was an attenuated form of the human small-pox, but that it was a specifically different disease. This belief was based chiefly on the many failures which experimentalists had incurred in trying to produce cow-pox in the cow by inoculation of this animal with human small-pox. It was equally true, however, that there had been many positive results, inasmuch as in a few instances there had been produced in the cow by inoculation of matter derived from the vesicles of human small-pox typical cow-pox, which on transmission to the human subject produced vaccinia and not variola, and on further transmission from human being to human being continued to produce vaccinia in all its typical characters. Thiele, Ceeley, Badcock, and, in more recent times, Voigt, Fischer, King, Simpson, Hime, he (Dr. Klein) himself, and Copeman had had unmistakable positive results. The argument which maintained that vaccinia was of a specifically different nature from human variola was faulty for two reasons. First, as a matter of actual experience, vaccination was now and then followed not simply by the production of a vaccine vesicle at the seat of insertion, but there appeared other additional vesicles even of the character of a general eruption ; this, though of rare occurrence, was nevertheless a strong argument for its derivation from variola. Secondly, the "breeding true" of vaccinia in the human subject through however many transmissions and the failure of a reversion of vaccinia into variola were completely paralleled by what occurred in a disease occurring in the sheep, and was in all respects homologous to variola-namely, variola ovina or sheep-pox. Protective inoculation was used against this disease with large success in the South of France, Austria and Germany. The lymph was "nursed" by local insertion through a succession of sheep, always producing a large local vesicle with mild constitutional symptoms. Such local inoculations had been practised over and over again, and as a general rule only at the places of insertion did a vesicle become formed; there was no general eruption, and, therefore, no reversion to the original type. It was clear from this that lymph derived originally from a vesicle of true variola of the sheep "bred true"-i.e., produced on transmission from sheep to sheep only local protective vesicles. If, however, this lymph were injected into the vascular system of a sheep, true variola might be the result. Cheauvau, he (the speaker) and others had had cases of this kind. But while the inoculation was made by cutaneous insertion, local vesicles only resulted. From this it followed that the argument because lymph derived from the cow and transmitted through human beings did not ultimately revert to variola, but produced a local vesicle only, in no way justified the conclusion that the two diseases, variola and vaccinia, were specifically different. The conclusion to be

drawn from this was that Jenner's original Dr. Klein then contention was established. briefly referred to the work of Pasteur on anthrax and foul cholera-a work which had been made possible by the discoveries of Koch. Satisfactory results in protective inoculations on the same lines as those pursued by Pasteur had been obtained in several-swine fever, swine erysipelas, etc.-but not in all infectious diseases. Unfortunately, not in all infectious diseases did one attack protect, although a first attack furnished, for a time at any rate, a certain resistance ; such was the case in diphtheria. In cases of acquired resistance or acquired immunity a condition was produced by the first attack by which the body was rendered unfit for a second attack. This sometimes happened after a mild first attack, but in other instances this only furnished a slight resistance, and in still others no resistance. In these two latter cases the resistance could be increased by repetition of the mild attack and by using the second time a somewhat stronger virus and producing a somewhat stronger effect, but still only a passing one; and after many repetitions in these cases the resistance thus acquired could gradually be increased to a high degree. It had been shown, both for animals and for man, that the immunity produced by artificial inoculation of attenuated culture or acquired in the natural manner by a first attack of the disease, was due to the presence in the blood of chemical substances produced in the course of the first attack ; these substances were capable of neutralizing the activity of the specific microbes. Moreover, it was found by Behring that the injection of blood serum of an immunized animal was capable of protecting an otherwise susceptible animal and of furnishing it with immunity, so that infection with the microbes of the particular disease was prevented. The degree of this protective or immunizing power of the blood of an immunized animal stood in direct proportion to the degree of immunity or resistance which that animal had acquired by the previous injection or by the previous attack. That in diphtheria the blood of an immunized animal possessed an immunizing or protective property in other animals had been fully proved, but it must be added at the same time that the protection thus produced was only of comparatively short duration. In the experiments in which the immunizing and protective action of the blood serum of an animal artificially immunized against diphtheria or tetanus respectively was ascertained, another important fact was elucidated by Behring, afterwards confirmed by a large number of workers-viz., that this serum not only possessed protective potency when injected into an otherwise susceptible animal, but that if injected into an animal in which the disease had already made its appearance it (the disease) could be cut short and