COMMON DISEASES OF TURKEYS

By W. A. BILLINGS

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Common Diseases of Turkeys

W. A. BILLINGS

WE PREPARED Extension Bulletin 124, "Talking Turkey," with the express purpose of helping you to keep OUT of trouble. If, however, you have been cutting too many corners and disaster has overtaken you, the following disease discussions may help. If you do not already have a copy of Extension Bulletin 124, a post card will send it on its way to you.

PULLORUM DISEASE

This is a disease many growers still call "white diarrhea." The latter name is undesirable for two reasons. First, the affected birds often show no diarrhea at all and, besides, the discharge from the bowels does not have to be white by any means. Up to 1928 no one ever heard of pullorum disease in turkeys. It was of course very common in baby chicks. That year, here at the Minnesota Experiment Station, pullorum disease was first reported in little turkeys. Since that time, during which the turkey business has become highly specialized, its existence in turkeys has been generally accepted. It now takes its place among the common diseases the turkey grower must contend with. The tremendous increase in turkey population and the interchange of breeding stock, together with the entrance of the commercial hatchery into the picture, have all contributed to the spread of the infection.

Pullorum disease is both contagious and infectious. Deaths from it usually begin shortly after the birds are hatched. This may be during the first two or three days of the poult's life. As a rule, if the birds remain well for the first two or three weeks there is little danger from then on.

Pullorum disease shows itself as a digestive disturbance with or without evidence of a diarrhea. Some of the poult's may appear loose and "pasted up behind" while others show none of this whatever. The actions of pullorum-affected poult's mean very little. One must remember we are dealing with infant turkeys whose constitutions are none too robust and the slightest drain on their delicate intestinal tracts is usually fatal. Poult's are commonly said to be "droopy." They stand around humped up and shivery, often huddling in clumps about the brooder stove. As a rule, when birds die in considerable numbers shortly after being placed in the brooder house one might reasonably suspect pullorum disease. However, snap judgment or on-the-spot diagnosis is generally impossible. One might make a guess, but a laboratory test is necessary to make sure.

Pullorum disease is largely transmitted through the old hen carriers. You see, it's like this: when an outbreak of pullorum occurs, as many as 50 per cent or more of the poult's may die while some of the sick ones may recover, grow up, and be carried over as breeders the following year. Many of these recovered birds carry germs of pullorum disease in their egg-laying organs or ovaries. In the spring, eggs
from these birds may contain the germs and the poults hatched from such eggs are infected at birth

One often hears the statement that pullorum is an inherited disease This is not strictly true, but you can readily see how one might get this impression. The fact that some birds recover from pullorum disease and act as carriers when they grow up complicates the situation and makes it possible for pullorum disease to appear in a flock year after year. The infection remains within the flock until the carriers are removed. I often think that if I had an outbreak of pullorum disease in my own flock, I would as soon they all died because some of those that apparently recover will doubtless be carried over in next year’s breeding flock. This, in turn, may start another outbreak the following year.

No Cure Known

Dismal as it may sound, there is no cure for this trouble. There are innumerable guaranteed cures. Most of them are designed to color the drinking water a beautiful purple color but give no relief except perhaps to the worried owner. Our national optimism makes the discouraged caretaker easy prey to all sorts of concoctions. This type of preparation is so profitable that nearly every corner store has a half dozen cures on the shelf.

So far as help for the sick birds is concerned, my own advice is pretty lame. The usual cleanup methods are advised. Remove all sick birds as fast as they appear. Use a cheap, easily disposed of litter (such as straw) on the brooder house floor and change it daily. Scald the drinking and feeding dishes daily. This should aid in preventing the spread of germs to other poults born healthy but exposed to the disease from the droppings of the sick birds. The infected droppings from the ailing birds mix with the feed and water, making it a simple matter for well birds to contract the disease. All the birds that sicken and die do not have to originate from eggs laid by infected hen mothers. Perhaps in a brooder house full of poults only a dozen or so birds are hatched from infected eggs, but these succeed in contaminating the feed and water and thus other birds become sick.

Test Breeding Stock

All this may sound a bit hopeless at first, but it isn’t quite so bad as that. As far as the present sick group is concerned, the immediate outlook is bad, but for the future, much can be done to prevent a repetition of the calamity. We may and should see that our breeding stock the following fall is tested for pullorum disease and all the diseased birds removed. Do the testing quite early in the fall before the final selection of breeders is made. Allow time for retests, in case many reactors are found. Only by testing and removal of carrier hens can we hope to cope with this difficult situation. The chicken raiser has been up against this for years. Turkey growers, being a very progressive sort, will doubtless adopt the testing program without much ado. Many breeders and hatcheries are already embarking on testing programs and frequently advertise their output as from pullorum tested stock. A careful testing routine will give one reasonable safety from this disease.

There is another factor we must not overlook. Pullorum disease is primarily a disease of chicks. Eggs from tested turkey hens should not be hatched in the same machine with untested eggs because infection can easily take place in the brooding compartments. It would be ideal if commercial hatcheries did their turkey hatching and brooding in a separate building from the chicks or at least in an isolated part of the hatchery. There are some hatcheries that receive nothing but eggs from tested flocks. It would be a hardship to
the flock owner to dump the eggs from his tested birds in with a batch of eggs coming from untested birds. It might turn out all right and then again it might not, especially if the untested eggs came from an infected flock. Keep this in mind.

**Coccidiosis**

Here again we have a disease which originally belonged to the chicken family, but has now invaded the turkey world. Some growers find coccidiosis hard to pronounce. Try it this way—cock-sid-e-O-sis. Put the accent on the “O.” It is quite easy once you get the hang of it. Coccidiosis usually affects turkeys when they are from two to six or eight weeks of age. Of course you may stretch this a bit one way or the other. The first two common diseases little turkeys encounter might be pullorum or perhaps paratyphoid. These usually occur soon after they are hatched. Next in line would come coccidiosis. This disease does not rain down. It is caused by a specific parasite or coccidium. It is commonly called a “soil-borne” disease because the tiny parasites causing it pass out in the droppings of the sick birds and mix with and lie in the soil for several months waiting for some small turkey to pick them up, perhaps the following season.

**Only Visible under Microscope**

There are a great many varieties or species of coccidia. Many of them are supposed to affect chickens exclusively. However, turkeys have two or three private ones of their own and no doubt more will turn up as time goes on. It is also quite possible that turkeys may adapt themselves to any or all of the so-called chicken varieties. This will only serve to make matters worse. Coccidia are very small and can be seen only under a microscope. One could put a million or two on a fingernail. Under the microscope they appear egg-shaped, much like a cross section of a hard-boiled egg, having a distinct outer shell and a yolklike center. Literally millions of these tiny parasites pass out daily in the droppings of the sick poult. Sometimes a poult will recover from an early attack but still carry many of these parasites or coccidia in its intestinal tract. These pass out from time to time and contaminate the soil or drinking water. Baby turkeys raised with hens often become infected from the droppings of their own mothers.

As in other infant diseases of turkeys, symptoms of coccidiosis must not be taken too seriously. We must first take into consideration the age of the poult. Usually they are between two and six weeks of age. They just look pretty sick. They may stand about in sleepy attitudes, teetering back and forth like drunken men. The feathers are rumpled and a diarrhea may be noticed. Most everyone thinks bloody droppings are a dead-sure sign of coccidiosis. Birds often do show this symptom, but not always. One may open two or three of the sick birds and examine the insides. Frequently we find the intestines much inflamed or reddened. The blind gut or caecum (this is the two-pouched affair found toward the lower end of the intestine) may be much enlarged, often as thick as the thumb, and filled with a reddish or dark brown mass. This blood-stained mass is not always present. Maybe the only noticeable thing will be the inflamed intestine and the enlarged caecum. These will serve only as a clue. It will require a microscopic examination in a laboratory to clinch the diagnosis.

**Remove Eggs before Incubation**

Usually the main thing that interests the reader is how to handle the disease after it appears. We will tell you how to prevent it shortly, but for the moment we will try to stop an outbreak of the disease. First, we must learn the
cycle or rigmarole these coccidia go through. Let us say we have several sick birds in a brooder house. Every time their bowels move literally millions of the coccidia or eggs pass out in their droppings. These, when first passed (mark this well), are harmless even though they are picked up by healthy birds five minutes later. These eggs must go through an incubation period the same as any other egg. In this case the incubation time might be from 24 to 72 hours. If the brooder house is warm with plenty of moisture, coccidia will hatch nicely in about 24 to 72 hours. They are now dangerous.

If we can remove the freshly passed coccidia before they have time to incubate, we will prevent other healthy birds from getting the disease. This is what we will try to do. First, kill all the birds tottering around the house. They seldom get well and even though they do, they may live over as carriers to infect other generations. Since the effort is to remove the eggs before they get a chance to hatch, we will use some easily disposed of litter (straw is fine) and change this EVERY day. Scald the drinking and feeding dishes daily. Do not allow wet places to persist because warmth and moist places hurry the hatching of coccidia. If possible, move the brooder house onto a new location and, if possible, move it along a few feet every couple of days. This is doubly important if the poults are running out on the ground instead of on a sun porch. Putting stuff in the drinking water is common practice, but it is cleanliness and the daily changing of litter that really stops the outbreak. Your success in halting an outbreak will depend largely on the job you do.

Since coccidiosis is a soil-borne disease or, in the case of artificially hatched and brooded birds, a litter-borne disease, why not try to dodge it rather than fight it after it starts? Remember, the soil about the farm buildings where both chickens and turkeys have run for many years probably is seeded down with these tiny parasites. These may easily be tracked into a brooder house on the feet of the caretaker. Hinshaw of California has demonstrated that coccidia may be carried on the feet for distances of half a mile.

**Brooder House Recommended**

We recommend that wherever possible a brooder house be used for brooding poults. If old hens are used, no real control is possible but we may place the brood coops quite some distance from the farm buildings, several hundred yards at least. A brooder house should be carefully cleaned and then scrubbed with hot lye water. It should then be moved onto an alfalfa field if this is available.

If the far-from-the-farmhouse location of the brooder house is undesirable or the walk is objected to, one should provide a wire front porch screened in on all sides. The porch is a separate unit and is attached to the brooder house. We will be glad to furnish a porch plan for the asking. The use of a sun porch makes it possible to brood poults quite near the house and at the same time keep the birds off the ground and safe from soil infections such as coccidiosis. Should the porch be used close to the farm buildings, it would be smart to keep a pair of rubbers inside the brooder house door, slipping them on the feet before entering the house.

This simple program will ward off many outbreaks of coccidiosis and is a wonderful worm preventer. Personally we think it is about the nearest approach to an airtight plan of sanitation yet devised. We, of course, didn't invent this. We are merely broadcasters. Try it and find out for yourself.

**MYCOSIS**

This disease, while not at all common in Minnesota as yet, has been reported to have caused considerable loss in
COMMON DISEASES OF TURKEYS

other states. It is due to a fungus which appears to attack the upper part of the digestive tract, principally the crop. Here it produces severe ulceration which in turn gives rise to the formation of a raised, irregular membrane. When this is scraped off, the underlying surface is found to be raw and bleeding. Some turkey growers call this disease “thrush.” This term means little or nothing and might well be forgotten.

The symptoms of mycosis are not particularly enlightening. All sick turkeys present a woebegone appearance. They stand about in various attitudes of dejection with their heads pulled in to their bodies. The region of the crop is usually flattened or “caved in” and upon killing a bird suspected of having mycosis, the crop is found to contain a small quantity of sour-smelling watery material. Very little feed is present. The finding of the characteristic ulceration together with the laboratory report of numerous fungi would establish a satisfactory diagnosis.

Writers in sections of the country where this disease is common infer that mycosis is more likely to be found in flocks that are not well managed in respect to sanitation, diet, etc. In other words, the natural resistance and vigor of the birds have been greatly lowered, making the flock easy prey to almost anything that comes along.

Remove Sick Birds

The treatment of flocks affected with mycosis is not very encouraging. First, it will be imperative to remove all sick birds and, if possible, move the remaining well birds frequently from place to place. Every two or three days would be fine. If movable brooder houses are being used, this is no hardship. California investigators suggest a 1-2,000 solution of copper sulfate in place of the regular drinking water. They point out that turkeys do not like this concoction, so all other drinking water must be removed. Crockery or wooden drinkers are recommended. Keep this copper sulfate solution before the birds as long as the losses continue and even a week or so after recovery has taken place. There is no guarantee attached to this treatment, but it is worth trying.

Of course the other customary sanitary practices should be carried out. This would include frequent cleansing of all feed and watering equipment. All visibly sick birds should be immediately withdrawn from the flock as fast as they appear.

TRICHOMONIASIS

This disease with the long name is caused by a one-celled protozoon called a “trichomonad.” While there are a number of different varieties of this parasite, so far only one has been definitely identified as being responsible for a specific disease of turkeys. This one has been given the title of Trichomonas diversa. It causes ulceration of the crop in turkeys in much the same manner as the fungus of mycosis. The main part of the intestines is seldom attacked. Hinshaw of California has described what he calls intestinal trichomoniasis. This term is used because in numerous outbreaks of disease in poults he has found tremendous numbers of these parasites along the entire length of the digestive tract from the mouth to the rectum. Since this type of trichomoniasis has not at this writing been established as a specific disease, we will consider only the first-mentioned type which causes the crop ulceration.

Associated with Wet Weather

Birds most often found to be affected are from three to four months old and up. Most outbreaks appear to be associated with wet weather conditions or follow the ranging of flocks on fields where there are stagnant pools of water.
As a rule the sick birds are flat-chested, bedraggled, and do not eat. They are said to slobber more or less, stand with their heads well drawn in to the body, become progressively thinner, and hang on for varying lengths of time. Since they refuse food, they may die of simple starvation if not from the effects of the disease itself.

When a bird is opened the crop may be found to be ulcerated. This condition may also extend on down into the true stomach or forward into the esophagus. The crop is usually empty. The extent of the ulceration varies a great deal. The ulcers may appear as individual raised areas or, when numerous, run together to form "patches."

Treatment of the sick birds and the rest of the flock is about the same as that suggested for mycosis, namely the removal of all plain water and the substitution of a 1-2,000 solution of copper sulfate. It is recommended that this solution be supplied in crockery or wooden drinkers. Use the solution for two or three days and then alternate with plain water.

Since this trouble is frequently associated with flocks that are ranged on wet or muddy fields, this condition should, of course, be promptly corrected. To prevent this disease, one should avoid any pasture with bad drainage. High, dry land, good feed, and care will do much to prevent an attack of trichomoniasis. So far, Minnesota growers have not been bothered much with this disease. Careful rotation of growing ranges from year to year, separation of young poultts from older birds, and selection of well-drained rearing grounds should be aimed at.

Mites should not bother most turkey growers. They are, however, a perennial problem to the chicken folks because they become established in the hen house and are sometimes very hard to dislodge. Perhaps I should qualify my statement about the turkeys. Now that some of the large commercial turkey growers are beginning to house their breeding flocks during the entire winter, it is quite possible these houses also may become infested the same as the old hen house. Fortunately, this winter housing movement is not general, so the cause for worry is not great.

Mites differ from lice in that they are blood suckers. Lice usually spend their entire life on the bodies of infested birds while mites attack the birds only at night. When morning comes, the mites leave the birds and crawl back into the cracks and crevices of the building. When starting a cleanup program against mites, one should remember it isn't the birds themselves we tackle, but rather the house. In the old days, brood coops often became so infested as actually to kill hens setting on the nests. At least that is what I have been told.

If a laying house or brooder house becomes overrun with mites, the best thing I know of is a thorough soaking of the inside of the house with some such thing as carbolineum. This is much better than kerosene. Remove all the litter from the house and spray the entire inside with this oil. Waste crankcase oil does very well too. This treatment doesn't appeal to many because it blackens the inside of the house. On the other hand, one careful application will often last for several years. Be sure to allow the house to dry out and air thoroughly before birds are permitted inside. Shut the house and try it yourself. If the air inside smarta the eyes, give it more airing.

Lice

We do not encounter lice in turkeys nearly as often as we used to in the "good old days" when baby turkeys were reared by hen mothers. Then, the
mother, if lousy, was sure to pass
them along to her offspring. Nowadays,
since the old hen is used mainly for
egg production and has been largely
relieved of her customary maternal
duties, lice should be no problem at all.
You see, the incubator and brooder
house are largely responsible for the
passing of this pest.

If, however, one happens to be using
hens for brooding, it would be a good
idea to delouse the hens before the
baby turkeys arrive. The varieties of
lice most often seen are those affecting
the head and body. Head lice can usu­
ally be eliminated by smearing lard
or vaseline on the head parts. Body
lice, which are by far the most com­
mon, are handled by the use of the old
reliable sodium fluoride (not sodium
chloride, for that is common table salt).
This is a white, odorless powder ob­
tainable at any drug store. It is quite
inexpensive. Before the poults are due
to hatch, apply several pinches of the
powder to several different parts of the
skin of the old hens. Do not merely
shake the powder into the feathers.
Push back the plumage and rub the
powder onto the skin. This treatment
should clean up the old hens so the
poults won't become infested as soon
as they hop out of their shells. Sodium
fluoride may be used on young poults
but some discretion must be exercised.
Apply only two or three small pinches.
Of course this powder is a poison and
therefore should not be stored on the
pantry shelf to be mistaken for baking
powder. This has happened. It will
cause death when taken internally.

PEROSIS OR SLIPPED TENDON
(Hock Disease)

This one is a comparatively new ar­
rival. It is doubtful whether our
grandmothers ever heard of it. Most
farm wives of that period fed their
baby turkeys a mixture of steel-cut
rolled oats, hard-boiled eggs, clabbered
milk, cottage cheese, and perhaps john­
ny cake, together with lots of fresh
milk. The birds were raised by hen
mothers and had the run of the garden
near the house. Here they picked up
fresh greens. Not so today. We have
largely done away with the hen mother
and have substituted a brooder house,
and instead of the simple homemade
mash containing generous quantities of
bran and middlings, the birds are fed
ready-mixed feeds of various kinds.

As a result of this change in method
and the subsequent tendency toward
highly concentrated reduced fiber feeds
from which many of the time-honored
ingredients such as bran and middlings
were largely removed, this bugbear
“perosis” or “slipped tendon” has ap­
peared. To explain further . . . bran
and middlings, for example, contain
relatively large amounts of a substance
called manganese. Oyster shells and
rice bran contain a lot too. It would
appear then that a mixture that is
markedly short in either or both of
these common by-products might bring
about a disturbance which causes the
bird's leg to twist outward at the hock
joint.

Affected birds hobble about and very
seldom recover once the deformity ap­
ppears. The average home-mixed starter
made up, say, of equal parts of finely
ground corn meal, bran, middlings, oats,
and meat scraps, together with a dash
of alfalfa leaf meal, dried milk, and
cod-liver oil would not be at all likely
to be short in manganese. Mashes that
do not have enough grains high in this
element may be made safe by adding
about one half pound of manganese
sulfate per ton.

The flock owner who notices birds
hobbling about on one leg with the
other twisted out of shape at the hock
joint would do well to destroy them at
once. They are an eyesore and never
get better. Often they are permitted to
live but they seldom grow big enough
to eat as broilers. Besides this, the
healthy birds pick on them, often to death. Cod-liver oil will not correct or prevent this trouble. The use of manganese sulfate should not be looked upon as a cure-all; in fact, it won't cure the birds already affected but when used as a preliminary precaution will usually prevent this disease. Most commercial starters now contain manganese in proper amount.

**BLUE BACKS**

As the above name would indicate, the backs of the affected turkeys are discolored blue or even black. This is not a disease, but rather a condition of the skin of the back which results from an injury to the base of the feather stalk. If one will examine the feather where it emerges from the skin, he will find the stalk filled with a black pigment or "ink" which tends to disappear naturally as the bird approaches maturity. When for some reason the quill is broken, this pigment oozes out and tattoos the surrounding skin. Sometimes the entire back is affected.

The cause of blue backs then is nothing more than an injury which may result in the breaking of the feather close to the skin. We might inquire still further to determine why this injury occurs and how. Feather picking is the primary cause and this vicious habit is encouraged by a variety of situations. The trouble often begins while the poult is still in the brooder house, especially when the house is badly crowded. Some growers persist in putting 500 birds in a 10 x 14 house when 225 would be about right. Keeping birds too long on the sun porch is another contributing factor, or it may be the porch is too small for the number of birds involved. Lack of sufficient fiber in the ration, which in turn leads to feather picking, is also blamed. Crowding, both in the house and on the sun porch, frequently incites poult to pick one another. After this picking habit becomes established, it is very difficult to stop. When acquired on the sun porch, the habit sometimes continues even when the birds are on range. Blue backs are seen most often in the larger commercial flocks where crowding is the rule rather than the exception. This always means a heavy financial loss.

**Avoid Crowding**

Since blue back results from feather picking and breakage, encouraged largely by crowding, the grower should and can avoid it. Never overload a brooder house or sun porch. One hundred seventy-five poult are enough for a 10 x 12 house and 225 are plenty for a 12 x 14 house. The sun porch should have at least as much floor space as the brooder house. The birds should be removed from the sun porch when they have outgrown the space provided. Time to move the poult is often indicated by the presence of numerous loose feathers on the floor of the house or under the porch. At the first sign of picking, the house should be abandoned if the birds are old enough to go on range. Otherwise the numbers in the house should be reduced. Picking in the house and on the range may be kept down by the generous use of whole oats. Poult can handle whole oats as early as four or five weeks. Grit, of course, should be available. For a growing flock on range, there should be several hoppers of whole oats in addition to the regular mash.

**BAGGY CROP**

This condition is sometimes called pendulous crop besides numerous other names. The simple fact is the crop becomes enlarged to varying degrees and hangs down in front of the bird, often interfering seriously with its movements. Very young poult are some-
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May Be Inherited

It is generally believed that baggy crops may be inherited and it is therefore good practice to use no birds as breeders that have shown any weakness in this respect. Birds with the slightest tendency in this direction should be tagged and not kept over in the breeding flock. What actually happens to cause the crop to fill up and sag is probably a loss of tone in the crop muscles and perhaps partial or even total paralysis of the whole organ. This condition may be further aggravated by overconsumption of coarse roughages or too much water, especially during periods of very warm or dry weather. The front of the bird becomes greatly distended, the crop sometimes containing a quantity of stones, grasses, feed, sticks, etc.

Treatment is decidedly not worth while. One might hold the bird head downward and massage the crop until it disgorged the contents, but the chances are it would refill immediately and the operation would have to be repeated. Some growers have performed operations such as opening the crop with a pair of scissors and spooning out the contents. All these so-called treatments are messy and as a rule do not pay. The owner in whose flock a few of these birds appear will be far better off to destroy them as soon as the enlargements appear. It is true, perhaps, that a few birds may recover, but they are seldom profitable. We recall seeing a tom with his crop dragging on the ground. The owner had kept him to see how long he would live. When emptied, the crop contained four pounds of coarse gravel and the bird was so emaciated as to be totally unfit for food. So let's not keep the "croppy" ones. They always spoil the appearance of an otherwise good flock.

CROOKED BREASTS

Wherever turkey growers congregate, the subject of crooked breasts is a favorite topic for discussion. A crooked breast is a deformity which, pronounced, invariably throws a bird into the lower grades or even discards. These crooked-breasted birds do not sell well because the consumer doesn't like to buy a misshapen turkey for at least two reasons. They do not look appetizing on the platter and besides that, the crook, if well developed, greatly reduces the amount of meat on the breast. There are mighty few flocks that, when dressed, show no crooked breasts whatever. On the other hand, there are flocks that every year dress out a very high percentage of crooked breasts. When this happens, the grower suffers a heavy financial loss because of the low price he receives for the malformed birds.

The cause of crooked breasts has been debated pro and con for many years. Various theories have been advanced from time to time. The most popular notion is that the affected birds sat on sharp-edged roosts. Some say they roosted too early in life, while others stoutly maintain the feed is to blame. They infer that it did not contain all the elements necessary for proper growth or perhaps if they were there, they were not in proper proportion. Boosters for minerals of various kinds
claim a lack of their particular product is the cause. We haven't heard anyone suggest increased amounts of vitamin E as a preventive, but that may be forthcoming.

There are some observers who believe that crooked breasts are a congenital weakness that may be transmitted through the breeding stock. In defense of this idea, the writer might record that he has seen flocks that were fed a balanced ration as far as we know how to balance it, sat on flat roosts or no roosts at all, and still there were a goodly number of crooked breasts. He has come to believe that until the exact cause is definitely revealed, growers should use none but straight-breasted breeders, feed well-balanced rations containing, so far as we know, all the essential food elements, and to satisfy that common impression, use no roosts with sharp edges. This should take care of most of the prevailing theories and one's conscience as well. After it has been all threshed out, it is difficult to underestimate the part heredity may play in the occurrence of this trouble.

WIND PUFFS

By the term "wind puff" we do not refer to the accumulation of air under the skin in the region of the incision after a caponizing operation. We are speaking now of air puffs under the skin of otherwise perfectly healthy poult. We have never seen this in mature turkeys. The little fellows present a ludicrous roly-poly appearance. Some of them are so fully inflated as to resemble a puffball with the head sticking out one end and the feet from the other. At times the blowup is so great the poult is unable to stand on its feet. These air-filled swellings usually appear about the sides or front of the bird. The cause may be more or less of a guess, but the chances are the air accumulates under the skin from a rupture of one or more of the air sacs with the resultant leakage of air which causes the skin to become greatly distended. The effect is curious although the losses are never serious.

Treatment Is Simple

As a rule, only a few birds are affected and the treatment is very simple. Take a pair of scissors and cut a long opening in the skin where the distention is greatest. Do not use a pin or knife point because this will close up quickly. A wide, clean-cut opening will instantly release the air and the bird, which may act a bit groggy at first, will soon resume its normal activities. While this is not an important source of loss, so many growers ask about it that we are including it in these discussions.

WORMS IN TURKEYS

Varieties

It is possible for turkeys to become infested with any of three common intestinal worms of chickens. These are the caecal worm, the round worm, and the tapeworm. The importance of the caecal worm rests largely in its ability to transmit blackhead to turkeys. As a matter of fact, the first sanitation devised for turkeys was built around this knowledge. Aside from the part it plays in the transmission of blackhead, the caecal worm is of very little consequence. The round worm, long a serious menace to chickens, has not invaded our turkey flocks to any extent. However, reports from several other sections, principally in the East, indicate that it does at times cause considerable loss. Turkeys appear to possess a great deal more natural resistance to round worms than chickens. Even when turkeys have the run of the farmyard and are daily exposed to round worm infestation, they are seldom seriously injured. It is quite possible that, as time goes on, the round worm may
COMMON DISEASES OF TURKEYS

become better able to acclimate itself to turkeys, in which case this will be just another parasite to fight. At present we have enough troubles without worrying about this worm. The tape-worm presents an entirely different picture. This worm is widespread and many flocks have been infested, especially those where no definite plan of sanitation was followed. We will discuss the first two worms briefly and devote more space to the tape worm.

Symptoms of Worms

We will describe the various worms presently, but before that, just a word about symptoms shown by turkeys infested with worms. Neither you nor anyone else can tell whether a flock has worms by merely observing the actions of a few sick birds. As a rule, the younger turkeys suffer most. When affected early in life, they fail to grow normally and many die or become unprofitable runts. The ones most heavily laden are a droopy, shopworn-looking lot. Their feathers are unkempt, they become weakened, and since their nutrition is disturbed they may be very thin and light in weight. So much so, that a good gust of wind might take them off their feet. They meander about listlessly and are frequently the object of derision and attack by the other more vigorous birds. There may or may not be a diarrhea. These few outward signs would apply to tapeworm infestation chiefly because this is the principal worm we have to contend with. While such a scene might make one suspicious of worms, the only way to be SURE is to open several of the sickest looking ones and explore the interior of the intestines from end to end. Many so-called experts advise the regular routine treatment of turkey flocks with some sort of worm expeller. This is ridiculous and always does more harm than good. Dear reader, the worm problem will NEVER be solved if the flock owner disregards all sensible rules of prevention and puts his faith in worm expellers. As you will learn presently, we have few good worm expellers and prevention is still the best insurance against these parasites. Stay away from worm-infested soil and the worm bugaboo will automatically disappear. Well, anyway, the thought we wish to leave here is, NEVER treat a flock on suspicion. Much money is wasted each year by the indiscriminate worming of flocks that may not have a single worm in them. After all, the symptoms mentioned above are seen in other diseases, so be sure worms are present in GENEROUS numbers before you even think of treating the flock. Just one or two worms never hurt any turkey. Now then, let's consider the various kinds of worms.

Caecal Worm

This one is often called the "pin worm." It is a tiny round worm about a half inch or so long and hairlike in thickness. Its natural abode is in the two-pouched appendix or blind gut which is located toward the lower end of the intestine. Mechanically, this worm causes little or no ill effects, but as stated before, we dislike it because of the part it plays in the transmission of blackhead. How this takes place is described in the blackhead section of this bulletin. Therefore we try to raise our birds as free of caecal worms as possible. This fact, you will recall, was one of the main reasons for divorcing turkeys from chickens and raising the turkeys far from the farm buildings where chickens have ranged for generations. This idea was strengthened because caecal worms are almost universally found in chickens, although they appear to do these birds little harm. The turkey grower who follows the suggested plan of turkey raising we have outlined will have small cause to worry about this worm.
There are many reputed treatments for caecal worms, but no successful ones. The location of the worm in the blind gut makes an almost perfect barrier to effective expulsion. Since the worms themselves are of little importance, most growers will have no reason to attempt their removal. In the first place, if he is raising his flock properly, they won't be numerous and, besides, there is no satisfactory way to get rid of them.

**Round Worm**

The common poultry round worm is white in color and three or four inches in length. It is sharp-pointed on both ends and about the thickness of a toothpick. This worm is frequently found in chickens, but Minnesota turkeys have not as yet been bothered a great deal. When present, these worms are usually found in the region of the big loop of the intestines and are large enough to be readily recognized. A single worm or even two or three probably do little harm, but when found in large numbers they do considerable damage because they interfere with the bird's normal growth.

Round worms may be prevented, of course, but where sanitation is ignored there may be need for treatment. We would use the same methods as those recommended for chickens, namely, the various tobacco-mash mixtures, nicotine sulfate capsules, and other commercial nicotine preparations readily available at the corner drug store or the local veterinarian. Just because we have included round worms in this discussion of turkey worms does not mean that turkey growers should worm their flocks as a routine practice. Far from it. As a matter of fact, this writer has never seen a half-dozen cases of round worms in turkeys in as many years. Nevertheless, the vendors of round worm pills, potions, and powders are active and have persuaded many growers to do this very thing. Never worm a flock of turkeys unless they are wormy. At the present time Minnesota growers would do well to ignore systematic treatment for this parasite.

**Tapeworm**

This worm really does cause a good deal of loss, but do not forget this occurs almost invariably in those flocks where little or NO sanitation is practiced. There are many varieties of tapeworms and each variety or species has what is called an intermediate host. For example, the fly is the intermediate host of the most common species of turkey tapeworm. This means that when tapeworm eggs or segments of tapeworms are passed from the infested bird, they must go through another stage in the body of the fly. When this is completed the fly must be eaten by a turkey before the next generation of tapeworm develops.

Do not get the idea that the adult fly picks up the tapeworm egg or segment. What happens is this . . . the infested turkey passes the eggs or segments in its droppings. The larvae of the fly eat these and they remain until the larvae develop into mature flies. This fly is now dangerous because it has an immature tapeworm in its body. Should a turkey chase and swallow this particular fly, it would be digested, the egg liberated, and a tapeworm come into being. In some other species of tapeworms the intermediate hosts are the earthworm, dung beetle, slug, etc.

All tapeworms are segmented or made up of links and have hooked mouth parts which enable the worm to attach itself to the lining of the intestine. The tapeworm is threadlike and ranges in length from those too small to be seen with the naked eye up to perhaps a foot or so long. A large mass of worms might resemble a length of matted white thread. They are usually found in the upper part of the intestines. Turkeys of all ages may be infested, although heaviest losses are
in poults from three or four up to a dozen weeks of age. The affected poults do not “do well” and many of them die from sheer starvation or become runts and therefore are unprofitable. When birds a few weeks old show evidence of slowing up in growth and become thin and weary looking, one might suspect tapeworms. This would be doubly suspicious if the turkeys had been running on ground close to the farm buildings or perhaps had been brooded by wormy hen mothers.

Only a post-mortem examination will determine the presence of tapeworms. If the numbers are enough to cause trouble, the worms will be found massed together in large clumps or adhering closely to the wall of the intestine. The writer often receives letters from farmers who say their turkeys must have “maggots” because they have seen little, white, wiggling things perched on top of freshly passed turkey droppings. These are not maggots but rather short segments of a tapeworm which were broken off from the main body of the worm and passed out with the droppings. The observance of these “wigglers” is pretty good evidence the flock harbors tapeworms. However, the proof lies in finding the worms so don’t ever treat a flock for tapeworms unless the worms are actually demonstrated.

The best part of this tapeworm story is over, for now we must take up the question of treatment. Without delay we must admit there is no entirely successful expeller of tapeworms. Many have been tried and advocated at various times, but invariably they have been found wanting. At one time kamala was looked upon as a sure-fire expeller of tapeworms, but recent trials do not confirm this. Besides, kamala for some reason or other is at times toxic or should we say poisonous to turkeys. Different birds vary in this respect. It is to be regretted we must end this discourse with the frank admission there is no effective treatment. This may be discouraging to the flock owner whose birds are heavily infested, but it should cause him to make a belated resolution not to let this happen again. Our salvation in sensible tape-worm control lies not in expellers but prevention. This CAN be accomplished.

BLACKHEAD
(Enterohepatitis)

Blackhead is a very common infectious disease of turkeys. It may affect birds of nearly all ages. The disease is largely transmitted through contact with chickens either directly or by the practice of raising turkeys on ground where chickens have been. Blackhead attacks the digestive tract of turkeys, causing enlargement and ulceration of the caecum or “blind gut” and the formation of the typical greenish-yellow spots on the liver. There is no known cure. The administration of drugs or chemicals in either feed or water as a preventive is worthless. The best way to freedom from blackhead is to dodge it by putting into practice the plan of sanitation outlined in Extension Bulletin 124, “Talking Turkey.” A copy of this may be obtained from the bulletin room, University Farm, St. Paul 1.

FOWL POX

In Minnesota, fowl pox has not been the problem it is in some other sections of the country. This applies to chickens as well as to turkeys. However, it appears to be increasing and perhaps before long it will present another obstacle to the turkey raiser’s peace of mind. Fowl pox is a so-called virus disease and turkeys of all ages may be affected. The disease appears first as blisterlike formations which later break and form dark-colored scabs. These scabs may be found on any part of the body but favor the unfeathered
parts, principally about the head and neck. The attack may be very mild and cause no great inconvenience or it may be so severe as gradually to involve the entire flock. In some cases it may drag out all through the late summer and fall.

Pox is a very difficult disease to handle once it becomes established, because the treatment which must be more or less individual in nature is tiresome and not entirely successful. In addition to the scab formation on the external parts, we may also find yellow patches on the inside of the mouth and in the corners of the jaws. Perhaps none of these things is capable of causing death, but the birds run down in condition very fast. Since the mouth may be very sore, feed consumption is cut down with consequent loss in weight.

In mild cases of pox, the simple removal of the few affected birds may suffice to control the outbreak. The removal of the sick birds is necessary because the disease is transmitted principally by contact with the virus which is contained in the blisters or pustules. The caretaker should be especially careful not to spread the disease to other healthy birds after handling the pox-infected ones. Since toms seem to enjoy fighting, it is likely that pox may be spread readily from one tom to another during these bouts, especially when injuries to the skin occur. This would make another good reason for the early removal of the sick birds.

The affected birds may be treated by first scraping off the scabs and painting the raw surface underneath with tincture of iodine. If many birds are affected, this takes a great deal of time. Be sure the hands are carefully washed before healthy birds are handled. It may be necessary to re-treat many of these birds several times before much improvement is noticed. Just to put some antiseptic in the drinking water is useless. If the sore mouth parts can be cured, the bird will take its feed and make a faster recovery. The labor attendant to treatment will be much reduced if the disease is recognized early and the few sick birds removed before the trouble becomes general. It is a great deal easier to treat half a dozen birds than to wait until you have to work on a hundred or more in your improvised hospital.

**Vaccination May Be Attempted**

As soon as the ailing birds are removed, vaccination may be attempted on the remainder of the flock. One should always keep in mind that fowl pox vaccination is intended to be used on flocks before the disease appears. When this has not been done there is no other alternative than to run the risk of vaccinating after the disease has gained a foothold. There are two types of pox vaccine, pigeon and fowl. The fowl type is recommended for turkeys. Buy it from a reputable manufacturer and use it according to direction. No attempt will be made to describe the method of vaccination because this will be fully outlined in the literature accompanying the vaccine.

In this section of the country, pox is not general by any means. It does occur here and there but it is not as yet a serious menace; therefore preventive vaccination of turkey flocks has not been on the recommended list. We take the attitude that unless pox is an established disease on the farm, it is just as well to postpone the day when vaccination must be used as a routine early-season practice. In other parts of the country pox is so firmly established that all turkeys are more or less exposed to it, and vaccination of birds when they are eight to ten weeks old is recommended.

Let's leave it this way. If pox has never been a flock problem, forget vaccination because it will be an added expense and will introduce the virus to
premises where it does not already exist. You see, the vaccine is the live virus of fowl pox and if carelessly used may serve to introduce a disease not already present. On the other hand, if an owner finds that pox has become an established disease as a result of one or more experiences with it, he should no doubt avail himself of the protection afforded by the regular use of the vaccine.

When the pox vaccine is used on healthy young poult’s, say about eight to ten weeks of age, outbreaks will be avoided. This vaccine has been used for many years and when the work is carefully done, good results follow. The immunity derived from vaccination will protect the birds for about six months. Those kept over as breeders should be revaccinated. If one contemplates vaccination as a routine measure each year, it should be done quite early in the season. Late summer or fall vaccination may delay the marketing of the finished birds because of the scab formation which occurs at the point of vaccination. This must be healed before birds can be sold for table purposes.

PARATYPHOID DISEASE

This one also is a disease of infant turkeys. It attacks them at about the same age as pullorum disease, namely, the first few days after the birds are hatched. There is little doubt that many outbreaks of this disease are mistaken for pullorum. The birds are about the same age, they act about the same, and the germ causing paratyphoid belongs to the same group of germs as pullorum. Under ordinary circumstances it would be next to impossible for anyone to distinguish between the two just by observing the sick birds in the brooder house. Paratyphoid is a comparative newcomer to the ever-lengthening list of turkey diseases. Some people refer to paratyphoid disease as “aertrycke” because the particular germ responsible for the trouble is technically called Salmonella aertrycke. This disease was unheard of a few years ago but now appears to be on the increase. Its actions and control are identical with pullorum disease. It confines its damage chiefly to young poult’s but sometimes causes losses in older birds.

When the disease appears in a brooder house of turkeys, the losses are usually very heavy. Symptoms mean little or nothing. There may or may not be a diarrhea. Some writers attempt to describe what this diarrhea looks like but this helps very little. To me all sick birds of this age look pretty much alike, so much so that I would not know how to tell anyone how to distinguish this disease from pullorum. The little fellows often stand hunched up near the stove and just look very, very sick. They usually live but a few hours. Sometimes one may remove all the birds that show signs of being sick at night and the next morning find a dozen or more dead on the floor.

If either pullorum or paratyphoid disease is suspected, it would be best to send a few of the sick birds to the laboratory for examination. Just to tear open a dead bird and look at the insides won’t do. Pending a report from the laboratory, it is always good judgment to guard against carrying the infection to other brooder houses. One could easily carry this on his feet. Visitors should also be prevented from tramping into the brooder houses.

Treatment here as in pullorum is lacking. About the same line of drugs and patent medicines are used with the same unsatisfactory results. My bag of tricks contains no cure for birds suffering from paratyphoid. I would apply the same sort of sanitary measures as described in the discussion of pullorum disease. If the owner feels better when he puts something in the drinking water, well and good, but I very much doubt its value. These delicate infant
Turkeys cannot stand severe intestinal medication and, for myself, they may well be omitted.

**Transmitted Through Infected Eggs**

The germ of paratyphoid passes out of the sick birds in the droppings the same as in pullorum disease. While most of the infected birds will die, some of them do recover and the germs often remain seated in the egg sac or ovaries of the recovered birds. Should these birds be kept over as breeders the following winter, they would be very apt to lay eggs that carried the germs inside and infect the little poults at birth. These infected poults would become sick soon after they emerged from the shells and in turn soil the drinking water and feed dishes so that other healthy poults soon become infected. As in pullorum disease, paratyphoid is largely transmitted through infected eggs laid by recovered carriers. Therefore, the obvious thing to do would be to test the breeding stock and remove the carriers. Testing for pullorum may succeed in removing a few of the paratyphoid and typhoid carriers. Just as soon as there is developed a suitable test fluid with which paratyphoid-infected birds can be detected, a person should test the breeding birds.

One may ask whether it is possible to vaccinate against this disease or even vaccinate birds after the disease has appeared. There may be vaccines for this purpose, but so far as I have been able to learn they are of very little value. The sensible thing to do will be to test the breeding flock, remove the reactors, and start afresh. If there has been no evidence of either pullorum or paratyphoid in the flock, it would be a fine safety measure to purchase breeding stock from tested flocks. This would act as a barrier against this possible avenue of infection.

**Fowl Cholera**

This is a contagious disease of turkeys, but may affect chickens, ducks, geese, and other domesticated birds. In geese, it is frequently spoken of as goose septicaemia. One could hardly say that cholera is common, but it does occur often enough to warrant discussion. The cause has been definitely identified as a germ belonging to the so-called pasturella group of microbes. The term “hemorrhagic septicaemia” is sometimes used instead of fowl cholera. The germ of cholera is quite widely distributed in nature. Some workers have reported finding it in the air passages of what appeared to be perfectly healthy birds.

Observation leads us to believe the germs may be present in a flock and still cause no trouble until, for example, the birds are subjected to some devitalizing experience such as severe exposure during a spell of rough weather in the fall when the flock had little or no protection. It is assumed, therefore, that something happens to lower the birds' natural resistance and the germs which may have been present are then able to gain a foothold, multiply in large numbers, and produce the disease. The flock is often in good condition up to the time of the attack; in fact many flock owners testify the birds were apparently all right until a number of dead birds were picked up from under the roosts of a morning. At times, owners report the birds “die like flies.” They may remove all the visibly sick and dead birds, destroy them, and a few hours later pick out as many more. This process may be repeated for several days in succession and then suddenly the epidemic may taper off and gradually disappear. Losses may exceed 50 per cent of the entire flock. Some say cholera is “self limiting,” that is to say, it appears out of a supposedly clear sky, the losses run very heavy for a few days in spite of all efforts.
to stop them, and then, lo and behold, the deaths may stop almost as quickly as they began. One cannot always depend on this, of course, but it has happened. On the other hand, losses may continue for several weeks. This continued loss is especially true in the chronic cases.

The symptoms of cholera-sick birds are not especially impressive. Many growers say that birds die without their having noticed any advance warning. The first signal of the impending disaster was the finding of varying numbers of dead birds. In other outbreaks the disease may proceed more slowly and one might record a few symptoms such as droopiness, sleepy attitudes, a lack of appetite, blueness about the normally red head-parts, and perhaps a greenish-yellow diarrhea. A few birds may show a stringy discharge from the nose, while on pressing the roof of the mouth one often squeezes out slimy, clotted material. So much for symptoms exhibited by the sick birds. As a general rule, the sudden death of several birds without previous warning would lead a person to suspect cholera.

Upon opening a bird or two, the internal organs may show evidence of a severe inflammation. The blood vessels in the wall of the intestines stand out vividly. The heart may appear inflamed and there may be a sticky yellow covering on the sac enclosing the heart. The liver is sometimes enlarged and engorged with blood, causing it to break or rupture easily. If the skin over the breast muscles is turned back, the normally white meat is often reddened or "pinkish" in color. The reddened breast muscles and evidence of severe inflammation of the internal organs along with a history of sudden death of many turkeys make one suspicious of cholera. It would of course require a careful laboratory examination to make sure.

No Guaranteed Vaccine

Readers will be more interested in knowing what to do to prevent cholera or how to stop losses after the outbreak begins. Let us talk about prevention first. It will bear repetition that while cholera is not exactly a common disease, it has been widely publicized by dispensers of so-called preventive vaccines, so much so that many growers vaccinate against cholera as a regular routine. This is uncalled for on two counts. First, the disease is not common enough to warrant this annual expense, and second, there is no guaranteed successful vaccine against cholera. Perhaps some day there will be a recommended method of preventive vaccination, but even then its adoption as routine would be open to question.

For the person who desires to do all in his power to prevent cholera, the best advice would be to pay especial attention to the comfort of the flock, particularly in the spring or fall and winter months. Give the flock plenty of protection from cold rains or snow. Dry footing helps a lot. In the fall when snow comes, haul in a load or two of dry straw and scatter it around the feeding places. Put up a windbreak of some sort. In freezing weather see that the birds get sufficient "wet" water to drink rather than the customary snow and ice. In midwinter some breeding flocks have succumbed to cholera for no other reason than the owner took their natural hardiness too much for granted and furnished no place where the birds could keep warm and dry. Turkeys do have a tremendous amount of resistance, but there is a limit to everything. Comfortable quarters will do much to ward off a possible attack of cholera. Once experienced, an outbreak of this disease won't soon be forgotten. To sum up... prevention involves good, careful, farsighted management. We know of nothing else.
Of course it is also to be understood that good feeding practices will be taken care of.

When an outbreak occurs it is perfectly natural to grasp at anything that offers the least bit of hope. The owner of the flock usually becomes panicky when he sees his birds dying right and left and many times pins his faith in any one of a dozen or more cure-alls. We recommend no drugs or medicines to put in the drinking water. Vaccination of the sick flock is definitely discouraged. Not that it will hurt the birds, but it is a useless expense.

Good Nursing Helps

What then will you do? First, get busy and supply that belated comfort we talked about in the paragraph above. Move the flock into a protected place. If possible, keep the birds dry. Supply plenty of clean water and warm it if the weather is cold. The flock eats little or nothing so we must pep up their appetites and increase feed consumption. Returning appetite is a sure sign of progress. A steaming-hot mash is fine in cold weather. This constitutes good nursing. Even these simple things won’t perform a miracle. Many birds will die before the flurry is over. Vaccinating the sick flock with the so-called mixed infection bacterins is often credited with a cure. The chances are the disease has passed its peak and whatever was used at this time would be regarded as a cure. Sick or dead birds should be removed from the flock as fast as they show up. They may serve to spread the infection. Drinking and feeding dishes should be cleaned and disinfected frequently. It would be safe practice not to keep recovered birds as breeders because many of them may serve as carriers. The management of a cholera outbreak isn’t the most satisfactory thing in the world. Try the good nursing program and we think you will have done your best.

SINUSITIS

Some turkey growers call this disease “roup” while others persist in calling it “sinus trouble.” This latter term is probably borrowed from the human family. Sinusitis usually starts out as an inflammation of the upper air passages and later on spreads to the sinuses or passages adjacent to the nose. In most cases this disease is due to an infection although the specific germ responsible for it has not been determined. In addition to this infectious type of sinusitis, there is still another which may produce exactly the same group of symptoms. This is called vitamin A deficiency. It sometimes happens that when turkeys are fed a ration notably lacking in food elements containing generous amounts of vitamin A, some of the birds may exhibit a train of symptoms which might easily be mistaken for the first-mentioned infectious type. In this part of the country where turkeys are usually fed plenty of yellow corn and alfalfa, sinusitis from this cause is not apt to occur. It is our belief that most outbreaks of sinusitis in Minnesota are due to infection rather than vitamin A deficiency. The remainder of this discussion will refer to the infectious type of this disease.

Early Symptoms May Pass Unnoticed

The very early symptoms of sinusitis usually pass unnoticed. These might consist chiefly of a watery discharge from the eyes and nose. The affected birds try to dislodge the mucus by much headshaking and often wipe their noses on their own or a neighbor’s feathers. We might compare this practice with that of a small boy using his sleeve for the same purpose. A few days later the flock owner may awaken to find several birds showing puffy swellings in the front of the face between the eyes and nose. At first, these
swellings are rather soft to the touch, but later on the material inside hardens so the skin covering is not easily dented with the finger. Sometimes a swelling may be so large as to cause a closure of the eye. These swellings disfigure the bird badly and frequently make them unmarketable if the outbreak appears just before market time.

If the swellings are extensive enough to close both eyes, the bird falls easy prey to its cannibalistic brothers and sisters who soon pick it to death. Being unable to defend itself or eat to maintain strength, many birds often die, not so much from the disease itself, but rather from starvation or plain murder. While sinusitis may not in itself be fatal, the results are frequently about the same. Some flocks which have been allowed to go unattended have been practically ruined by a severe attack of this disease. Should it begin in the early summer, it may stay with the flock all season. This would be especially true if no attempts were made to stop its spread in the early days of the attack. In some outbreaks, sinusitis spreads slowly, while in others, birds become affected in quick succession. This might be somewhat dependent on the general condition of the flock, its management, and the virulence or severity of the infection.

Remove Affected Birds

To control an outbreak, one should not allow the disease to get a head start. Recognize it at once as an infectious disease and instantly remove all the visibly affected birds. Treatment of these birds will be described in the next paragraph. Do not waste time putting stuff in the drinking water. Vaccination of either the sick birds or the remaining well ones is not recommended. Rubbing the swellings with "this and that" is useless. If the outbreak takes place in the fall or early spring, perhaps as the result of exposure, this slip in management must be corrected by providing comfortable quarters and protection from rain, wind, sleet, and snow. Check up on the diet just to be sure there is no vitamin A deficiency. If yellow corn and alfalfa are being fed in generous quantities, this is not likely to be the cause of the trouble. Drinking and feeding utensils should of course be cleansed and disinfected often.

Prompt removal of all sick birds together with good care and management will do a great deal to shorten the attack. In the meantime, we may attempt treatment of the ailing birds. It might be stated here that fumigations and sprays are worthless. Owners sometimes corral the sick birds in a so-called tight room and spray them with various concoctions and fumigate with things like sulfur, formalin, etc. These makeshift stunts merely delay recovery and usually aggravate the condition. The common practice of dipping birds' heads in kerosene or smearing carbolated vaseline about the head parts is to be discouraged.

Argyrol Treatment Best

The method here described is not by any means 100 per cent effective but is the best available. The most favorable time to start treatment is when the swellings are in the soft, watery stage. This would be in the beginning of the attack. Equipment consists of a few ounces of a freshly made 15 per cent solution of argyrol, a safety razor blade or a sharp knife, some cotton or gauze bandage, and a pair of tweezers. Have someone who doesn't sicken easily at the sight of fresh blood hold the birds to be treated. Make a free cut along the lower edge of the swelling about an inch or more in length. The incision should be long enough so the opening won't heal up at once, but rather remain open and drain for several days. There may be some bleeding, but this
is easily staunched with a bit of cotton. When the incision is made, squeeze out the material inside and immediately repack the cavity with cotton or a short piece of gauze bandage which has been thoroughly soaked in the argyrol solution. Allow the packing to remain for several days or until it falls out.

There is still another method of applying the argyrol treatment which works very well, but it must be used while the swellings are soft and the material inside is still thin and watery. This might be called the bloodless, knifeless treatment. It requires different equipment, but the same 15 per cent solution of argyrol. Provide two hypodermic syringes with large-bore needles. These syringes are similar to ones used for hog cholera vaccination. Using one of the empty syringes, stick the needle directly into the center of the swelling, wiggle it about a little to free the point of the needle, and then aspirate or suck out the liquid inside. Now, disengage the syringe from the needle, LEAVING THE NEEDLE STILL IN THE SWELLING, which has of course collapsed. The other syringe previously filled with the argyrol solution should be at hand. Attach this syringe to the needle in the swelling and proceed to inject argyrol back into the cavity until it is blown up as big as it was before the watery material was removed. The needle and syringe is now withdrawn, leaving the argyrol in the cavity. You see, all we have done is to suck out the original material in the swelling and replace this with the argyrol solution. There may be a severe reaction following this treatment, but this will subside in a few hours and the bird usually makes a good recovery. This method of using the argyrol is a bit complicated and a flock owner is best advised to call in his local veterinarian for this somewhat technical procedure.

POISONS

When turkeys die and no other cause of death is immediately apparent, it is often very convenient to assume they have died from poisoning. The writer has heard growers accuse neighbors of poisoning their turkeys, perhaps as a result of some local feud. Such suspicions are usually unfounded because true cases of poisoning are few and far between. The fact of the matter is turkeys will not eat poisonous plants if there is anything else to live on. Many growers will themselves testify that turkeys resent sudden changes in either feed or water. Should some poisonous substance be added to their customary water supply, the chances are the birds would avoid it at least until the owner suspected something was wrong. Salt has been said to poison birds, but it would require a grave error in the feed formula to bring such disastrous results. All in all, turkeys suffer very little from poisons of any sort. It could happen, no doubt, but by and large the turkey grower is advised to look for something besides poison when severe losses occur.
ANOTHER TURKEY BULLETIN

The treatment of sick turkeys is admittedly very difficult. It will be far better to avoid them by strict adherence to the simple plan outlined in Extension Bulletin No. 124, entitled "Talking Turkey." A copy of this may be obtained from your county agent or from the bulletin room, University Farm, St. Paul 1, Minnesota.