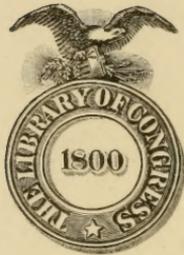


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PREVENTION and CURE

OF

POULTRY DISEASES

BY

NATHAN W. SANBORN, M. D.

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PREFACE.

Writers in the poultry press, in telling what remedies to give, often say, "I gave three doses of 'something,' and cured the bird." Many letters have I received asking, "How *much*, and how *often* shall I give the medicine?" It is hoped that the directions here given are plain on these points.

A severe illness of a bird, even though it apparently recovers, reduces its value. Throughout these pages it is prevention of disease, rather than cure, that is emphasized. First, how to avoid; second, how to cure.

Our birds are at our mercy, and if disease appears in the flock, commonly, it is because of sins of omission or commission on the part of the owner.

If the ideas here presented shall lead to more healthy birds—increased profit—the book will have accomplished its mission.

NATHAN W. SANBORN, M. D.

Holden, Mass.

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AMERICAN POULTRY DOCTOR.

Prevention of Disease.

To be successful in the keeping of poultry one must be able to avoid the losses that come from preventable disease. Very likely you may be skillful in curing ailments that appear in your flocks; but how much more satisfactory it is to have no sickness to contend with. Use common sense and prevention rather than so-called "sure-cures."

The first essential in the prevention of disease is :

Sturdy Stock.

Avoid buying eggs or birds from weak, long in-bred stock, or from yards largely made up of late hatched, undersized birds. Breeding from birds that have been ill, although apparently well, is poor practice. Let every bird used for breeding be well matured, good-sized, vigorous, and a descendant of sturdy stock.

Proper Houses and Yards.

Land for poultry plants ought to be dry or easily drained. Light land, where the snow melts early in the season and quickly becomes dry, is to be sought for. A damp or wet soil, even though tight floors are used, is to be avoided. The yards should be large enough to keep in grass permanently, not only to furnish green food, but to feed upon the droppings and thereby prevent the ground becoming filthy.

The poultry house should be of such size that every part can be easily and quickly taken care of. The roof and cold sides should be wind and water proof. Cracks let in rain and cold air where they are not needed, and lead to roup and bronchitis. There should not be too much glass in the house front. One window (two sashes) to a pen twelve feet square is enough, both for light and warmth. More glass than this will make the house at noon in sunny days in winter too warm — and at night will radiate the heat so that the house becomes too cold. Some scratching-shed arrangement will be helpful; or a door in the front of each pen that can be opened in pleasant weather, will answer the same purpose. Ventilators will not be required in houses that are six feet high and kept clean.

Roosts and droppings boards ought to be low for heavy breeds, and made so as to furnish as little room as possible for "red mites." Nests should be movable, and easily kerosened. Dust boxes full of road-dust should be in every pen. Shade should be furnished in warm weather. If the poultry yards can be in an orchard the problem is solved; but if there are no trees board shelters can be made in the runs.

Care and Food.

Birds, houses and brooders must be kept free from all lice. No one who wishes to succeed with poultry can neglect to consider the lice question. It comes into prominence at all times of the year. Like the poor, lice are always with us. The great obstacle to paying poultry and the stumbling-block in many an otherwise successful plant, is lice: If your birds ought to be laying but are not — look for lice. If the young chicks, that should be growing, are dying — look for lice. Do not feed the army of tramps,— lice and mites.

Begin early to fight lice. Dust the sitting hen with some good insect powder. Use the powder on the young chicks. See that the brooders do not become infested. Whitewash and kerosene will help keep within bounds the lice tribe in the large house. Roosts and nest boxes need constant attention. The red mites will multiply rapidly in the droppings if not often removed. It is good practice to dust the old birds with insect powder every two months during the warm season. If this is done in a business-like way it will take less time than one would at first suppose. Next to lice, I would place filth. Droppings boards and floors must be kept clean. Many cases of roup are due to uncleaned boards in the wet weeks of the year. Droppings boards cleaned and dusted at least twice a week, will prevent disaster to more flocks than one.

Exercise is needed for good health, and to help fill the egg basket. During the cold months of the year this can be produced by using scratching material, hay or straw, on the floors of house or shed, and throwing all whole grain into it. When the material becomes too fine and soiled it should be replaced with a new supply. Remove early in the spring, lest it become a breeding place for lice.

Fresh water is as necessary to fowls as to ourselves. It should be given twice a day in winter, and three times in summer. Drinking vessels should be carefully washed once a day during the warm weather, and at least twice a week in winter. Fountains that cannot be thoroughly cleaned should not be used. Very cold water should not be given, as it sometimes produces "cramp," and takes too much of the bird's heat to warm it to the temperature of the body.

Hens should be kept as much as possible from heavy rains and snows. To be drenched with water when half moulted adds much to the drain that is being made upon the system to supply a new suit of clothes. Chicks a few days old are sometimes stunted, if not killed, by exposure to a sudden shower.

Grit.

Broken stone, brick or crockery ought to be within reach of every chick and fowl. Oyster shells will not take the place of grit, but are useful as a variety. To oblige birds to seek for grit in the droppings or from the earth floor of the pen, is uncleanly, to say the least. To attempt getting winter eggs without *hen-teeth* in abundance is useless.

Charcoal.

A box or basin of small charcoal will be appreciated by the stock, and prove helpful to the digestion. I have often noticed my birds, when let out in the morning run to the ash heap or the remains of a brush fire and seek earnestly for small pieces of burned wood.

Green Food.

Hens running wild or confined to a large yard of sod have this article in abundance during the growing season of the year. Birds kept in small bare yards or in houses, and all birds during the winter, need a generous supply of green food. Without doubt clover is the best well balanced green food we can use. Care must be taken that it is cut into pieces not more than one-half inch in length, thereby avoiding impaction of crop. It can be fed at noon by itself, or used in the morning mash. Barn-sweepings and waste from the mows contain seeds and leaves that the birds gladly pick up. Lettuce, young oat sprouts, lawn cuttings, cabbage, and roots of many kinds, may be used for winter green food.

Cut Green Bone and Meat.

A flock of twenty birds, with perfect freedom, getting all the animal food needed in the form of insects and worms, can do nicely during the open months without cut bone or scraps. When the frosts come and insect life is still, and worms are not in reach, then it is necessary to supply the animal food that the system craves. Birds confined to yards need a constant supply. No doubt a little animal food every day is nature's way; but in feeding green bone I have found that two full meals a week give good results. Feed at noon all the birds will eat. If away from markets, or unable to get a full supply of bone near by, any of the *ground* meat, bone or blood meals will be found to give good results when fed in morning mash. If cut bone or meat meals cannot be obtained, scraps will answer the purpose.

Grain.

Nearly every grain can be used at some time to advantage. Wheat stands first as a well balanced food, followed by barley. Corn and buckwheat are quite fattening, and should be used sparingly, with discretion. All the grains are to be had ground, and form the large part of the morning mash. The mash should be well cooked, and fed warm if possible. Find out how much the hens will eat if allowed their choice, and then always give less than a full meal. Keep the birds a little hungry until the night meal, and then feed bountifully. Fowls are early risers, and seek a breakfast about sunrise. Both old and young birds need food when they begin to look for it. To lie in bed until the sun has been up two or three hours, may be pleasant to the sleeper; but he will never be a successful hen-man. Not only do the chicks want food and water, but they are anxious to get out of the close brooder house or roosting coop into the pure air and sunshine.

Mash for young chicks must be well cooked. Half-done food will produce diarrhœa. I always bake mine in the oven two hours.

In feeding condiments to young or old birds, do not make the mistake of using too much. A little will supply a need that really exists; but more than is needed will overdo the matter, and produce liver disease.

It is good practice to keep birds of different ages and conditions in separate flocks. The large and small birds do not each require the same proportion of food.

CONSUMPTIVE persons or animals should not be allowed near poultry.

SCALY-LEGGED birds will spread the disease to young chicks, and even to those birds on the roost with them.

QUARANTINE all new birds, and dust with insect powder every addition to the flock.

Anæmia.

By this we mean a condition of the blood itself, characterized by lightness in color, less albumen than in health, and under the microscope the red-blood corpuscles are seen to be less in number than normal. Anæmia is due in most cases to *lack* of proper food, or air, or sunshine. Anæmia from either of these causes may induce other diseases. Anæmia from bad air, or want of light, brings on indigestion, which only intensifies the trouble. When we know the important part oxygen takes in the animal economy it becomes plain why fowls kept in close crowded houses become weak, with light red (or yellow) combs and wattles, and fall a prey to roup and other diseases. The scratching shed plan provides two of the three "needfuls" to healthy poultry — *air* and *sunshine*. If to these be added proper food, anæmia will seldom be seen.

An anæmic fowl is tough to eat, and hard to digest — not fit for food.

TREATMENT.—Find the cause, and remove it. Do the birds need more sunlight, better air, or an improved "bill of fare?" See that the droppings do not accumulate and poison the air; that dust and cobwebs do not shut out the sunshine; that a false idea of economy does not keep you from feeding a well balanced ration. Tonics will be needed to improve digestion. Tincture of iron one teaspoonful, ten drops tincture nux vomica to one pint drinking water, will be useful to increase the appetite and tone up the nervous system. Anæmia is not so common to-day as it was ten years ago, owing to more care and better understanding of the fowls' needs.

Debility.

This is the condition known by poultrymen as "going light." It is seen both in chicks and fowls. There is hardly a flock of one hundred chicks where one or two of the birds do not, when about ten weeks old, grow thin, weak, with a dry skin, and die. Then in the fall or early winter birds sent to exhibitions or shipped to distant points, from one cause or another, lose appetite, "go light," and die. Late in the winter many a bird that has been

over-stimulated, and probably over-fat, "goes light." That there is a cause for this condition in chicks we have no doubt; but why it takes one or two birds and leaves the other fifty or more in splendid shape, we do not know. When it appears in exhibition birds it seems to be due to shock from rough handling, or new surroundings. In the full grown bird it is often the "breaking down" from an over-fat unhealthy condition.

Vertigo.

This is dizziness or "swimming" of the head, making the bird turn round and round. It is due primarily to brain-pressure, and secondary to some abnormal condition of the digestive system. It is sometimes caused by fright. It is most common in over-fat birds.

SYMPTOMS.— The bird is seen to elevate its head, turning it as though it was trying to look at the sky through one eye, moving around in a circle, followed in severe attacks by falling to the ground, and lying there with a tremor in the muscles.

TREATMENT.— A laxative of castor oil, followed by a diet not rich in fat or fat-forming foods, will be all the treatment needed.

Cholera.

Cholera is an epidemic disease, affecting the mucous surfaces, and always accompanied by diarrhœa. It is rarely seen in this country in the true Asiatic type; that we have is of a less severe character. It is more often seen in wet weather with a high temperature, filthy surroundings, improperly balanced rations of food, and lack of care. Cholera will attack a flock that is rightly housed, fed, and in a healthy location if a bird with the disease is introduced into it, or even if the droppings from an affected bird are brought in any way (as on the shoes), so that they get into the food or water of the flock.

Cholera attacks all breeds, old and young birds, strong and weak, alike. The older and stronger birds seem to be affected with this disease quicker than the chicks and weak birds, and die in less time. Cholera is seldom seen in settled cold weather; in fact a sudden freeze often does more to control this trouble than the medicines we use in its treatment. A thaw in mid-winter is sometimes the occasion of a violent outbreak of cholera where the disease has been previously introduced into the place.

When birds are dying of bowel diseases in large numbers on neighboring farms, a vigilant watch should be kept that no possible way of contagion or infection be opened. New birds added to a poultry plant ought always to be quarantined; yet how seldom do we observe this safe method.

Cholera is a rapid disease. Your bird is seen to be sick to-day, and to-night or to-morrow, or possibly the second twenty-four hours, finds it dead. These first cases nearly always die. It is only by recognizing the disease you have to contend with, that you have any hope of saving any of your birds.

When seen early the bird is dull, moves about slowly, is inclined to get into a sunny corner and mope. The feathers are ruffled, and those near the vent

are wet and stuck together with the diarrhœal discharge. The muscles are relaxed, letting the wings droop; the feet drag when walking, the eyelids fall, the head is carried on one side, the bowel discharges running away. The appetite is lost, but there is a strong desire for water. The bird is seen slowly walking back and forth between the warm corner and the drinking vessel. The diarrhœal matter is at first slightly thick, but soon becomes watery and frothy.

As the disease progresses, the bird can hardly stand, and the bowel discharge is often streaked with blood. The mucous membranes of the body now become inflamed, and a frothy discharge is seen to come from the mouth, eyes and nostrils. The comb grows darker in color — sometimes purple.

Prof. Hill says: "The bird is disinclined to move, and either stands with its back raised, the wings being away from the body and drooped, or squats on the ground with its beak in the earth and the wings spread out. The breathing is short and labored, the crest swollen and black in color, the vision almost lost, the plumage lustreless, and finally the bird dies in a state of stupor or convulsions."

Post-mortem appearances, according to Prof. Hill, in his new edition of the "Diseases of Poultry," the best European book we have, are: "Lining membrane of the mouth livid, except toward the outside, which was pale; throat purple and full of sticky dirty-yellowish matter; tip of tongue hardened and partly detached; eyes sunk deep into the sockets, eyelids emphysematous or swollen; gizzard empty, except a little gravel and thin acid fluid; muscular substance of a deep red color; intestines extensively inflamed, with extravasated blood patches under the mucous membrane; and here and there corrosions. The matter contained in the intestines was of a dirty thin ichorous, or acid nature; liver deeply congested and increased in volume; lungs slightly congested and pleuritic exudation; heart purplish-red and studded with ecchymose or extravasated blood spots; pericardium contained an excessive amount of straw-colored fluid."

TREATMENT.—A disease running its course in two or three days, and so uniformly fatal, necessarily demands an early and vigorous treatment. First remove every bird with diarrhœa to a house or place away from the well birds. At once see that water-dishes are perfectly clean. In those of the diseased birds keep for drink the following: water, one quart; spirit of camphor, one-half teaspoonful; sulpho-carbolate of zinc, one-fourth ounce. Give the apparently well birds for drink: water, one quart, sulpho-carbolate of zinc, one-eighth ounce. If there is violent diarrhœa give every two hours a tablet or pill of Dover's powder (one grain each). This will relieve some of the pain, and lessen the number of discharges. A diet of meat juice is best for a cholera case. This can be made from round steak, and given with a spoon or glass dropping tube. All the houses must be cleaned at once from all filth; white-wash and carbolic acid used thoroughly. Fresh earth should be spread on the floors of the buildings, and the yards be plowed or spaded. All birds that die should be burned.

Cholera rarely visits the poultry plant of the man who houses carefully, feeds intelligently, and quarantines all sick or new birds. A heavy wet soil is a factor that enters into the spread of this disease. Such a location is certainly not the right one,—if possible should be avoided. The crowding year after year of birds into yards so small that weeds and grass have no chance to grow, in time causes the soil to become extremely filthy, and a good breeding place for cholera. Such yards should be seeded to grass or some crop and allowed to lie unused for a year or two. True cholera is a rare disease, but when it enters a flock few escape from its deadly clutches. Let us hope you will never make its acquaintance.

Diphtheria.

Diphtheria is a dangerous and quite fatal disease. It is contagious, being given by one bird to another, directly or through the medium of food or drinking water. The “canker” seen at the winter shows is a mild form of diphtheria. This disease is most common where houses or surroundings are damp and filthy. It is usually seen during the cold months of the year. Diphtheria is sometimes introduced into a flock through new stock that is diseased. The contracting this and other diseases of poultry might be more often avoided if some plan of quarantine was adopted by those who buy new birds.

SYMPTOMS.—Diphtheria, when first noticed, shows itself by great depression of spirits accompanied by signs of catarrh. The feathers are ruffled, the bird looks sleepy, the neck is held as if it was stiff. In a day or two there is a slight discharge from nostrils, and a sticky fluid from the mouth. Looking into the mouth, it will be found partly full of the sticky fluid, with string-like pieces mixed with the fluid, especially toward the back of the throat. As time goes on the fluid becomes more thick and strong smelling. The back of the mouth and all the throat are at first bright red, then purple, in those places not covered by the membrane. As in the human throat in diphtheria, so in that of poultry, any attempt to remove or pull off the thick leader membrane leads to bleeding. This membrane increases in size, and finally runs together, shutting closely the opening of the larynx, causing by suffocation the death of the bird.

These cases take from five to fifteen days for a full run of this disease. If a case improves there is some trouble for several days in swallowing food, and quite often the bird loses the use of legs and wings for weeks.

TREATMENT.—To successfully handle this disease the bird should be in a warm room of even temperature, where the air can be kept moist by boiling water. The discharge should be carefully wiped off the mouth and throat. Then with a metal or quill tube blow sulphide of calcium in fine powder all over the mucous membranes. This should be done three or four times a day. If the patient is able to take food, put one grain of the calcium sulphide into a little warm mash, and give before each application of the powder to the throat.

Dr. Hill advises:—“The inhalation of acid vapor is also serviceable; one ounce of acetic acid to a pint of boiling water. The bird’s head should be held with the mouth open over the steam for five or ten minutes at a time, and this

should be repeated several times during the day, always previously mopping the throat and mouth out with carbolized water. When shreds or specks appear, the parts should be painted with tannic acid and glycerine (tannic acid five grains to glycerine one ounce), tincture of per-chloride of iron and glycerine (tincture per-chloride of iron ten minims to glycerine one ounce), or a solution of nitrate of silver, ten grains to the ounce of water."

For diet, give milk, raw egg, and beef juice. If unable to swallow, the food may be given by the bowel, and if not given in this way the bird will probably die. If the severe symptoms grow less and less, and the patient passes safely the danger point, tonics should be given. The best I know in these cases is Fellows' syrup hypophosphites compound, five drops three times a day.

Canker.

Canker is a mild form of diphtheria. It is seen quite often in Game birds, especially in birds that have been exposed to cold while on their way to and from the winter shows. The bird is slightly dumpish, has some little difficulty in swallowing, and seems to try to swallow even though it is taking neither food or water. The usual treatment is to apply or blow upon the sore patches in mouth and throat finely powdered dry chlorate of potash.

Diphtheria is as likely to attack the strong vigorous bird as one that is weak or delicate. If a case appears it should at once be isolated, and the remainder of the birds given the best of care. Tincture of iron, one teaspoonful to a quart of drinking water, is a good tonic to use during any sickness to tone up the well birds and ward off disease.

Catarrh.

This is an inflammation of mucous membranes caused commonly by exposure to wet or cold. It may be seen as a mild watery diarrhœa, or a slight mucous discharge from nostrils and eyes. As a "cold," it is to be distinguished from roup by the mild attack, by absence of odor, and by the tendency to get well without active treatment. That there is a line drawn between roup and catarrh, I have no doubt; but I know of no symptoms in the early stages of these diseases that surely determine one trouble from the other.

It is well in the beginning of either disease to bathe eyes, nostrils and throat with a solution of sulphate quinine, ten grains to two ounces warm water. If this does not check the trouble in a day or two, then treat as directed under "Roup."

Roup.

The word roup is probably derived from croup, an inflammatory disease of the larynx and trachea in the human biped. Roup is a purulent catarrhal affection of the air passages.

CAUSES. — Roup is the result of close air, extreme variations in temperature between day and night, damp houses, draughts, improper food, and filthy water. It is a contagious disease, and large numbers have been lost from the

thoughtless introduction of a roup bird into a healthy flock. Over-feeding or under-feeding, stagnant water, anything in food or drink that lowers the vitality of the fowl, is one factor in the process that sometimes ends in roup. A damp location of house, a leaky roof or cracks that admit draughts, often lead to catarrh or roup. A hen-house that is cleaned out only semi-occasionally, especially if damp, is a good breeding place for catarrhal diseases. Inbreeding, the closer the more danger, weakens the vitality so that catarrh too often finds a ready victim.

SYMPTOMS.—Roup begins with a catarrhal inflammation of the mucous membranes of nostrils and eyes, is characterized by redness and swelling of these membrane, the discharge first watery, and lastly becomes muco-purulent.

At first the discharge is thin, and breathing is not interfered with, but as the disease progresses respiration becomes more difficult from clogging of nostrils and throat.

Early in the disease air bubbles appear at the nostrils, and often in the eyes; as the discharge thickens the nostrils become clogged; sometimes the exudation gets cheesy, and from obstruction in the throat the bird dies. Emaciation appears as the disease progresses, caused by the fever and loss of appetite. Some cases are ushered in by swelled heads and ulcers in mouth. These are often fatal.

Sometimes in buying stock you think that the bird has had roup, but are not sure. Look under the wings, and often you will find the dried catarrhal discharge on the feathers, left from the nostrils when the bird put her "head under her wing, poor thing."

COURSE, DURATION.—A mild case of catarrh or "cold" will run along without any treatment for several weeks. If given good care, proper housing, and right medication, a week's time ought to see it well.

A severe case, when there is swelled head and "strong-smelling" discharge, if left to itself will die in from five to twelve days.

TREATMENT.—When you find many remedies offered for the cure of a disease, you may be sure that it is a trouble that is dangerous to life.

For the cure of roup, we are offered nearly as many different medicines as there are writers. "Sure cures" are numerous, "warranted to cure or money refunded." But alas! they often fail. Yet much can be done to abort, and in the early stages, to cure.

Every "cold" or slight catarrh should be early taken in hand. Local treatment is of first importance, constitutional second.

If there is sneezing while on the roost at night, or a little watery discharge from nostrils or eyes, inject with an atomizer the following solution: Extract witch hazel four tablespoonfuls, carbolic acid three drops, water two tablespoonfuls. Four or five squeezes of the bulb into each nostril, and two squeezes into the mouth three times a day, will do much to relieve the catarrhal condition of the mucous membranes. Isolate the bird, giving soft food, and water containing ginger.

It is necessary whenever a roup bird is found in a flock, the drinking dishes be very carefully cleansed with boiling water in which a little carbolic acid has been added.

If you find a bird with the enlarged head, semi-thick mucous discharge, and a dumpish condition, take one part of "Platt's chlorides" and five parts warm water, put the mixture into a tin dish, dip the head into the solution for an instant, and then with a clean soft cloth wipe the comb and neck dry. Do this several times a day. Feed carefully, and keep in as even temperature as possible.

For severe cases, characterized by enlarged head, canker in mouth, a very disagreeable discharge from eyes and nostrils, I follow this plan: Take a bucket three-fourths full of water, add slowly one gill kerosene oil. This will remain on the water. Take the diseased bird by legs and head and dip the head into the oil so that the eyes are covered. A moment's pause, then take out the head and wipe dry. The feathers may come off, surely will if you are too slow in taking out, or in drying the bird.

This simple treatment has been successful where roup pills and "dilutions" have been used in vain.

A very intimate friend of mine, who has been raising poultry successfully for twenty years, tells me that he tried in vain nearly all the advertised cures for roup. At last he thought he would try coal oil. It proved successful. He soon afterward had occasion to repeat it, with the same result. Last spring on visiting a neighbor's poultry yard, he found him at work on a large number of birds sick with roup in its worst form. This neighbor, who by the way, was an "M. D.," had been using all his skill to cure by use of various medicines. The hens were dying every day. "Five cents worth of kerosene oil will cure them," my friend said. The hens were taken, put through the treatment, using fresh oil for every five birds, and there were no more deaths. The same plan has been used since then by another man of my acquaintance, with the same good result.

Prof. J. Woodroffe Hill, in his "Diseases of Poultry," an English work, recommends the early use of steam from carbolized water; the cleansing of eyes and nostrils with weak alum water; internally a grain or two of quinine in a teaspoonful of port wine; the food to be warm bread and milk to which a little pepper or mustard has been added. In severe cases he advises that the matter in throat and nostrils be removed and syringed with a mild solution of chloride of zinc.

The editor of FARM-POULTRY, in his articles upon "Colds and Roup," advises the use of the following treatment: "A tablespoonful of clear lard, half a tablespoonful each of ginger, cayenne pepper and mustard; mix well together, and then add flour till the whole has the consistency of dough, roll into slugs about the size of the top joint of the little finger, and put one down the patient's throat. The dose can be repeated in twelve or twenty-four hours, according as the case seems to need it; but one slug frequently cures, if the case be taken in time. For swelled head we bathe with a glycerine-turpentine

lotion made of one part spirits turpentine to six parts glycerine; and for sneezing cold and swelled head combined, use both remedies; if the patient does not show signs of improvement within three days after beginning treatment, take off its head and bury or burn it."

We earnestly protest against the use for breeding of any bird that has had a severe attack of roup. Do not do it! You will surely lower the vitality of your stock.

Prof. Cushman, of the Rhode Island agricultural experiment station, says in his report: "A lot of cockerels bought of Sharp, of New York state, had the foulest kind of roup when received. Part were killed, and the others cured after a long course of treatment; but they were continually getting out of condition, and the *mortality among their chickens was large.*"

In roup, as in most other troubles, "an ounce of prevention is worth a pound of cure."

I have been watching this fall the effect of kerosene upon twenty cockerels sick with roup. They had reached the stage when the house where they were was very disagreeable to go into, and the discharge from the nose was thick and "strong smelling." The kerosene was poured upon a pail of water so that the oil was an eighth of an inch deep. The birds were taken one at a time and dipped into the pail until the eyes were covered. They were held there for an instant, and then slowly withdrawn. A film of oil was kept upon the top of the drinking water for three days. One bird was killed, as he was in a low condition when treated, and the others slowly improved, were sold in fine condition to the butcher forty days after the first treatment.

Gapes.

Among the diseases of poultry that occur in the experience of the unhappy hen-man, resulting from internal parasites, is "gapes." The disease is caused by the irritation of the lining of the windpipe, and is aggravated by the blood lost in supporting the life of the parasite.

This parasite is a worm known as *Syngamus trachealis*. It is introduced from a previous case. This worm has been known and written about for more than one hundred years. It is the cause of death to millions of chicks and wild birds the world over. I have known of it destroying one-half of a flock of full grown chickens in the autumn of the year. Gapes is a disease of warm and damp weather, late summer and early fall months, damp and filthy houses, and wet clay soil. It is probable that the worm or eggs must be brought from an infected bird or soil before the trouble will manifest itself. It is possible that this worm is a natural parasite of the earth worm; at any rate, in infected sections of country it is found in earth worms at all seasons of the year. In 1885, Dr. H. D. Walker, of New York state, was employed by the United States agricultural department to experiment with the gape worm. He found that if the newly hatched embryos were introduced into a chick, in eight days there were to be found in the trachea full grown gape worms. The eggs need a temperature of above thirty degrees to live, and are killed by freezing.

The worm as found is about one-half inch long; and what appears to be a double headed worm is two worms permanently united for breeding. There is a red color to the worm caused by the bird's blood upon which it thrives.

SYMPTOMS.—At first there is a slight cough, as if there was a little dust in the throat; this is followed by the symptom that gives the name to the trouble—gaping or gasping. As the worm continues to live on the mucous membrane of the windpipe, it irritates the lining, causing a catarrhal discharge to be spit up. The lining thickens, the mucous becomes stringy, the windpipe is nearly filled with mucous, and the bird has to work to get air enough to live upon. If not suffocated at this time the inflammation extends to the lungs, and death follows. An examination will show the presence of the worms in the windpipe. Bronchitis and pneumonia are sometimes supposed to be “gapes,” but a post-mortem will surely show the difference.

TREATMENT.—That this is a serious and hard disease to handle, is made plain by the many and various remedies proposed for its cure. The same worm, if its natural home was in the bowel or upon the skin, would cause much less trouble—but the size of the windpipe is fixed, and any swelling of its lining only makes smaller the passage for air.

Garlics, assafœtida, turpentine, carbolic acid, onion tops, in the drinking water, have been used with fair success. Air-slaked lime, carbolic acid fumes, or the steam from boiling vinegar, are all advocated by various writers.

To remove the worms from the throat, the best plan seems to be to use a long wire with horse-hair bent into loops at its end. This is introduced into the windpipe, turned once or twice, then withdrawn. The worms become entangled in the loops, and are thus caught. This is a slow process. Another plan is to have a large box with a door in the side, and covered on top with coarse cloth. A few birds are put into the box, then air-slaked lime is dusted upon the cloth. The birds breathe in the dust, it seems to make the worms relax their hold upon the membrane, and by the coughing caused by the lime the worms are ejected. The same box can be used in trying carbolic acid. The birds are put in as before, but upon a platform of laths one foot from the bottom of the box. Then on a red-hot brick pour one teaspoonful carbolic acid. Two or three exposures kill the worms, and careful watching is needful to prevent the birds being killed also. Vale says: “The passing of a feather dipped in oil of turpentine or paraffin, though an effectual remedy, is at the same time a highly dangerous one.”

If any changes are needful in houses or yards, make them at once. The houses should be dry, light, and kept clean. Do not crowd the birds. Give fresh water often, adding one teaspoonful carbolic acid to each gallon. Feed some onion tops and bulbs, as green food. If the yards are badly infected, seed to grass, and do not use them for two years. Poultry plants on damp soil, into which gapes has been introduced, had better be given up, and a new start made in a better location. Under such circumstances make the new beginning with eggs, and hatch in incubator. Buy all fresh blood in the egg, and hatch them yourself.

If obliged to remain in the old location, treat all diseased birds until cured, being sure to kill all worms that are extracted, and burning all birds that die.

Not all birds that gasp or gape have "gapes." If you have several sick chicks kill one and examine windpipe for the worms.

To treat a case of pneumonia or bronchitis with lime or carbolic acid would be sure death. The presence of the worms themselves is the only sure "sign" that you have the "gapes" in your flock, and is a sad reminder that you have a long road to travel before the last worm disappears from your poultry plant.

Diseases of the Lungs.

Bronchitis and pneumonia are diseases of the organs of respiration. Bronchitis is not properly a lung trouble, but a disease of the mucous membrane lining the bronchial tubes. It is thought best to consider it in connection with pneumonia, as the diseases are often confounded.

Bronchitis.

A catarrh of the mucous lining of the air tubes. It varies from a slight cold that is hardly discernible, to such an outpouring of mucous that life is in danger from drowning.

CAUSES.—The sensitive membrane of the bronchial tubes is easily inflamed by extreme changes in the weather, by dust, from exposure to a damp current of air, or by extension of a mucous inflammation of the head or throat.

This disease is most common during the fall of the year, before the young birds have been taken to their winter quarters, especially if the houses are filthy and the weather cold and damp. Exhibition birds are liable to this trouble because of the sudden change from the hot and close show room to the cold draught of the express truck. We have seen birds with their mouths open, panting for breath, in the close hall, and then left for five hours on the station platform in a west wind below freezing. It is hard to understand how many birds escape catarrhal troubles under such trying circumstances.

Birds having rousy ancestors often fall a prey to bronchial troubles. The use of air-slaked lime while the birds were in the house, has been known to produce bronchitis.

SYMPTOMS.—When suddenly attacked with bronchitis, there is increased heat with dryness of the mucous surfaces. The bird is inclined to keep near the water dish, and tries in vain to satisfy its thirst. There is a little cough at first, and close listening will detect a whistling noise with each respiration. As the disease progresses the secretion increases, and the sound heard will be more rattling than whistling in character.

TREATMENT.—In the first stages of bronchitis an effort should be made to abort the trouble. This is done by giving aconite — one drop of the tincture every hour for five hours, and then once in three hours. If the bird can be kept in a moist warm air it will help in soothing the engorged membranes. The food should be a hot mash of at least one-half bran.

if under any treatment the disease progresses into the chronic stage (and this you will have no difficulty in telling by the peculiar rattle that we have all heard at times when visiting the poultry house after dark), then a different line of treatment will be required. The best is the use for weeks of a little pill made of strychnine, iron and quinine, known as "Dumas Antimalarial." One pill should be given morning and night. Good care and the use of this pill will cure nine-tenths of these cases.

Pneumonia.

This is an inflammation of the air cells of the lungs. In the large majority of cases it proves fatal. Every year seems to increase the belief that this disease is contagious.

CAUSES. — Close confinement to warm houses, followed by a sudden exposure to cold, damp storm. Babying brooder chicks (thinking that good care consists in keeping them where they cannot run on to the earth or out of the warm house to fresh pure air), makes them tender, and an easy prey to pneumonia. The open front scratching sheds for fowls (and for chicks, too), will do more to prevent pneumonia than medicine will to cure it. There is always danger that bronchitis may extend to the air cells. Chicks not feathered, caught out in a heavy rain, easily contract pneumonia — and such cases are usually fatal.

SYMPTOMS. — Bird is hot, with short labored breathing. Every effort seems to be directed toward getting air enough to live on. Putting the ear to the chest walls, a crackling noise may be heard. The bird makes no effort to move about, but stands with lowered wings, panting for breath.

TREATMENT. — Keep the bird in a room of about 70 deg., with steam from boiling water if possible. Give every six hours one grain phenacetin and one grain sulpho-carbolate of zinc, mixed with bread crumbs enough to make a pill. Feed on raw egg and milk. Do not give quinine or spirits. Tincture aconite in the drinking water, or one drop every two hours in the egg and milk, will help control the hard breathing.

If successful in saving the bird, build up its strength with tonics, such as nuxvomica or quinine.

The more I study poultry diseases and their treatment the more convinced I am that one-half the time spent in curing sick birds would prevent nine-tenths of all the ailments fowls are heir to. When will people learn that stagnant drinking water precedes many a case of "cholera," and filthy houses lead to many attacks of roup?

Pip.

This is not a disease, but is a dry condition of the tongue appearing in pneumonia, bronchitis, roup, and catarrh. It is caused by rapid breathing through the mouth, removing the moisture from the tongue, and causing the tip to become dry and hard. Do not try to remove the dry tip, but treat the disease that causes it, and wet the tongue with glycerine.

Consumption and Tuberculosis.

These diseases show symptoms both alike and unlike. They may exist together in the lungs, or be found separately in two different organs of the body. Hereditary influence plays an important part in the causation of both diseases. Birds raised from rousy, weak or narrow-chested stock, fall an easy prey to these troubles.

Damp quarters, unbalanced or insufficient food, persistent inbreeding of weak birds, all tend toward a condition of body favorable to the production of tuberculosis or consumption. Conditions likely to produce roup are sure to lead to more or less consumption; and if the germs of tuberculosis are about the yards, that disease may follow. Tuberculous persons or animals on the place are sources of danger not to be overlooked. Avoid both these diseases — by careful care of young stock; not over-crowding, or keeping in damp or filthy houses or yards; not breeding from stock previously sick with any illness; quarantining all birds bought from new sources. Better breed from strong, vigorous stock that are off some in feathers than to use some of the “little beauties” scoring high in the show room, but of weak bodies and poor health. Inbreeding for “points” has caused many a fine flock to degenerate to that condition in which consumption and tuberculosis are easily acquired, and years of otherwise well spent efforts entirely lost. We are told of instances where inbreeding has been followed for years and with good results; true — but it does not pay to take the risk, because it is too great.

Consumption.

Consumption is a disease primarily of the lungs. It follows closely after pneumonia, bronchitis, or roup. Following one of these diseases we notice that the cough continues, the body grows thin, the bird is weak and listless, and possibly diarrhœa sets in. The food is passed from the bowels in much the same condition as when eaten. When any of these symptoms are seen the bird should at once be put in a clean dry coop. When satisfied that the trouble is consumption, kill and burn or bury deep. Treatment is useless, and a fatal end sure.

Tuberculosis.

Tuberculosis is of a greater intensity than consumption. It differs from consumption by a higher fever, more pronounced cough, rapid wasting, quick breathing. It is a germ — bacillus — that takes an active part in the causation as well as the course of tuberculosis. A cow on the place that has a persistent cough, grows thin, and has diarrhœa, is a source of positive danger to any poultry that has access to barn, barnyard or pasture.

No sick hen should be allowed to remain with the flock even one night. Every poultry plant, however small, should have its hospital, even though it be a dry goods box. When you think you have a case of tuberculosis you should at once clean the pen and yard it was in. Do this thoroughly, using last of all a wash of strong carbolic acid. This can be well applied by means of a tin hand pump or a knapsack sprayer. The sick fowl should be killed at once; and burned. Take no chances of further trouble from simply burying.

If you wish to try medication in either of these diseases, give any good emulsion of cod liver oil combined with hypophosphites, one-half teaspoonful mixed into one tablespoonful of mash, three times a day. Syrup hydriodic acid, ten drops three times a day, will help many a bad cough, and in the early stages of consumption will sometimes arrest the disease.

I wish to impress upon every reader that to breed from any bird that ever had any severe sickness, is perfect folly; and to sell eggs for hatching from such a fowl, or to ship such a bird for breeding purposes, is positively wrong.

Prof. Hill, in "*Poultry*," of May 11, 1894, writes as follows:—"The broadest fact established regarding the exciting cause of tuberculous deposit is that the domesticated animal is more liable to tubercular disease than the same animal in a wild state. The stabled cow, the penned sheep, the tame rabbit, the monkey, the caged lion, tiger or elephant, are almost invariably cut off by tuberculous affections, no doubt due to deficient ventilation and the abeyance of normal exercise of the pulmonary functions. Compare the ordinary barn-door fowl with the highly bred show bird as to vigor, stamina, and freedom from hereditary disease, and the former, generally speaking, shows the cleanest bill of health. For this reason—it lives in a more natural condition, is not crammed with artificial food, or dosed with quack nostrums, and gets what grit it chooses to find without being supplied with any special form. The ravages of tuberculosis in the human family are too patent to ignore its gravity in the lower creation, and the poultry fancier will best consult his own interests in studiously avoiding breeding from or purchasing birds of scrofulous or tuberculous taint, and in the event of the disease manifesting itself, to dispose of his stock, thoroughly disinfect his ground, and after a sufficient interval import fresh and pure blood."

Dropsy of Heart Sack.

This is the only disease of the heart at all common in poultry, and is seldom thought of while the bird is alive. Hill gives the symptoms as seen in a case that was proved to be this disease by a post mortem: "Restlessness, moping, head continually thrown backwards, inability to feed from the ground, and when attempted, reeling and staggering backwards, tumultuous action of heart, occasional spasms."

Diseases of the Crop.

Impaction.

The crop often becomes impacted, or filled to distention, with food or foreign substances. Sometimes this mass gets dry and hard, so that it cannot pass out into the gizzard, and it prevents the passage of food into and through the crop passage. Unless relieved, the bird gets thin, comb dry and yellowish, and it dies of starvation.

Among the causes of impaction is the eating of long pieces of hay, especially when fowls first get out to the bare ground in spring, and eat the old rowen. When at liberty and in time of grass, the hen or chick takes hold of a blade of

grass. It is fastened to the plant at one end, and the bird shuts its bill upon about half an inch of the other, and breaks it off. In confinement the hen craves green food, and unless given it in some form will eat the hay given to scratch in for grain. The blade is long and loose, and after some effort the hen swallows it; then another and another. Every hen that eats in this way does not have impaction of the crop; but it is dangerous to thus tempt the birds, and is one of the common causes of this condition.

The feeding of food in large quantities (especially at night) of cracked corn, sometimes brings on impaction. The hen eats all she can hold of the dry grain, and then, before going on the roost, drinks water. This causes the grain to swell, distending the crop to large size. Commonly no trouble results, but in some cases the mass remains solid, and unless help is given the bird dies for want of food, even though its crop is full of grain.

A very rare cause of impaction is from obstruction of the outlet of the crop by large splinters of bone or wood. These lie across the opening or get caught in the muscle, and dam back the other food, causing a solid mass to gather. It is true that *generally* a hen can pass out of the crop any substance that it can swallow.

TREATMENT.—Having a case of impacted crop, proceed as follows: Cause the bird to swallow a tablespoonful of castor oil; then knead carefully the hard mass. If successful in softening it, hold the hen head downward and try to push the substance along and out of the mouth. If swelled grain is the cause of the trouble, you will probably be successful; but if matted hay or corn stalk makes up the mass, you will have to open the crop.

If some one can hold the bird for you it will make the operation more easy. Pluck out a few feathers, and then cut through the skin over the crop, a line about one inch long. This cut should be in the medium line of the body. Then make an incision three-fourths of an inch long through the crop. The distention of the crop will cause the opening to gape, and the mass will be in plain sight. With toothpicks, blunt pointed scissors, tweezers, or similar tools, begin to take out the contents of the crop. This done, run the finger into the crop, and make sure there is nothing remaining to obstruct the outlet of the organ. When sure all is right, take three or four stitches in the opening in the crop, making each stitch by itself, and tying a knot that will not slip. Then do the same thing to the cut in the skin. For stitches use white silk, or (if nothing better can be obtained) common cotton thread, number sixty, can be used.

Keep the bird by herself for a week, feeding soft food.

Inflammation.

This is caused by eating irritant material, such as unslaked lime, paint skins, “rough-on-rats” (phosphorus), and occasionally from feeding too much spice. With inflammation, a bird is restless, moving here and there, then for a while standing still with head depressed, and often trying to vomit; breathing jerky.

If you know the cause of the inflammation it will help in determining the course of treatment. If unslaked lime has been taken, give for drink vinegar water. If phosphorus, give magnesia. If lead (paint) has been eaten, give six drops of diluted sulphuric acid in three tablespoonfuls of warm water. In all these cases try to empty the crop, by holding the hen head downward, and working the contents of crop toward the mouth. If crop is nearly empty, give warm water to furnish something to work upon.

After the crop is empty, give for drink flax seed tea, and feed lightly for several days.

Enlarged Crop.

“Slack crop,” “pendulous crop,” this is sometimes called. This results from feeding at irregular intervals. No feed is given for a day or even longer, then a full feed of grain is thrown down; the flock fill themselves to fullness, drink eagerly of water, the grain swells, the crop is stretched very tightly. This is repeated time and again, until the crop loses its power of contraction, and remains enlarged. It hangs downward and forward, partly filled with food, not having the contractile force to push the food onward in its course. The looks of the bird are not a recommendation of your stock.

To remedy this disease, operate as for impaction, making cuts three times as long. Clean out the crop, then with a pair of blunt-pointed scissors cut out of the most enlarged part of crop a piece from one to two inches wide and two inches long, shaped like a diamond, or pair of (\diamond). With silk sew edge together as in impaction, and feed soft food for a week.

Gastritis.

This is an inflammation of the second stomach, or enlargement of the esophagus just before it empties into the gizzard. It may be caused by irritant substances, such as have been given as producing inflammation of crop; may be produced by long continued over-feeding, or the use of too much spice.

SYMPTOMS.—Poor appetite, constipation alternated with diarrhœa, rapid breathing, great general weakness.

TREATMENT.—Remove cause, if possible to discover it. Give rice-water for drink, soft-mash made with the water in which clover hay has been cooked. Arsenite of copper *one-fourth grain* to each quart of the rice water (drink) will do for the medicinal treatment.

Indigestion.

Indigestion, or dyspepsia, comes as the result of mistakes in care, feeding or housing of the birds. It follows the “too-often” meals of a cramming system. Birds fed in yards should have time to digest one meal before another is given. Chicks ought not to be fed oftener than every two hours, and grown birds need only three full feeds a day. Lack of exercise from crowded pens, or want of opportunity to work for grain or worms, is a factor in indigestion. The absence of green food, such as clover, hay, corn-fodder or grass, will in time produce dyspepsia.

In this condition the bird's appetite is quite changeable, constipation common, and the general appearance of the bird is "tired."

TREATMENT.— Good housing, pure water, regular feeding of a right ration, with plenty of exercise in the open air, will restore to good health nearly every case of dyspepsia. A teaspoonful sulphate magnesia to each pint drinking water, given for a week, then followed for a month by adding one-fourth grain sulphate strychnia to two quarts water, may be needed in case a whole flock is affected.

Diseases of the Liver.

The diseases of the liver are caused commonly by over-feeding of fat producing foods, or by use of too much spice and stimulating substances.

Congestion.

This is the first stage in inflammation, but does not always lead to it. It is caused by any disease of crop, gizzard or bowels that obstructs the circulation of blood. Disease of egg passage is often accompanied by congestion of liver.

The use of "egg foods," especially if given to hens in close confinement, often produces this condition. The feeding of a large proportion of potatoes, corn or corn meal, has a tendency to irritate the liver.

When fowls are attacked with this disease, the early symptoms are: rough plumage, watery diarrhœa, first brownish—then yellow. The comb is at first of a purple hue, but soon becomes dark, and even black. The bird looks forsaken, and shows little desire for food or exercise.

TREATMENT.— A teaspoonful of castor oil, or one-half teaspoonful of sulphate magnesia, dissolved in water, given once a day, combined with a diet of cut clover in winter or cooping out on grass in summer, will be helpful in this disease. If this condition is not soon relieved it passes in the second stage, known as hepatitis.

Inflammation.

Inflammation, or hepatitis, is nearly always fatal. If allowed to get into this stage medicine or care bring little reward. These cases will nearly always show a history either of tuberculosis or fatty degeneration.

SYMPTOMS.— Diarrhœa of a yellow cast, watery often; appetite poor, but thirst increased. The hen sits on floor, and moves seldom except to get drink. Breathing is slow and heavy. The bird rapidly loses flesh, and in a week or two is little more than skin and bones.

TREATMENT.— Unsatisfactory, but is as follows: A teaspoonful of sulphate magnesia dissolved in water given at night, and the next morning one-half teaspoonful castor oil. Tincture nux vomica, one-fourth teaspoonful to pint of water, to be kept constantly within reach for drink. Feed lightly, on bran mashes and green food, avoiding all stimulating foods or medicine.

Enlargement.

Enlargement, or hypertrophy is often found in hens kept over the second winter. The feeding of too much fatty food, or such foods as tend to lay on fat, combined with lack of exercise, are active factors in producing this disease.

SYM-TOMS.—When this trouble is fully developed the hen sits most of the time on the ground, and late in the disease does not go on to the roost at night.

TREATMENT.—Feed as in inflammation of the liver. As drink, give one quart of water in which one-half teaspoonful of powdered muriate of ammonia has been dissolved.

Prevention is better than cure, and in this disease, certainly, is more sure to give the best results.

Wasting.

Wasting, or atrophy of the liver, is not so common as enlargement, but still is to be met with in flocks that have had either too little, or a poorly balanced, food. I have known this to occur in flocks of late hatched pullets that the owner tried to keep cheaply because they were not laying, and hence were not a source of income to him.

SYMPTOMS.—The bird is quiet, dumpish, comb and ear-lobes yellowish, and does not seem inclined to hunt for food.

TREATMENT.—Give the hen her freedom, not confining her to a grassless yard, and feed a well balanced ration, not forgetting to give a good supply of cut green bone. For medicine put one teaspoonful "Fowler's solution of arsenic" in each quart of drinking water, not forgetting to change the water daily.

These diseases of the liver are to be avoided by giving good care and well selected foods. A difference should be made in the character and amount of food as given to laying hens, and those that are not laying. A hen that is resting will put on fat if fed with laying stock. So far as possible keep the two classes apart.

The fattening of birds for the market is the first stage in a process that if continued too long ends in fatty degeneration, not only of the liver, but of muscular tissue.

Diseases of the Intestines.

These cover all troubles existing between the gizzard and the vent. They occur alone, or in connection with other diseases of the bird. Improper feeding, unsanitary surroundings, exposure to cold storms, lack of grit, and in some cases infection from other diseased birds, are the leading factors in causation of these diseases.

Constipation.

This is caused in young chicks by lack of exercise, and absence of green and coarse food. Increase the amount of bran, and give lettuce, or cabbage, or onion tops. Let them have the waste from barn floor and hay mows. This gives them more exercise, and they find many a choice seed or leaf in the heap as they work it over.

In adult birds constipation is not common, but is sometimes seen when stock is crowded in close yards, without green food.

Diarrhœa.

This is more prevalent than constipation, especially in chicks. Chicks suffer from this disease quite young, whether raised in brooder or with the mother hen. It is produced sometimes from want of heat. Many a brooderful of fine chicks has joined the "silent majority" simply because its owner persisted in regulating its heat by a thermometer resting on the warm floor. I sometime ago gave up the thermometer in brooders, finding that the appearance of the chick was the best test of the right temperature. If I find the chicks lying near the edge of the fringe of the "mother," with a look of contentment on each of them, I know the heat is correct; but if they are crowded together in the centre, I am certain more heat is needed. I prefer heat enough so that some of the heads can be seen thrust out through the fringe. Diarrhœa is also caused in chicks from feeding too coarse, half-cooked food. Too much bran in mash, or simply mixing it with warm water, often leads to bowel troubles. Until my chicks are four weeks old, I bake my "mash" in a hot oven at least three hours. The ground grain and meat is mixed with cold water or milk, and then put into large milk pans to bake. I take no chances from uncooked food, and am certain from my experience that the results pay well for the extra time and work needful. A sudden shower sometimes so chills the chick that catarrh of the bowels follows. Keep the chicks where dry and warm; add a handful of linseed meal to each panful of feed; and put one tablespoonful tincture iron into one quart cold water for drink. Avoid the feeding of sour milk to very young chicks. Have grit within reach.

Hens often have diarrhœa as the result of improper feeding. The feeding heavy one day and light the next, upsets digestion, and irritates both crop and bowels. Filthy houses, damp location, stagnant drinking water, cause diarrhœa. Hens breaking down when two years old from being fed too much fat-producing food, often have a loose discharge from bowels. It is hens confined in yards, and supplied all their food, that usually have diarrhœa. Those at liberty and having the run of a barn, seldom suffer from this disease.

TREATMENT.—Take from flock and give a grass run; put tincture iron or old nails in drinking water; feed dry grain—largely wheat. If the case is acute and severe, give one teaspoonful castor oil, following it in an hour with five grains Dover's powder.

Dysentery.

This is characterized by a watery discharge, streaked with more or less blood. It is a filth disease, and can be communicated through the discharge to other birds. The feeding upon filthy ground, or being obliged to drink water in which the droppings of the hens has fallen, will at times bring on this disease.

A neglected diarrhœa sometimes runs into what looks like dysentery. For any of these conditions, take care that water and feed are right; give ten grains sulphate magnesia, followed in three hours by five grains Dover's powder. If dysentery continues, give two grains Dover's powder morning and night. Treatment in these cases is not often successful. There is diarrhœa in scrofula, consumption, cholera, and tuberculosis; and it is considered under those diseases.

Diseases of Abdomen.

Dropsy.

Dropsy, or ascites, is a watery condition of the abdomen, due to a collection of serum in the cavity. When seen in chicks it is usually due to improper feeding or bad sanitary surroundings, producing an anæmic condition. In fowls it may be caused as in chicks, but is more often due to some obstruction of the circulation of the blood, either by pressure of tumor or structural disease of abdominal organs.

TREATMENT.—Sunshine, good food, and clean houses and runs, combined with purgatives and tapping, will help correct this condition. Tapping is done by inserting a hollow needle or trochar through the skin and muscles of the abdomen into the cavity, and allowing the fluid to escape. Put one tablespoonful sulphate magnesia into one quart of drinking water, and use for a few days. Follow this with iodide of potassium ten grains to one pint water, to be used for drinking. If successful in curing the bird, market it at the earliest possible date. Never breed from such birds.

Enteritis.

More attention has been given to this disease the past few months than ever before. It bears the same relation to diarrhœa that roup does to catarrh. It is a severe diarrhœa aggravated, if not caused, by improper feeding, violent purgatives, foreign substances, poisons, or following a mild attack of diarrhœa or dysentery. Unlike cholera, it is not infectious. If a large number are sick with enteritis it is because they all have been exposed to the same causes. Enteritis is an inflammatory disease of the small intestine, in mild cases including only the mucous membrane—but in severe attacks extending to all the layers of the bowel.

It is caused by feeding too stimulating or irritant foods; poisonous vegetable or mineral; large numbers of worms in bowel; in fact by anything that irritates or inflames the bowel. There are three sources of danger from poisons on many farms—paris green, paint, and unslaked lime. Paris green, when it first began to be used, was carefully protected and used with discretion, but of late years it may be seen just where it was most convenient to drop the box, and the pails are left in some fence corner until wanted again, letting the rain gather in them, proving a cause of many an attack of "bowel trouble." Paint pots and cans are thought to be harmless; if, not, why are they left lying around in the fields for years? Drinking the water that collects in these vessels has led to enteritis in hundreds of cases. Unslaked lime is understood by nearly everyone to be a dangerous substance to be swallowed by a bird, and it is fairly well taken care of. Its usual way of producing trouble is by being picked up from droppings board or house floor where *slaked* lime is used to "sweeten" the place. If the lime is not screened there are often many pieces as large as corn kernels that remain in the lime *un*-slaked. These little lumps combine with the water of the crop and bowel, producing great heat and irritation.

SYMPTOMS.—Great general weakness. Bird gets into a corner, sits down in a listless manner with feathers ruffled. Eyes are nearly closed. The bird is seen to shiver, and is restless. The bird is hot—in fact, there is general fever. The discharges are watery, with mucous stringy matter, and sometimes yellow with bile. Blood may be passed with the discharge, and is usually followed by death. It is quite common for fatal cases to show stupor or wildness when well advanced in the disease.

TREATMENT.—Seek the cause; if possible, remove it. If due to an irritant in the bowel, give a teaspoonful of castor oil to remove it; follow with bland liquids, such as flour porridge, boiled milk, rice water. The best foods are meat extracts, raw meat, Murdock's food. If constipation is observed to be present part of the time, give injections of warm milk and water or warm castor oil. If enteritis is caused by worms they should be removed by remedies, as given in "Worms."

In all cases, add to one quart drinking water one level teaspoonful sulphocarbonate of zinc. Boiled water is best.

Do not give violent cathartics in any case of diarrhoea, as they simply increase the irritation.

Do not give solid food or grit for several days. As the bird improves bread and milk is to be given, followed in a week by a well-cooked mash.

Peritonitis.

This is an inflammation of the membrane lining the abdomen, and covering the various organs that it contains, and is a common cause of death.

Violence from outside the body produces this disease sometimes, but the usual cause is rupture of egg passage or blood vessel, and pus in the cavity from an abscess.

SYMPTOMS.—The bird is very hot, the temperature ranging from 103 to 107 degrees; is restless; "the abdomen is full, hot and tender;" pain is intense. As the disease progresses the bird falls on one side, and the legs are drawn up close to the body. Breathing is rapid, and the breath hot.

TREATMENT.—This is seldom successful. Use opium in one grain pills, twice a day, to relieve pain. Foods should be liquid, warm, and of an animal nature, such as meat juice and milk equal parts.

Enlargement of the Testicles.

This is a condition not often met with, yet not altogether unknown.

SYMPTOMS.—A bird with enlarged and congested testicles is inclined to be quiet; is careful not to jump from any object to the ground; will remain on the roost longer in the morning than the hens; the motion in walking is peculiar, the body rising and falling more than is normal, and he is depressed in spirits.

TREATMENT.—Plain food, without spice; and iodide of potassium three grains, in pill form, morning and night, will relieve this condition if not successful in curing it.

Worms.

As a cause of disease and of death little attention has ever been given to the worms or parasites that are to be found in the intestines of our common fowls. It is becoming more recognized every year that worms play an important part in failure with poultry. Investigations by the United States agricultural department and by the Rhode Island experiment station under Prof. Cushman, have proved that worms are the cause of death to whole flocks of turkeys, and a serious obstacle to successful raising of turkeys in some sections.

It will be well to remember this in looking after the health of the poultry, and in those cases that are not plainly the result of some definite trouble, to watch closely for worms, and in case of death to examine the bowels for these parasites.

There are two kinds of worms more or less common among fowls—the *roundworm* and *tapeworm*.

Roundworm.

This worm is found in length from a third of an inch to over five inches. It is white in color, head like a pencil point, tail blunt much like a finger end. Roundworms are quite common in poultry, yet do little harm unless present in large numbers. A worm or two will produce no symptoms, but when fifty or a hundred are busy at work struggling for room and food, it is to be expected that the bird will show the effect of the warfare within. The large numbers may cause "stoppage" of the bowels, from irritation, produce diarrhœa, or from the nutriment taken make thin and weak the bird. The roundworm is seldom thought of and its presence known till an examination after death shows that the worms are there. An observing person, who is with his birds nearly all the time, may now and then see a worm in the droppings, but the other birds quickly eat anything of such nature that they find.

TREATMENT.—Every other morning for a week, an hour before feeding, give a two-grain pill of santonine, followed by one-half teaspoonful castor oil. All droppings of suspected birds should be taken up as often as practicable, and used on ground remote from range of the flock.

Tapeworm.

This worm is much less common than the roundworm. Vale says: "It appears to be identical with the tapeworm found in cats (*Toenia crassicolis*), and it is, therefore, highly probable that it is derived from the same source—that is, the fluke of the liver of the mouse, for it is an ascertained fact that fowls will actually catch mice and eat them." I have seen brooder chicks three weeks old catch young mice and tear them limb from limb.

Usually there are no symptoms of the presence of the tapeworm. Sometimes the bird grows thin with no apparent cause. If the joints of the worm (like pieces of tape) are seen in the droppings, give five drops oil male fern in one teaspoonful sweet oil. Do this before feeding in the morning, giving about two hours after the male fern, a warm mash of bran and milk containing for each bird one teaspoonful castor oil.

Prolapse.

This is a protrusion of the bowels caused in pullets by straining to pass an egg, and in older birds from general weakness. Wash the bowel with tepid water and then with extract hamamelis (witch-hazel), gently replace it by pushing it up into the abdomen. If it comes out again continue the same treatment, giving a teaspoonful sweet oil every morning, and avoiding the feeding of irritating food.

Break-Down.

This is the "baggy condition" often seen in old hens that have had too much corn. The rear part of the abdomen is crowded with fat and hangs down, sometimes to the ground, giving a very unhandsome appearance to the bird. The ceasing to feed corn and other fat-producing foods will sometimes remedy this condition, but a bird that has been allowed to get into such a shape is spoiled for life both as a layer and breeder. The hatchet and pot should be the fate of such a bird.

Vent-Gleet.

This is an inflammation of the last two inches of the bowel—the expanded portion that receives both fecal and urinary discharges—resembling a certain venereal disease, and is contagious.

SYMPTOMS.—The first to be observed is a frequent contraction of the end of the bowel, as if something was there that the bird wished to get rid of. Examining the bird, the red membrane is seen to be hot, dry and swollen. In a day a discharge begins to appear, at first whitish, then yellow and bad smelling. This dries around the vent and diminishes the opening.

TREATMENT.—Wet a piece of cotton in a solution of ten grains sulphocarbolate of zinc, five drops oil of wintergreen to one gill boiled water, and insert at morning and night. Or as an injection, use sulphate zinc five grains, water one-half pint. Even with the best of treatment this disease will run a course of over ten days. It seems unnecessary to say that birds with this trouble must be kept isolated.

Diseases of the Oviduct.

Egg-Bound.

Many deaths result from this condition. It is most common in late winter and early spring, owing probably to a diet tending toward extreme fatness. Hens of the smaller breeds, and especially those having their liberty, are seldom troubled with this disease.

A majority of the cases of egg-bound hens will be found on post-mortem examination to be fat—the liver enlarged, and the muscular system weakened by fatty degeneration. Not only is fat deposited between the muscular fibres, but many of the fibres themselves are replaced by fat. This makes the muscles not only weak in action, but quite easily ruptured. In common with other muscles, those surrounding the oviduct (egg passage) become weak and flabby,

and if a large egg is on its way out, or if through fright extra strain is brought upon these muscles, the passage is easily torn open, and the egg passes into the abdominal cavity and is followed by peritonitis — and death.

Hens are sometimes found dead upon the nest, apparently there for the purpose of laying an egg. This is caused often from the fatty condition of the heart muscles. The action necessary to eject the egg being too much for the weak heart, it staggers and then stops, and the hen is found lying dead in the nest. An over-fat hen has a deposit of fat around the bowels, pressing upon not only them but also the lower part of the egg passage. This acts as a foreign body, and obstructs the passing of the egg.

Very large, soft shelled or broken eggs, are causes of difficulty in the oviduct. Pullets are often egg-bound for a few days when they begin to lay. This is owing to the small passage; but after a few eggs are passed the oviduct becomes larger, and the trouble ceases.

SYMPTOMS.—You will find the hen walking about with tail depressed, and every few minutes going to the nest and trying to pass an egg. Catching the bird you will find her straining, and sometimes can feel a hard body within the vent.

TREATMENT.—If the egg-bound condition is owing to long continued fatness, all treatment will fail. "Prevention" ought to prevent nearly all cases of this trouble. Dip the finger into sweet or castor oil, and introduce it into the vent. Ten drops of fluid extract of ergot, given to the hen from a spoon, and followed in half an hour by holding the bird over hot water so the steam can reach the vent, will sometimes relieve this condition. At all events, remove her from the male bird, and feed soft food and warm water. If successful in removing the egg, and the bird is worth the extra trouble, keep her in dry sunny quarters, and in her drink put ten drops tincture nux vomica to one pint of water. Give this for ten days, avoiding foods rich in starch, such as corn and buckwheat.

Inflammation of the Oviduct.

This follows in most cases from an egg-bound condition. It is sometimes produced by feeding too much spice, or "egg-forcing foods." It is also caused by the extension of inflammation from vent-gleet, and these cases are infectious. External injury very seldom causes this trouble.

SYMPTOMS.—Hill, in "Diseases of Poultry," says: "A bird affected with inflammation of the egg passage suffers acutely; at first there is a continual and violent straining (sometimes resulting in apoplexy). The wings are dropped, and the feathers pulled out. The vent is usually hot, and if a thermometer be inserted the temperature will be found high, frequently 105 to 107 degrees. As the inflammation proceeds the bird becomes more and more mopeish and exhausted, but does not strain so violently — pain and exhaustion acting as preventives. Ultimately the temperature becomes lower, the body cold, and with a few convulsive gasps the sufferer dies."

Too many birds die during their second winter, from this disease. The tendency of a hen to lay on fat is well known; and fed as hens usually are, *with the pullets*, the hens grow diseased with fat, while the pullets are doing the laying. The hens should be fed by themselves, and lightly as to the fat-producing foods.

TREATMENT.— Prompt treatment is necessary, as in severe cases death follows in less than twelve hours. At once, if you suspect this disease, give one-half teaspoonful sulphate magnesia in a tablespoonful water. With an oiled finger examine the egg passage, and if any egg shell or other body be found, try to carefully remove it. Keep the bowels well opened by use of the magnesia, giving plain unstimulating food, grass and clover, rather than grain and meat.

Soft-Shelled Eggs.

Anything that excites or inflames the ovary or oviduct tends to produce soft-shelled eggs. An over-fat hen, or one fed highly on spiced food, is apt to lay these eggs. A frightened hen may lay prematurely; or worms in bowels may cause irritation enough to hurry the expulsion of the egg.

TREATMENT.— A little sulphate magnesia in the drinking water (two teaspoonfuls to quart of water) and the feeding of plenty of cut clover, with wheat and boiled oats, oyster shells and grit in reach, will do much to change this condition and its results.

Diseases of the Comb.

The appearance of the comb is a fair index to the condition of the bird. If it has a bloodless look, is light colored and limp, it indicates an anæmic state of the fowl.

On the contrary, if it is dark-colored, purple, and tense in substance, it shows the other extreme — plethora. Between these two opposite appearances is that healthy color and plump look that we always associate with birds in fine condition.

The wattles and ear-lobes by their appearance also add to or diminish our opinion as to the real severity of the case.

Nearly all the diseased conditions of the comb are owing to disturbances in other parts of the body.

In America we suffer less from the real diseases of the comb than in England and on the continent.

Fungoid.

This trouble is contagious, but to its full development must be added bad sanitary conditions and the feeding of a diet rich in starch. A flock under such conditions, if a case arises or is introduced from without, will rapidly contract this fungoid affection.

SYMPTOMS.— A few bead-like swellings are seen upon the comb (and wattles); at first hard to the touch, then grow soft, and bursting discharge a yellow liquid. Around these first few ulcers other swellings appear, going

through the same process. As crop after crop appears, the head swells, the disease spreads to the neck; the yellow discharge dries upon the comb and skin, giving a disagreeable look to the fowl.

TREATMENT.—Birds run down in health ought to be killed and burned. If, on the other hand, you have a flock of strong, well-nourished birds, into which in some unknown way this disease¹ has been introduced, a simple treatment may be tried. Quarantine all sick birds. Tie the legs loosely—not so as to prevent walking, but to keep it from scratching its head. Sponge often all diseased parts with a wash of carbolic acid crystals five grains to one pint of water. Give soft food to which has been added as a spice black pepper.

Black-Rot.

This disease is a gangrenous condition of the comb, seen in all of the tall comb varieties, but most often in the Black Spanish. There seems to be an intimate connection between the disease and congestion of the liver.

SYMPTOMS.—The comb, especially the points, is at first purple, then blue, and at length becomes black. It may affect only the points, or may extend to take in all the comb. Sometimes the bird is in such bodily condition as to live long enough to have part or all of the comb drop off. With the comb in the state of “dry-root” or “moist-rot,” there is some looseness of the bowels, with a dark discharge, changing to yellow. The bird has no desire for food or exercise, but remains for hours at a time standing quietly.

CAUSES.—These are rather uncertain, but seem to be damp and musty houses, or a sudden chill.

TREATMENT.—Remove the bird to a coop where it can have fresh air and sunshine in abundance. To a pint dish of drinking water add one-half teaspoonful of *muriate* of ammonia. Paint the comb three times a day with a lotion of one ounce of water, one-half ounce glycerine, and two grains carbolic acid. Green food, such as onions, dandelion leaves, and cabbage, should be within reach all the time.

White Comb.

This is a disease caused by bad sanitary surroundings, such as close air, lack of sunlight, and fostered by absence of green food. It is a disease of city rather than country. It is met with in basements of city stables.

SYMPTOMS.—Small points the size of a pin-head appear on the comb, soon break down, and the discharge runs together, making a thick crust, that cracks and comes off in flakes. The eruption may spread to the face and neck, causing the feathers to drop off. As this condition is owing to an anæmic (or starvation) state of the system, with the comb eruption will be seen paleness of wattles and skin, and debility of the whole bird.

TREATMENT.—This can seldom be given, because it means removal to green fields, with proper housing and feeding. The local conditions should be met by the daily application of an ointment of oleate of zinc one heaping teaspoonful to one-half cup of vaseline. Do not (as has been advised by some) give laxatives, but try to build up in every possible way the bird's weakened system.

Injuries of Comb.

These are to be met with in poultry yards quite often. Seldom are they severe enough to require much attention. If there has been a severe cut or injury to the comb followed by much bleeding, bathe with warm carbolized water. If the cut or tear is severe, pass a needle threaded with white silk through each edge of the wound, drawing the cut surfaces together, and then tie. After fastening the knot, cut the silk, and proceed to stitch as before. The bird should be kept alone because of the danger of picking by others if the opportunity is allowed. In five or six days, if the wound seems to be healing, cut each thread and remove the stitches. Whenever a bird's comb has been picked or injured so as to cause the blood to settle in it or to be followed by bleeding, remove to place alone, as much for the sake of the flock as of the single bird. It is easy to teach a hen under such conditions to pick the comb of another bird, and it soon learns to do so for the sake of the blood it gets. The zinc ointment referred to under "White Comb," will be found useful in healing the combs of cocks that have been injured by fighting.

Frost-Bite.

This resembles "black-rot" in appearance, but the bird with frost-bite is fairly active, and with a good appetite.

SYMPTOMS.—Such of the comb (and wattles) as has been frozen is at first purple, and if improvement does not follow turns black, and may at last drop off.

TREATMENT.—Prevention ought to be practiced, but in the best houses and with the best of care frost-bite will sometimes be seen. Birds with tall single combs need lower and warmer houses than the rose and pea comb fowl. Well fed flocks will stand a lower temperature than those carelessly looked after in kind and quantity of food.

To reduce the swelling and improve the circulation in comb or wattles, apply two or three times a day the following mixture:—vaseline five tablespoonfuls, glycerine two tablespoonfuls, spirits of turpentine one teaspoonful.

Apoplexy.

This is caused either from a weak condition of the blood vessels of the brain, or so great a pressure upon them that a break occurs, letting out the blood into the brain.

Violent exercise, as in running down a cockerel, overloading the crop after fasting, severe straining in laying an egg (in hens), are some of the ways by which this condition is produced. Once in feeding my birds at night, I noticed a cock among some young cockerels. He was very lively, and his appetite was so good that I stopped just to see him enjoy his supper. When I went thirty minutes later to shut up my houses, I found him dead lying on his side with purple comb. While he was with the hens he was careful to see they had food before he did, but when he was put with cockerels his greed was too much for him. Hens that are over-fat are in good condition to have an attack of apoplexy. In this condition the blood vessels, in common with the other parts

of the body, are weakened, and straining to pass an egg through an egg passage made smaller by the fat about it, bursts a blood vessel in the brain, and the hen is found dead on the nest.

Extreme heat, as in summer, sometimes brings on this trouble. The bird is seldom seen until dead. It may occasionally be seen lying on its side, with purple comb, partially or completely insensible.

TREATMENT.—Bleed the bird from a vein in the under side of a wing; give if possible two drops croton oil by the mouth, and keep in coop alone. To avoid this disease (1) keep stock in proper condition by not feeding too much fat-producing food; and (2) for handling, catch birds at night while on the roost; (3) feed grain in moderate quantity at regular intervals.

If your birds are already too fat, keep them on a grass run if in season, or feed largely on cut clover if in winter, being careful to avoid using much corn or fat meat.

Broken Bones.

Every year we see a case or two of broken bones in our flock of birds. If the break is in the shank the treatment is simple and successful. For broken shank in a chick, straighten the bone, wind a two-inch cotton bandage around the limb twice, then place wooden toothpicks up and down the shank, take two turns more with the bandage, cut off the cloth and fasten with needle and thread. For fowls splints of pine can be made of right size and length to fit the case. For broken wings and legs (thighs) use the hatchet, and serve for dinner.

Lameness.

This is caused by an accident. Getting caught in the fence or other place, and using considerable force in getting away, will produce this condition. If due to this, and not complicated with rheumatism, time itself will cure.

Diseases of the Leg.

Weakness.

This occurs in young stock, (cockerels more often than pullets), at from sixteen to twenty-four weeks of age. The small breeds, such as Leghorns, seldom develop this trouble; but it is more common among the heavy varieties. The causes of leg weakness are trying to rush the young birds to maturity; feeding too much condiment; fattening food; increasing the weight of the body beyond the strength of the legs to support it. This trouble occurring in fowls is more apt to result from a fat condition of the body, and is likely to attack hens rather than cocks.

SYMPTOMS.—The birds first show an unsteadiness in gait. They walk slowly, and there is a tremble in the limbs. In a few days they can hardly hold themselves up, and when feeding will sit down on their legs. There seems little wrong except the leg trouble. The plumage is bright, the eye clear. As time goes on the appetite lessens; the other members of the flock pick on him; he grows thin; the skin dry and crackly; lice increase and grow fat; the bird loses weight.

TREATMENT.—Remove all causes of the trouble, as pepper, corn, and corn meal. Over-crowding must be avoided. If you have been feeding any and every time you went near them, in fact, “babying” them, change this—feeding right foods at regular intervals, and at no time filling them to repletion. Give them a yard and pen by themselves to avoid picking upon by stronger birds. See to it that they have clean water and green food. Bathe the legs daily with Anodyne Liniment, or tincture of arnica. Bone meal, or phosphate of lime should be put in the morning mash. Boiled beans or peas will help to furnish a right diet. No better medicine can be given than quinine, — one grain per bird every day, administered in pill form.

Rheumatism.

This is a disease affecting the whole body, characterized by heat, and enlarged joints. The joints are swollen, the skin over them red, and hot to the touch. The leading symptoms belong to the legs, so we call attention to this disease under this heading.

CAUSES.—Rheumatism is caused by exposure to cold and dampness; by over-feeding of nitrogenous food; by under-feeding of green food; and is intensified by hereditary taint.

SYMPTOMS.—There is generally contraction of the muscles, drawing up of the toes, and sometimes flexing the legs. Forcible straightening of the legs or toes causes severe pain. Because of the pain, the bird sits down most of the time, and in this way takes off part of the pressure upon the inflamed joints. Sometimes there is with this disease an inflammation of the lining membrane of the heart, complicated with congested liver. Adult birds do not furnish many fatal cases; but the mortality among chicks is often large.

TREATMENT.—Dry and roomy quarters must be furnished. Green food in varied articles should be given. Cabbages, carrot tops, lettuce, mangels—some or all of these you can obtain. Fresh water, so protected that the birds cannot get it on them or upon the floor, must be within reach constantly. In case of brooder chicks, be careful to keep brooder at right temperature, clean, dry, and plenty of sand or chaff upon its floor. Brooder chicks especially need regular feeds of green material. In warm weather we depend on the tender grass to which they have free access; and in cold seasons and when confined to brooder we have found carrot and turnip tops well suited to supply the need. Softly rubbing the legs with tincture of opium, or extract witch-hazel, and then wrapping them in flannel will help remove the local condition. To meet the constitutional symptoms, put into the drink fifteen grains of iodide of potassium to one quart of water. Bicarbonate of soda, or salicylic acid may be used; but we consider the iodide of potassium best in the general treatment of rheumatism.

Cramp.

This is a trouble of chickenhood occasioned by crowding at night, too much warmth in brooders, and from want of exercise.

To cure this trouble, and (what is better yet) to avoid it, give plenty of room in the brooders. Do this by reducing the number in each brooder. Fifty chicks are all that ever ought to be put in one flock. Give just heat enough so there is no crowding at night. Make every chick work for its grain. Use sand, dust, or chaff, and bury in it all the cracked corn and wheat you feed. Exercise will do much to prevent cramp.

Scaly-Legs.

This is a local condition dependent upon a parasite, an insect that lives among the scales covering the shanks of the domestic fowl. There may be only a small place rough, the scales pushed apart; or the legs may be enlarged to twice their ordinary size, covered with disgusting bunches of scales and dirt. Scraping off some of this and putting it under a magnifying glass, you find one or more insects. This is among the few troubles that are quickly cured.

TREATMENT.—One ounce sulphur rubbed into ten tablespoonfuls of vaseline makes a good ointment to cure this disease. Apply every other night for a week, working it into the rough scales.

The best and simplest method is the "roup cure" — kerosene, applied not to the head, but to the toes and shanks. A tin quart measure, nearly full of water, with one tablespoonful kerosene oil floating on top, and tied or fastened to a box to hold it firm. Then dip the legs (both at the same time), into the oil, holding them there one minute. Repeat this after three days.

Set no hen with scaly legs if you wish to avoid the trouble in the chicks. If you have one hen with these insects upon her shanks you have present a condition favorable to owning a scaly-legged flock. On the roost these insects can sometimes pass from one bird to another. While you are curing the few cases you know you have, take the pains to apply the oil to all your birds, and to the roosts also. Do not have scaly-legs in your flock. It is an indication of a careless poultryman.

Fish-Skin Disease.

This is a dry condition of the skin of legs and toes, resembling "scaly-legs," but not caused by irritation of a parasite. It is not contagious, and in many cases seems to be hereditary. There is a deficiency in the amount of oil in the skin, and it becomes dry and rough. Dirt gets in the cracks that appear, and picking or scratching only aggravates the trouble.

TREATMENT.—Softly rub into the dry parts of leg or toe an ointment of cosmoline (any petroleum jelly) two tablespoonfuls, oleate zinc one teaspoonful. Daily rubbing with this ointment will soften the skin and improve the condition.

Dropsy of Feet.

This condition is wrongly called gout. It is simply a swelling of the feet and toes, due to a sluggish state of the circulation. Over-feeding, too little exercise, or none at all, may be followed by dropsy of the feet.

TREATMENT.—A laxative, with plain food, and plenty of green vegetable nutriment, will remove this condition. When well, add exercise in abundance.

Bumble-Foot.

Sometimes the bottom of the foot becomes puffed, hot, tender, and in a few days matter gathers beneath the thick skin of the sole. In the beginning the skin is hardened; then irritation is set up in the tender layers underneath; the tissue breaks down, pus is formed. If left to itself the matter will spread a little way up and around the leg. Bumble-foot is caused generally by the bird alighting heavily on a hard floor when jumping from the roost. I have known it to occur in half-grown chicks that had never been on a perch of any kind. I have sometimes thought it due to a splinter or thorn; but have never found any foreign substance except glass. The beginning of the disease is rarely noticed. The bird walks somewhat tenderly, lifts up the sore foot when standing, and seems to be in a hurry to get off the ill foot if in motion. If seen early, washing the foot in strong vinegar, or applying tincture of iodine to thickened skin, will often prove a cure.

Usually matter has formed when attention is called to the trouble. The only treatment then serviceable is to open the abscess with a clean slender knife, wash out all matter with warm water containing carbolic acid, and then apply nitrate of silver—ten grains to one ounce of distilled water. Keep the bird on clean straw for three or four days.

Eczema.

A disease of the skin, caused by too stimulating food, given to high-bred birds. It is not contagious.

SYMPTOMS.—The usual parts of the body to show this trouble are the wattles. White points appear, grow larger, run together, burst, discharge a liquid that dries making a crust. In severe cases the discharge falling upon the feet irritate them. The bird is "off his feed," and moves sluggishly.

TREATMENT.—Two grains calomel every other night, and a one-grain pill of citrate iron and quinine twice a day for two weeks, will be the proper internal medication. Apply several times each day ointment of oleate of zinc to the wattles or parts affected. Simple foods, including cut clover (steamed), or a grass run, with green cut bone twice a week, will be required to put the bird in a healthy condition and to keep him so.

Chicken-Pox.

This rarely attacks full grown birds, but usually is seen in the fall of the year on partly matured stock. Wet dark days seem to increase the number of cases, and the severity of the disease.

The head, face and underside of wing are the ordinary seat of the sores or ulcers that constitute the prominent feature of chicken-pox. Extension of the inflammation to the eyes may result in the loss of one or both of them. When the sores are numerous the bird loses appetite, strength and color.

TREATMENT.—Apply carbolated vaseline to the ulcers twice a day. Avoid damp houses and exposure to rains. Feed mash rich in animal material, made by mixing ground grain and animal meal with boiling milk. A grass run in summer, or cooked cut clover in winter.

Lice.

Lice are always with us. Constant watchfulness is needful to prevent their overrunning us, and thus making our poultry plant a failure. The dainty little insects easily make a large hole in our profits.

Prevention in this, as in other poultry trials, is cheaper and more satisfactory than extermination.

If hatching with hens use clean boxes, fresh earth and hay, and set in a place free from lice. Dust the hen thoroughly with Persian insect powder before placing on the eggs, not forgetting to use a little of the powder in the nest. Repeat this at about the tenth and eighteenth days. After hatching, the powder should be used every ten days until the hen weans the chicks, or they are large enough to do without brooder heat.

If you have used no powder, and find your chicks growing thin, and down or feathers dull and rough, look for lice. No doubt you will find them. The use of the insect powder will kill the lice, but those chicks will always be less vigorous than they would have been if prevention rather than cure had been practiced.

Sometimes you will find your chicks standing up trying apparently to see how tall they can grow, and then falling over backward and trying to rub the tops of their heads on the ground. This indicates head lice. Looking you will probably find a few (two or three) of these large lice on the top of the head. Catch them, using a fine wire or needle, and then rub a little kerosene on the head. Tobacco dust is often used in place of the Persian powder, and tobacco stems can be used to make the nests for sitting hens.

We have always used the Persian powder, buying it in one-pound boxes, and usually obtaining it at seed stores, and have had continual good success. This powder loses its virtue in time, and a fresh supply of a good article should be obtained once a year.

Sometimes (too often I am sure) a house will become infested with lice, red-mites. The nest box is alive with insect life, the underside of the roosts and the cracks of walls and droppings boards, thick with the little pests. If this was all we could stand it; but, alas, the lice are not satisfied with a diet of dust, but at dark come trooping up the sides and along the roosts to feast upon the life-blood of the hens. There is no profit in feeding such a multitude of tramps; in fact, plenty of lice and a large egg supply do not go hand in hand.

Such a house and flock need a very thorough treatment. Clear the house of everything movable. If there are *permanent* nest boxes built into the building, knock them down and never again use such fine breeding places for lice. Clean the house of cobwebs and dust. Carry out all litter from floor, digging down to fresh earth. Shut all windows and doors, and then burn sulphur, leaving the house closed for several hours. Follow this with a thick coat of whitewash, using crude carbolic acid in it. The roosts should be of planed lumber, and well kerosened on all sides. Let the hens crowd at night at the small doors, keeping them closed. Take the hens, one at a time, and carefully dust the insect powder into the feathers. Do this by holding the legs and with

the fingers working the powder down to the skin, being sure the fluff is not overlooked. This will get rid of the lice. Use clean nest boxes, and every month during warm weather kerosene the roosts. Road dust must be provided for dusting — for dusting is to a hen what bathing is to its owner.

There is danger of introducing lice into your flock through birds bought from other persons. Some of our "best breeders" are not careful enough to avoid lice; and no new bird should be put into your house until carefully disinfected.

Feather-Eating and Egg-Eating.

There are two evils that the careless poultryman is likely to meet that are not, strictly speaking, diseases, but are worthy of a place in this series of articles. They are feather-eating and egg-eating.

Feather-Eating.

This is due largely to laziness on the part of birds and owner; over-feeding and crowded flocks; nothing to do for a living except to bolt the food that the careless owner supplies in such generous quantities, and then to stand around ready for mischief. The man who crowds and over-feeds his poultry also allows lice to get a lodging place upon his fowls. Lice eggs are commonly laid upon the fluff near the opening of the bowel. The lice irritate that part of the body, and in picking at the lice and "nits" the hen gets a taste of the substance in the shaft of the feathers. Other hens see what is going on, and take a hand in helping remove the feathers — so the skin is bare and red from irritation.

TREATMENT.—Fowls that have contracted this depraved habit, even if kept from following it for a time, are likely to take it up again on the slightest provocation. Feed lightly a well balanced ration, making birds scratch for all grain; give green food, allow plenty of house room and runs; get rid of the lice by use of insect powder, remembering that the first application kills the lice, but the "nits" remain to hatch a new generation that must be taken care of in the same way. To stop feather-pulling a "bit" can be put into the mouth, and held in place by a wire passing through the comb. This keeps the bird from getting a hold on the feather, and its constant use will in a few weeks cure the habit.

Egg-Eating.

Egg-eating, caused principally by thin shelled eggs, lack of proper food for egg shells, or an inflamed condition of egg passage, causing the too rapid movement of the egg, accounts for most thin shelled eggs. The egg is left in the nest, and another hen going to lay, steps on it, and it is broken. If she remains some time on the nest the egg sticks to her feathers, and on leaving the nest is liable to take the egg with her. It is then within reach of the flock. The first bird takes a pick at the shell, likes it, takes another bite, — and the other hens, seeing all that is going on, take part in the feast. Sometimes the lack of animal food seems to create an appetite for egg-eating. Nest boxes without proper filling, turned toward the light, and easy of access, often lead to broken eggs.

TREATMENT.—The feeding a ration rich in shell forming material—of which cut green bone is the best. Boxes to be in secluded corners, and as dark as possible. Birds must be kept at work to keep them out of mischief. All inveterate egg-eaters should be killed and marketed. It is well never to give egg-shells to hens, unless crushed and fed in mash.

Moulting.

This is a natural condition by which the bird exchanges an old worn suit of feathers for a fresh clean one. Yet so many birds pass through this process with difficulty, if not disease, it is well to call attention to it. Moulting is done during the late summer and fall months, when the weather is warm. A moulting hen is easily fattened. Hence at this time of the year feed lightly of those foods that produce fat. Corn, corn-meal, middlings, potatoes, sweet corn, must be used sparingly. Increase the amount of green bone, bran, and skim-milk. A run on a field of clover will be of help in moulting. Do not try to hasten the time of the moult by keeping in a warm pen or by feeding cottonseed or linseed meal. Keep all males by themselves during the moulting season. If kept with the hens he is likely to damage the tender new feathers as they grow. If hens are not well fed at this period of their life they may learn the habit of feather-pulling, or egg-eating. They should also be housed so as to give them shelter from cold storms and hot sun. The ideal place for a run is in an apple orchard, where, in addition to the grass, may be found insects in fallen fruit, and the apples themselves make a welcome change of food. If to the orchard be added the scratching-pen house we have an arrangement suited to all conditions of sun or temperature, and a place where moulting birds will safely pass through the exhausting process. Hens during this process lay few eggs, unless in perfect condition at its commencement, and fed the right foods. Birds should go into the moult not fat, free from lice, and with no red mites in the house.

For a tonic, one-half teaspoonful tincture nux vomica to two quarts drinking water; or twenty grains citrate iron and quinine to same quantity water, will help the digestion and strengthen the whole system during this exhausting process.

Under-Feeding.

Under-feeding and over-feeding are prolific factors in producing disease. As a whole, poultrymen are inclined to feed too much grain, especially in the late autumn, thinking to force the pullets to lay — and during the warm summer months when nature furnishes much of the heat that must be supplied by food in winter.

No one engaged in the poultry business is inclined to stint the birds in quantity of food. Under-feeding is often found practiced in the tenement districts of our large cities. When continued, the fowl becomes thin in flesh; lays, possibly, a few eggs with thin shells and watery contents; is slow in movement, and lives a half-starved existence. In these places, lack of food is

combined with absence of sunlight and pure air, and probably dampness and filth to contend with. These conditions produce anæmia, and it is only remedied by removal to sunshine, fresh air, with careful and proper feeding.

While, as we said before, poultrymen are not inclined to stint their flocks in quantity of food, they are very much disposed to keep from their feeding rations certain foods that are necessary to the best welfare of their stock. Many persons keeping twenty, fifty and in a few cases more fowls, never feed cut clover or grass (green or dried) and seldom give green bone or meat. The family flock of a few hens, commonly, in receiving the waste from the table, get a fairly well balanced ration. It is a waste of good grain to use it to the exclusion of green and animal foods. If you are so fortunate as to have unlimited run for your poultry, of course, they will attend to the bugs and clover themselves during part of the year; but when the grass is brown and the earth frozen, remember that grain, cut clover and green bone in the proper proportions make a healthful bill of fare. To the right foods do not forget to add the "hens' teeth," *grit*. Do not think they will find it themselves in their rambles — but keep it before them in quantity. As our nearest friends across the water would say — many a poultry plant in years past has gone to pieces on the *rock of no-grit*.

Over-Feeding.

Too much in total quantity or too much of any single article of diet produces disturbances in the animal economy. The most trouble comes to those birds that are confined to narrow quarters, and are allowed no choice in the selection of food. If there is any one article of food more misused than any other in the feeding of poultry, it is our national grain, *corn*. Before the advent of FARM-POULTRY, a large proportion of the farmers and villagers fed no whole grain except corn; and the morning mash (if they were so fortunate as to have one), was largely corn meal. This method of feeding is slowly changing to a more sensible and better paying menu. With perfect freedom and access to the chaff that is found in country barns, hens are not likely to over-eat of corn, if it is kept before them all the time. When confined to the house and wire runs, care must be exercised in feeding this *heat* producing food. Its over-use produces a deposit of fat in all available parts of the body, which in time is likely to be followed by "fatty degeneration" of muscles and organs. Large collections of fat, with the conditions likely to arise from its presence, are common causes of apoplexy, inflammation of liver, bursting of oviduct (egg passage) from the obstruction, vertigo, and abnormal conditions of heart and kidneys. The over-feeding during the winter makes little apparent change in the bird. Few if any eggs are laid. With the springtime, continuing the same ration as is the custom of many, the fatty muscles and organs begin to break down. The bird gets more and more thin, no appetite, and "mopes" — and ought to die. Some do; I wish more did, because those that recover are never strong healthy birds fit to produce young.

Now, corn is not the only food that will produce too much fat. Feeding oats, wheat, and fat meat in over-abundance will induce the obese condition —

but these articles as commonly fed are fairly safe to use. Any animal not fed a well balanced ration has a craving for food that is not satisfied with a normal *quantity* of nutriment. A complete food costs slightly more than the common haphazard feeding of the past, but pays good dividends in better health, more eggs, and finer show-birds.

Prof. Hill says: "An over-fed fowl is never a well-fed one."

The over-feeding of meat produces a perversion of nutrition; the heart becomes enlarged in size; and unless the bird is of an active variety, there follows a morbid chemical action in the body. The nitrogenized material, of which meat is so largely formed, is decomposed in excess within the system, and throws unusual work upon the organs of excretion to remove the surplus. This irritates the kidneys, and leads to positive disease. The presence of an excess of nitrogenous material in the body tends towards the production of one of the forms of rheumatism.

The feeding of raw animal food, while on the whole a welcome addition to the poultry diet, is not without its dangers. In this way the various parasites that thrive in the intestines of the beef animal, or the trichinæ in the pig, may be introduced into the fowl.

There is also danger in feeding decayed meat, whether it be from the large piece of flesh lying on the ground, or the pailful of cut meat and bone that is alive with "crawlers." For your satisfaction, however, let me quote from Dr. Richardson:

"As a rule, such foods do no harm to the body that receives them. In that wonderful alembic the stomach, not half of the functions of which are as yet discovered, the matter is rendered innocuous, though it would be actively poisonous were it inserted into a wound or injected into a vein."

No perfect rule for feeding can be given. The age and condition of the bird, the season of the year, and the object in view, all influence the variety and quantity of food to be used. The laying hens and the growing "youngsters" need a diet much alike. So far as is practicable, laying hens and those that are resting from their egg labors, ought to be fed apart. One ounce of green bone three times a week, is enough for any laying hen or growing chick over three months of age. Salt should be used as a seasoning in same quantity as you would on your own food. Condiments are good in limited amounts in the hot mash. The wild birds pick and eat many a leaf and berry that is spicy, and our domestic fowls appreciate ginger and black pepper in their breakfasts. Charcoal in small pieces should be kept within reach of the flocks. It is pleasing to see a hen scratching in an ash-heap, picking up now a small piece of slate or unburnt coal, and then a cube of half-burnt wood.

Water is an important article of the daily food. It should be as fresh as possible, and kept in a dish that is clean. Hot, filthy drinking water is an abomination to all living creatures, and is a cause of many of the cases of diarrhœa and bowel troubles in the poultry yard. Feeding properly will banish from your poultry plant one-half the diseases that trouble the unsuccessful "hen-man."

Colds and Roup.

Causes, Prevention, Diagnosis, and Treatment.

By DR. P. T. WOODS.

General Causes and Prevention.

Nearly all diseases are preventable. The old adage: "An ounce of prevention is worth a pound of cure," is one that every poultryman "should paste in his hat."

Fowls which are vigorous and active, having a sound constitution, are rarely affected by disease. Paraphrasing a famous saying of Dr. Holmes, it may be said that "a fowls physical training and constitution should begin with its grandparents." One of the most valuable precepts in the science of prevention is to breed only from fowls that are well matured, that have been selected for vigor and sound constitution, and whose parents and grandparents were physically sound. While I am not an advocate of inbreeding, I would much prefer to breed related birds which are themselves, and whose ancestors had been in sound physical condition (with the risk of perpetuating some minor fault) than to use new blood of doubtful character as to healthy ancestry.

Given fowls with sound constitution, and half the battle of prevention is won; but a sound constitution may be ruined by unsanitary surroundings and indiscretion in feeding. The drinking water is a fruitful source of disease. It is not an uncommon sight in poultry places otherwise well kept, to find the water containers in a filthy condition. Putting clean water into a foul receptacle is labor lost, and worse, since it invites disease. Contagious poultry diseases probably spread more rapidly through the drinking water than any other way. All water receptacles should be cleansed and refilled several times daily, and should be frequently scalded. Earthenware water dishes, those having a glazed inner surface, are the best. In most of our cities the common yellow deep baking dishes can be had for five cents each. Never, under any circumstances, give medicines in drinking water contained in tin, or any metal dishes.

Accumulations of droppings, foul air, filthy water, dampness, vermin, undue exposure to cold winds and wet, crowding and consequent overheating, and last, but not least, coddling or babying fowls must all be avoided if disease is to be prevented.

Contrary to some of the professed authorities, I believe that the hot mash plays an important part in the causation of colds and kindred ailments. I do not believe that the mash should ever be fed hot, nor should it be given absolutely cold. Notice a fowl after filling its crop with hot mash, and you will see that it comes pretty close to sweating, and not infrequently will seek some sheltered place and take a nap. In winter weather such condition will often be followed by a cold or worse. Never give mash food hot; cook it over night, or scald it, as you prefer; but when you feed it see

that it is only warm—never warmer than the temperature of the fowl, say 105 degrees F. The same rule applies to the drinking water. It is better to have it too cold than too hot.

Do not commit the indiscretion of feeding nitrogenous foods too heavily. Protein is not convertible into heat and fat so readily as is carbonaceous food, and your fowls to be healthy must have some fat on them.

If you do your best to have strong, vigorous, sound stock, keep them free from vermin, in clean, dry, windproof quarters, well aired daily, and allow them clean, wholesome food, with plenty of pure fresh water and grit, avoiding undue exposure, but never coddling; you have nearly won prevention.

Contagious diseases, caused by their own special long named germ, will often pass by birds so kept. A sound constitution well cared for is well nigh germ proof. As a preventive of contagion, never introduce new stock to your flock without first subjecting it to quarantine for at least ten days. Never return apparently cured birds to a flock until at least a week after last symptoms of the disease disappeared. Isolate all fowls suspected of disease as soon as discovered. Never go direct from handling sick birds or from strange henneries to your own. Never keep sick birds in the same room where food for other fowls is kept. Whenever disease appears, and the cause is discoverable, if possible remove the cause.

General Treatment.

For obscure cases where diagnosis is difficult or impossible, it is desirable to have some general method of treatment that will apply in most cases. Always when a sick fowl is discovered, remove it from the flock at once. Sick fowls should, as a rule, be placed by themselves in a clean, dry, well aired coop which has sunlight the greater part of the day. Some eye diseases have to be treated in darkened coops. Never allow a sick fowl to roost; bed it on clean straw. Clean water should be constantly on hand, and in most cases there should always be a liberal supply of green food. Hospital coops must be kept clean. All excrement should be taken away daily and burned. The coops themselves as soon as vacated should receive a liberal going over with hot whitewash, to which a little carbolic acid has been added.

Any fowls having a discharge from eyes or nostrils, should have eyes, nostrils and throat washed out twice daily with an antiseptic solution. I prefer hydrogen dioxide, and think it the best and cheapest. It should be diluted with water, one part hydrogen dioxide in two parts cold water, mixed as you need it. It is not poisonous, and is only active on diseased tissue.

A good all round remedy available for many varieties of colds and so-called roup, is the following: Take tincture aconite ten drops, tincture bryonia ten drops, tincture spongia ten drops, alcohol enough to make one fluid ounce—mix. Of this a teaspoonful should be used in each quart of drinking water.

Food given should preferably be soft food cooked. Bread and milk is probably the best. To this should be added some chopped meat and some finely cut green food. A sameness in diet may be avoided by giving a bread made of various mixtures of ground grains.

Fowls convalescing may need a tonic, and there is nothing better for them than compound syrup of hypophosphites (Fellows') given in five drop doses three times daily, or a small teaspoonful in each pint of food or drinking water. If given in five drop doses it may be made into a bread pill, or given in a little cold water.

True Roup. Diphtheria.

SYNONYMS.—Diphtheritic roup, putrid sore throat, putrid canker.

DEFINITION.—An acute specific constitutional disease, analogous to diphtheria in human being. Very contagious.

CAUSES.—A specific germ. All conditions of bad hygiene increase its virulence, and act as predisposing factors. The poison exists in the membrane and secretions of the throat, mouth and nostrils, but not in the breath. It is spread by contagion from contact with the poison, mainly through the drinking water. Dried particles of the secretions may be carried through the air or on the clothing of attendant, and so cause spread. Symptoms develop in from three to five days after infection.

SYMPTOMS.—All symptoms appear suddenly. Fowl may have seemed in perfect health. Suddenly loses appetite, and appears dumpish. Bird may not show any symptoms of eye or nose at beginning. Body seems hot, comb hot, deep red; later becomes pale and droops. Fowl may cough, making a sharp "pip." Examination of the throat, the back part appears very red and inflamed, with small irregular patches in back part of throat. Patches vary from pearl gray to yellow in color. They increase rapidly in size, and have a tendency to run together, frequently extend up on to cleft palate as a tough membrane, nearly filling throat. This membrane is apparently a part with the mucous membrane of the throat; any attempt to remove it results in bleeding. (If the membrane comes away easily, and does not leave a bleeding surface, the trouble is not diphtheria.) Fowl shows signs of great weakness, and breathing is often difficult. Breath is always putrid. Membrane may extend into windpipe, causing death from suffocation; or may extend into nasal passages, and from there infect the eyes resulting in swollen head.

Death may result suddenly from suffocation, or from paralysis of heart. Course of disease, under favorable conditions, from five days to two weeks. Often followed by paralysis. Throat may be paralyzed, rendering swallowing almost impossible; or loss of use of wings or legs may result. Paralysis is not necessarily permanent. One attack predisposes to another, and no fowl should be considered as well until at least six months after last symptoms subsided, with no recurrence of any symptoms.

TREATMENT.—When you are sure of your diagnosis, the best treatment is to kill the fowl and burn the carcass. If it seems a mild case, or uncertain, and you are disposed to treat it, try the following, observing the rules laid down under general treatment: Cleanse throat, nostrils, and eyes, twice daily, with a solution of hydrogen dioxide. In each pint of drinking water use fifteen drops of tincture of phytolacca root. Food must be nutritious, easily digested, and stimulating. After severe symptoms subside give a tonic.

Two eminent Canadian physicians recommend the use of diphtheria antitoxine for diphtheria in fowls. Using a clean hypodermic syringe, about ten drops of antitoxine

serum is injected under the skin over the thigh beneath the wing. From three to six injections are used about six hours apart. In severe cases the amount of serum is increased.

As even mild cases are often followed by severe sequelæ, and as fowls which had had diphtheria would not be fit to breed from for at least six months after apparent cure, as they are always more or less susceptible to another attack, and as if bred from their offspring might have a predisposition to take the disease, I think it is the wisest policy to save time and money by killing the fowl and burning her carcass as soon as diagnosis can be made.

Influenza.

SYNONYMS.—Contagious catarrh, roup, grippe.

DEFINITION.—An acute, specific, moderately contagious fever, associated with catarrhal inflammation of respiratory tract and eyes; often accompanied by diarrhœa. Sometimes occurs in epidemic form, and is then very contagious.

CAUSES.—A specific germ, unaffected by climate or season. One attack predisposes to another, which usually occurs about the same time each season. All conditions which are unsanitary and tend to debilitate the fowl are predisposing factors.

SYMPTOMS.—Onset is sudden. Bird is droopy, feathers ruffled, seems feverish, and drinks frequently. Slight discharge from eyes and nostrils, and may have greenish watery diarrhœa. Sneezes frequently. Face about eye becomes badly swollen on one side of head or both. Later discharge from nostrils becomes thick and sticky, and shows a tendency to cake on nostril—may become yellowish, and smell. Mouth is filled with mucus. Throat inflamed, but no patches. Fowl loses appetite, and seems greatly debilitated. Under proper treatment disease runs a course of from five to ten days. May be complicated with pneumonia or bronchitis. When occurring in epidemic form it is rapidly fatal. Mild cases recover slowly, and are always liable to another attack.

TREATMENT.—Use hydrogen dioxide to cleanse eyes, nostrils, mouth and throat, of discharges. The aconite, bryonia and spongia mixture, is frequently useful in influenza. If it does not do the work, try tincture of gelsemium fifteen drops in each pint of drinking water. If the disease is taken early, a one grain pill of quinia sulph. given every night, will sometimes abort an attack.

False Roup.

SYNONYMS.—Incipient roup, catarrha laryngitis, sore throat, rattling in throat.

DEFINITION.—An acute catarrhal inflammation of mucous membrane of throat, accompanied by feverishness, difficult breathing, and suppression of voice.

CAUSES.—Sudden atmospheric changes; exposure to cold wind or drafts of air. Getting wet. Inhalation of irritating vapors or dust.

SYMPTOMS.—Noisy rattling cough. Preference for soft, easily swallowed food. Bubbles in corner of eyes. Mouth filled with mucus. Throat inflamed. No odor or patches. Fowl's voice weak; any attempt to use voice accompanied by rattling of mucus in throat, followed by cough.

The presence of this disease favors the invasion of roup, as do all other catarrhal affections.

TREATMENT.—Most cases, if removed to separate quarters, and a simple antiseptic wash used to cleanse mouth and throat of secretions, will get well without other treatment. Fowls should be well fed. Ten drops of tincture of belladonna in each pint of drinking water will often help matters wonderfully.

Canker.

SYNONYMS.—Ulcerative catarrh of mouth. Cheesy growth.

DEFINITION.—An ulcerative inflammation of mucous membrane of mouth and tongue, characterized by irregular cheesy growths on tongue, in corners of mouth, and on cleft palate. Mildly contagious.

CAUSES.—Not well known. Is thought by some to be a mild form of diphtheria, but I can hardly credit that. Probably has a special germ of its own. Usually occurs in very young or old birds, and especially in overtrained show birds. Nearly always accompanied by debility and digestive disorders. Uncleanliness a predisposing factor.

SYMPTOMS.—Seldom noticed until fowl shows some indisposition, and makes difficulty of eating. Examination of mouth reveals irregular cheesy growths, usually several, may be on cleft palate, side of tongue, corner of mouth, or any part of mucous membrane. Growth is tough and hard, but may be carefully removed from mucous membrane without causing bleeding. Surface underneath is deep raw ulcer. Color of growth varies from white to yellow. Sometimes eye is affected through tear duct. In such case growth appears under lower lid, grows rapidly, bulging out lower part of face. Recovery is sometimes sudden, without treatment. Growth disappears and ulcer heals in less than twenty-four hours. Other cases are more protracted and require treatment.

TREATMENT.—Use hydrogen dioxide solution as wash, twice daily. For ulcers in mouth and nasal cavity, the following powder will prove effective: Equal parts of pulverized camphor, boracic acid, and subnitrate of bismuth, well mixed. This should be blown into nostrils and throat by aid of glass tube or a straw, twice daily, after first cleansing with hydrogen dioxide solution.

Colds in the Head.

SYNONYMS.—Acute nasal catarrh. Watery eyes and nostrils.

DEFINITION.—An acute catarrhal inflammation of mucous membrane lining the nose and cavities communicating with it; attended by discharge of fluid from nostrils and eyes.

CAUSES.—Exposure to cold winds or drafts. Sudden atmospheric changes. Irritating dust or vapors. Dampness, crowding on roosts at night, and subsequent sweating.

SYMPTOMS.—Fluid discharge from nostrils, at first watery, then mucus, later mucopurulent. Discharge may dry on nostril, stopping it, causing breathing with open mouth and watery eyes, with bubbles in corners. Frequent attacks render trouble liable to become chronic. It makes a very favorable condition for development of roup germ.

TREATMENT.—Usual wash with hydrogen dioxide. If discharge is quite watery when first noticed, spirits of camphor in drop doses, given on bread crumbs or a little sugar, repeated four or five times daily, will usually cure. Many cases can be cured by simply using the hydrogen dioxide solution frequently; keeping the nostrils clean. For cases of long standing, after thoroughly cleansing nostrils, inject morning and night the following: One part finely powdered iodoform in 20 parts liquid alboline.

Eye Troubles.

CONJUNCTIVITIS.—A catarrhal inflammation of the mucous membrane of the eye. Caused by cold, exposure, bad hygiene, injuries, or may be extension of inflammation of nasal passages. Symptoms are gumming together of eyelids, discharge of fluid from the eye, and swelling of face about the eye. May occur on one side of head only, or on both. Swelling sometimes all out of proportion to amount of inflammation. Purulent cases may result in keratitis.

KERATITIS.—Inflammation of the outer membrane covering pupil of eye. Results from exposure, constitutional disease, bad hygiene, and inflammation of adjacent parts.

SYMPTOMS.—If discovered early, a small opaque white spot or ulcer may be noticed over pupil. It is usually accompanied by conjunctivitis, and gumming together of lids. In all cases hen keeps eye closed, as light causes pain. Ulcer may rapidly increase in size and depth, destroying sight, and resulting in rupture of membranes of eye and loss of contents of eyeball. All cases when under treatment should be kept in darkened coop.

TREATMENT.—Conjunctivitis usually yields to daily bathing with hydrogen dioxide one part in two parts cold water. Ten drops of tincture euphrasia in each pint of drinking water often proves efficient.

Keratitis, if discovered early, can oftentimes be so treated that eyesight can be saved. Eye should be bathed several times daily in cold hydrogen dioxide and water, dried carefully, and the following ointment smeared on inner side of lids, so that ulcer may get well anointed: Finely powdered iodoform one part, well mixed with twenty parts pure vaseline. Even hopeless cases should receive treatment, if the fowl is to be allowed to live, since if the case is neglected the other eye may suffer also. As in most of these eye cases there is an ulcerative condition of the mucous membrane of the nasal tract, the nose should come in for its share of cleansing. After cleansing nose it will be well to inject into it the iodoform and albolene mentioned under "Colds in Head," or to use the powder recommended under treatment of canker.

Bronchitis.

SYNONYMS.—Bronchial catarrh, cold in chest, rattling in chest.

DEFINITION.—An acute catarrhal inflammation of the mucous lining of the bronchial (air) tubes, accompanied by oppression of breathing and profuse discharge of mucus from air tubes.

CAUSES.—Common in fall of year from sudden changes in weather, exposure, dampness, irritating vapors and dust, crowding and sweating, changing from warm quarters to cold ones. Birds with constitutional weakness and rousy ancestry especially liable.

SYMPTOMS.—Bird is very thirsty and feverish. Coughs frequently. Breathing labored and accompanied by whistling sound. Later cough becomes loose and rattling, and rattling of mucus in air passages can be distinctly heard, accompanying respiration.

TREATMENT.—In cases taken early in the disease the aconite, bryonia, and spongia mixture often gives prompt relief. In many cases it will be the only remedy needed. Should the cough be persistent, and the rattling respiration continue, try the following: Get some tablets of arsenite of antimony, each tablet representing one one-thousandth of a grain of the drug, and give one tablet three or four times daily. For the chronic stage Dr. Sanborn recommends using for a few weeks a pill made of strychnine, iron, and quinine, known as the "Damas antimalarial," one pill each night and morning. He claims that good care and the use of the pill will cure nine-tenths of the chronic cases.

Pneumonia.

SYNONYMS.—Lung fever, winter fever.

DEFINITION.—An acute, infectious croupous inflammation of air cells of the lungs.

CAUSES.—It is an infective disease caused by its own special germ, which needs only certain conditions to develop. These conditions are exposure to cold and damp, sudden changes in weather, coddling fowls, confining them closely for fear that they will get cold; in fact, anything that renders the fowls tender. All these things make the bird an easy prey to the pneumonia germ. Brooder chicks too closely confined in warm brooders are very liable to pneumonia. Dr. Sanborn fathers the opinion that the open front scratching shed plan of housing will do more to prevent pneumonia than medicine will to cure it; and he will find many who have had experience with poultry diseases who will agree with him.

SYMPTOMS.—Breathing very labored; every expiration ends in a grunting sound. Fowl shows no disposition to move, and seems to give all its energies to an effort to breathe. Bird's position is peculiar to this disease, usually is half-squatting, half-standing position, with wings drooped and held away from the body, neck stretched, mouth open and panting for breath. If ear is held close to chest a crackling noise not unlike the sound of crumpling parchment will be heard.

TREATMENT.—Remove the bird to warm quarters where the temperature will not go below, nor much above, 65 degrees F. If the atmosphere can be kept moist with steam, so much the better. Give every three hours one-tenth of a five grain antikamnia powder. The powder may be made into a pill with bread crumbs. In the drinking water use ten drops tincture of bryonia in eight ounces of water. If the bird will not drink, give a teaspoonful of this every few hours in a little raw egg and milk. Feed nothing but egg and milk until breathing becomes much easier. No solid food for at least forty-eight hours. As fowl recovers, gradually harden it to cooler temperature, and do not return it to the flock until it is strong and able to stand the temperature of the poultry house. Bird will need some tonic while convalescing; as before mentioned, there is nothing better than compound syrup of hypophosphites for this purpose.

Bacillary White Diarrhoea.

We are coming to understand that there is a disease of little chicks, manifested largely by a white bowel discharge, that is not due to overheating or chilling, nor to wrong methods of feeding, neither is it caused by improper incubation. It was hard to convince myself that this was true and I am all the more sure of my position because of my attitude toward it in the past.

As sure as there must be a certain germ to start a case of chicken-pox, just so sure am I that you must have present a definite little "bug" to cause real "white diarrhoea" to appear in your flock of young chicks.

Where has it been all these years? Why is it becoming so common the last three seasons? It has been with us all the time. Rare, perhaps, in most sections and yet not unknown in its results. It is not the only illness that is getting into new states within my time with hens. It is less than fifteen years since I heard of the first case of chicken-pox in Massachusetts—now getting too common to suit poultrymen. Fowl cholera for years has been an unknown disease in New England—yet last year one whole farm flock was killed by it in the state of Connecticut. Bacillary white diarrhoea is with us, must be recognized, must be fought, if we would succeed in the raising of chicks.

This is a disease that kills chicks of four weeks or less. If a bird gets by that age it is likely to live, if a pullet to lay eggs, and many cases to still carry the germ life to spread the trouble later. The germ of the disease may be within the chick when hatched, may be taken in from the shell of an infected egg in the picking on the floor of the incubator, or may be eaten with food, or taken with drink, in the first few days of the chick's life. A single chick with the illness well established can, by means of the droppings, spread it quickly to the whole bunch. It is a fact that many can testify to that when white diarrhoea comes it means the loss of the whole bunch. If it would only take every last chick in the infected lot we should be better off, as then there would not be those germ-infected birds to carry over the disease to another spring.

There is this to comfort you: if you have never had this new disease on your plant it will not appear until its special disease germ is brought to you. Once having it break out may infect your incubator, your brooders, your coops and your stock. This is where prevention is easy compared to getting rid of disease in infected premises.

Treating is of little avail in bacillary white diarrhoea. When sign of the illness appears it is too late to do much to better conditions. Your whole work will be: first to prevent its coming, and, second, to stamp it out if it appears.

As to prevention. Every hen with signs of bowel trouble should be excluded from breeding pens. This will not take out all infected cases, but will help. Every egg incubated under hens or in machines, should be dipped

in some germ killer that will not injure the contents of the egg. A two per cent. mixture of one of our tar disinfectants, such as Zenoleum, with water of 100 degrees temperature, will answer. Dip the egg and place wet in the machine. Wash out all parts of the incubator that can be contaminated, using a five per cent. mixture of the same disinfectant. Then it is best to darken the door of the machine that the chicks when hatched stay near the shell and do not get to picking at droppings on the tray or floor. Cover the floor of brooders with fine chaff that will absorb moisture and clean out every day for the first five days.

Drugging is little good. If the illness is at work you will lose most of your chicks. Nothing better can be suggested now than the giving of buttermilk or milk that has been soured by the special germ used by dairymen as "starters" for cream. If there is anything that will put up a stiff fight with the disease germs in the intestines it is this germ of buttermilk. If you find that eggs from certain matings produce your first sick chicks, cease to use the eggs. The trap-nest may point out to you a single hen that is laying infected eggs. Kill her at once. Run down the starting point of your trouble—if it comes—and practice prevention.

The real bacillary white diarrhoea comes from germ life that is laid in the yolk of the egg. The mature hen carries this germ over in her ovaries and it is in the little yolks as they lie in the abdomen. Not every ovule may be infected—varying much in different hens. These germs, with the yolk, are absorbed into the abdomen of the chick just before it comes from the shell.

How shall I know this sickness when it comes? It may never come. I hope not, but my letters tell me that it is to be found in nearly every section of the States. The chicks are listless, drowsy, inactive. They look ruffled, dull in every appearance. They brighten up for a moment, pick for food, and suddenly grow dull again. With it all comes the single symptom that gives the name to the disease. This is a thin bowel discharge, white in color, pasty, sticky. The discharge clings to the parts under the end of the bowel, drops on the floor of the incubator, or litter of brooder. It is loaded with germs that will spread the disease to other chicks.

Do many chicks die? One farm within fifty miles of me lost twelve hundred chicks out of fifteen hundred hatched in 1910, from the illness that I say to you is well worth your study.

Faulty incubation, poor brooding, bad food, close air, may increase the chances that bacillary white diarrhoea will get a good start if introduced, but they are never the direct cause of the illness. Get all the literature you can find on the subject. Some of the State Experiment Stations are working on this disease. Nowhere have I got light and help more freely than from the men at the Connecticut Agricultural College at Storrs. They have been the leaders in this investigation and to their labors I look for the final solution.

Roup.

There is no poultry disease of serious importance more widely spread through the country than roup. I doubt if it is quite so common as twenty years ago. Improved methods in poultry keeping have done much to prevent so many cases of roup and catarrhs.

In my early days with poultry it was an every day occurrence to have brought to my knowledge the fact that "swelled head" was breaking out in neighbor's flocks. As I became interested in poultry ailments of all sorts, had written my first book of the subject, I began to receive many requests for aid in the handling of sickness in the poultry yards. No disease was so frequent as that we are considering. To-day I hear no more about roup than years ago, but the causes of other varieties of disease have increased four-fold. Unheard-of troubles, then have come to the front and are serious ailments.

I remember my first personal experience with roup. I shall never forget the impression made on me that morning when I opened up a new, tight hen house and got the smell of the breath of a bunch of twenty roup-y cockerels. Was it as rank as all that? It was rotten eggs and skunk cabbage combined! While that was twenty years ago, and I have not had another case since seven years back, I shall never forget that awful odor!

Causes of Roup.

I have come to the conclusion that you can have cases of roup if you will house "fall colds" in close or filthy houses. That is, you can take perfectly healthy birds, from healthy ancestors, put them into quarters never before used for fowl, expose them to wind and wet till catarrhal discharge appears at the nostrils, shut them into a warm house to "cure" them—and see the catarrh progress into full-fledged roup. This is probably due to breathing over, and over again, the same filthy air—not the heat. Another cause of roup is weakness due to breeding from birds that have been seriously ill with roup and yet seem to have become well. There does seem to be good sense in the statement that I have made over and over again, that "it is dangerous to use in the breeding pens any apparently cured case of roup!" I know of no other disease that is so sure to appear in the future generation than roup. Then there are cases of roup that come from infection that clings to wall and nest, drinking fountain and hopper, roost and wire. A serious outbreak of roup calls not only for the exclusion from future matings of all birds that have been ill, but also for careful and thorough cleaning of all infected houses and yards.

Symptoms of Roup.

You should know roup by the swelled head, by the strong odor of the breath, and by the slowness to respond to treatment. All catarrhal running

from the nostrils is not roup. "Colds" are as common to the maturing chicks as measles to the children. Yet "colds" and measles are largely preventable. Roup gives a new appearance to the cockerel or pullet. That single case of roup will stand out in the flock so that you see hardly any other bird.

Treatment of Roup.

First do what should have been done along the line of prevention: A sunny coop, wind tight on ends and back, water tight roof, nearly open front of wire netting letting in air and sunshine. The coop must be clean and kept so. Droppings are to be removed daily, fresh litter put in often, clean water always within reach. I would urge the using of less animal food for a few days as well as feeding some green food such as weeds or cabbage. Never try to cure roup or fall colds in a tight, warm house. You will only increase the severity of the attack.

If I were to have a case of roup appear in one of my cockerels next autumn I should proceed as follows: Take the bird from his fellows, treat him, quarantine him. The treatment would be by dipping in a film of kerosene. A pail is nearly filled with water, a tablespoonful of kerosene put on the surface of the water. Then the cockerel will be held by legs, wings and neck, his head pushed down through the film of oil till the head is entirely covered, slowly withdrawn. The kerosene kills the germs of the illness and stimulates healthy secretions. If the oil is used too freely you will blister the skin and gain nothing from your thoroughness. If the bird is sick enough to appear weak in general strength I should give him an eighth teaspoonful epsom salts mixed with a tablespoonful warm water. The single dose of salts is enough, but the kerosene treatment should be repeated three mornings at least. If restricted to a single line of treatment it would be to put the case of roup into a wire front coop and let him alone. If I could do two things, I would add the kerosene remedy. If three, then fresh air, kerosene and epsom salts.

When your cases of roup in the cockerels appear well, market them at once. The pullets may be kept to lay table eggs. But use neither cockerels or pullets, that have had roup, in any breeding pen.

Quarantine all new stock, all birds returning from the shows, for at least seven days, to avoid introducing roup into your flock.

Give pure air in abundance, protect from wet and strong winds, keep premises clean, and you are not likely to see cases of roup in your flock the coming autumn. Make free use of the tar disinfectants in brooder and roosting coop, in winter house on roosts and nests, avoid the dangers from mouldy litter, as tending to prevent disease in general and roup in particular.

Are "Cured" Fowls Fit to Breed From?

Would you use fowls for breeding purposes that had had chicken-pox? Do such illnesses as those outside of roup and cholera hinder for breeding?

If the birds have simple chicken-pox—with no complication of catarrhs of any sort—they should be healthy when the disease is gone. Do not save for breeding any hen or chick that has had white diarrhoea, cholera or roup. It is the single case of white diarrhoea that gets apparently well that takes the infection over the winter into the hatch of the following season. Cholera—the real thing—seldom leaves a case to bother you at all. Roup and fall catarrhs seem to leave in the system something that invites the same illnesses in the chicks of a year later. Better not breed from flocks that show fall colds year after year. It will be money saved and time better spent to buy new blood.

Chicken-Pox.

Chicken-pox is becoming altogether too common. Long known in the states south of Virginia, and always present in Cuba, it is spreading northward and is reported from most of the states along the border. Poultrymen should learn all they can of this illness that they may know it when it appears, and be ready to treat it along sensible drug lines.

It is a disease of the blood, with local manifestations. There is a definite time of incubation. It does not come from faulty feeding, poor housing, weak stock. Behind each case was a previous one. You will never have chicken-pox in your flock unless the germ of the illness is brought in from outside.

Uncomplicated chicken-pox is a simple ailment. It can be treated with good results. Breaking out in the cold, wet weather of late autumn it is likely to be a serious disease. Combine chicken-pox with fall colds or roup and you will lose many of your birds. I am told that half the chicks hatched in Cuba die in the wet season with chicken-pox. While all birds are liable to contract this disease when exposed to the germs of it, it seems to select the nearly grown chicks in the fall.

Its Course.

Let us suppose your place has never had a case of chicken-pox. You buy from a breeder one hundred miles away a cockerel. He comes from a plant where chicken-pox is familiar. Or perhaps there is no disease on the place, but he was sent out on approval and got the disease while away, and is re-shipped before any signs of sickness can be seen. At any rate he appears at your station. You take him home and remove from the coop. He may

seem well, looks all right, except there may be a few marks on comb as though he had been scrapping and blood has made a few warts on the comb or wattles. It makes little impression on you unless you are in the habit of quarantining all new stock. It is spring time and the small flock of females are waiting for the head of the pen. Without a thought of trouble you put him in the pen and take pleasure in the new mating. The next morning to your surprise there are more of the warts or scabs on comb and wattles, and a few have appeared along the edge of the eyelids. The cockerel is not ill—yet he looks sick to you. Into the house you go, get out your copy of "Poultry Doctor," and try to decide what the trouble is with the new bird. A good plan is to work by exclusion. Can it be a certain disease? No. Can it be another ailment? No. Run through the list until you have thrown out all except one. Can it be chicken-pox? Yes.

It may mean little to you to come to the conclusion that you have this disease on your place. Later, when you have had all the experience you desire, it will mean much.

You put the cockerel in a coop alone and proceed to treat him. What about the pullets? Wait ten to twelve days. One or two, or all of them, most likely, will then show the breaking out on the head as did the cockerel. A single case, then ten. Any danger to hens in the next yard? Probably. If the weather is pleasant you may go a few weeks and see no outbreak. But let it rain, the yards get muddy, and you are likely to see more chicken-pox in the next flock. The matter, or scabs, from the head has been washed under the fence and infected the other stock. Or, if the hens can scrap through the wire netting you will get the disease passed along.

If the hens add on to the chicken-pox anything of the autumn cold sort, you will see the breaking out on the head increase in numbers and size, the eyes close, and a sickly looking bunch of birds will be in your yards.

Treatment.

Outside treatment matters little except as it makes the bird less uneasy and destroys the germ life in the sore. An ointment made of petroleum jelly ten parts and coal tar disinfectant one part rubbed on all the warts or sores will answer all needs. The real positive treatment is the internal use of calcium sulphide. I would plan to get one grain of the dry drug into a five pound hen once a day. This drug can be mixed with wet mash and quickly fed. You will find it in the drug stores in one to four ounce bottles. It must be strong smelling to have kept its virtues. The top layer in the bottle may be lighter in weight and color. If so, pour it off and use the good drug underneath. I want to get about one grain of the drug into a five pound hen during the daytime. Keep up the treatment for a week. In case you have little chicks with the disease plan to give each one a half grain of the drug once a day. Mix freshly and use within an hour.

Avoid cold breezes, damp houses, mouldy litter or food. Give the sick birds a sunny house, dry, pure air, clean litter. Feed ordinary grains and mash. Reduce the animal food of the ration about thirty per cent.

Prevention.

Knowing the cause of the disease—prevent its getting a start on your place. If it appears in your neighbor's hen house have no passing from his flock to yours. The scab or matter may be brought on the shoes or clothing. Doubtless you have seen this disease in the show room and wonder when your birds will return home with it. The bird you show may be cooped in a pen that a few weeks before held a case of chicken-pox. I have seen three cases of chicken-pox in a single show within a thousand miles of my own home. It is not pleasant to tell, but we must know the dangers if we would avoid the evil. Quarantine all birds bought or returning from the show. Do the same to stock sent out on approval and returned to you. Cooped apart for fourteen days, and remaining well, you may consider them safe to return to the flock or ship out to another buyer.

You may have a few cases too severe to doctor. Kill and burn! Take no chances of future illness through putting the dead birds into the ground. I know one outbreak that followed exposure of such bones after being buried over twenty-four months. The germ life is strong and clings to bone and tendon for months, if indeed it does not escape into the nearby soil.

It takes time and trouble to clean up a pen and yard after having cases of chicken-pox. Roosts, hoppers, water dishes, walls and floors, may have the contagion clinging to them. Hot water mixed with Napereol, Carbonal, Zenoleum, Pratt's disinfectant, or some one of the tar germ killers, making a two per cent. mixture, can be used to scrub all these working parts of the house. The runs should be spaded, seeded to oats or rape and left unused for a few months. If it is in the chicken season, raise the new lot away from former houses and runs.

Prevent chicken-pox by knowing how it is introduced. Cure your cases by good care and sound treatment. Get rid of all infection and when once more free from the germs of the disease, ward off new outbreaks.

Experience seems to prove that calcium sulphide given to well birds will almost prevent them contracting chicken-pox. Try this line of treatment, if a single case appears, on a flock or on birds in neighboring pens. Make the dose the same as for ill hens—one grain of the drug each day. With calcium sulphide, as with all medicines, do not give it carelessly. Use one grain, in divided doses.

Chicken-Pox, or What?

"About three weeks ago I noticed a hen that had a sore comb, but thought it a simple injury. A few days later another appeared on the under part of eyelid, and this spread till the eye was closed. Finally the bird got so thin I killed her. Have killed three hens since. I have others I am treating. All infected birds are removed at once, but new cases appear, and it seems very contagious. The first appearance is a hard sore on comb, which seems to be hard, the size of a bean; eye slightly watery after sore appears on eyelid. Can you suggest anything?"

I should first want to decide just what was the disease. Chicken-pox is the one common illness that is likely to be yours. To be sure there is "fungoid," but that is rare and hardly answers to your description. Now chicken-pox begins with an appearance as if one bird had picked another and blood had settled on the place of injury. Then it swells, and most folks describe it as "wart like." When this gets ripe it falls off and there is a small open sore exposed. The marks of chicken-pox usually appear on combs, lobes or eyelids, though not unknown on flesh part of wings or body. Whatever the trouble, I would dose those birds with calcium sulphide. In fact I would also give it to every bird that is likely to contract the illness—as a preventive. Get some of the dry powder—say a four ounce bottle—and mix fresh each morning with wet mash enough so each hen of four to seven pounds weight gets one grain. Keep this up for ten days at least. Avoid all exposure that would give your stock "colds."

Cause of Gapes in Chicks.

"Is there such a disease as gapes? The poultry books all say there is and describe the symptoms. The most common cause of the disease is eating angleworms. I believe in many cases that the trouble diagnosed as gapes is just simply lice. I give my chicks all the angleworms they will eat, spading up a plot in the yards every day, and have never seen the least sign of gapes."

Angleworms never are the direct cause of gapes! It is only when the angleworm itself the host of the germ of gapeworm that the eating of the earthworm spreads gapes among the small chicks. Unless you have brought gapes onto your poultry land, and in that way infected the worms—you can feed earthworms all you please with the best of results. Gapes has never been common in New England, and it is seldom that I hear of it nearer than New Jersey. Some sections of the country it is common to nearly all small plants. It is most often heard from in the yards of small breeders, the large poultry breeders giving more care and time to the prevention of illness.

You can avoid gapes, when on your plant, by raising all chicks on soil that has not been run over by your birds for one or two years. Or the chicks can

be kept off the ground, until ten weeks of age, housed in open front houses, whenever the weather conditions are such that earthworms do not come to the surface of the ground or get within scratching distance of the chicks. Feed all the non-infected worms you wish to your growing chicks. Avoid infected worms getting into the crops of your growing stock, doing this along some sane, sensible line of handling the chicks.

"My chicks with one particular hen are gaping. These are part of a hatch that I had and divided between two hens, giving black chicks to a black hen and white chicks to a white hen. These cases of gapes are all with one hen. They got wet and the hen dried them off in the night so they looked as bright as ever."

If these chicks were mine, I should cut open one and examine the inside of the windpipe. If real gapes is present you will find several of the fine, short worms that cause gapes clinging to the lining of the tube. Not finding the gape worm I should consider whether the chicks had not a severe catarrh of the small bronchial tubes. With this there is loss of appetite, often fever, and quickened breathing. First find out your condition and then apply the proper treatment.

Specific Cure for Gapes.

"Do you know of a specific cure for gapes? I have just lost seventy-five out of two hundred and fifty young chicks."

I do not know any real cure for gapes. There are drugs worth using, but it is largely to prevention that we must look. It appears to me that the germ of gapes lives over the winter in the common earthworm. *No worms—no gapes!* The presence of the common earthworm in the soil does not prove that you will have gapes. There must always be the germ of the disease in that particular lot of worms. A plant that is free from gapes will not have it till introduced from outside by infected birds. I would urge the giving of sulphide of lime—calcium sulphide—so that each five pounds of weight of hens or chicks gets one grain of the drug every day. Mix with wet mash and feed at once. Continue for two weeks.

Mosquitoes and Chicken-Pox.

An inquirer makes the statement that he has come to the conclusion that the mosquito is the cause of chicken-pox! I want to make this matter more clear to my readers than I ever have before.

Chicken-pox is a blood disease—not just a local trouble of the skin. It begins within and the outside symptoms come after the illness has been working in the body for about ten days. Suppose you buy a half-grown cockerel in the autumn and when he comes to your yards he has the "warts" on comb,

edge of eyelids, and wattles. How will the second case get the infection? In several ways. It may be from the discharge getting into some scratch on the head of the second chick, it may be from the eating of one of the "scabs" that has come off and been scratched into the next yard, or it may come in the "vaccination," possible by some fly or mosquito biting the ill chick, and then biting the well one. If the fly, or mosquito, has not the disease germ on his lancet, he may bite all he wishes and you will not see chicken-pox.

Indigestion.

"I am having trouble with my Wyandotte chicks eight weeks old. They are suddenly taken without warning, lose the use of their legs, heads are drawn back till they touch the wings, have loose bowels, discharge of a brown color. Chicks that seemed well yesterday at 6 P. M., at 8 P. M. showed the symptoms. I feed a commercial mash and scratch food, have grit and charcoal before them at all times. I find no dead animal about the place to cause ptomaine poisoning, and the food seems sweet and pure. I have never had anything like this before and would appreciate advice from you."

Looks to me like acute indigestion. It is possible that the animal food in the mash was spoiled before cooking and sifting. The mash may be too rich, may have been given in too large quantities in proportion to the scratch feed. Exposure to too high a degree of heat, too close air in the small coops or brooders may have hurt them, or absence of green food might have made the ration too heavy. It seems to me that a careful study should show this inquirer where his trouble is. The fact that he has never had similar outbreaks should make him look to something out of the usual as the immediate cause. I would add ten grains sulpho-carbolate of zinc to each quart of drinking water and use for a few days. Give full feeds of fine cut green food, or waste growing green food from the garden. Have cool, shady places of some sort to which the chicks can retire when the sun is high. Give cool, pure water at least twice a day, and have the water dish protected from the direct sunlight. Fight lice and be sure that red mites are not sucking the chickens' blood through the night. Chicks are few this summer, are worth good money, and should have good care to bring them to maturity worth the wintering.

Bumblefoot.

"Will you kindly send me directions how to cure a hen with swollen foot? It is as large as a walnut. She seems well, eats good, and we would like to cure her, as she lays well and is a pet. Hope I am not giving you too much trouble, and will thank you so much for any information."

This is a condition well known as "bumblefoot." It is a swelling of the soft parts of the bottom of the foot, often extending to the toes and up the

shanks. The center of the trouble is at the junction of the three main toes. Bumblefoot is caused by a bruise from a sudden descent from the roost on to the hard floor, from constant scratching on packed earth or cement floor, from splinters of wood or glass, or from mere scratches in the skin covering of foot. In all these cases there is the part taken by active germ life that gets into the parts, multiplies, and makes mischief. Usually you find a hard core, or lump, that shows on the bottom of the foot, and late in the illness can be pulled out by some effort. Beyond the core is liquid, usually pus, more or less thick.

The treatment is to pull out the core, if it has formed, or cut into the soft flesh, if no core can be found. Swab out all germ life with hydrogen peroxide, and then oil with camphorated oil. If the matter gathers again clean once more and swab out with tincture iodine. Take these cases early and do not wait till the "size of walnut." I had thirty yearling hens come by express, last week, and in the lot were three with bumblefoot that I had to open and treat. Bumblefoot, and scaley-legged birds, do not add to the appearance of a flock.

Crooked Breast-Bones.

"What is the cause of crooked breast-bones in poultry? I have a flock of pullets hatched last March which were bred from perfect birds and several have crooked breast-bones. Can I remedy this in next Spring's chickens? Was it due to the feed not containing the right balance or is it a common occurrence?"

Men are not agreed to the cause. The old idea used to be that too early roosting, while the bones were soft, was the cause. I have seen as many cases in chicks that have never had a chance to roost as in those that took to the trees and roosting coops. Then other folks say that crooked breast-bones come from lack of bone making material in the food. Still others hold to the opinion that there is a lack of general vitality in the breeding stock behind the chicks that have the crooked bones. I have a friend who tells me he would no more serve a crooked breast-boned bird on his dinner table than he would one with roup or chicken-pox. Here is something for the Experiment Stations to solve! Until they decide, let me advise you as follows: Remove all crooked breast-boned birds from your matings. Surely have the male bird right in this particular. Then feed a ration that has bone forming material, beef or fish bone, in it from seven days old till maturity. House in plain coops till you must use roosts, and then have them three inches wide on top. Feed the breeders a ration that has plenty of lime in it—bone, oyster shell or lime grit.

Scale on Shanks in Hens and Chicks.

The scale insect lives under the scales of the shanks and toes. It is best killed by thorough rubbing in of lard and kerosene—often taking two to three applications. Mix a cup of lard with a teaspoonful of kerosene and work into the parts. Clear kerosene is likely to irritate the shanks and cause swelling—but it will kill the scale surely. Scale passes fairly easy from hen to hen on the roost, and is almost sure to get from hen to the chicks she is brooding. Be sure to have the hen scale free before letting her hatch and rear chicks. Too many breeders are careless of the presence of scale. Many exhibitors will pay no attention to scaly legs till a week before show time, and then work over the birds much longer than it would have needed to cure long before. The shanks never look well in the show room on a bird that has had scale. Once get rid of scale on the plant and you should not see it any more. The use of some of the liquid lice killers on the roosts and droppings-boards helps clear out scale, but it's the local treatment that does the business.

Scale in hens and chicks gives a bad look to the stock, injures its sale for breeding or food, and makes the stock uneasy from the irritation. No man can afford to let scale spread in his flock, or fail to fight it if present, or let it get a foothold at all. Prevent you can. Get rid of it if now seen on any of the hens or chicks.

Lice and Mites.

"I have been planning to move to a new location. Is it a fact that if my buildings, brooders, coops, are free from lice and mites, and I start over with eggs to hatch from, that I will not be troubled with vermin? I have good stock now and prefer to move it to my new location, if I gain nothing by selling it and starting fresh. I have a department circular before me that reads, "Build the hen house on a spot where none has been before; never buy fowls, raise them artificially, keep them away from other fowls, and they will not be troubled with mites and lice. You say that the sparrows will give lice to the hens. Is this true?"

Yes, the English sparrow is a dirty bird, is loaded with lice. When it feeds with your hens or chicks it is sure to pass on a full supply of lice. Mites live and breed for years in old wood, decaying trees, etc., as you are likely to find out in future years. Take the best of your present stock to the new farm. Have them as free from lice as you can. Work vigorously to destroy all mites before and after moving.

Depluming Mites.

"I am having trouble with feather mites. Much of the feathers on wing, back and head are gone. I have used disinfectants, powders, liquid lice killers

and make little progress. What I used has stained the feathers of the hens, and it does not come off. Can you suggest?"

The dep'uming mite lives on the hen. You catch them on the bird—if catch them you do. I know no better plan than to use a good sheep dip, soaking the hens well in it. Take a warm day, put the hens under the "dip" all you can, without the dip getting into the mouth and nostrils, and repeat in a week. You have got to kill the present crop and catch any later that escaped. The dip has to come in absolute contact with the mites, and only a real soaking will do it. Get your flock once free of the mites and you will see no more until some infected birds come near your own flock.

Ptomaine Poisoning.

"I have had one hundred and fifty pullets that have been sick from eating spoiled beef scraps. One has died, a dozen are so weak they can hardly stand, the rest seem to be getting along all right again. Those that are the weakest mope around as if they had cholera. Combs somewhat pale, poor appetite. I used one pound of the poor scrap to twenty of mixed dry mash. Birds were on range, with open front houses, and access to running spring water. Tell me all you can as to the beef scrap and its use."

You are fortunate in getting out of the illness so well. I know one man who lost over half his flock from this sort of poisoning, and the remainder of the birds were permanently injured. It is hard to tell spoiled meat that was bad before cooking and grinding. You may have some idea of quality by mixing a tablespoonful of the scrap in boiling water and getting the odor of the "beef tea." Scrap that has spoiled in the bag after leaving the factory varies in looks in the handling of it. It is of various colors, hard lumps, etc. I would feed these birds a dry mash that has more than usual of middlings or flour. Then add ten grains sulpho-carbolate of zinc to every quart drinking water given the birds. As to quantity that can be fed to hens and chickens, I use one part by measure beef scrap to seven to nine parts of ground grain, according to the protein contained in the scrap. I prefer to feed the animal food with the ground grain rather than have hoppers for both. Some summers I have raised chicks on free range by the two-hopper method. One hopper filled with cracked corn and the other with beef scrap. I am feeding more fish scrap than beef—and in four years use have never had a spoiled pound of the fish. Select your brand of animal food with care, and having found a reliable product, use it as long as it remains of quality. Spoiled animal food, scrap, green bone or table scraps, is a mighty dangerous food for the poultry farm. You can get limberneck as quickly from a spoiled salmon salad as from the dead animal or bird out in the brush.

Unthrifty Chicks.

"My chicks were apparently all right when hatched and continued so till four to five weeks of age. Then they became weak and scrawny. They had good appetites but did not put on flesh or grow as they should. Three hundred out of four hundred chicks have not grown well. To-day they are light and blue looking—poor—although they have ravenous appetites and always well fed. They have had free range on farm of fifty acres, open front houses, with everything in the food line good for chicks. Have had several die showing just barely the frame—no meat on their bones. Some have bowel trouble, and after a week they die. I have fifty shut up trying to fatten them, but they take on no weight."

There are several factors that might be behind this condition. There is little help in this letter in solving the matter. Red mites in large numbers would weaken the chicks, as described, but a careful poultry woman should have found them long ago. Must rule out mites! Next I should consider tuberculosis. The bowel discharge makes me suspicious of tuberculosis. Then you get the loss of flesh, and the impossibility of added either weight or size. It would be a good plan to send some of these ill chicks to the State Experiment Station for examination. I think that the trouble is serious enough to do this. Probably you will need to get rid of all your birds and make a new start. If so, the quicker you know the need, the better for future success.

The Texas Flea.

Mr. W. M. Lewis of Georgia writes me as follows: "The Texas flea is a small insect, we call them 'chiggers' (chigoes would be better), that infest the chicken yard, mostly dry, secluded places under cover. They attack the small chicks along in the early summer, first appearing in April. They adhere to the head, and will, unless removed, surely kill the biddy. My remedy is to apply any mild ointment, such as vaseline, mentholatum, and such drugs to the chicken affected. To clear the premises spray the roosting places, as well as dry shaded or secluded places, with any of the pine tar disinfectants. My experience is that the insect breeds and remains in the dust or sand of the chicken house, and under boards and other shaded dry places in the chicken yard. When the bird passes near by the fleas attach themselves to the head, and there will soon be a bunch of them on it. This becomes as large as a dime, and it will sap the life of the chick. One or two applications of vaseline to the part affected will in a day or two cause the death of the insect. It is well to spray the roosts twice a week during the summer time, and any part of the yard that is shaded, with a solution of the pine tar mentioned. Make the mixture one part disinfectant and three parts water. Use a good sprayer and do thorough work.

"I hope this will be beneficial to some poulterer who is thus troubled."

H. W. Rappley writes as follows: "Eternal vigilance is the price of immunity. Liberal applications of air slaked lime to the runs and places where the fowls dust will prove quite effective in suppressing the pest. Should the flea not be fully exterminated by the lime they will show attached to comb and wattles of fowl. Kill them by applying coal oil freely to head of fowl. The oil won't hurt fowl and is certain death to fleas. The universal practice of allowing hens to go under the houses in the South prevents the use of lime as outlined. Keep the hens from access to the space under buildings!

"Although my neighbors are annoyed by the pest, I have found only two of my fowls with the fleas on the head after using the lime, and one application of the oil permanent'y got rid of them. Do not allow the oil to get into ear of fowl.

"As to 'chiggers'—they are nothing to the flea, and don't trouble fowls. Wish I could say the same regarding their liking for human bipeds."

Dead Toes.

This is probably the result of freezing the toes in winter. Does not look at all like tubercular trouble. There were many such cases last winter in the severe below zero days of January. Otherwise than from the awkwardness the cock is as good as ever, and I should not take him out of the breeding pen in his present general condition. On litter in the house, and a grass run, he should not irritate the toes, but on a hard floor and packed dirt he is likely to get sore ends to the toes.

Purple Comb in Cock.

If this purple color in comb increases quickly on exercise, only to get back to his normal shade of color in a short time, there is likely to be heart disease. On the other hand, if the shade of color remains nearly the same all day, and every day, it points to a torpid liver. You should be able to decide which it is by watching him as you feed and care for the stock. If heart trouble, I can suggest nothing to do. If there is liver disease of some sort you should clear out the bowels with a quarter teaspoonful Epsom salts in a tablespoonful of warm water. Then give him a grain of sulpho-carbolate zinc three times a day, in a little damp mash, or made into a "slug" of earthworm loams and put into his mouth. Cut down his grain feed, have his animal food largely fresh meat, and supply good green vegetable food in variety. In my experience a male with purple comb that is at all permanent in appearance should be at once rejected for all future use in the breeding pen. No matter what his value has been he is now worth only his selling

price for table poultry. Get rid of him. If you retain him you will probably find him dead some morning next winter when you go to feed that early breakfast.

Limber-Neck.

Limber-neck is a single symptom in ptomaine poisoning in hens and chicks. It comes as the result of spoiled animal food while passing through the bowels. Most cases originate through the eating of dead birds or animals lying around the lot or farm. It is not the magots that are eaten that causes the disease, but the decaying flesh of the carcass itself. Germ life is destroying the meat and they give out a poison that paralyzes the nerve centers. Early treatment is to clean out the rotting mass in the intestines by use of Epsom salts or castor oil, and then add sulpho-carbolate zinc to the drinking water for a week. A half-teaspoonful salts in a little water, or a teaspoonful oil given straight, will clear out, and ten grains sulpho-carbolate zinc to each quart drink will do the rest. Best of all is the preventing of the trouble by burning or burying deeply all dead animals and fowl, as well as never feeding any beef scrap or green bone that is at all doubtful as to sweetness.

Tuberculosis.

My chicks hatch badly, die early, and the old birds grow thin in flesh with large mortality. I have even found chicks not out of the shell that were rotten at the "rear." Sometimes the unabsorbed yolk in the shell of the nearly hatched chick is really fermenting. My stock is not inbred, is well housed and fed, and I cannot see what I have to contend with. What is it, and what would you do?

This is a case where the State Experiment Station ought to be called into use. Most states have some expert who could be helpful. If in this man's state there is no proper authority to go to I should feel free to ask the help of some neighboring state. The Stations are quick to respond to such calls and both hen and chick would be subjected to a thorough post mortem examination. Judging from the full letter that came to me from this breeder, I should suspect tuberculosis. It seems to me to call for the getting rid of every bird on the place, cleaning up the yards as they never were before, and starting fresh with new stock. I would buy where I could visit the breeder's yards and see the health condition of his chicks and breeding stock.

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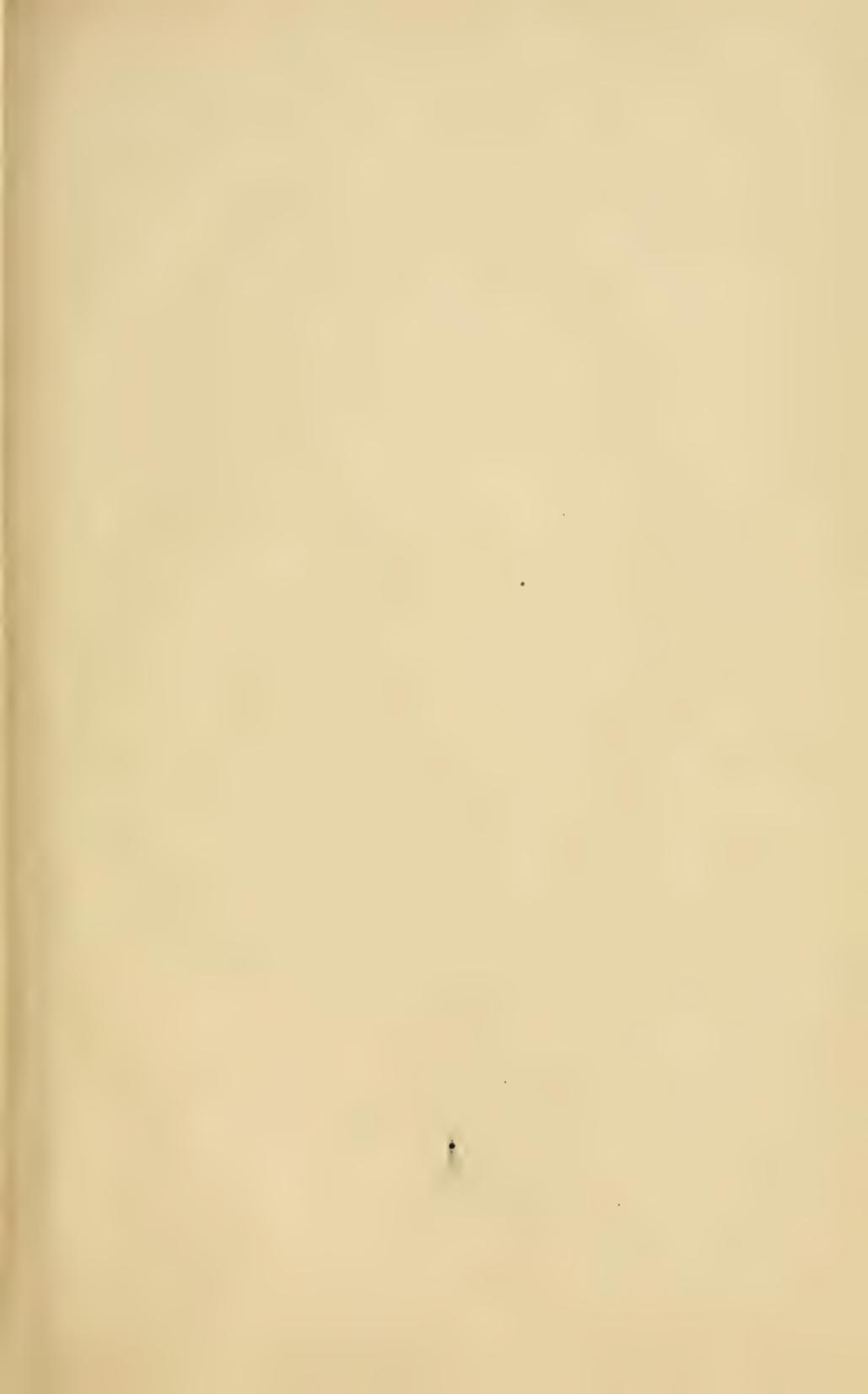
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