with fresh and inactivated rabbit serum. After allowing the mixture to stand for 24 hours at room temperature, following frequent shaking, healthy goats were inoculated subcutaneously with 2 cc. of each mixture. In every case the inoculated animals developed typical symptoms of rinderpest. In other experiments the mixtures were incubated at 37.5° C. for 6 hours before testing but there proved to be no virucidal activity of the immune goat serums.

Rabbits were injected intravenously with 20 cc. of rinderpest infected carabao blood and 24 hours later were bled from the heart, the blood being immediately injected subcutaneously into susceptible goats. In no case did rinderpest develop.

It appears from these experiments that goats are excellent animals for the experimental study of rinderpest; that goats which have recovered from rinderpest are immune to subsequent attacks of the disease but that the serums from such goats possess no virucidal properties for the virus of rinderpest *in vitro* when virus and immune serums are mixed in a ratio of one to four. Further it appears that while fresh rabbit serum is nonvirucidal *in vitro* for the rinderpest virus this virus is either quickly destroyed or entirely eliminated from the blood stream of healthy rabbits following intravenous injections of large quantities of rinderpest infected carabao blood known to provoke the disease in goats in dilutions of 1/10,000. Experiments of this nature are facilitated by studying the disease experimentally in this animal.

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Chloroform-Treated Tissue-Vaccine in Experimental Herpetic Encephalitis.

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During the past year Kelser[1] has prepared a chloroform-treated tissue-vaccine for rinderpest which is highly efficacious in protecting cattle and carabaos against this disease. Kakisaki, Nakanishi

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1 Kelser, *J. Am. Vet. Med. Assn.*, 1927, xxiv, 97; *The Military Surgeon*, July, 1927; Paper F. E. A. T. M., Calcutta, December, 1927; *Phil. J. Sci.*, 1928, xxxvi, 4.

and Nakamura[2] in Japan have also prepared a tissue-vaccine for this disease by treating the infected tissues with toluol, ether, etc. The vaccine prepared by the Japanese workers is difficult to administer because of its consistency and is also absorbed very slowly. In the Philippines the Kelser vaccine has now been adopted as the standard method of protection against rinderpest and its efficiency approaches 100%. In more recent work Kelser[3] has prepared a chloroform-treated tissue-vaccine for rabies.

Briefly the chloroform-treated tissue vaccine for rinderpest as prepared by Kelser consists of finely ground tissues (lymph glands, tonsils, spleen, liver) from animals killed in the acute stages of rinderpest. This tissue is diluted with equal parts of physiological saline and for each 100 cc. of tissue emulsion 0.75 cc. of chloroform is added. Such a vaccine can be used a few hours after preparation. Kelser prepared a tissue vaccine for rabies by the same method except that in this case he employed the infected brains of rabbits dying of rabies. Vaccinated rabbits were found to be immune to subdural inoculation of rabies virus after 2 and 3 subcutaneous injections of the chloroform-treated brain emulsion.

In the field of the filterable viruses we can learn much by comparing the properties of one virus with those of other viruses. We have attempted to immunize rabbits with chloroform-treated brain tissue vaccine prepared with herpes virus. Brains from rabbits dying of experimental herpetic encephalitis (Beckley strain of herpes was employed) were emulsified in physiological salt solution according to the method of Kelser and treated with chloroform in the quantities recommended by this author. After 24 hours the vaccine was administered subcutaneously to rabbits and in all 4 injections of 3, 3, 4 and 4 cc. each were given. After 10 days following the last inoculation the rabbits were tested subdurally with 0.2 cc. of a fresh emulsion of herpes infected rabbit brain. Contrary to the results reported by Kelser for rinderpest and for rabies none of our animals were protected and all developed typical herpetic encephalitis and died on the 5th or 6th day. Rabbits tested with the chloroform-treated brain vaccine by the subdural route remained normal.

Kelser believes that in rinderpest the chloroform destroys the virus, since injections of the vaccine into susceptible animals produces no symptoms. We are inclined to the view that the virus is not destroyed but rather attenuated or mitigated by the action of this reagent. Immunity to filterable viruses in general has only

[2] Kakisaki, Nakanishi and Nakamura, *J. Jap. Soc. Vet. Med.*, 1927, vi, 107.

[3] Kelser, (1928) in press. Personal communication.

been produced by living viruses and if killed virus in rinderpest produces immunity it stands alone as an example of this type. Kelser believes that some by-product in the tissue, perhaps of the nature of an aggressin, is responsible for the immunity produced. It seems more likely that a mitigated virus is responsible. We are unable to explain our results with herpes virus in view of Kelser's results with rabies virus but it is possible that herpes virus is more susceptible to the action of chloroform than are either the rinderpest virus or the rabies virus. In other words the herpes virus is probably destroyed by the action of this reagent and being so destroyed it is not capable of producing immunity. On the other hand since it has been suggested that some tissue product is responsible for the immunity produced by chloroform-treated tissue vaccines it appears that similar products are not present in the brains of rabbits dying of herpetic encephalitis.

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Leptospira Icterohaemorrhagiae in Wild Rats of the Philippine Islands.

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In so far as we have been able to learn epidemics of so-called infectious jaundice have never occurred in the Philippines. Indeed the writer has been unable to find any record in the various hospitals in Manila or in the Naval Hospital at Canacao of a single case of infectious jaundice associated with the presence of the *Leptospira icterohaemorrhagiae*. This is a curious observation in view of the widespread prevalence of this disease in Japan and Formosa and the extensive shipping communications which exist between these countries and the Philippines.

The wild rat is known to harbor this parasite in other parts of the world. In Japan nearly 50% of wild rats are infected and the disease is quite prevalent particularly from September to November each year. In the United States Jobling and Eggstein[1] found 10% of the wild rats caught in Nashville infested with this organism. Walch and Walch-Sorgdrager[2] have found 33% of rats in

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[1] Jobling and Eggstein, *J. Am. Med. Assn.*, 1917, lxix, 1787.

[2] Walch and Walch-Sorgdrager, *Am. J. Hyg.*, 1927, vii, 393.