

frequently performed in the past without care or discrimination as to the lymph used, and with perfect indifference as to the result. This lack of prophylactic power is without doubt traceable to the use of degenerated lymph, although some practitioners of my acquaintance point to their own experience and that of the Royal Vaccine Establishment of England as arguments against this view. But the frequent recurrence of post-vaccinal small-pox can be accounted for in no other way than by the assumption of a previous imperfect vaccination, which observation in small-pox hospitals has fully established as true.

One of the reasons why old practitioners preferred a *crust* for vaccination from was because crusts of a typical character never form where the vesicles have been imperfect either in type or development, and hence by a continual survival and reproduction of the fittest they were able to go on for years without much apparent degeneration in the lymph in use.

Perfect *vaccinia* is always attended with profound constitutional fever, and this is much more marked where heifer lymph is used than where exhausted virus of long human transmission has been employed, and is usually coincident with the rise, development and decline of the *areola* which begins middle of 8th and lasts until 12th day.

Stress requires to be laid upon this constitutional fever, which was considered of the greatest import by the earlier vaccinators, who deemed a vaccination unattended with it not to be depended upon as protective against small-pox. This was Jenner's explanation when *post-vaccinal variola* excited so much comment some years after the introduction of vaccination, laying down as a *dictum* that in all such cases the alleged vaccination had been *spurious*, and that the unfaillible test of a perfect vaccination—such as alone was prophylactic against small-pox, consisted in the occurrence of this accompanying febrile action; that without it the patient must not be considered protected, but should be revaccinated.

In my own judgment a better test of a perfect vaccination is the production of characteristic vesicles, passing through all their several stages of development, decline and fall of crust, leaving behind them indelible cicatrices or depressed scars of the peculiar and well-defined type.

The resulting *vaccine scar* is a matter of great importance, and offers to the observing practitioner an excellent guide with respect to the perfection of

a vaccination owing to the direct relation between the two. A great variety of vaccine scars are to be met with, while there is but *one* typical of a perfect vaccination.

Decanteleau, a French writer, in a monograph upon "the cicatrices of vaccine," gives illustrations of sixty, fifteen of which are typical of varieties always to be seen.*

* I have endeavored to obtain a good chromo-lithographic illustration of some of these, with perfect resulting vaccine vesicles, after use of bovine lymph taken from cases in practice.

These variations from the normal type may be accounted for in the following manner:

They may result: 1st. From the use of lymph enfeebled by a long series of human transmissions. 2nd. Some imperfect condition of the vaccine—however pure—preventing its proper development, or an insusceptibility on the part of the patient; or 3rd. Violence applied to the vesicle by which it is lacerated, as from scratches, adherent clothing, etc.

90 per cent. of the variations are due to the first cause, a small number to the second, and fewer still to the third. Since in all but the very feeble good vaccine will produce a perfect vesicle followed by a typical scar, even rupture of the vesicle, while modifying, fails to prevent the formation of a characteristic cicatrix.

The phenomena resulting from vaccination with virus direct from the animal differ materially from those presented by long-humanized lymph, and from what may be termed *spurious* vaccinations.

Jenner described the fully developed disease and areola as having the appearance of "a pearl upon a rose leaf," and the crust resulting as of a shape exactly the same as that of the vesicle, circular in form, with a very decided umbilication in the centre. The color of the crust a rich dark brown, sometimes a dark mahogany or amber color.

The *Longue Pointe virus* gives usually a group of small vesicles, circular, umbilicated and contiguous, but not confluent. After several human removes it becomes confluent, and as many of these vesicles may be produced as the operator desires by extending his crucial scratches. It develops slowly—sometimes very tardily—until the 6th day, when a small vesicle begins to form, which by 7th day is quite distinct, and by the 8th is fully developed and contains a quantity of clear water lymph, which if extracted will reproduce itself with a slight quickening or shortening of time in the several stages of the phenomena.