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[WITH THE AUTHOR'S COMPLIMENTS.]

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"UNFORTUNATE RESULTS OF VACCINATION."

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A FEW WORDS ON "UNFORTUNATE RESULTS OF VACCINATION."[1]

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An article in this journal for December 21st records one perfectly normal, one fatal, and two very irregular results of vaccination with one lot of humanized vaccine points, presumably from the same vaccinifer; also, entirely negative results from previous inoculation of the same patients with one package of what was said to be "fresh cow matter," and quite irregular though unimportant phenomena following the use of a second package of "cow matter." All these different lots were obtained from the same "reputable vaccine purveyors." There could not be a better text than Dr. Adams's report for a very extended series of remarks on a subject of prodigious importance to the medical profession and humanity, in regard to which the most singular indifference seems to exist, namely, the comparative value and *safety* of the two varieties of vaccine virus: the animal, or "bovine" (original *spontaneous* cow-pox, transmitted by inoculation through a continuous series of young bovine animals), and the "humanized" virus (cow-pox which has passed through one or more human subjects). If Dr. Adams had given the names of the "reputable purveyors," he would have done a real service in warning his *confrères* of at least one very unreliable source of vaccine supply. As it is, his report throws a suspicion on all who have devoted themselves to this, in the absence of all state or national vaccine institutions, infinitely important specialty. Hardly a day passes that I do not receive reports of utter, often-repeated failure and of bad results of virus procured from a firm of "reputable vaccine purveyors," not physicians, but traders, totally ignorant of everything connected with vaccination, who, simply for the sake of a few additional dollars of income, assume a responsibility which should never be taken except by a physician thoroughly familiar with human vaccination, with the really difficult details of vaccination of animals, and personally cognizant of the source and quality of every particle of virus which he issues. I cannot doubt that if physicians would note and report instances of *repeated total failure* and ill results of vaccine virus, with a distinct indication of the source or

[1] In which, for the first time, is publicly announced the entire immunity of *true* animal vaccination from erysipelas.

sources of such unreliable supply, they would do a valuable service to the profession. Dr. Adams's results with so-called "cow matter" are precisely identical with those observed by hundreds, possibly thousands, of physicians who have obtained supplies procured by men utterly ignorant of the extremely short period in the brief course of the cow-pox in the animal during which the virus is in its highest condition of perfection. Efficient fluid virus may be obtained from the human vesicle as early as the sixth, or even the fifth day, in minute quantity; and from that time till the tenth or eleventh day, or even later; so long, in fact, as a particle of *clear*, undesiccated lymph exudes from the punctured circle surrounding the umbilicated centre.[1] In the heifer, on the contrary, the whole course of the disease, from the insertion of the virus till complete desiccation and the formation of the scab, is generally less than ten days, although the crusts are too adherent to be easily removed before the thirteenth or fourteenth day. Virus is secreted in the cells of the so-called vesicle rapidly and for a very brief period, during which it is in perfection. Before that time, a clear fluid may be obtained by pressure, but it is simply serum, and inert; after that time, too, pressure will exude a fluid, but in a vast proportion of cases that fluid partakes but feebly of the qualities of good vaccine virus. I do not propose, at this time, to discuss the reasons for this fact, but that it is a fact every close observer of vaccina[2] in the animal will admit. The knowledge of the exact period at which to obtain perfect virus is the one great and essential item of knowledge necessary to success in the specialty of animal vaccination. Dr. Adams's first package was either old and on that account inert, or it was collected from animals whose vesicles were not of cow-pox at all, or were at a period when they contained no efficient virus. His second lot was probably procured when the operator's forceps squeezed out serum, fibrine, blood globules, and perhaps pus, but no vaccine virus, or very little, and that little in a deteriorated state. I say "perhaps pus" because the slight effects, efflorescence, hyperæmia, etc., noticed in two of Dr. Adams's cases, are precisely such as are often seen after inoculation of pus in the earlier stages of decomposition. The results of the use of pus and other ani-

[1] Let me not be misunderstood as countenancing, much less recommending, the taking of virus for use from the arm at any time from the fifth or sixth to the twelfth day. Such practice has been the fertile source of imperfect and spurious vaccina. Virus should be taken when the vesicle has reached perfection of form and development, but before the slightest appearance of the areola. The time from insertion of virus cannot be given, for there is a wide difference between cow-pox and humanized virus in the time at which the areola appears and, in a less degree, not only between different "stocks" of humanized virus, but between different individuals vaccinated from the same stock. Before the appearance of areola there is no pus in or around the vesicle; afterward there is no security from its admixture with the lymph.

[2] Vaccina is the original and correct nomenclature. I do not wish to be pedantic, but see no good reason why it should have been changed, or, if changed, why we should not have variolia, scarlatinia, etc., etc.

mal matters in a more advanced stage of putrescence (for example, the fearful series of cases at Westford in 1860, and a number of cases during the small-pox epidemic of 1872–73 in Boston, both from the use of decomposed and putrid solutions of native humanized and imported so-called animal vaccine scabs) are among the most dreadful accompaniments and sequelæ of vaccine malpractice.

It was more than two years before I fully ascertained the state of the vesicle in the heifer, in which virus exists in its most desirable condition. A want of that knowledge was the cause of frequent failure with the virus as first procured and issued by myself; the same lack of knowledge is one of the principal reasons for the failure of virus now issued by many propagators, and has been at the bottom of most if not all the rational objections to animal vaccination. It is not possible to state the number of hours after vaccination at which virus should be taken from the animal; the time varies from different causes, but a thorough familiarity with the phenomena of vaccina in the animal alone enables the operator to select the time at which the vesicle should be opened. The veriest tyro may hit it in his first attempt, by accident, and may wonder why he fails subsequently, again and again. Any one issuing animal virus may in this way now and then send out virus of the most perfect efficiency amid a host of failures, but unless he possess the critically accurate knowledge referred to he can never be relied on in all cases and at all times and seasons for suitable material for vaccination. Failures with properly collected animal virus of a proper degree of freshness is a very rare circumstance indeed, always supposing that it is used properly and with due care; while, judging from many reports which have reached me, success with that almost constantly issued by some producers is, no matter how skillfully employed, even rarer. I have repeatedly been informed of cases in which three, four, five, and six successive lots of "animal vaccine" have been used with total failure in every instance. The annoyance and blame to physicians, the trouble and even danger (from lack of protection) to patients, and, above all, the infinite injury to the cause of animal or true cow-pox vaccination are incalculable. Such continued and *repeated* failure in the quality of virus is inexcusable, and is the result, invariably, either of neglect, ignorance, or fraud on the part of the propagator or dealer.

I am very familiar with the phenomena described by Dr. Adams as following his use of humanized virus. I have never seen a fatal case in civil practice, but his other results I have witnessed a great many times. I saw one fatal case of revaccination followed by enormous axillary and thoracic abscess, and knew of several others during the two years of my military service. Besides these, a great many cases of severe disease and lasting injury came under my observation, all

traceable to gross malpractice in selecting the vaccinifer, or from using the crusts of retrovaccination which were furnished by contract, in vast quantities, to the army during the war, and did not produce in any instance of thousands within my knowledge anything like vaccina, but in hundreds of cases phenomena of septic inoculation. This rubbish was particularly recommended to the acceptance of the surgeon-general as being true animal virus; its bad reputation has been one of the numerous stumbling blocks in the way of true animal or cow-pox vaccination meeting with that full acceptance and enthusiastic approval which are its due.

In civil practice I have as yet seen no death which could fairly be attributed to vaccination (however abominably done) except the three cases in Westford, in 1860, but many cases in which severe disease has followed humanized vaccination. I have over and over again seen bad results when one arm was inoculated with long-humanized virus and the other with cow-pox, and invariably on the side in which the former was inserted. The humanized side would go through its regular course, perfectly, to the formation and decline of the areola (seventh or eighth to ninth or tenth day), but the process of desiccation of the vesicle and formation of typical scab would not occur; in its place an excavated ulcer appeared, covered by a soft, thin crust which fell off and was renewed every few days, running an indefinite, and often, unless surgically treated, very tedious course; while on the cow-pox side the vesicle (the areola of which always commenced at the end of the ninth day or more frequently in the first half of the tenth, and fully declined at the close of the twelfth day or even later, precisely as described by Jenner, Willan, Coxe, Waterhouse, and a host of early vaccinators) became desiccated with perfect regularity, forming a firm, dark, umbilicated crust, the exact image, on a reduced scale, of the vesicle at its highest perfection, and fell off, or was capable of easy and painless removal from the twenty-first to the twenty-eighth, thirtieth, or even thirty-second day. At the time when I had both the English national vaccine stock and cow-pox, I supplied a great many physicians with both, and urged them to repeat this experiment and verify my assertions in regard to the constantly observed difference in the form, course, and duration of the two sorts of vaccination, the exact correspondence of animal vaccination with that described by Jenner, and its wide difference from the results of the use of the best stock of long-humanized virus. I should be happy to do this now if I still continued the propagation of the so-called "Jennerian" stock. If readers wish to repeat this experiment, let them remember it must be made with virus of *long* humanization. I never made a trial with lymph of early removes from the cow; it is possible that some of the same phenomena may be observed in its use, but I have no experience on that point.

In all that I may write, particularly as to the deterioration in vigor of humanized virus, I am to be understood as *always* referring to that which has passed through a large number of human systems. The deterioration after the second remove from the cow is very gradual indeed, easily noticed if vaccination with the twentieth remove be contrasted with that of the third, but *not* by comparing the twentieth with the nineteenth remove. It is quite possible, and indeed probable, that vaccination with *early* human removes is perfectly protective, as much so to all intents and purposes as that with cow-pox, and I do not think that the liability to erysipelas has yet been noted with the first three or four removes from the cow. Now I always use the animal virus, not because early removes *may* not be just as good, but because vaccination with virus direct from the animal has alone been proved to be absolutely protective from variolous disease (when done at any time after puberty) in every case, and also entirely exempt not only from erysipelatous complication but from all chance of syphilitic and other possible contamination. A great deal of error has arisen from contrasting effects of — say the third or fourth remove with those of cow-pox. If physicians wish to satisfy themselves as to the deterioration of virus, let them get, if possible, virus of eight or ten years' humanization and contrast its effects with those from the use of that *direct* from the heifer obtained by the method of animal vaccination. It may well be doubted whether such virus can *now* be obtained in America, as probably all now used on this side of the Atlantic is of comparatively early removes from the "stock" first issued here by myself in September, 1870. I think, however, that just the right virus can be obtained by application to the National Vaccine Institution of England. Virus very frequently received by myself from that admirable institution always proved the best possible lymph of *long* humanization. If it could be ascertained at what human remove from the cow permanent protective power first becomes impaired to an important degree, and if such virus could be fully insured from syphilitic contamination and liability to erysipelas, etc., all rational objections to the use of *early* human removes would be ended. Such knowledge and security are not attainable, and therefore the only absolutely safe course is to use either virus of original cow-pox or that transmitted through a series of selected bovine animals.

Erysipelas, the bane of vaccinators, not the vivid and wide areola, that sure mark of a perfect vaccination, which is often called erysipelas by those who mistake the proof of perfection of virus for a sign of its violence and deficiency, but *true* erysipelas, is a disease peculiar to vaccination with humanized lymph, and has never followed vaccination with true animal virus. Erysipelas is a disease of which the occasional occurrence is inseparable from vaccination with humanized virus. It is apt to complicate the most perfect development of the vesicles and areola

resulting from the use of that virus; in fact I have very seldom known it to follow any other than a "fine arm." No care in the selection of virus, no study of seasons or of the condition of patients, affords any means of escape whatever. During the sixteen years in which I supplied humanized virus, the presence of this pest in my own practice and in that of my correspondents was the one great and serious drawback, the one formidable source of anxiety and blame. Since I have issued bovine virus to a far greater extent, and to from eight thousand to nine thousand correspondents, for the vaccination of large cities, towns, factories, and bodies of troops, I have never received a single complaint of the occurrence of erysipelas. It is said to attack particularly cases of revaccination, but in 1872–73 I revaccinated about twelve thousand patients with my own hand, and there was not one case of erysipelas among them all, nor have I ever known a case following the use of bovine virus at any other time.

It is certain that with virus from my stables over one million of vaccinations have been made, involving the production of many millions of slight, cutaneous wounds. From other producers virus has also been issued to vaccinate a great many people. Not one case of erysipelas can, to my knowledge, be connected with this host of vaccinations and revaccinations *direct* from the animal. Fatal cases of erysipelas reported as following the use of this virus were the result of vaccination with virus of the tenth, twentieth, or thirtieth human remove, and not with that direct from the animal. (See note at end.)

The reason why, in February, 1873, I abruptly ceased to propagate and collect humanized virus was because in one week of that month I had five cases of erysipelas. They were all in children vaccinated on one arm with the institution "stock" and on the other with cow-pox; and in every instance the disease appeared on the humanized side. I had previously had four precisely similar cases scattered over the preceding two and a half years, and contemplated an eventual abandonment of the old stock;[1] but this epidemic determined me at once to discontinue vaccination with humanized virus.

I shall be happy to have an opportunity to discuss at length this fact, now first publicly announced, but shall regard no answers to my announcement of it, unless they are supported by *undoubted* cases of *true* erysipelas following vaccination or revaccination with *undoubtedly* au-

[1] I feel now that I continued the use of humanized virus too long; my only reason for not discontinuing its use much sooner was a desire to supply my *confrères* with means of demonstrating the great difference between *true* animal virus and that formerly in use, and this could be done only by the experiment above alluded to. If I had not become absolutely convinced that I had no moral right to do so, that continued humanized vaccination meant continued "bother" and suffering to mothers and infants, and continued danger from erysipelas, I suppose I should still have propagated the old "stock" for the same purpose, salving my conscience by vaccinating *one* arm with cow-pox.

thentic *true* animal virus, that is, virus which (without ever having passed through a single human system) has been transmitted through a series of bovine animals from an original *spontaneous* case of cow-pox, like that of Beaugency.

In Dr. Adams's cases there is no real proof that the points in the package were all from one arm, taken at the same time; but still, diverse as were the results, that is quite possible.

In September, 1870, I introduced into America the method of *true* animal vaccination; for some three months I alone supplied cow-pox or animal virus. For nearly three years I had but one considerable competitor. During this time anything which I might have written in favor of animal vaccination would have been open to uncharitable criticisms; but now, when my rivals literally swarm in every part of the country, I feel that the situation is changed, and that I have no right to withhold longer from the profession whatever may be valuable and suggestive in my experience in the specialty of vaccination, and everything connected with it.

NOTE. — The following passages were in the original manuscript of this paper, but were *not* printed in the article as it appeared in the JOURNAL; they are inserted here, as I consider the theory propounded to be an important one: —

It has suited two or three malignant enemies of mine to report numerous severe, and in several instances fatal cases of erysipelas and septicæmia as results of vaccination with "MARTIN'S VIRUS," because virus of one or more — generally many more — human removes from animal virus issued by me was said to be employed in those cases. "MARTIN'S VIRUS" is that DIRECT from the animal. MY part in it ceases with the *first* human remove; after that it becomes liable to ALL the perils and defects of humanized virus except, possibly, that of injurious deterioration in vigor. I do not think that so many simple, slight incisions with a clean lancet would be entirely free from erysipelatous sequelæ. I confidently assert that perfect typical vaccina with that febrile reaction which Jenner *always* maintained *alone* assures perfection of vaccination and of protection, and is absolutely PROPHYLACTIC OF ERYSIPELAS. I hope for future opportunities for vindicating and supporting this well-considered theory. H. A. M.