

Hawaiian Islands, an incidence of .3%. These hogs were kept in concrete or wooden pens and fed cooked garbage. In this same area 13.6% of 44 wild hogs were infected with trichinella. Cameron¹¹ found only .2% of 955 diaphragms from garbage-fed hogs in Canada contained this parasite. In Canada all garbage-feeding hog ranches are required to be licensed and inspected and all garbage is cooked prior to feeding. The low figures found in the Hawaiian Islands and Canada suggest strongly that the cooking of garbage and careful inspection of hog ranches are sound procedures for preventing much of the trichinosis in hogs.

Summary. The diaphragms of 495 garbage-fed hogs received in 2 abattoirs of San Francisco showed 20 or 4.04% infected with *Trichinella spiralis*. This figure is comparable with similar surveys of garbage-fed hogs in other areas of the United States. It is 20 times higher than found in garbage-fed hogs in Canada where garbage is cooked before feeding.

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Recovery of Virus Morphologically Identical with Psittacosis from Thiamin-Deficient Pigeons.

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The virus to be described here was recovered from young pigeons purchased in South Carolina. These pigeons, which were between 6 and 8 weeks old when received, were kept on a diet of mixed grain for one or 2 weeks, and then put on the following diet: Vitamin-free casein—180 g; cod liver oil—40 g; peanut oil—50 g; salt mixture—40 g and corn starch—580 g. Eighteen to 20 g of the above mixture was introduced daily by tube into the crops of the birds. The original purpose of these experiments was to study the changes produced in the central nervous system of the birds on this diet. These results have already been reported.¹

In the majority of birds kept on the above diet, vomiting occurred on and after about the eighth day, opisthotonus began usually on the fourteenth day, and death rarely occurred before the twenty-first day. Occasional birds, however, developed leg weakness or opistho-

¹¹ Cameron, T. W. M., *Canad. J. Res., Sect. D*, 1940, **18**, 83.

¹ Swank, R. L., *J. Exp. Med.*, 1940, **71**, 683.

tonus between the sixth and tenth days, and died a day or two thereafter. In such birds, fibrinous peritonitis and pericarditis, with or without enlarged hemorrhagic livers, were occasionally observed. Since these organs and exudates appeared sterile when planted in ordinary bacteriological media, mice were injected intracranially in an attempt to determine the cause of the condition.

From the exudate or ground-up organs of 4 pigeons a serially transmissible virus was recovered by this method which killed mice 2 to 4 days after intracranial injection. Histological examination of the brains of these mice showed a well marked chorio-meningo-encephalitis, mononuclear cells predominating in the inflammatory exudate. Within the mononuclear cells, large numbers of minute intracellular bodies having the typical appearance and arrangement of the bodies seen in psittacosis were observed. Similar bodies were later found in large numbers in the exudate on the surface of the livers in 2 of the pigeons from which the mice were injected.

Nature of Virus. Morphologically the picture was identical with that of psittacosis. The appearance of the intracellular bodies in this disease is so well known that it seems unnecessary to illustrate it in this paper. In view of the fact that the appearance of cells infected with this virus is unique and not duplicated in any other infection, it seemed justifiable to conclude that our virus was closely related to, if not identical, with that of psittacosis. Cross-immunity tests with known psittacosis virus were, however, not carried out because of the fact that the virus was lost through too great reliance on its preservation in glycerine. (In early experiments it persisted, with some loss of virulence, for more than 8 weeks.)

Biologically our virus differed from typical strains of psittacosis virus in the fact that it was pathogenic for mice only when introduced intracranially. Intraperitoneal or subcutaneous injection of large doses of the virus had no apparent effect. Whether this atypical behaviour was due to a modification of the virus or merely to a partial loss of virulence was unfortunately not determined. Recent attempts to obtain the virus again from pigeons purchased from the same dealer have not been successful.

Frequency of the Infection. From a total of 400 pigeons on the deficient diet, the presence of the infection was proven by mouse injection in only 4 instances. In 16 other birds, however, presumptive evidence of infection, in the form of hemorrhagic livers or fibrinous peritonitis, was noted. Exact figures cannot be given because all birds were not examined post-mortem, but less than 10%, and probably no more than 5% of the deficient pigeons showed

apparent infection. No tests for inapparent infection were made. Six of the presumably infected birds and 2 of those proven infected, were found in one group of 24 pigeons purchased in March, 1938.

Relation of the virus infection to the dietary deficiency. All birds studied were in apparently good health when received, and remained in good health during the preliminary period of one to 2 weeks on normal diet. Moreover, no birds died during their first 4 or 5 days on the diet, but all deaths from the infection occurred before the twelfth day on the diet. The relative constancy of the period of deficient diet preceding manifestations of infection suggested a relationship between the deficiency and the infection similar to that shown to exist between riboflavin deficiency and experimental typhus fever in the rat.²

Summary and Conclusions. A virus closely related to, if not identical with that of psittacosis was isolated from about 5% of 400 pigeons on a thiamin-deficient diet. The observations made suggest: 1. That pigeons should be added to the list of birds naturally infected with psittacosis virus and therefore of possible importance in the epidemiology of the disease, and 2. That thiamin deficiency may be capable of changing a latent infection with psittacosis virus into an active stage, with consequent danger of spread to other birds and to man.

Acknowledgment should be made of the assistance of Dr. T. M. Rivers who kindly examined our sections and stated that the intracellular bodies seemed identical with those of psittacosis.

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Effect of Undernutrition on Thyroid Tissue Respiration of Guinea Pig.*

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In a previous publication¹ it has been shown that undernutrition in the guinea pig results in marked structural changes in the thyroid

² Pinkerton, H., and Bessey, O. A., *Science*, 1939, **89**, 368.

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¹ Stephens, D. J., *Endocrinology*, 1940, **26**, 485.