

broken up, however, and inoculated into a second calf, in that calf the result is more typical, and, by renewing the process, after three or four passages we obtain the development of a perfect vaccine vesicle. Lymph taken from this vesicle produces typical vaccinia, or smallpox with localized symptoms as opposed to the smallpox with generalized symptoms, that the original virus would have produced.

Considering these facts, I cannot avoid drawing the conclusion that the first part of Koch's statement that human tuberculosis differs from bovine and cannot be transmitted to cattle, is to be regarded as true only in a modified sense. Here let me also call attention to the fact that although there is much difficulty in inoculating the cow with smallpox virus, there is but little difficulty in inoculating man with cowpox virus. Is it not possible that a similar condition may exist in regard to the bovine tubercle bacillus? Permit me briefly to refer to the evidence pointing to the transmission of bovine tuberculosis to man. From the nature of the case we would expect proof to be difficult. Man is a cooking animal and direct experimentation is out of the question. Cases of accidental inoculation are all liable to be disqualified from our inability to exclude every other possible source of infection. A few, however, appear fairly trustworthy. Professor Jensen, of the Veterinary School of Copenhagen, was severely infected in his hand while performing autopsies on tuberculous cows, and was said to have been saved from general infection only by surgical removal of the lesion. Dr. Thomas Walley, of the Royal College of Edinburgh, was infected in a similar way, and death is said to have resulted from the infection. Ravenal<sup>15</sup> also reports three cases of infection in the same manner, in which, however, the general infection was prevented by removal of the primary lesion and adds that the value of such cases as he has reported in proving the virulence of the bovine bacillus for man, has been questioned on the ground that the lesions resulting from inoculation are usually slight and remain localised; the conclusion being forced that the bovine tubercle bacillus has little virulence for man. All observers, however, agree that the skin offers a very poor soil for the growth of tubercle bacillus as indicated by the slow evolution of skin lesions, and the small number of bacilli as a rule found in them. Chauveau failed entirely to infect calves by superficial scarifications and punctures even with the bovine bacillus, the nodules so formed often disappearing spontaneously; even the guinea pig, one of the most susceptible animals to the infection of tubercle bacillus resists invasion by the skin. Ravenal concludes that it is unfair to consider the local character of the lesions produced by superficial inoculation as an indication of lessened virulence for man.