FOWL TUBERCULOSIS IN SWINE.

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It is the purpose of this paper to briefly report the result of investigations started in 1922, which throw some light on the susceptibility of swine to avian tuberculosis as well as the occurrence of the avian type of the disease in market hogs at the time of slaughter. For nearly a quarter of a century it has been known that pigs were slightly susceptible to avian tuberculosis, though the practical significance of avian tuberculosis to swine in the United States, at least in the Middle West, was not appreciated until after the nation wide program for eradicating bovine tuberculosis was started in 1917. At this time authoritative opinion estimated that a larger part of avian tuberculosis and probably as high as 90 per cent of the infection was due to association with infected cattle or from feeding unpasteurized milk or milk products from creameries.

As a result avian tuberculosis in fowls, though prevalent in many localities in Illinois, received little attention until the federal state plan for the suppression of tuberculosis in cattle was modified to a county area basis. This plan as first adopted in Illinois in 1920 provided an opportunity for federal and state inspectors to observe the prevalence of tuberculosis in fowls as well as the intimate contact between infected flocks and other farm animals. In some instances where irregularities in the eradication of the disease in individual herds of cattle were encountered it became apparent that infected fowls were suspected as a possible source of infection to other animals on the farm.

Experiments were planned to obtain information regarding the danger of tuberculous fowls associating with healthy non-tuberculin reacting pigs and calves. Exposure provided experimental pigs was in some instances analogous to natural exposure under farm conditions though other pigs were fed and injected with Mycobacterium tuberculosis (avian). The results of these preliminary exposure tests and later the findings in lymph glands of market hogs from Illinois farms, slaughtered at the Chicago and East St. Louis packing houses, contributed evidence which serves to emphasize the importance of avian tuberculosis in swine and the approaching need of a systematic and practical plan for eradicating this type of tuberculosis in the Middle Western States.

The preliminary observations including the feeding and injection of Mycobacterium tuberculosis (avian), involving the use of approximately 100 pigs in more than 30 separate tests yielded consistent evidence of the susceptible character of swine to avian tuberculosis which may be summarized as follows:

SUMMARY OF PRELIMINARY EXPOSURE TESTS.

1. Pigs are susceptible to avian tuberculosis through direct or indirect exposure.

(a) A single feeding of Mycobacterium tuberculosis (avian) may induce the disease in pigs.

(b) A single feeding of the tuberculous organs of chickens may produce lesions of tuberculosis in pigs.

(c) A single intravenous injection of Mycobacterium tuberculosis (avian) may produce lesions of tuberculosis in the liver and lungs of pigs.

(d) The daily feeding of grain contaminated with feces of tuberculous fowls may produce lesions of tuberculosis in pigs.

(e) Healthy non-tuberculin reacting pigs placed in houses in which tuberculous chickens were previously confined contract tuberculosis. Contaminated quarters appear to be much less infective to swine than association with tuberculous chickens as judged at autopsy by the number of exposed animals that were infected as well as the number and size of tubercles in the lymph glands.

2. English sparrows and pigeons in the vicinity of tuberculous chickens may show hepatic or spleenic lesions of tuberculosis at autopsy. Several naturally infected sparrows and a few infected pigeons coming to our attention were unable to fly, though apparently

healthy flying pigeons that were shot a distance of over a mile from known infected premises showed gross lesions of tuberculosis at autopsy.

(a) Naturally infected tuberculous sparrow cadavers proved infective to chickens and pigs, via the mouth, suggesting that wild birds do not necessarily alter the virulency of the avian virus and that through their feeding habits they might carry avian tuberculosis from farm to farm.

(b) No evidence of a rapidly spreading tuberculous infection among sparrow or pigeon flocks was obtained to suggest that the disease is communicated from sparrow to sparrow or pigeon to pigeon to perpetuate the disease in flying birds.

3. Wild rats proved slightly susceptible to avian tuberculosis but no evidence was obtained to suggest that the disease appears spontaneously among wild rats on or adjacent to infected premises, or that the experimental disease in these animals is characterized by anatomic lesions of tuberculosis.

4. Autopsy of pigs experimentally infected with avian tuberculosis showed the lesions encountered to be local and benign in character and confined to the lymph glands. The mesentery lymphatic glands were the most common site of infection. Pigs appear more susceptible than mature swine.

5. Pigs infected with avian tuberculosis may communicate the disease to healthy non-tuberculin reacting pigs by continuous direct association. The rate of transmission from infected pigs to healthy pigs through association appears to be slower than from infected chickens to pigs following comparable contact.

(a) Seventeen or 22 percent of 77 rectal scrapings obtained over a period of three months from 10 reacting pigs infected through association with tuberculous fowls and which later, at autopsy, showed mesenteric lesions of tuberculosis, produced lesions of generalized tuberculosis following injection into healthy non-tuberculin reacting chickens.

AVIAN TUBERCULOSIS IN MARKET HOGS.

The positive experimental evidence obtained in transmitting avian tuberculosis to pigs suggested the advisability of examining tuberculous lymph glands from naturally infected swine from the Chicago and East St. Louis markets. According to the Sanitary Committee of the Chicago Livestock Exchange, federal meat inspection retentions in swine at the Chicago market had

TABLE 1.

SWINE RETAINED FOR TUBERCULOSIS.
Chicago Market, 1908-1921.

Hogs			
Slaughtered	Retained		4 8 12 16 20 per cent
6,110,746	230,478	1908	3.77 per cent
6,172,124	258,224	1909	4.18 per cent
4,831,848	256,577	1910	5.31 per cent
5,394,544	408,709	1911	7.58 per cent
6,227,730	534,829	1912	8.59 per cent
5,843,182	566,779	1913	9.70 per cent
5,917,396	665,443	1914	11.24 per cent
6,548,442	816,020	1915	12.46 per cent
7,343,746	1,161,339	1916	15.81 per cent
7,550,530	1,229,297	1917	16.28 per cent
6,692,697	1,016,171	1918	15.15 per cent
8,359,895	1,104,631	1919	13.21 per cent
6,772,692	1,018,632	1920	15.04 per cent
6,311,332	1,117,307	1921	17.70 per cent

increased from 3.77 per cent in 1908 to 17.70 per cent in 1921. (See Table 1, page 6.) During this time the disease in cattle had been reduced, suggesting the possibility of other sources of tuberculosis in swine, than tuberculous cattle.

In 85 separate specimens of tuberculous swine glands taken from 85 carloads of hogs, a total of 6,041 animals, 1038 or 17.18 per cent were retained, 37 or .61 per cent were sterilized and 12 or .19 per cent were condemned (See Table 2, page 8). The results of typing these specimens are summarized in Table 3, page 8. Twenty-three of the 85 tuberculous lymph glands or 27 per cent failed to yield definite results. Of the 62 that could be definitely classified 51 or 82.2 per cent were avian type, 7 or 11.2 per cent were probably avian and mammalian mixed, though this deduction is made upon a single inoculation and no attempt was made to further pass the virus, while 4 or 6.4 per cent of the specimens proved indistinguishable from the mammalian type.

SUMMARY.

The virus of fowl tuberculosis may be commonly found in swine in some districts of Illinois. This form of the disease appears to be one of the important sources of swine retentions at the Chicago and East St. Louis markets. Infected flocks of poultry are probably the principle sources of avian tuberculosis in swine, though the

TABLE 2.

Disposition of Tuberculous Hogs Examined from Chicago and St. Louis Markets.

Group I.

Hogs Slaughtered		1000 2000 3000 4000 5000 6000
85 carloads	6041	
H Retained	1038	17.18 + per cent
H Sterilized	37	.61 + per cent
H Condemned	12	.19 + per cent

danger of this type of disease in breeding animals being perpetuated independent of direct association with tubercular flocks of poultry should probably not be disregarded.

TABLE 3.

RESULTS OF TYPING TESTS OF TUBERCULOUS LYMPH GLANDS FROM SWINE IN CHICKENS AND GUINEA PIGS.

Group I.