater; but having lost its *specific properties*, it was incapable of producing that change upon the human frame which is requisite to render it unsusceptible of the variolous contagion; so that it became evident a person might milk a cow one day, and, having caught the disease, be for ever secure; while another person, milking the same cow next day, might feel the influence of the virus in such a way as to produce a sore or sores, and in consequence of this might experience an indisposition to a considerable extent, yet, as has been observed, the specific quality being lost, the constitution would receive no peculiar impression."

Never was logical booby-trap more cunningly contrived and baited; never was bait more eagerly swallowed by five-and-twenty million people, mostly blockheads. Disingenuous as the work as a whole was, however, it contained Jenner's one discovery. He had really found out the communicability of horse-pox from arm to arm, and this is the one thing at once new and true to be found from cover to cover of the famous "masterpiece of medical induction." The work is thus summed up and has sentence pronounced on it by our author in terms of great but just severity :—

" The cases are carelessly jumbled together; important details are often missing; dates are omitted; facts unfavourable to the project are suppressed; and excuses for failures are ingeniously incorporated. All that the *Inquiry* contained was known to dairymaids and farriers, with the exception of the doctrine of spurious cowpox and certain speculative comments. All that was added experimentally, to what had been previously practised, was the inoculation of horsepox from arm to arm, an imitation of arm-to-arm variolation. Up to the year 1796, Jenner had simply collected notes of a few cases of milkers and others, who had had either horsepox or cowpox and had resisted inoculation with smallpox, and Fosbrooke tells us that up to this date he was not burdened with work. In the same year he made one experiment of inoculation on the human subject, and hurriedly wrote a paper which was rejected by the Royal Society. Two years later he carried on a series of arm-to-arm inoculations, and then published the *Inquiry* on his own account. These are the dry facts of the case.

From the consideration of Jenner's works, Professor Crookshank passes to the subject of the various sources of vaccine lymph. And a long and very formidable list do we find of these sources. Human smallpox, cattle-plague, sheep smallpox, goatpox, cowpox, and grease, are all passed in detailed review, and a very awkward squad do they make for anyone who wants to construct or defend a rational theory of vaccine-prophylaxy. Commencing with the human smallpox, it is first noticed that different varieties of this complaint were always known. And the inoculators well knew that by cultivation from the milder kinds a result could be obtained, so mild in itself, and so free from general eruption, and so closely resembling a vaccine vesicle, that it was often hard to persuade the patient that vaccination had not in reality been substituted for inoculation, a substitution, be it observed, which at that time would have been looked on as little short of a fraud. Hence, it stood proven that, by suitable cultivation, a true Jennerian vesicle could be obtained from the inoculation of human smallpox on the human subject, without the intervention of any other animal. But this experience being apparently forgotten, every effort was made to variolate the cow; and Ceely and Badcock in England, and other observers in other parts of the world, were more or less successful. Smallpox lymph, therefore, was clearly proven to be one of the acrid

fluids from whose inoculation can be raised a so-called vaccine vesicle. But here a difficulty seems to arise, with which we cannot think our author quite successfully grapples. For lymph so raised was found sometimes to communicate undoubted smallpox, even occasionally starting an epidemic of that disease with fatal cases; and yet on the other hand, it sometimes, as in the case of the Badcock stock, produced no markedly variolous effects. Our author accounts for this by the supposition that all the lymph products are alike variolous, and that the difference of result is simply a question of the stage of cultivation; that the non-eruptive lymph of Badcock has simply been "drawn milder," as it were, than the lymph which was the source of the disasters experienced by Chauveau. But this seems to us to be a too rigid adherence to absolute specificity. We can see no reason in logic why the product lymph should be so certainly held identical in the two cases. In the one case, it seems to us that smallpox may have been simply lodged, so to speak, in the skin of the cow, and taken out again without practical alteration; just as you might put it into your pocket and take it out again. In the other case the smallpox lymph has raised a vesicle which is simply a product of a non-specific irritant, which vesicle, though it contains vaccine, certainly contains neither cowpox nor smallpox, any more than it contains sheeppox or goatpox, or, for the matter of that, "cigarpox."* And though it is of course with the utmost diffidence that we should suggest a point of pure pathology to so skilled an observer as our author, yet it does seem to us that the logic of the case will not be *solidaire* until every various origin of lymph is made to bear its share of witness to the utter non-specificity of the "vaccine" contagium.

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* "Let us suppose that the glowing end of a cigar is firmly applied to an infant's arm; an eschar and an indurated sore will result, which may be called cigarpox. Let the variolous test be now tried, and there is every reason to expect, assuming the lymphatic glands to be touched, that the result will be the same as after cowpox. Of course the experiment can never be made; but the cigarpox is in its pathology just as relevant to the smallpox as cowpox is."—Dr. Creighton, *Jenner and Vaccination*, p. 152.

III.

In Part I. of our notice of Professor Crookshank's work we quoted (page 7) from the concluding chapter of his first volume the remarkable summing-up :—" We have been led to regard vaccination as inoculation of the human subject with the virus of a benign disease of the cow, whereas the viruses in use have been derived from several distinct and severe diseases in different animals." We need not dilate on the gravity of such an indictment. To maintain it is not merely to " knock the bottom out of a grotesque superstition," but is to sweep away every remnant of the superstructure. Let us see how our author maintains so comprehensive an impeachment.

No less than six complete chapters (Chapters ix –xiv) are devoted to it, so that it cannot be said that the Professor in any way underrates the gravity of his task, or the need of full and elaborate defence of such a position. The sources of so-called " vaccine " which our author examines alike historically and critically, with a skill, a patience, and a wealth of knowledge to which no review can do justice, are six in number, viz., human smallpox, cattle-plague, sheep smallpox, goatpox, cowpox, and grease. From each and all of these vaccine lymph has been derived. " And why not ? " the unskilled reader may not unnaturally be inclined to ask. But a moment's consideration will show to what a hopeless wreck the demonstration of these facts cannot fail to reduce all vaccine theory. There might have been reason, though there never was truth, in the assertion that " the vaccinated are safe against smallpox because they have in fact had it." But what becomes of such a statement if it is to be altered into " The vaccinated are safe against smallpox because they have, in fact, had some one or more, but we do not know which, of a motley group of cattle-plague, goatpox, cowpox, grease " ? Yet this is precisely the pitiful case to which Professor Crookshank has reduced the vaccinal position.

First, it is clearly shown that human smallpox is perfectly capable of yielding a typical Jennerian vesicle

without the intervention of any other animal whatever. By inoculation of the mildest form of the disease, the swinepox or pigpox, called by Adams in 1807 the "pearl sort" of smallpox, the results of actual smallpox inoculation were reduced to a single vesicle, and that so closely resembling the vaccine vesicle that, as Adams declares, the parents of the children operated on mistook the one for the other, and were inclined to resent a deception in the supposed substitution of the vaccine for the variolous inoculation. Thus "vaccination" with human smallpox direct, *is* a possibility and *was* a fact. Another variety of the same thing appears in the lacto-varioline of Thiele, of Kasan, 1839. Here smallpox lymph was diluted with milk, and inoculation performed with the mixture. After ten removes the resulting vesicles became classically Jennerian, and it seems to have been by a simple perversity that this system of vaccination dropped out of sight and memory. But Jenner had surrounded the cow with too conspicuous a halo of sanctity for her to be thus easily deposed from her vaccinal supremacy. Something must be got from the cow to keep up the charm of the name and preserve for the process the benefits of the legend of the fortified dairymaids. So in 1830, Dr. Sonderland wrapped a cow in a blanket. The blanket had come off the bed of a smallpox patient, and Sonderland declared that in this way the disease had been communicated to the cow, and the udder had become affected with an eruption of pustules with the appearance of cowpox, and possessed of all its protective properties. And Dr. Thiele claimed to have successfully inoculated cows with variolous virus; and even before Thiele's results were published in England, Ceely had also succeeded in variolating the cow, and obtaining a Jennerian vesicle, from which children were inoculated. And in 1840 Mr. Badcock, of Brighton, was induced to try the same experiment by the fact that he had had a bad attack of smallpox after vaccination, and thence concluded that the lymph used in his case must have degenerated and required renewing. He was successful in thirty-seven out of 200 cows experimented upon, and his lymph was spread

far and near for the "vaccination" of children. But it must not be forgotten that that vaccination was not vaccination at all, but variolation. If proof be wanted it is not far to seek, for Dr. Martin, in America (1836), and Reiter of Munich (1839), both communicated smallpox, the first fatally, by attempting the Badcock process, and a similar fate awaited the repetition of the experiment at Berlin in 1847. The Lyons commission of 1864 had no better luck in experiments whose inception was due to the same reasoning. We have the authority of Chauveau himself that it was in deference to the gathering strength of the cry, "Notre vaccin a dégénéré, nos vaccinés prennent la petite vérole" (Our lymph has degenerated, our vaccinated patients are taking smallpox), that the experiments were undertaken wherein for process animals were variolated, and for result children were smallpoxed, and handed on smallpox by contagion. From this, and a mass of other evidence, our author comes to the conclusion that the doctrine of the identity of cowpox with smallpox, though adhered to with extraordinary tenacity, is utterly false.

Next as to cattle-plague. Here Baron, the biographer of Jenner, prejudiced and muddle-headed, is the central figure. Impressed with the belief that cowpox in the cow and smallpox in man, were, and must be shown to be, identical, he finds and describes a disease of the bovine species which does present many points of resemblance to human smallpox, confuses it with cowpox, with which it has nothing to do, and thence argues that cowpox and smallpox are the same disease. And in this muddle he secured the valuable support of Ceely, who was led to endorse the error by the simple fact that the rinderpest is transmissible to man by inoculation, and that, so inoculated, it does give rise to a "vaccine" vesicle. But a muddle it was nevertheless, and a fatal muddle it proved to be when it set forth on its travels and arrived in India. For in Bengal the cattle had long been subject to a malignant disease, Mhata or Gotee, and this disease Dr. Macpherson, in 1832, used for inoculation against smallpox. Of several native children inoculated by him only one was successful; but that one

suffered severely, and was "greatly reduced." And when Mr. Furnell followed suit in 1834, and similarly inoculated his own baby daughter, the result was that, in spite of every care, she died of the disease thus induced. Cattle-plague was thus not a whit more happy than human smallpox.

The next heading, Sheeppox, is of more importance, chiefly as being associated with the name of Sacco, who, about the year 1806, was in the full swing of his experiments with the sheeppox virus. He inoculated many patients with it, found the vesicles always very typical, the course very regular, and the effect constant. Depaul went one step farther, and showed that cowpox takes well on sheep and sheeppox on cows, quite a touching interchange of courtesies. The goatpox of Professor Heydeck (Madrid, 1803), on the other hand, had but a brief career. Mr. Dunning published an account of it and was promptly sat upon by Jenner, and it was heard of no more, though its vesicles were as orthodox as those of any of its competitors.

But all this time cowpox was advancing on its way. It had been described by Jenner, Clayton, Sims, Bradley, and Lawrence. Of these, the last should be spoken of with respect, for he had the courage to say, in set terms, what a filthy disease it was and is. At present, when cowpox is spoken of, people are apt to think only of what they have seen in a favourable case of vaccination in the human subject. But to those familiar with the disease in its original form, as Bousquet was, and as Professor Crookshank is, what the former called "les frayeurs de Jenner" (Jenner's terrors) over the inoculation of such a disease were and are explicable enough. To point the contrast, let us compare a case of vaccination when it runs a favourable course with what cowpox is in itself, and apart from any modifying cultivation. In the ordinary human case the vesicle has taken on its characteristic features by the fifth or sixth day, when it is bluish white, with a raised margin and a central cup-like depression. On the eighth day it is perfect, circular, pearl-coloured, and the areola beginning to appear. From and after the tenth day the areola fades, the

vesicle dries, the scab becomes black and falls off, leaving the characteristic scar. This is all very well, and this is of course what the doctors try to persuade us is always the course of vaccination. But Professor Crookshank states for us clearly, and no statement of his is, in our view, more important or more true, that "under certain conditions, such as a peculiarity in the subject inoculated, or if lymph be taken too late, there will be, just as in variolation, a tendency to revert to the full intensity of the natural virus." What, then, is this full intensity like? There is no difficulty in finding copious materials for the answer. From Jenner downwards, the descriptions abound, and our author has not been remiss in their collection. "Vomiting and delirium"; "abscesses not unlike carbuncles"; "several corroding ulcers"; "the vesicles in a sloughing state"; "a dark, deep central slough"; "rough ulcers, deep enough to encase a bean"; "an ulcer as large as a shilling"—such descriptions sprinkle the page. Of the spontaneous cowpox itself, we have our author's own observations made at the time of the outbreak in Wiltshire in 1887, and illustrated with coloured plates. The plates are beautifully done, and the terrors of Jenner are justified.

And then we turn to horse-grease, and the subject advances, even as does stale fish, from the simply nasty to the unendurably gruesome. We are now face to face with the original Jennerian hypothesis; and a sorry history it has had. Horse-grease to begin with as the ultimate origin of the "grand preventive"; horse-grease dropped and forgotten when the greaseless lymph of Woodville began to pay; horse-grease once more when the failures of Woodville made it probable that his lymph might have to be pronounced spurious after all. Grease, no grease, and grease again, according to the exigencies of the moment; the morals and the materials were equally foul. "Manners none and customs beastly," might be taken as the motto of all these early vaccinal transactions. But at length the grease theory gave place to the cow-smallpox theory, and slumbered until revived in France in 1860. In that year there was an outbreak in Toulouse among the

breeding horses, and from the vesicles inoculations were made on some cows, and from them on some children, who had very fine "vaccine" vesicles. Again, in 1863, cases occurred at Alfort, and one Amyot inoculated himself accidentally whilst attending to the cases in the horses under his care. Professor Crookshank's enthusiasm carried him to Toulouse to investigate this disease on the spot, and there he was fortunate enough to secure the kind offices of Professor Peuch, who was in possession of the fullest information, and permitted copies to be made of his valuable drawings, reproduced in this work. The cases investigated by Professor Peuch occurred in 1880, and were by him identified as "pustular grease," a disease which, though different from the essentially syphilitic *maladie du coit*, or *dourine*, is like it in being propagated during coition. The illustrations of this disease are quite the most graphically nasty and nauseating in the book; but when we ask what is its exact connection with our subject, we are to find, and rejoice with what joy we may, that in France it is "extensively employed."

Here, then, is the delightful present state of the vaccine case. This vaccine of many origins has been accepted and enforced wherever poverty and the law combined make health too dear, honour too great a luxury, and cleanliness too great a crime, for any but the rich to safely purchase. It has been enforced by and for the reason that its origin was supposed to be one and individual in human smallpox. By identification with smallpox vaccination won its way, and identity with smallpox is about the one thing concerning it to which something like demonstration can be applied—to show it false. The same error spread it over the world, and gave to it a universal life. The same exposure awaits it and shall destroy it; and derision shall watch it die, and contempt shall bury it.

We do most seriously believe that it is a great work that Professor Crookshank has done in this book. On one wing of the controversy it ends debate. Of course, we have still to deal with the person who says that all this may be very well, but facts, statistically arranged, have shown that vaccination is a preventive of small-

pox. A man may still, if he cares, say that Jenner stumbled by accident on a prophylactic which neither he nor any man after him has been able to explain; that he admits that Jenner shuffled with incredible meanness, and pretended to know that of which he knew nothing; that the pretended identity of cowpox and smallpox is false; but still, in some unexplained way, vaccination has an influence for good—he knows not how, but the facts show it. But one thing it is no more open to any man to say, who wishes to retain a reputation at once for truthfulness and knowledge—he can no more maintain the faintest ground for it in science. To his statistics we shall still have to oppose ours, and we have no fear of the ultimate issue; but scientific pathology is lost to him for ever. That field is won. To our adversaries is now left nothing but the most hopeless and avowed rule of thumb—empiricism pure and simple.