First, *absolute purity.*

In this, as in other cases, we find that the inexorable law of propagation holds sway, and " we reap that we have sown."

If our lymph has contained *pus* mingled with vaccine germs, we will have a crop of septic poisoning, taking the form, it may be, in a favorable subject of edematous inflammation or erysipelas, followed by abcesses.

If it has contained the taint of syphilis, then following the decline of the vaccine vesicle will appear a hardened base with elevated edges; or in its stead perhaps a phagedenic ulcer, which it will require all the skill of the surgeon to treat.

If an *ichorous* liquid has been included in the discharge of lymph flowing from a vaccine vesicle, which may be the case in an unhealthy subject in an advanced stage of the disease, then such lymph will prove most virulent in its action, when used upon another subject, and following the vaccine vesicle (which will go through its stage of development and appear all right) there will be an acrimonious discharge and a slow healing ulcer, with possibly several new sores occurring where it has touched.

Again, some forms of imperfect vaccine pustules are described by old writers on Vaccination under the head of Spurious Vaccination. Willan describes *three*, and Burns (of Glasgow, 1820) *one*; and as security against small-pox is not conferred by spurious vaccine vesicle, it becomes necessary to study carefully not only the characteristics of the genuine disease as produced with *pure bovine virus* or its *early removes*, but also those appearances which characterize spurious vesicles.

To meet these dangers we have been obliged to go back to as perfect an imitation as possible of the original conditions noted by Jenner in his observations and experiments.

These were based upon the observation every where corroborated—that milkers upon whose hands the disease vaccinia had been casually produced by contact with the disease as it appears spontaneously upon the cow's udders were thoroughly protected, or enjoyed a perfect immunity from subject attacks of small-pox when exposed thereto. Neither could they be made to contract the disease by inoculation.

It will be self-evident that the above conditions are more nearly fulfilled in any given child's case when vaccinated with lymph direct from the heifer, than when lymph of long human transmission has been used.

The question arises, does the virus obtained by this inoculation of heifers with the virus of original cow-pox induce a development of *vaccinia* in greater perfection and of more protective efficacy, in consequence, than that derived from the use of virus which has passed through a long series of human transmissions?

I maintain that it does, and this is one of its principal advantages. For, whatever may be our opinion of the degree and permanence of protection afforded by long-humanized vaccination, it can hardly be doubted that the nearer the intentionally induced disease approaches in its phenomena to that accidentally contracted by grooms and milkers, which has been proved beyond cavil to be perfectly and permanently protective, then the safer must we be in the assumption for artificially induced attacks of the *vaccinia disease* direct from the animal, of a like thorough and permanent protection.

It may also be asserted that the lymph from the heifer when applied to the child exhibits perfectly all the phenomena of the disease described as having resulted from the use of the earliest removes in Jenner's time, and though admitting that the virus of carefully selected human subjects one or even ten removes from the animal may be equally protective, and less liable to failure in the use, yet the risks from possible evils, such as syphilitic, erysipelatous or septicæmic contagion, are such as to make the choice of animal lymph almost an imperative duty of the practitioner of to-day.

It may safely be asserted that the use of virus direct from the animal ensures safety from scrofula, syphilis, cutaneous diseases, pus inoculation and more especially imperfect vaccination from the use of deteriorated lymph.

Vaccine virus, being indigenous lo the heifer, does not degenerate by frequent transmission through the animal, but, when removed to a foreign soil—the human subject—it undergoes modification, and if the greatest care is not observed, is liable to undergo very serious degeneration, for it cannot be doubted that a very gradual but imperceptible change does take place from one transmission to another, sometimes more perceptible in one case than another.

This change has always been observed to be in the direction of a shortening of the period of incubation and developement, a decrease in the