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VACCINAL CICATRICES AND RE-VACCINATION.

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I PROPOSE to show, by extracts from medical authors, that the profession generally believe that vaccine cicatrices have a distinctive character, and that the amount of protection which the system has acquired by vaccination against variola may be pretty correctly estimated by the appearance and number of the cicatrices remaining; and that it is the almost universal opinion of medical men "who know anything of smallpox" (transcendentalists or ultra-theorizers alone being excepted) that a "miserable, flat, white speck or two," which happen to be in the usual locality of vaccinal cicatrices, do not indicate that the system is protected.

If this be so, and this general medical belief be founded on observations and experiments, then it can hardly be considered courteous for any one, especially a leader of medical opinion, arbitrarily and without proof, to declare it wrong, and to assume that his belief and a record of twenty-six cases prove its fallacy.

Supported by Hebra,* whose views doubtless are the basis of the paper by Dr. Cotting, the latter apparently sets at naught all other writers, with their views or facts, some of which I will detail. What, then, is the character of the vaccinal cicatrix?

Condie† speaks of "a cicatrix of a form and size proportioned to the previous inflammation, and marked with radiations and indentations."

Watson‡ says, "the cicatrix which it leaves should be somewhat less than an inch broad, circular, slightly depressed, marked by radiating lines, and dotted with little pits."

Tweddle§ states that a perfect vaccinal scar should be of small size, circular, and marked with radiations and indentations."

* Vol. xxx. New Sydenham Society. Diseases of the Skin, p. 21.

† Condie, "Diseases of Children," p. 506.

‡ Watson, "Principles and Practice of Physic," p. 984.

§ Tweddle, "System of Practical Medicine," vol. on Fevers, p. 408.

Copland* describes it as "a cicatrix which is permanent in after life, is circular, somewhat depressed, striated, and indented with six, eight, or ten minute pits."

Cazenave and Schedel† say, "a depressed, circular, and honey-comb-looking cicatrix remains, with several depressions at its base."

Wood‡ says, "the surface of the scar is characterized by numerous little depressions."

Graily Hewitt§ represents it as "usually circular, radiated, indented, and foveated, having a number of little pits on its surface, a well-defined edge, and generally of considerable size." "Defective scars are comparatively smooth, without indentation, without the little pittings; the edges are irregular and ill defined, and it is often very small."

Flint|| says the "cicatrix, provided the vesicle have pursued a regular course, and subsequent ulceration have not occurred, is characteristic, presenting a series of depressions or pits," &c.

Aitken¶ states that "good cicatrices are of circular form and pale or white appearance. They are somewhat depressed, and dotted, indented, or foveolated with minute pits or depressions over the base. In some instances there are radiations from the centre. The normal diameter, if produced by a single insertion, is one third of an inch. *Bad* cicatrices are generally all ill-defined, faint, scarcely discernible white patches, especially such as consist of large, flat, ill-defined, shiny marks. A distinct connection subsists between the number and quality of the cicatrices and the protection conferred by vaccination against smallpox; so that it may be confidently stated that that vaccination is the most efficient from which the best and the most cicatrices result."

But the most valuable testimony that we have seen on this point is by M. Denarp Decantaleu, in a "*Monographie des Cicatrices de la Vaccine*," published at Paris in 1851—a work of the most remarkable toil and industry, comprising the results of the careful examination, and impressions and modellings taken from 5412 vaccinal cicatrices, the distinctive characters of which he shows in a large lithographed plate. He shows that it is the united testimony of MM. Bousquet, Rayer, Hueson, Alibert, and in fact all writers on diseases of the skin, that "les cicatrices vaccinales legitimes ont une forme générale unique, c'est-à-dire, que toutes sont rondes, déprimées, profondes, parsemées de petits enfoncements qui les font paraître comme gaufrées, et que les petites différences qui existent entre elles consistent seulement dans le l'empreinte plus ou moins marquée qu'elles produisent dans les teguments"; and that "les cicatrices illégitimes auxquelles les fausses vaccines donnent lieu, consistent en

* Copland. "Medical Dictionary," Art. Vaccination, § 13.

† Cazenave and Schedel. *Diseases of the Skin*. Am. Ed., p. 138.

‡ Wood, "Practice of Medicine," vol. i. p. 407.

§ Graily Hewitt. "Lecture on Vaccination," at St. Mary's Hospital. London *Lancet*, September, 1863.

|| Austin Flint. "Principles and Practice of Medicine," p. 781.

¶ Aitken. "Science and Practice of Medicine," vol. i. p. 296.

de simples tâches régulières ou irrégulières, et moins étendues que les cicatrices vaccinales légitièmes."

And although the monograph shows that each of the distinguishing marks of true vaccinal cicatrices may be modified—that they may be round or oval, above or below the level of the surrounding skin, punctated or honey-combed, with or without rays, from two to seven tenths of an inch in diameter, and more or less pale in color—yet it also shows that on one point pathologists are agreed; that as M. Broschet* has said, "Les cicatrices, quant à leurs formes, et à leur apparence extérieure, méritent d'être étudiées avec soin, car elles peuvent servir à reconnaître les maladies dont le sujet a été affecté. Quel est le praticien qui confondra la cicatrice d'une brûlure avec celle d'une solution de continuité par un instrument tranchant, la cicatrice d'un ulcère vénérien avec celle d'un ulcère scrofuleux ou cancéreux? Ne sait-on pas que les cicatrices de la vaccine, de la variole, du furoncle . . . ont des caractères faciles à saisir et à distinguer?"

It being shown that there is a general agreement among vaccinologists as to what constitutes a "good" vaccinal cicatrix, it remains to determine whether the difference between the good and the bad is one of appearance only, or is a true difference in the amount of protection afforded against variola. Fortunately, on this point too, there is abundant testimony. Mr. Granger,† in a paper read before the Royal Medical and Chirurgical Society, 1852, showed among other facts, that of 365 smallpox patients, who had been vaccinated and had cicatrices, ten per cent. died; of sixty-three vaccinated but without cicatrices, 39 per cent. died.

An epidemic of smallpox occurred at Jamaica in 1851, of which Dr. Seaton‡ read an account before the Epidemiological Society. Amongst other facts given by him are the following, prepared by Dr. Bowerbank. Dr. B. attended 301 cases of smallpox, of whom 241 had never been vaccinated, and 18 per cent. died; 58 had been vaccinated, and 2 died; 2 had been inoculated, and 1 died. Of the 58 vaccinated, 34 had good cicatrices, 12 had imperfect cicatrices, and 12 had none.

Of the 34 with good cicatrices, 2 had confluent smallpox,

14 " discrete "

18 " modified "

Of the 12 with imperfect cicatrices, 0 had confluent smallpox,

11 " discrete "

1 " modified "

Of the 12 who had no cicatrices, 3 had confluent smallpox,

9 " discrete "

0 " modified "

* Dictionnaire de Médecine en 18 vol. Tome v. p. 246.

† London Lancet, May, 1852.

‡ Am. Jour. Med. Sci., October, 1855.

Graily Hewitt, in his lecture before quoted, gives the following remarkable facts noted by Mr. Marson. During sixteen years ending with 1851, 3094 vaccinated individuals were admitted into the smallpox hospital:—

There were 1357 persons with one cicatrix.					
"	"	888	"	"	two cicatrices.
"	"	274	"	"	three "
"	"	268	"	"	four "
Of those with one (1357) there were					Mortality per ct.
{ good,					768 4.23
{ indifferent,					589 11.95
{ good,					608 2.68
{ indifferent,					280 7.29
{ good,					187 1.63
{ indifferent,					87 2.32
{ good,					202 0.99
{ indifferent,					66 0.00

Of the vaccinated who had no cicatrices the mortality was 21.73 per cent.

Mr. Hewitt also informs us that Dr. Buchanan, in 1862, examined, in various schools, 15,041 children indiscriminately; 185 of these were scarred with smallpox, one in every 81; 12,860 out of the 15,000 had been vaccinated, and only 12 of these bore the marks of smallpox, and of these 12, 11 had "bad" cicatrices, showing inefficient or spurious vaccination.

A paper by D. Francis Condie was published in the *American Journal of the Medical Sciences* (April, 1865); he gives the result of the observations made by Mr. Simon during twenty-five years in nearly 6000 cases of smallpox after vaccination, viz.:—

Of the vaccinated who had no cicatrix, 22 per cent. died.			
"	"	"	one well-marked cicatrix, 4 pr. ct. died.
"	"	"	two " " 3 pr. ct. died.
"	"	"	" slightly developed cic. 7 pr. ct. died.
"	"	"	three well-marked cicatrices, less than 2 per cent. died.
"	"	"	four well-marked cicatrices, less than 1 per cent. died.

In 500 re-vaccinations carefully performed under Dr. Condie's care, 81 reputed to be vaccinated had no cicatrices; 76, small and imperfect ones, and 79 tolerably perfect ones, while 264 had well-defined, perfect scars. Only ten had more than one well-defined cicatrix. Of the 81 first, vaccination succeeded fully in all; of the 76 second, vaccination succeeded fully in 34, and imperfectly in 42. Vaccination of the 79 third was followed by a vesicle more or less imperfect, and a faint, small, irregular areola. In the remaining cases vaccination produced, in a day or two, some inflammation, a slight circumscribed papular elevation, the whole drying, by the tenth or twelfth day, into a small, thin, yellow scab.

We claim, then, that the difference between a good vaccinal cicatrix and a bad one is one of the well-established points in medical science; that vaccination, well performed, leaves behind it, even after the lapse of years, something more than "miserable, flat, white specks," and that no medical man, looking at these imperfect cicatrices, can consider them any evidence that the patient is protected against smallpox. A perfect, round, umbilicated vaccine vesicle does not pass through its various stages to resolution and leave its base marked only by flat, white specks. The question is not alone of the size of the scar, as the learned writer intimates, but of its characteristic appearance. It is not whether a sufficient amount of suppurative inflammation have taken place, or a proper degree of the cutis destroyed, but whether the vaccine disease have been taken and allowed to pass through its regular course. The only means by which a physician can judge of the perfection of a vaccination whose progress he has not watched, is the appearance of its scars. The absolute susceptibility of the person to variola is not under examination, only his susceptibility as affected by his vaccination; and if that be imperfect or spurious, his susceptibility to take variola has not been destroyed; and laying aside any natural insusceptibility to the disease, as not being under discussion, the legitimate conclusion of the experienced physician is, that when the cicatrix is imperfect the vaccination was imperfect, and the protection from contagion equally imperfect.

Re-vaccination has been much studied and discussed, but its necessity depends on two very simple questions, which seem now settled.

First, have we any other absolute way of judging of the amount of protection conferred by the primary vaccination? On this point I need quote only Dr. Cotting, who says that re-vaccination is desirable to ascertain the amount of susceptibility remaining after first trial.

Second, have we any reason to fear that the protective influence of vaccination wears away in time? To induce us to urge the custom of re-vaccination, it is not necessary that we should prove, *nemine contradicente*, that protection by vaccination is but temporary; we need only show that there is good reason to *fear* that such is the case—only to prove that there is "probable cause" to believe it: for the operations of vaccination and re-vaccination are so simple and trivial as a rule, that no one need fear to avail himself of their advantages if there be the least reason for so doing. The statement that "disasters from this source are frequent and damaging," that "severe illness is often thus produced," and "a fatal termination occasionally the result of it"; and that "possibly there have been as many deaths from repeated vaccinations as from varioloid after first vaccinations," needs proof. "Les vaccinophobes," as Trousseau calls them, could hardly go further.

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It is true; as Dr. Graily Hewitt* says, "The wound inflicted by vaccination is, like other wounds, liable to be affected by injurious conditions of the surrounding atmosphere. Pyæmia may follow the use of bad lymph; erysipelas has in rare instances been observed. Ordinary care is sufficient to prevent such evils." The case quoted by Dr. Cotting, at the top of page 72, was in all probability such an one; and until that gentleman brings forward tables of cases and lists of mortality occurring in his *own* practice, or that of some other careful vaccinator, who does not use bad lymph or neglect to use ordinary care, it will be unnecessary to devote more than a passing word to this fear.

So little importance is attached to the operation by those who have re-vaccinated many, that it is difficult to find any allusions to it, except in the most incidental manner. Dr. Charles Hogg,† after giving tables of some hundreds of cases, states that during thirty years' practice he has met with "only two cases that have created anything like anxiety," and these recovered in a few days by rest and a cooling lotion.

Trousseau‡ gives the statement of M. Gintrac, an extensive re-vaccinator, that, "les re-vaccinations pratiquées dans le foyer épidémique contrairement aux craintes exprimées par quelques médecins, se sont montrées d'une complète innocuité."

M. Laure,§ a surgeon of the French Navy, in giving the results of re-vaccination as ordered in that service, says that "the local phenomena in re-vaccination are not remarkable, provided the men on whom true or false pustules appear are exempted from any duty on the fifth day. The constitutional effects are unimportant."

In the autumn of 1864, two cases of smallpox occurring in the garrison where I was stationed, I vaccinated all the troops and many of the prisoners there, several hundreds in all. In almost all more or less specific local inflammation followed, but in none was this of a serious character. A few were excused for some days from mounting guard or going through with the manual of arms; not one required admission to the hospital. No other case of smallpox followed.

But, passing by these supposed dangers, let us return to the question, "Is there any reason to fear that the protective effect of primary vaccination *may* wear away?" Of this there can be no doubt, if we attach any value to the testimony of many observers, who have carefully collected and published the results of experiments. We should naturally expect this to be case from the analogy of other diseases. If varicella, measles and all other exanthemata sometimes recur, why not vaccinia? Hebra|| says that measles may occur more than once in the same person, and that smallpox may also; *a*

* London Lancet, September, 1853.

† Ibid, September, 1863.

‡ Clinique Médicale, vol. i. p. 120.

§ London Lancet, June, 1859.

|| Diseases of the Skin (New Sydenham Society, vol. xxx.), p. 184.

fortiori, then, should he expect vaccinia to do so, which is, he says, identical with variola, but modified and made milder by passing through the cow.

At any rate we should have judged that any one was precluded from denying it, who acknowledges the fact of measles occurring twice in six weeks. If medical testimony in this case (as in that of the contagiousness of cholera) has not given overwhelming proof, it is certainly much safer, in view of all possible contingencies, to *act* as if it had.

We quote a few from the authorities with which one might fill volumes on this subject. Dr. Horatio Adams, of Waltham, in his discourse* before the Massachusetts Medical Society (1858), quoted by Dr. C., says:—"In order that we may be sure that the susceptibility (to receive smallpox) is extinguished, vaccination should be repeated as long as it produces any specific effect; especially should it always be repeated when the first operation has been performed at an early age, during dentition, or when disease of any kind or a diseased diathesis existed. It would be well always to re-vaccinate all who may at any time be directly exposed to smallpox."

Dr. Gregory,† in a paper read before the Royal Medical and Chirurgical Society, states that the records of the Smallpox Hospital in London show that "in eleven years, 4092 persons having smallpox have been admitted, of whom 2168 had been vaccinated. The majority were of adult age, a few between nine and fifteen, but below nine scarcely any vaccinated person was admitted—making it appear that the susceptibility to the variolous miasm among vaccinated persons increases as life advances."

M. Laure‡ arrived at the following among other conclusions:—"The practice of re-vaccination is not, as might be supposed, useless; it is, on the contrary, a very important hygienic measure, the execution of which should be carefully watched. People who have had the smallpox should be re-vaccinated as well as those who have been subject to the cowpox inoculation.

In re-vaccinations made at the prisons in Belgium in 1859, as reported to the Academy of Medicine at Brussels by M. Vleminx,§ it seems that of 1660 subjects, 16 per cent. were successful; that M. V. found that re-vaccination succeeded better the more distant the time of the operation was from the original vaccination, or from an attack of smallpox.

Dr. Charles Hogg|| shows by tables from Dr. Commenge, of Paris, that from ten years old and upward re-vaccination is important and necessary; that, generally speaking, the effect of the first vaccination is lost after the twenty-fifth year, in many people after the fifteenth, and that, in fact, all persons, not excepting those who have had smallpox, should be re-vaccinated.

* Medical Communications of the Massachusetts Medical Society, 1858, p. 253.

† London Lancet, May, 1852.

§ Ibid, January, 1859.

† Ibid, June, 1859.

|| Ibid, September, 1863.

Graily Hewitt, before quoted, says:—"It would appear that, after the lapse of a certain number of years, the protective power of vaccination has a tendency, more marked in some individuals than in others, to wear out, and a resusceptibility to smallpox arises. The impression has been for several years past gaining ground that re-vaccination is proper and even necessary once or more in the life of an individual. Mr. Marson states that during seventeen years not a single servant or nurse belonging to the smallpox hospital has taken smallpox, and the universal custom has been to re-vaccinate the servants, nurses and attendants in or about the hospital on entering on their employment at this institution."

"Re-vaccination should be performed at the age of puberty, and perhaps again at the age of twenty-five or thirty, and it is desirable to re-vaccinate at other ages than these during epidemics of smallpox, and especially in the case of individuals likely to come into contact with smallpox patients."

Dr. Condie says:—"In view of the many accidents that may render vaccination unsuccessful or only partially successful, the propriety, if not the absolute necessity, of re-vaccination demands the earnest consideration of every practitioner. The examination of a very extended series of well-authenticated statistics has convinced me that in many cases the protection of primary vaccination is but temporary, and can be rendered permanent only by a second, or in some instances by repeated re-vaccinations, and that in all cases without exception vaccination should be repeated after a proper interval, to insure the complete infection of the system—to endue it with the due amount of protection against the variolous poison.

Twecdie, in his work on Eruptive Fevers,* declares it "impossible to conceal the apparent conclusion that time lessens the power of resistance to the variolous germ."

Austin Flint† expresses himself on this point thus:—"The protective influence of vaccination diminishes after the lapse of a certain number of years. With our present knowledge, the propriety if not the importance of re-vaccinating every five years is to be advocated. Re-vaccination, in fact, is always proper as the readiest and safest test of unsusceptibility to smallpox."

William Aitken‡ announces that "from the evidence contained in the bills of mortality of 1825, from the experience of epidemics of smallpox in France and Italy in 1826, 1827 and 1829, from the experience of the epidemics of smallpox in Ceylon in 1833 and 1834, and from the admissions into the London Smallpox Hospital in 1838, it has been rendered obvious that the susceptibility to smallpox, which in vaccinated persons is destroyed for some years, returns with advancing life, and becomes greater as life advances."

Farther on,§ he speaks of re-vaccination as "a most necessary

* System of Pract. Med., vol. iv. p. 408.

† Sci. and Pract. of Med., vol. i. p. 288.

‡ Princ. and Pract. of Med., p. 782.

§ P. 289, op. cit.

supplemental measure to vaccination. A large reduction in mortality and in the occurrence of smallpox can be shown to have taken place from the practice of *re-vaccination* so as to leave no doubt of its practical efficacy." "In 1833, between 40,000 and 50,000 adults were *re-vaccinated* in the Prussian army, and in about 33 per cent. of the number it took with perfect success. Amongst Russian soldiers at Kasan the rate of perfect success was about 18 per cent. In the army of Denmark, from 1843 to 1847, nearly 20,000 *re-vaccinations* were practised, of which more than a half were attended with *perfect* success, and more than a quarter with *modified* success. Since 1843, *re-vaccination* has been compulsory in the Bavarian army. From that date till 1857, not even a single case of unmodified smallpox has occurred, nor a single death from smallpox. Similar good results have followed the institution of *re-vaccination* in the Danish army, the army of Sweden, of Baden, and in the British army also." In the latter a departmental order was issued in 1858, and is still in force, that every recruit on joining the headquarters or depot of the corps or regiment to which he belongs, shall be vaccinated, even if he have marks of smallpox or previous vaccination.

Trousseau* confirms our view thus:—"En définitive, le vaccin tel qu'il est aujourd'hui, ne procurant plus, chez bien des individus, qu'une immunité temporaire au lieu de l'immunité absolue qu'il semblait avoir au commencement de ce siècle, il est nécessaire de recourir à une pratique depuis long-temps préconisée, celle des *re-vaccinations*."

To show its benefits, he quotes extracts from a paper in the *Gazette des Hôpitaux*, July 11, 1867, narrating the rise and progress of an epidemic of variola in a commune of France, and the different degrees of its severity among the vaccinated show that the gravity of the cases was in direct proportion to the length of time which had elapsed since their vaccination, and concludes with the following:—"La *re-vaccination*, pratiquée d'une manière générale en pleine épidémie, en a arrêtée d'emblée les ravages, et éteint le développement: elle a préservé indubitablement, et ceux-là même qui se trouvaient déjà sous l'influence d'une incubation variolique ont paru jouir d'un certain degré d'immunité."

He finds that of 44,000 *re-vaccinations*, 20,000 succeeded perfectly (nearly half), 9000 imperfectly, and 15,000 produced only a temporary local redness of the skin, lasting from twenty-four to thirty-six hours. "Mo fondant," says the distinguished lecturer, "sur les faits que j'ai signalés, je conseille généralement de *re-vacciner* autant que possible tous les cinq ans. Si cette pratique est inutile, quels inconvénients présente t'elle?"

Having thus made it clear that the opinion prevails strongly among the profession that the protective influence of *vaccinia* is or at least *may* be impaired by time, and that in view of this every physician should (in accordance with his professional duty to arrest the pro-

* Clinique Médicale, vol. i. p. 117 et seq.

gress of disease) proffer and if necessary urge re-vaccination, especially after exposure to variola, we have but a few additional words to say with regard to Dr. Cotting's cases and comments.

His table shows, if a table of twenty-six cases can be said to show anything, where tables of thousands of cases can be readily referred to, that almost all persons, who have been vaccinated but once, are liable to take modified smallpox—that those re-vaccinated do not. It proves nothing with regard to the value of distinctive cicatrices, since the writer's belief on the subject prevented him from noting the distinguishing marks of the cicatrices, taking account of their size only. It shows that he allowed six patients in one family, two in a second, and seven in a third, to take variola from a first case, without using any exertion to prevent it, and it is not wonderful under those circumstances that he should be a little sensitive with regard to "denunciation." It is true that "re-vaccination was declined" by these unfortunates, but it can hardly be supposed to have been urged upon them by one who holds it in such dread.

It is all very well for the parties concerned to be now "abundantly satisfied with the result," and for their physician to congratulate himself on the trivial character of the sickness he did nothing to stamp out; but one fact should not go unnoticed, which is that each of these patients constituted a *foyer* for infection for the neighbors about and the community in general, and that each of them, though suffering but little and having but half a dozen pustules, may have been the direct cause of cases of confluent smallpox; so that "it is possible" that more deaths may have been the ultimate result of this *laissez faire* treatment that would have followed even from re-vaccination.

Re-vaccination, then, is important, not only "to ascertain the amount of susceptibility remaining after first trial," but also to give additional protection to those persons whose original vaccinia may have been annulled by time, or at least to obviate the danger that it *may* have been thus destroyed, and that we may leave nothing undone to lessen the liability to variolous disease. "Ne doit-on pas," says Trousseau, "chercher à multiplier les chances d'immunité contre la variole, et même contre la varioloïde, qui, toute bénigne qu'elle soit, dans la majeure partie des cas, n'en pas moins grave exceptionnellement, ainsi que j'ai eu soin de le dire, en faisant son histoire?"

THE HYGRODEIK AND THE PROPER MEANS OF HYDRATING OUR HOUSES AND HALLS OF ASSEMBLY.

[Report to the Suffolk District Medical Society.—Concluded from page 127.]

DURING cold weather, when a room is heated by a stove or a hot-air furnace, many persons experience a painful sensation in the chest, produced by the excessive dryness of the air, consequent upon rais-