

attempt in the case of any individual ought not to be taken as proof of insusceptibility to smallpox, as is too often done. A single exposure to the virus of any disease is not necessarily followed by infection and various causes arise to prevent vaccination operations being successful. The operation should be repeated several times, leaving just sufficient intervals to prove that previous attempts have failed.

The question of the relation of cowpox to smallpox is an interesting one from both the academic and practical standpoints. It is just possible that in certain instances protection in some degree may be conferred by the use of lymph *even though no local reaction occur*. Copeman has observed this in experimenting with the calf in the case of vaccinia, and Chauveau, Copman and Klein have done so in the case of variola. It certainly would not be wise to trust to the chances of such a course of events, but in it we may possibly find an explanation of some cases of apparent immunity from both cowpox and smallpox. All that is known of immunity from infectious diseases as conferred by previous attacks would lead us to expect that variola and vaccinia must be the same disease, or variations of the same disease. Many attempts have been made to demonstrate the connexion or identity of the two by inoculation of bovines with variolous lymph, with the hope of giving rise to vaccinia, and although the majority of investigators have reported some successes these appear to have been relatively few, and amongst the failures are those of Chauveau and the Lyons Commission. Yet one positive result is worth more than an unlimited number of negatives if it be attained by rigidly correct methods. In spite of the failure of Chauveau to produce typical cowpox by means of smallpox virus it is very suggestive that the animals subjected to experiment could not subsequently be infected with cowpox, lymph of proved potency being used, and that, although they were known to have never previously suffered from vaccinia. Even in those cases in which variolation of bovines has been considered successful, the results have shown but little resemblance to human smallpox and have not been typical of vaccinia until three or four removes from the first animal. Ceely's remarkable observations have not as yet been duplicated so far as we can find out. "He records an instance in which five out of eight milch cows sickened with cowpox within twelve or fourteen days of their having been seen to be licking over a quantity of flock from the bed on which a patient had died of confluent smallpox and which had been spread out on a field for purification." Copeman, whose words have been quoted above, tried to reproduce the experiment by feeding lymph from variola in saline solution to a young heifer. The result was a mastitis, but with-