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.

Baltimore harboring the organism, while Langworthy and Moore[3] report 40% to 60% for Albany. Brill[4] has reported 20% of field mice positive in flooded districts in Germany. Noguchi has reported the presence of this parasite in rats caught in New York City and from time to time there have been clinical reports of the disease emanating from that city. Only recently Cushing[5] has reported 2 cases of infectious jaundice in New York City from which cultures from the urine yielded the organism in both cases and from the cerebrospinal fluid in one case.

While it now appears that the *Leptospira icterohaemorrhagiae* and the so-called *Leptospira icteroides* may be identical organisms and that the latter may be etiologically unrelated to yellow fever,[6, 7] it still remains that from the clinical standpoint infectious jaundice is an important disease, not only on its own account but because of its similarity to yellow fever. It becomes then quite important to know the distribution of this parasite.

Nearly a year ago we began a systematic examination of the wild rats caught in and around Manila in order to determine the presence or absence of this parasite. Since most of the shipping to the Philippine Islands comes to Manila we believe that rats caught in this vicinity are representative of those elsewhere in the islands in so far as this question is concerned. During this period we have examined 250 rats which were caught alive and brought to the laboratory for examination.

Our method of examination has consisted of (1) bleeding the rats from the heart (usually the blood from 6 rats was pooled) and injecting guinea pigs intraperitoneally with from 5 to 8 cc. of the pooled citrated blood; (2) the urines from each rat if possible were examined under dark field for spirochetes; several samples of the pooled citrated blood were examined by dark field; (3) half of each kidney was emulsified in physiological saline and examined under the dark field following which guinea pigs were inoculated intraperitoneally with the emulsion; (4) and finally the other half of each kidney was fixed in formalin and sections were prepared and stained according to Levaditi's method for examination.

In rat series 192 to 197 the pooled blood contained spirochetes and guinea pigs receiving 5 cc. of blood intraperitoneally from this series of rats developed typical jaundice and cultures of *Lepto-*

[3] Langworthy and Moore, *J. Infect. Dis.*, 1927, xli, 70.

[4] Brill, *Münchener med. Woch.*, 1927, lxxiv, 1537.

[5] Cushing, *J. Am. Med. Assn.*, 1927, lxxxix, 1041.

[6] Sellards, *Am. J. Trop. Med.*, 1927, vii, 71.

[7] Stokes, Bauer and Hudson, *J. Am. Med. Assn.*, 1928, xc, 253.

*spira icterohaemorrhagiae* were obtained from the kidneys of the dead guinea pigs. Healthy guinea pigs inoculated with kidney emulsion of these animals developed jaundice. The cultures from the original guinea pigs unfortunately became contaminated and were lost. We were never able to use these cultures for experimental infections and did not attempt to isolate others since we were interested solely in determining the presence of the parasite. Subsequent examination of over 50 rats has never resulted in another positive result. None of the kidney sections have shown spirochetes. From the morphological, pathological and cultural characteristics of these spirochetes we feel certain that they are *Leptospira icterohemorrhagiae*.

Schüffner and Kuenen[8] have shown that leptospira are found to be more prevalent in old rats than in young rats. Fully one third of the rats examined by us were young rats. It is doubtful if more than one rat of the 6 composing series 192 to 197 was infected in view of the apparent rareness of the infection in our whole series. This, of course, cannot be determined.

The paucity of the *Leptospira icterohemorrhagiae* in the wild rats of the Philippines is in harmony with the clinical records regarding infectious jaundice. One may estimate that probably not more than 1% of the Philippine rats are infected with this parasite and perhaps this figure is high. Certainly infectious jaundice is not a clinical problem in the Philippine Islands and in view of this study there appears to be an adequate explanation for this.

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## A Method for Experimental Production of Chronic Abscess of Lung.*

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In the attempt to produce in an experimental animal an abscess of the lung that is identical with the postoperative pulmonary abscess in man, we considered the factor of chronicity to be of major

[8] Schüffner and Kuenen, *Nederl. Tijdschr. v. Geneesk.*, 1923, ii, 2018.

* Presented at the Fifteenth Reunion of the Peter Bent Brigham Hospital, Boston, April 27, 1928.