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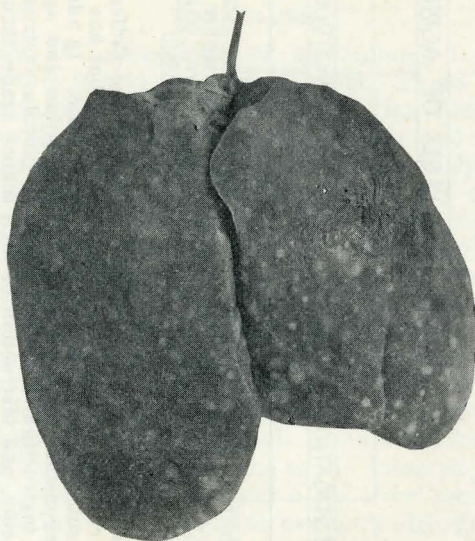
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**THE UNIVERSITY OF NEBRASKA
AGRICULTURAL COLLEGE EXTENSION SERVICE**

March, 1923

Extension Circular 1415

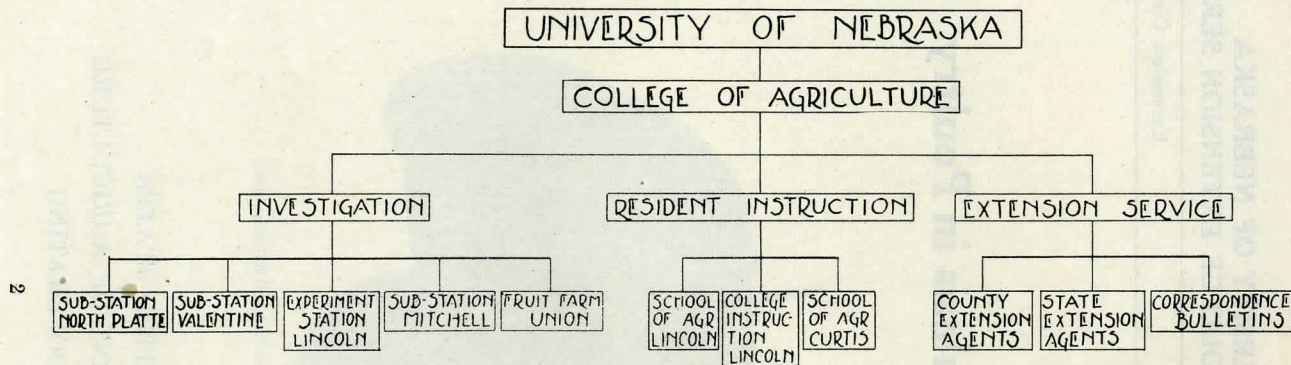
Tuberculosis in Poultry



Tuberculosis of chicken liver

**UNITED STATES
DEPARTMENT OF AGRICULTURE
COOPERATING**

THE COLLEGE OF AGRICULTURE AND ITS ACTIVITIES



This chart shows in graphic form the organization of the College of Agriculture. The College of Agriculture is one of ten colleges in the University of Nebraska, but has its own campus and buildings at Lincoln, besides experimental substations in various parts of the State. In addition to the customary instructional work of a college, it is responsible for experimental investigation and agricultural extension work. The instructional work includes instruction of college grade at Lincoln, instruction of high school grade thru the School of Agriculture at Lincoln, and instruction of high school grade thru the Nebraska School of Agriculture at Curtis. Experimental work and farming investigations are carried on at the main farms at Lincoln, and substations at North Platte, Valentine, and Mitchell, and at the fruit farm at Union. The Agricultural Extension Service represents the intimate contact between the college and the farmers of the State. This includes demonstrations by county and state extension agents, the distribution of bulletins, and practical service to the farmer, such as the answering of inquiries by mail.

TUBERCULOSIS IN POULTRY

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One of the most important diseases of farm animals is tuberculosis, and, while it inflicts the most damage to cattle and swine, its occurrence among poultry is also sufficiently common in Nebraska to require the attention of all who are interested in the raising and keeping of chickens and turkeys. It is especially among those kinds of fowl that the disease is most frequently found. It is rarely seen in ducks and geese, but outbreaks among pigeons have been described.

THE CAUSE

The cause of tuberculosis of all animals is the tubercle bacillus; and this is also the case in birds. There are, however, certain variety differences between the avian bacillus and the ones which produce the disease in man, cattle and swine. Those differences manifest themselves principally in the disease-producing qualities of the germs with which we are concerned. It is very difficult, if not impossible in most cases, for mammals to contract tuberculosis from birds, while the tubercle bacilli of human and bovine origin will not produce the disease in fowls in a typical manner. Furthermore there are also certain differences in the manner the various organisms grow in the laboratory and by which it is often possible to distinguish them. Cross-infections have, however, been observed, and it would be folly to disregard this fact when we are confronted with the disease.

The bacillus of bird tuberculosis is quite resistant to adverse influences. It remained alive in the soil of infected poultry yards for long periods after the diseased birds were removed and the germ is only killed slowly by the ordinary disinfectants.

The germ does not multiply outside of the body of the infected animal, and hence we may be quite certain that one case of fowl tuberculosis always has its origin in the direct or indirect contact with an infected bird.

THE TRANSMISSION

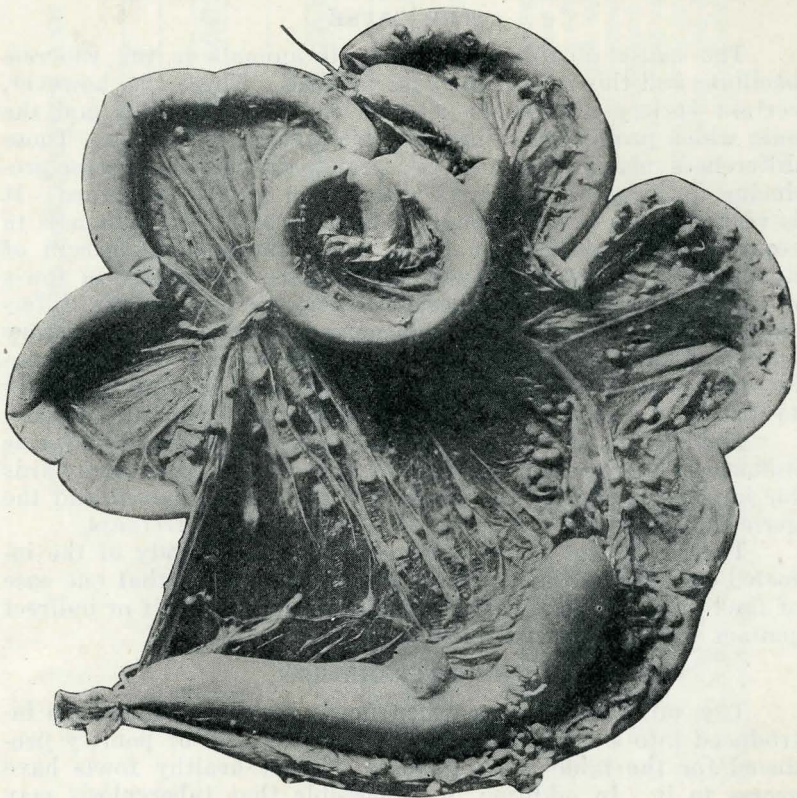
This often takes place when newly-purchased birds are introduced into a healthy flock or when the offal of poultry produced for the table is so disposed of that healthy fowls have access to it. In addition, it is possible that tuberculosis may be carried to a healthy flock by such flying birds as pigeons and

sparrows, both of those species being quite susceptible to the disease.

Once tuberculosis is introduced into the flock further spread comes about almost exclusively by droppings of the infected birds contaminating the feed and drinking water of the remainder. Other means of infection are, of course, possible, but for practical purposes it is sufficient to regard the disease as always being of alimentary origin.

THE LESIONS

The name tuberculosis indicates that the chief characteristic of the disease is the formation of tubercles or small nodules. This nodule formation is seen in all typical forms of the disease in all animals, including the birds. The nodules occur as whitish,



Tuberculosis of intestines and mesentery of chicken

grayish or pearly spherical bodies either in the depths of an affected organ, or protruding from the surface if some of the internal covering membranes are involved. Commonly of millet seed size, they always have a tendency to form conglomerations, which afterward may become of considerable size. They are composed of a cheesy substance. In birds, the liver, spleen and intestines are the common seats of the disease, but no organ is exempt, and not uncommonly tuberculosis affects bones and joints.

THE SYMPTOMS

As a rule the disease is quite far advanced before it manifests itself by visible signs. Then the affected birds may be noticed to have suffered a very marked loss of flesh. When we pick them up we are struck with their extreme lightness. Not uncommonly such birds are dull and their feathers are rough and without the gleam of a normal state of health. Comb and wattles are pale and lameness is a frequent accompaniment of the disease.

THE DIAGNOSIS

While the manifestations of disease, described above, may lead one to suspect the existence of tuberculosis, they are by no means conclusive, while furthermore, the slightly or moderately affected animals will escape recognition altogether, if we were to depend on the presence of distinct symptoms. If it is only a question of establishing the presence of the disease in the flock, the killing and subsequent examination of suspicious birds will usually be sufficient, but when we desire to cull out the infected fowls we have only one way open and that is the application of the tuberculin test.

Under ordinary circumstances, and when no fowls of extraordinary breeding value are involved, most owners will prefer to sacrifice the flock and start anew after cleaning up, but there is no doubt that the tuberculin test will be valuable if an outbreak is to be managed conservatively or when it is deemed important to challenge the freedom from tuberculosis in newly procured fowls.

The tuberculin test, which was found to be useful in chickens, consists in the introduction of a small quantity of tuberculin, prepared from the avian tubercle bacillus, into the skin of one of the wattles or of the comb. A small hypodermic syringe is used for the purpose and care must be taken to insert the needle into the proper place. This place is the layer of the true skin immediately below the epidermis. Only when we succeed to inject the tuberculin at that place can we expect success. If we

inject too deeply no reaction occurs in even a diseased bird, and when we inject too superficially the fluid is apt to burst thru the epidermis, and this also would render a reaction impossible. As a rule one succeeds better with attempting the injection into the wattle, which has the further advantage that in case of positive reaction the latter is more clearly marked.

The quantity of tuberculin to be injected is usually determined by the tissues themselves; about so much can be injected, but no more. A small quantity in a positive case gives as good a reaction as a larger one. The injected birds are to be examined for results 24, 36 and 72 hours after the introduction of the tuberculin. If a reaction is present the injected parts have become swollen. This swelling, however, varies considerably in degree. It may be quite small, but with properly made injections there is usually no difficulty in arriving at a correct conclusion. The typical reaction swelling is not one of congestion and not uncommonly the red color of the tissues has become much paler under the effect of the reaction. In the middle of the swollen area the color leans toward a distinct pale yellow which gradually merges into the dirty, greenish red toward the edges of the enlargement. The reaction is commonly at its height about 48 hours after the injection, but it frequently persists for a day or two longer. The test is fairly accurate, especially so in the hands of one who has acquired skill in applying it. Yet, like in all tuberculin tests, it will occasionally happen that an affected animal fails to react.

THE PREVENTION

The prevention of avian tuberculosis is above all based upon the fact that the disease primarily depends on the introduction into birds or flock of the tubercle bacillus and that this organism almost exclusively is transported from place to place by infected birds or their parts.

When we are reasonably certain that a flock is free from the disease, prevention is in the first place dependent on the exclusion of infected fowls from the premises. This may be done either by procuring new stock from flocks known to be free from tuberculosis or by subjecting the new birds to the tuberculin test as described above.

A further source of infection to be kept in mind is connected with the use of the undrawn fowls of unknown origin for table use. On our farms this is, of course, not a very common practice, but in our cities and villages this danger is by no means negligible.

Even in the case in which the fowls are bought in a drawn condition, the finding of a liver with tuberculous nodules is usually sufficient to consign that part, if not the whole carcass, to the garbage can or pile where healthy birds may find it and consume it. On account of this danger all offal, no matter what its condition, should be destroyed by burning in stove or furnace.

To what extent flying birds visiting poultry yards are a means of transmission we do not know. Probably it is a factor in exceptional cases only, yet it seems wise to keep its possibility in mind, especially in connection with pigeons.

Altho the tuberculosis germ has been found in eggs, it is probable that eggs purchased for hatching do not constitute a very potent source of danger.

The common occurrence of tuberculosis in cattle and swine naturally brings up the question in how far the offal of such animals used for poultry feed may be an element of danger. We know that it is a very difficult thing to transmit mammalian tuberculosis to fowls, yet we believe that a little caution in this respect will not be entirely thrown away. Poultry growers find meat and bone scraps an excellent feed and it appears to be a good practice to boil this material before feeding. This will absolutely remove all infection danger.

While it is not difficult to keep a healthy flock free from infection, the eradication of tuberculosis from an infected flock is by no means an easy matter, if it is to be done in a conservative manner. The management of a diseased flock may be undertaken along three distinct lines. In the first place we may proceed in a radical manner and kill off the entire flock, clean and disinfect yards, houses, eating and drinking utensils and restock with healthy poultry, after a considerable period. In small flocks or in those not having a particular breeding value, this method is by no means always objectionable and may be even the most economical one. The birds sacrificed are not a total loss because the ones not diseased or only slightly so can be used for table purposes. In summer the carcasses can be preserved by canning, while in winter it is often possible to keep them in frozen condition until wanted for the table.

When it is deemed necessary to preserve the flock as much as possible, the diseased and healthy birds may be separated by means of the tuberculin test. All birds showing a positive or even a doubtful reaction should, of course, be sacrificed. The healthy birds should be taken to non-contaminated quarters and the premises; etc., subjected to a thoro cleaning and disinfection. If the older birds be likewise eliminated this method gives

good results in the hands of persons having skill in the application of the tuberculin test.

The third plan is of less value, as under its operation it is only possible to keep the number of diseased animals down to a minimum. It depends upon the fact that in infected flocks the older birds furnish the greatest number of tuberculosis cases. If we now constantly eliminate the birds of two years old or older, the greatest number of diseased birds will be materially reduced, while in consequence the infection danger for the healthy fowls will be lessened in proportion. While this method will serve as a makeshift, it cannot be especially recommended, because there is always the possibility of a rapid spread of the disease among younger birds.

The elimination of the older birds is always a good practice and will undoubtedly help to retard the spread of tuberculosis. In addition, it is good poultry husbandry because as a rule older birds do not pay for their keep.

With a view to tuberculosis and its prevention, value must be attached to sanitary management of the flock. Cleanliness of pens, houses, and eating and drinking utensils, well-lighted and ventilated houses, have an excellent influence on the general health of the flock as well as upon the resistance of the birds to infection. Overcrowding should be especially avoided because should an infected bird be present the intimate contact with many birds in close quarters is the best possible factor for a rapid spread of the disease.

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