New York Meeting.

New York Academy of Medicine, April 19, 1933.

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A Pandemic of Rabbit-Pox.

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A recent outbreak of a highly contagious disease in our breeding colony produced such serious consequences that it seems desirable to direct attention to the infection. This report concerns the disease produced by natural transmission. The experimental infection and the causative agent have been studied by Pearce, Rosahn, and Hu.[1]

The first cases of the disease appeared in December, 1932, and within a month every animal in a colony of 1500 rabbits had been infected.

Clinically, the disease resembled small-pox in man. It was characterized by an elevation of temperature with a pock-like eruption of variable extent in the skin and mucous membranes and an incubation period of from 5 to 10 days. In typical cases, the first sign of infection was the appearance of erythematous spots; papules were then formed in these areas and later became umbilicated and covered by crusts. These lesions varied in size from minute points to nodules a centimeter in diameter; they occurred singly, in groups, or as confluent masses with extensive edema and in some cases were hemorrhagic. The papules occurred over the entire body but were most numerous in the ears, the eyelids and brows, the lips, the nape of the neck, the skin of the trunk, and the scrotum.

The mouth, nose, and pharynx were frequently the seat of large nodules, diffuse infiltrations, and ulcerative lesions which, in extreme cases, obstructed respiration and prevented eating. Such animals usually showed a mucopurulent discharge with the formation of brownish crusts about the nose and lips suggestive of snuffles or a clear blood stained secretion from the nose.

[1] Pearce, L., Rosahn, P. D., and Hu, C. K., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 894.

Eye lesions were of frequent occurrence and in some animals were the only visible manifestation of infection. The lymphoid system was invariably affected and one of the earliest signs of infection was enlargement and induration of the popliteal nodes. In males, the testicles usually showed a nodular or diffuse orchitis with edema of the scrotum.

Animals with severe infections showed obvious signs and symptoms of illness. Upper respiratory and buccal infections were accompanied by labored respiration, mouth breathing, and in protracted cases, by emaciation and weakness. Mild cases of infection were, however, asymptomatic and the existence of infection could be determined only by the most careful examination. Moreover, animals with extensive lesions often appeared to be in perfect health.

The course of the disease was variable. Death frequently occurred within a few hours after the first signs of infection were noted or after a period of days or weeks. Many animals recovered after severe infection, visible lesions healing with the formation of scars. The mortality rate varied with breed, sex, age, and physiological status. Among animals under 2 weeks of age, the mortality approximated 100%, but the rate decreased with age until, in normal adults, the mean mortality was less than 20%. In certain breeds, as the Himalayan, there were no adult deaths, while in others, as the Belgian, the breeding stock was decimated. Abortions were frequent.

The findings at autopsy were also variable and not always characteristic. The organs most consistently affected were the liver, spleen, and lungs.

In typical cases, the liver was enlarged, pale yellow or yellowish grey in color, firm in consistency, and showed a profusion of small, opaque grey or pearly white nodules. These were usually absent in fulminating cases. In some animals, the general appearance of the organ was not greatly altered and the focal lesions formed the most definite evidence of disease.

The spleen was enlarged, dark red in color, and firm, and usually showed focal lesions comparable with those in the liver.

The lungs were occasionally normal but as a rule showed either small focal lesions, areas of consolidation, or a lobar pneumonia. In exceptional instances, the entire lungs showed an acute, diffuse pneumonic process with clearly defined pearly grey or white focal lesions distributed throughout.

Focal or diffuse lesions were found in many other organs and

tissues such as the adrenals, ovaries, salivary glands, lymph nodes, bone marrow, subcutaneous tissues, fat, muscle, and periosteum.

Histologically, lesions showed a central area of necrosis with a surrounding zone of edema or hemorrhage and mononuclear cell infiltration. Inclusion bodies were not found.

In conclusion, it should be noted that during the terminal stages of the epidemic, the severity of the infection diminished greatly so that a large proportion of animals of the most susceptible age groups survived infections contracted at this time.

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Experimental Transmission of Rabbit-Pox by a Filterable Virus.

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Experimental transmission of the spontaneous rabbit-pox discussed in the preceding communication[1] was attempted early in the course of the pandemic. Since the result of bacteriological examinations together with the clinical picture of the condition made it appear unlikely that we were dealing with any of the usual bacterial agents, the initial experiments were carried out with Berkefeld "V" filtrates of various organs and tissues from rabbits showing well marked symptoms of the disease. In other experiments, unfiltered suspensions were used. The organs employed included: testicle, liver, spleen, lung, popliteal lymph nodes, brain, spinal cord, blood, and skin. Injections were made into the testicles of rabbits procured from outside sources.

The results of the first experiments were positive in that an orchitis and scrotal edema were pronounced within 48 hours, fever developed (105°-107°), the animals appeared ill, frequently a diarrhea was present, and death occurred in from 4 to 8 days. This condition has been produced successively from rabbit to rabbit by means of filtered material (usually testicle) and the agent is now in the fifteenth serial passage. Other routes of inoculation have also been successfully employed, namely, intracutaneous, subcutaneous, intravenous, intraperitoneal, intramuscular, intracerebral, and nasal and conjunctival instillation. By using small doses and certain

[1] Greene, H. S. N., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 892.