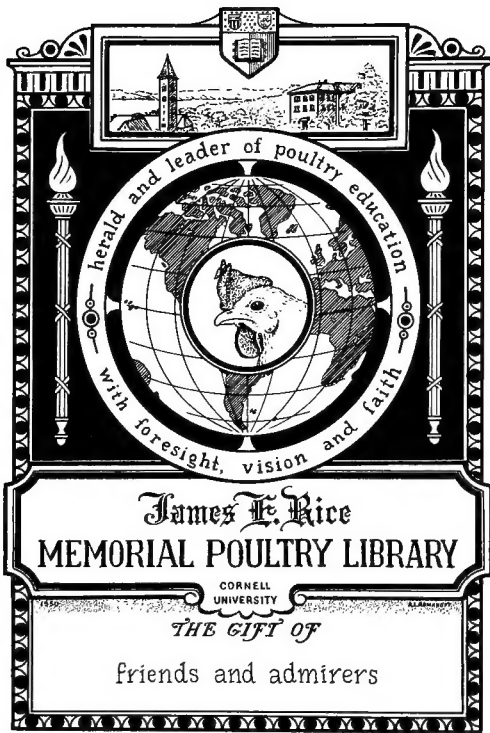


Wm. H. Green
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Reliable Poultry Remedies





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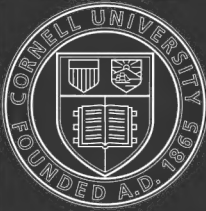
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RELIABLE POULTRY REMEDIES

The Causes Symptoms and Treatment of Poultry Diseases

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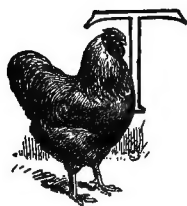
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PREFACE



THE first edition of *Reliable Poultry Remedies* was published principally on account of the numerous letters received from the readers of the *Reliable* asking for information and advice concerning the care and treatment of their poultry in health and disease. It was seldom possible to prescribe a treatment and render the necessary assistance within the limited space of a reply by mail, so that a trustworthy work on the diseases of poultry seemed necessary. In later editions the size and number of pages were materially increased; authentic articles were contributed by several well known specialists on the diseases that they had successfully treated and the work was carefully revised.

A number of remedies prescribed for the same disease should not confuse the reader. A physician knows of several remedies, one of which may be better than the others, but in its absence he uses another with more or less success. In doctoring sick fowls and chicks, use whichever remedy is at hand. Time is often an important factor in a cure.

Reliable Poultry Remedies will be revised and republished from time to time with a view to improving it, and the co-operation of interested persons is desired. A report, therefore, of your success in following the treatments prescribed in this work, or in applying other remedies with beneficial results will be greatly appreciated not only by ourselves but by the readers of future editions.

EDITOR.

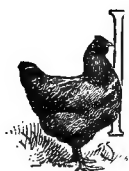
Quincy, Illinois, November 1, 1913.

REQUISITES FOR HEALTH

HEALTHY POULTRY*

HOW TO MAINTAIN HEALTH IN POULTRY—
HOW TO PREVENT DISEASE—HELPFUL SUG-
GESTIONS ON BREEDING, CHICK GROWING,
HOUSES, FOOD AND OTHER ESSENTIALS

P. T. WOOD, M. D.



IT IS more important for the beginner to know how to prevent diseases than how to treat and cure them. In most cases where the amateur begins to doctor his flock he is in very much the same plight as the man who neglected to lock his barn door until after his horse was stolen. It is much easier to keep disease out of the flock than it is to get rid of it when sickness once gets a foothold.

To combat disease successfully one must be familiar with the requirements of the fowl in its normal condition and a general knowledge of the essentials of anatomy and physiology are desirable. With fowls, as with other live stock, we have almost absolute control over their environment, breeding, food and habits. This control and the fact that we can promptly kill any undesirable specimen gives us the power to prevent or effectually stamp out any disease which may make its appearance. In the majority of cases disease is preventable and on well regulated poultry farms it will be conspicuous only by its absence. Barring the unforeseen results of sudden climatic changes, accidents and certain insidious contagious disorders which occasionally make their appearance on the best regulated plants, disease can, in nearly every case, be prevented by good care and management and the exercise of ordinary common sense.

Disease is seldom thought of until it makes its appearance and to carelessness, ignorance and lack of forethought in this respect is due to a large extent the prevalence of poultry diseases—the horse is stolen before we remember to lock the door.

BREED FOR HEALTH

It is one of the well-known laws of heredity that "like produces like,"—what is bred in the fowl will out in the chick. The tendencies to certain habits are readily transmitted from parent to offspring and when handed down for a number of generations, the tendency becomes more firmly fixed.

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RELIABLE POULTRY REMEDIES

To have healthy poultry we should breed for health as carefully as for any desired standard point. Breeding for health should be the foremost consideration since with the habit of health firmly fixed in the flock we have a solid bed-rock foundation on which to build up a strain well fitted to develop all other desirable qualities. Breeding for health should begin not alone with the parent stock, but if possible with the grandparents.

SELECTING THE BREEDING STOCK

In selecting breeding stock be sure to accept only strong, vigorous, healthy specimens, birds which are well developed, fully matured and which have never had any serious illness. If possible know that they come from perfectly healthy parents. No matter how good a specimen a bird may be, if it is not mature, does not possess size, vigor and a sound constitution, do not permit it to take a place in the breeding pen. It may hurt the breeder's feelings and require an effort to throw out a promising specimen for such defects, but it will pay in the end.

There is every reason to believe that well grown chicks will inherit the habit of health from sound, healthy parents and that such will be practically immune from disease when properly cared for. Birds used for breeding should be born healthy and inherit a sound constitution from their ancestors. The bright eyes; red comb; smooth, bright, well-kept plumage; alertness, activity and a keen appetite indicate the healthy fowl. Remember, too, that though a fowl may appear to be healthy it should be examined carefully for any deformities that may suggest hereditary taint. The body should be well formed and free from all such defects as wry wings or tail, enlarged joints, deformed backs or other evidence of improper development. Examine the legs carefully. They should be clear, clean, bright, well formed and typical of the variety. You can tell a fowl's condition by its legs quite as readily as a physician will note a change in a patient by his pulse. If the legs feel hot and dry to the touch, look pale and the veins are prominent, particularly if accompanied by a dry mouth and hot breath, quarantine the bird until you find out what is wrong.

While the male bird is "half the flock," as we are often called upon to remember, it should be borne in mind that the selection of the females in the breeding pen is equally important. It is the female parent which, to a large extent, controls the size and shape of the progeny. Both male and female parents should be typical and perfect physical representatives of their variety.

DON'T BREED "CURED" FOWLS

Fowls which have once had a severe sickness should have no place in the breeding pen. Even though a specimen may appear to have fully recovered, there always remain the possibility and probability that some constitutional taint remains which may transmit a predisposition to disease to the offspring. A great deal of time and money is wasted in an endeavor to cure diseased fowls. No fowl, unless it is an exceptionally valuable exhibition specimen, is worth the expense and trouble attendant on

REQUISITES FOR HEALTH

the treatment of a serious sickness. Even in such cases the wisdom of doctoring the bird is of doubtful quality. Spending several dollars worth of time and medicine in an attempt to cure a dollar bird, thereby endangering the health of the balance of the flock, is suicidal policy. Minor ailments that give way to the prompt application of simple remedies will prove worth treatment, but in the long run the poultryman will find that a small graveyard is more profitable than a large hospital. The poultry keeper who knows how and when to use the axe does more to insure healthy poultry than the man who resorts to the medicine bottle.

INBREEDING

Inbreeding is bad practice. Hereditary tendencies possessed alike by both parents are prone to be exaggerated in the chicks. For this reason never mate males and females possessing the same fault. Evil tendencies seem even more readily transmittable than good ones, and, for this reason, what the breeder gains in standard points by inbreeding he may lose in health and constitution. There is, however, less danger from carefully conducted inbreeding, if not overdone, using fowls of known parentage whose physical conditions and development are known to be of the best, than from the indiscriminate introduction of unknown new blood. Nature balks at inbreeding and demands new blood, but she requires that it shall be above reproach. Secure health by breeding for it, and keep the birds healthy by good care.

START THE CHICKS RIGHT

Eggs from healthy fowls will produce strong, sturdy chicks when incubated under normal conditions. The test of incubation is the chick. A healthy chick comes out on time, neither too early nor too late, comes into the world with a vigorous kick and peep, is strong, large, well-developed, bright, lively and hungry. This chick has the hereditary tendency to health—a sound constitution. Whether it will develop properly or not depends now on the care and food it receives. A healthy chick should grow all the time from birth to maturity. Much depends upon how the little chick is started, and proper treatment at this time will often prevent trouble later on. For the first twenty-four hours small chicks should have no food. When they are removed from the nest or from the machine, care should be taken not to chill them, and each should be given, before being placed in its new home, whether brood-coop or brooder, a little drink of pure, fresh water by dipping its bill. It is very little trouble to do this, and the results are well worth the effort. For twenty-four to forty-eight hours after they are placed in the brooder or brood-coop, little chicks should have, as first food, dry stale bread crumbs, barely moistened with milk, to which has been added a little sharp sand. The effect of this food is to clear the chicks' digestive organs and to assist in the proper absorption of the yolk. This food should be discontinued at the end of forty-eight hours, when the chicks may be put on any good dry grain chick food. Dry grain chick food is recommended because when it

RELIABLE POULTRY REMEDIES

is used there is less danger of losses from bowel troubles or kindred ailments than when mash or dough is fed. Oyster shell and marble dust grit should be avoided for small chicks, since these have a tendency to promote bowel trouble. Pure, fresh water, in clean founts, a little pure charcoal and a good chick grit should be kept where the chicks can always have access to them. Some meat food and a plentiful supply of fresh green stuff are also essential to the proper development of the chick.

With good care and wholesome food at the start, the healthy chick will invariably thrive, since it is its natural tendency to live and grow, notwithstanding the fact that some writers apparently would have us believe that most chicks are born into this world to die within the first two weeks after hatching.

A standing still in the growth of young chicks should always be looked upon as a danger signal, warning the grower that there is some important matter that needs immediate attention. Chilling and over-heating the chicks must be avoided if losses are prevented. The aim should be to keep the chicks just warm enough, comfortable, busy and well fed. The presence of vermin must not be tolerated, since it is not possible to raise a good flock of healthy chicks and a big crop of lice and mites at the same time. The vermin generally come out ahead, while the chicks suffer. Everyone is liable to make mistakes, and some of them the sturdy chick with inherent healthy tendencies will overcome, and it will grow in spite of them, but mistakes, once discovered, should be rectified, since a repetition of them is almost invariably fatal.

COMMON CAUSES OF DISEASE

Unsanitary surroundings, vermin, dampness, crowding, impure water, improper food, neglect and want of exercise are all predisposing causes of disease. It does not matter whether it is a germ disease or not, when subjected to such conditions even a strong, sound constitution is liable to break down. All are preventable, and there is no excuse for the existence of any one of them on a well ordered poultry plant.

LOCATION AND VENTILATION OF BUILDINGS

A poultry plant should be located on well-drained land, and the buildings should be well-built, roomy, dry and not too low studded. It is the best plan to provide for ventilation by opening the doors and windows, arranging them so that the house can be tightly closed whenever necessary. Ventilators are seldom, if ever, satisfactory, and are almost certain to create drafts. Fowls sleeping in drafty roosting quarters are certain to become the victims of colds. Colds lead to other troubles, and the result is loss to the owner. The buildings should be tight and warm. The windows should be made to open so that the house can be given a thorough airing daily. If, after the house is made tight and is thoroughly ventilated daily by opening the doors and windows (the length of time to be governed by the weather conditions), it still seems to need ventilation, you may be certain that you

REQUISITES FOR HEALTH

have over-estimated its capacity, and that what you want in the house is not ventilators, but fewer fowls. The use of the now popular open-front house will do much to solve the problem of ventilation.

IMPORTANCE OF SUNSHINE

Sunlight is most important to health. The house should be so placed that through the day sunlight may penetrate to all parts of it. Sunshine and pure air are the greatest blood purifiers and natural disinfectants. No poultry house should ever be built in such a manner that it cannot be thoroughly sunned whenever the sun shines. This applies to all poultry buildings. Many brooder houses which have proved unsatisfactory and which seemed veritable death traps for little chicks would have worked well if proper provision had been made for getting plenty of sun into the house whenever practicable. This does not mean that little chicks should be exposed indefinitely to the direct rays of the sun without an opportunity to seek a shady shelter. Such a condition would be almost sure to result fatally from sunstroke, but the house and runs should be so arranged that the chicks may have sunshine and shade at will, trusting to their natural instinct to seek shelter whenever the heat from the sun becomes too strong for them.

THE EARTH BATH

For as long as the writer can remember, dust has been recommended as a remedy for all kinds of insect pests affecting poultry. It is true that fowls can stand more dust than human beings, but constant breathing of a dust-laden atmosphere invites catarrhal troubles. The place for dust is in the dust bath and not all over the poultry house. This bath should be located in some sunny corner. The so-called "dust" or earth bath is a necessity since it is the natural method of cleaning the skin and feathers and keeping down vermin. At this point attention should be called to the fact that the most satisfactory dust bath is "dust" in name only, since hens prefer baths that are supplied with earth that is a little moist, and will always choose such rather than use one that is very dry and dusty.

Dusting powders for destroying insects will be found valuable and very effective, but in order to get satisfactory results they should be thoroughly applied by working them well down into the feathers at frequent intervals. Where a large number of fowls are kept this involves too great an amount of labor for the results obtained, and it is much more satisfactory to encourage the hens to dust themselves by providing them with an earth bath.

The roosts should be so placed that the fowls will not be required to do much jumping. Jumping to and from high roosts often results in injury. They should occupy the most sheltered position in the pen; should be high enough to escape floor drafts and should be far enough away from the roof to afford ample head room and plenty of air space. Where the roosts are too close to the roof, the breath from the fowls condenses on the boards in cold weather in the form of heavy frost, rendering the sleeping

RELIABLE POULTRY REMEDIES

quarters damp and unsanitary. Small, narrow roosts or perches should never be used, since they are almost certain to cause corns, foot-abscess, bumble foot and cracked hocks. The most satisfactory roosts are made of 2 by 3 inch stuff with the edges slightly rounded and set on a two-inch edge. A good cheap creolin disinfectant or lice paint should be used on the roosts and droppings boards two or three times a month. This is an easy means of getting rid of vermin and is conducive to good health.

The droppings boards should be smooth, wide and ample and should not be too far below the roosts. They should be cleaned at frequent intervals. Daily cleaning is simplest and most satisfactory and when persevered in requires much less time and trouble than when the droppings boards are cleaned but once a week or twice a month. After the boards have been scraped, a little fresh earth or sand should be scattered over them. The nests should be cleaned and nesting material renewed at least once a month in summer as they afford hiding places for vermin. They will not need attention more than two or three times during the winter unless fouled by broken eggs or droppings. Spasmodic attempts at cleaning up at irregular intervals do not accomplish much; it is the man who keeps things clean that gets results.

ARTIFICIAL HEATING

If the breeding and laying house is warmly built there will be no occasion for use of artificial heat. Artificial heat is out of place, except in the brooder house, and is liable to do more harm than good since the fowls have no control over the heat and cannot remove their feathers to cool themselves off if it gets too warm for them. When artificial heat is used the difference in temperature between that of the house and the outside air will often be so great that there is danger of the birds taking cold. Where the large comb varieties are kept, the danger from frostbite may be averted by using a burlap or muslin curtain in front of the roosts on cold nights.

DAMPNESS—"HOUSE SWEATING"

Crowding on the roosts must always be avoided since it is almost certain to result in sweating and subsequent colds and roup. Provide ample roosting room for your birds and do not at any time allow more fowls in the pen than can be comfortable there. Fowls will not thrive in damp quarters and dampness should never be tolerated. Any vapor from the breath of the fowls that may condense on the walls and ceilings of the house, commonly termed "house sweating," can be overcome by airing the buildings well each day. The length of time for this airing will have to be determined by the condition of the weather, and in this regard the breeder will have to exercise judgment.

THE YARDS OR RUNS

The yards or runs should receive good care since foul ground is a source of disease which cannot be overlooked with safety. One reason that be-

REQUISITES FOR HEALTH

ginners seldom have much serious trouble until the second or third season is because at the start the buildings and grounds are new and fresh. Apparent success at the start leads to neglect and the fouled ground of the floors and runs breeds trouble. With portable houses the conditions are almost ideal since the poultry can be moved to fresh ground whenever necessary. With permanent buildings and runs the yards should be ploughed up at frequent intervals and sowed with some quick growing grain like rye to sweeten them. Fruit trees in the runs, combined with frequent stirring and working of the soil and seeding down, afford satisfactory means of purifying the soil. Where grass runs are used they should be ploughed and re-sown whenever the ground shows evidence of needing sweetening. Here the poultryman will need to be observing and possess a keen sense of smell. While an offensive odor does not necessarily mean disease and death, it is a good plan to consider it a danger signal. The poultryman who possesses a "sensitive nose" will find that that organ used with good judgment will save him many dollars in a year.

DRINKING WATER

As with human beings, the drinking water is the fruitful source of trouble. Probably more diseases are spread through the drinking water than in any other way. Impure water should not be allowed within reach of fowls. It is no uncommon sight on poultry farms, otherwise well kept, to find the water vessels in a filthy condition. To put clean water in foul receptacles is labor wasted, yet we often see on poultry farms dirty wooden tubs or unclean metal vessels containing foul, green-scummed water. Carelessness of this kind is almost certain to result in heavy losses. The drinking water should be the best obtainable and such as we would be willing to drink ourselves, since it plays a most important part in the make up of the fowl and of the egg. Water dishes should be made so that they can be easily cleaned and once a week they should be washed and scalded or rinsed with some good non-poisonous disinfectant.

FOODS

Food has an important influence on health. The amount of food, the variety and method of feeding depends largely on what your fowls have been accustomed to. Damaged food is money wasted, and feeding it is prejudicial to health. In feeding the aim should be to promote a healthy appetite by supplying a variety of wholesome, palatable, nourishing food. Its chemical composition is of secondary importance. Whether a dry grain ration is to be fed or one in which a moist mash plays an important part, is largely a matter of individual preference on the part of the breeder and one which will he will have to settle for himself. Anyone who is getting good results with his present ration would be foolish to change because someone else gets equally good or possibly a little better results by another method of feeding. Where mashes are fed, they should never be given hot, since a hot mash invites colds and other disorders by overheating the fowl and causing sluggishness. Mashes are best fed barely warm. The writer prefers feeding mash at night, since fowls so fed will take more exercise. For the same reason

RELIABLE POULTRY REMEDIES

it is recommended to feed the most of the whole grains in deep litter. There has been a good deal of controversy between the advocates of the moist mash method of feeding and those who prefer the dry method, and a great deal may be said in favor of both plans. Where fowls are to be forced for egg production, the claim has been made, and results seem to sustain it, that more eggs can be obtained by feeding highly concentrated moist mashes than when the birds have an exclusively dry grain ration. However, it is a fact that it is more easy for the beginner to keep fowls in good health when fed on an exclusively dry grain ration than where mash foods are fed; also where mash foods are fed there is more or less of a tendency to bowel trouble, since mash fed fowls almost invariably void large quantities of soft, more or less watery droppings, while the stools of birds fed exclusively on dry grains are usually of better consistency and indicate a more healthy condition of the digestive organs. This is not surprising, because the natural and normal method of feeding is on hard, dry grains.

For little chicks, the dry grain chick food plan of feeding has almost entirely superseded the moist mash or cooked food methods, and we have yet to learn of any poultry raiser who, after once trying the dry plan of feeding small chicks, ever returned to the old style dough and mash mixtures. There are fewer losses with the dry method, less labor, and equally good, if not better, chicks, which seems sufficient argument in its favor. Cooked foods are not to be recommended for poultry, except by way of variety, since cooking partially, if not wholly, destroys the anti-scorbutic properties of the food, and birds fed for a long time on cooked foods have less power to resist disease and are more prone to digestive disorders than those fed on raw grains.

A supply of meat food is essential to health, and a most satisfactory plan is to keep good, clean, pure beef scrap constantly before the birds. Green food is essential to health at all seasons and should be supplied in the form of lettuce and cabbage heads, fed whole, split beets and mangels hung up for the birds to pick at, thus forming an incentive to healthful exercise, as well as furnishing a desirable addition to the ration. Whenever practicable, a grass run should be provided. In cold weather cut clover, which has been steamed or scalded to soften it, should be fed in troughs daily or mixed with the mash food. Never lose sight of the fact that green food and meat food are, in addition to grain, necessary to the health of the fowl. A little salt in the moist mash promotes better digestion and serves to favor more ready absorption of the food. Where mash is fed, it should be given in clean troughs, which must be thoroughly cleaned at frequent intervals.

MEDICINES AND TONICS

Tonics and medicinal foods, while they will undoubtedly help fowls of unsound constitution, are not desirable, since, if we are to have and keep healthy fowls, we must not breed from birds that require constant dosing. Healthy fowls will do their best without the use of condiments. Feeding condition powders and the like to healthy birds that are already

REQUISTES FOR HEALTH

doing all that should be expected of them is like whipping up a horse that is doing his best to pull a heavy load, and is bound to bring about discouraging results. The less dosing the fowls get the better. Healthy stock should need little or no medicine. A good grit is necessary to health, as also is a supply of oyster shell for adult fowls. These should be kept constantly before the birds. Granulated charcoal should always be kept in one compartment of the grit box. Wherever a tendency to looseness of the bowels is noted, a little mash containing powdered charcoal may be fed with excellent results. If constipation proves troublesome a little linseed meal and some bran in the moist mash, or bran fed dry, usually corrects the trouble. Preventive medicine in the form of drugs is of little use. Disinfectants are necessary, and some good non-poisonous creolin disinfectant should be freely used about the poultry house at frequent intervals.

CONTAGIOUS DISEASES

Fowls that have been bred for health and so cared for as to keep them in good condition seldom become victims of contagious disease. A sound, vigorous constitution is the best safeguard against contagion. To prevent the spread of contagious diseases every sick bird should be isolated as soon as discovered. Remove it from the flock at once. Do not wait until some more convenient time, since you are liable to forget and the bird may not be removed until the trouble has spread sufficiently to assume alarming proportions. All new birds or fowls which have returned from the show room should be subjected to at least ten days quarantine before being permitted to run with a flock, and if suspected of being diseased should not be allowed to run with other birds until it is positively certain that no disease is present. Birds which have recently recovered from any disease should not be returned to the flock until it is absolutely certain that they are cured. Poultrymen should not go direct from handling sick birds to the quarters of well ones or your neighbors' birds should not be allowed with your own. Do not go direct from other henneries to your own, and last but not least, never keep sick birds in the room where the food for other fowls is kept.

The poultry buildings should be thoroughly cleaned and disinfected at least once, or better, twice a year. The walls should be thoroughly swept with a stiff broom and then brightened by a thorough application of good hot whitewash, to which a little carbolic acid or creolin has been added. If whitewash is not obtainable, use some good wood preservative and paint the whole interior of the house with it. If the floors are made of earth or sand, dig them up and cart off the upper six inches and, after disinfecting with a good fluid disinfectant, replace with new fresh earth or sand. If the floors are of wood or cement, cleanse them thoroughly and whitewash them or mop them over with some cheap non-poisonous disinfectant, then cover them with a few inches of sand or earth.

EXERCISE

Exercise is a most important factor in promoting good health, and should never be lost sight of. Fowls must exercise or they will become

RELIABLE POULTRY REMEDIES

fat and their muscles atrophied. Fat and flesh are not the same thing. Some fat is essential to health, but a very fat fowl is never a healthy one. Proper exercise helps the fowl to keep up in flesh and muscle and to burn up any surplus fat. The healthy fowl will hold its weight, allowing for slight variation at different seasons. Lack of exercise tends to divert the digested food from flesh forming and the development of eggs and turns it to fat making. For some reason food seems to be disposed of more readily in storage of fat than for the purpose for which we intend it. If we fail to supply a sufficient incentive to proper exercise, we are almost certain to defeat our purpose in feeding. Sluggishness begets laziness; exercise begets activity, and activity is necessary to health and the performance of the normal functions of the body.

Where the dry food hopper plan of feeding is adopted, fowls should have liberal range, so that they will take the necessary exercise in rambling about in search of bugs, insects and other natural food, otherwise the dry grain should be fed in litter to encourage exercise.

Exercise is very important for growing chicks. To do well, mature properly, and make the best of their growing up, they should have a liberal range. A good grass range on the farm will do much to help chickens to outgrow any evil tendencies which they may have inherited. The range should give them the freedom of a grassy field where they can get good grass food, worms and insects. Old or young fowls should never be coddled or babied. They should be provided with a suitable shelter, and then allowed to use their discretion about keeping under cover. The shelter should be such as will provide protection against wind, rain and sun, and it should be so arranged that they can run to it if they want to.

Fowls usually lay more eggs in semi-confinement than on free range, but the eggs of yarded fowls seldom hatch as well as those of birds which have more freedom. Where birds are confined, they should have comfortable houses and good sized runs, plenty of litter deep enough to keep them scratching and a sufficient supply of grain in the litter so that they can always find a little by scratching for it, lest they become disgusted from digging and finding nothing. If they are permitted to have plenty of outdoor exercise and the houses are well sunned and aired daily, you will not find the birds susceptible to colds from sudden changes in weather. Where it can be avoided, fowls of different ages and conditions should not run together in the same flock. Fowls of various sizes and varieties do not do as well running together as if they were in separate flocks.

Tuberculous persons or animals, consumptives or other diseased human beings should not be permitted to go near any live stock. To be successful in breeding healthy fowls means that the breeder must at times sacrifice sentiment and possibly some high-scoring or record breaking birds, but in the end he will find that it pays. Constitutional disease is a danger too serious to be overlooked, and every day those who are interested in the study of poultry diseases find fresh evidence of its prevalence. If poultry is to be kept from becoming a menace to public health, every breeder must do his best to produce healthy poultry.

PREVENTION BETTER THAN CURE

Every poultry keeper should have personal knowledge of how to recognize the disease of fowls and chicks and of what steps to take to cure them. But of far greater value is the knowledge of how to prevent these diseases, and the poultry man who does not know how to care for and feed his flock so as to accomplish this, is liable to have more than his share of annoyance and loss. In this book the object has been to describe the more common diseases of domestic fowl and tell how to treat these diseases, in order to help the beginner who does not recognize symptoms until a disease has gone too far to prevent it, or who has not yet learned the art of keeping his flock up to that point where diseases are warded off.

Our successful poultrymen know how to ward off diseases—first, by having stock that possesses vigorous constitutions; second, by proper housing and feeding; third, by absolute cleanliness. The question of clean poultry houses is so important that it cannot be emphasized too strongly, so we give the following definite directions.

HOW TO CLEAN A POULTRY HOUSE

The following excellent advice is given by Dr. Raymond Pearl, of the University of Maine:—

Not every poultryman of experience even, knows how really to clean a poultry house. The first thing to do is to remove all the litter and loose dirt which can be shoveled out. Then give the house—floor, walls and ceiling a thorough sweeping and shovel out the accumulated debris. Then play a garden hose, with the maximum water pressure which can be obtained, upon floor, roosting boards, walls and ceiling, until all the dirt which can be washed down easily is disposed of. Then take a heavy hoe or roost board scraper and proceed to scrape the floor and roosting boards clean of the trampled and caked dressing and dirt. Then shovel out what has been accumulated and get the hose into action once more and wash the whole place down again thoroughly and follow this with another scraping.

Next, with a stiff-bristled broom thoroughly scrub walls, floors, nest boxes, roost boards, etc. After another rinsing down and cleaning out of accumulated dirt, let the house dry out for a day or two. Then make a searching inspection to see if any dirt can be discovered. If so, apply the appropriate treatment as outlined above. If, however, everything appears to be clean, the time has come to make it really and truly clean by disinfecting. To do this it is necessary to spray or thoroughly wash with a scrub brush, wet in a solution used for all parts of the house, with a good disinfectant at least twice, allowing time between for it to dry.

HOW TO DISINFECT A POULTRY HOUSE

First. See that the house is perfectly clean by following faithfully the instructions given above. Where the garden hose is not available, use instead a broom or a scrubbing brush.

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Second. Fumigate. Before fumigating it will be necessary to provide accommodations for the fowls. Usually these operations take place during mild weather, when it will not hurt the birds to be shut out of the house for eight to ten hours. The closing up need not be done until along towards noon when most of the laying is over with. Should there be other houses, shed or coops into which the hens can go to lay, the fumigating can be done at any time.

In case the disinfecting is done during cold weather, extra precaution should be taken in caring for the hens. If they are laying, do not expose them to sudden changes. Usually, however, when conditions are such that it is necessary to do this house-cleaning in the winter time, very few eggs are forthcoming, and it is not a question of keeping up the egg yield, but of getting the house properly disinfected. When the hens are removed close up the house as tight as possible and light sulphur candles. Let them burn four or five hours or until they are exhausted. The house then can be opened and in half an hour the rest of the disinfecting should be finished.

Third. Thoroughly disinfect by the use of good lice paint, applied with a brush or sprayer. Paint the roosts, drop boards and nests very thoroughly. Be sure the liquid gets into all the cracks and joints of the roosts. Miss no place where the fowls go or where the insects may hide. Follow this with some of the good, coal-tar preparations sprayed over the entire surface of the inside of the house. Take pains to get into every corner.

Now that the house is clean, this spray should be used once a week throughout the summer and once a fortnight during the winter. To do this is important, because it is a simple matter to keep a poultry house clean after it has once been thoroughly cleaned and properly disinfected.

Fourth. To make a complete job, follow the foregoing treatment with a whitewash brush and your house will be as clean and healthful as hands can make it. The whitewashing will depend upon the time of the year and the accommodations for the fowls, but if possible have it done before they are allowed to enter the house again. A good whitewash, one that will stick and not rub off, is made as follows, or in these proportions:—

U. S. GOVERNMENT WHITEWASH

Unslaked lime.....	2 pecks
Common salt.....	1 peck
Rice flour.....	3 lbs
Spanish whiting.....	$\frac{1}{2}$ lb.
Glue.....	1 lb.
Water.....	Sufficient quantity

The quantities given are sufficient to make nine or ten gallons of whitewash. If only part of the whitewash is needed, the balance can be kept for future use. Should a smaller quantity be desired, the proportions can be cut down to suit.

Directions. To properly make the amount of whitewash above mentioned, two vessels are needed, one holding at least ten gallons and the other

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holding half as much. A small barrel and a tub or any water-tight vessel will answer very well.

1. Slake the lime in the barrel, using two or three gallons of water for two pecks of lime. 2. Cover the barrel. 3. Dissolve the salt in water, strain the brine and add it to the slaked lime in the barrel. 4. Boil the rice flour for ten minutes in a small quantity of water. 5. Dissolve the glue in a double cooker or water bath and avoid scorching. 6. In the tub mix the whiting with about five gallons of hot water. 7. Add to the whiting mixture in tub the boiled rice and dissolved glue. Mix thoroughly. 8. Pour mixture in tub into the barrel containing slaked lime, stir well until thoroughly mixed. 9. Cover barrel to protect from dirt and let whitewash stand for a few days, when it will be ready for use. 10. This whitewash should be applied hot if best results are to be obtained. Heat it in any kettle or other metal vessel on a stove or suspended over a fire.

Fifth. Before allowing the fowls to return to the clean house they themselves should be made clean by a thorough treatment for lice. It is a good plan to go over them with some good insect powder or powdered sulphur before removing them from the house and again on putting them back. Dust the powder well into the feathers of every one and allow no sickly birds to enter the clean house.

A first class lice powder can be made by mixing 5 parts of Naphthalene flakes with 95 parts of some good carrier such as a cheap talcum powder that can be purchased for 5 to 10 cents a pound.

Sixth. Remove and destroy all wooden feed troughs, and provide new ones. If these are made of galvanized iron they can be kept clean with little trouble. Galvanized or earthen ware drinking vessels must be thoroughly cleaned by scalding and scouring. If the old ones are not in perfect condition it is much better to destroy them and to provide new.

HEAD, THROAT AND LUNGS

ROUP AND "ROUPY" COLDS

SYMPTOMS WHICH WILL AID DIAGNOSIS—CAUSES
AND CONDITIONS—BEST MEANS OF PREVEN-
TION—SIMPLE AND EFFECTIVE TREATMENT

P. T. WOODS, M. D.

IN actual every day experiences diseases are not as easy to recognize as one might be led to believe by reading about them in books. It is often difficult to tell just which symptoms belong to the disease, and which belong to some other cause or condition. It is not always possible to say where one disease leaves off and another begins, and it is quite likely that we may meet more than one disease at the same time in the same subject. During the past nine years I have had an opportunity to observe and treat roup and "roupy" diseases in large flocks of fowls under many conditions. I have not had the time nor the equipment to make a microscopical search for the germ or germs (the bacteriological work properly belongs to the laboratories of our experiment stations), but I have had ample opportunity to see and treat "roupy" diseases.

The name roup has been given to all poultry ailments having the common symptoms of "frothy eyes and running discharge from nostrils." All "colds" may have these symptoms, and every cold is not roup. There are three diseases of a roupy nature which are not easily differentiated—roup (or contagious catarrh), diphtheria and influenza. I think that the latter is a distinct disease with a special germ of its own, but am not prepared to say positively that this is so. Many contend that contagious catarrh and diphtheria are caused by the same germ, and in view of the close relationship between these diseases this may be so. In such case, roup (contagious catarrh) and diphtheria may be the same disease, the symptoms varying only with the virulence of the germ and the conditions; but although the diseases have many things in common, and tend to merge readily from one into the other, I prefer (until the laboratory experiments settle the matter) to consider the diseases as two distinct plagues.

ROUP

The term roup has been applied to nearly all poultry diseases accompanied by the symptoms described as "frothy eyes and running discharge from nostrils." All "colds" may have these symptoms, and every cold is not roup.

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Roup or contagious catarrh is a very common disease. It has not yet been positively determined that this disease is distinct from diphtheria or diphtheritic roup. It may be acute or chronic in form, and is characterized by a catarrhal inflammation of the mucous membrane of the eyes, nose and throat. It is always accompanied by the familiar foul "roup smell". The odor is peculiar to the disease, and is very lasting and penetrating and when once recognized there is very little danger of ever mistaking any other disease for roup. The disease is often very contagious, but in some cases only mildly so. It should always be regarded as dangerous even in mild cases since some of the worst epidemics of this disease have had their origin in mild cases that were deemed of little importance. It is caused by a specific germ. The predisposing causes are, all conditions of bad hygiene and improper care, neglected colds, hereditary tendency and weak constitution.

SYMPTOMS

The symptoms develop in from two to five days after infection. First there is dryness and inflammation of the mouth and throat, followed by frothiness and bubbles in corners of eyes, sneezing, and a thin sticky discharge from nostrils begins. Symptoms now develop slowly or rapidly, according to the virulence of the attack or the condition of the bird. The disease may confine itself to the simple catarrhal symptoms of discharges from the nose and eyes (always accompanied by the "roup smell," which in roup can always be detected by seizing the bird and squeezing the discharge from the nostrils, or by opening the mouth); or the disease may, if virulent, run rapidly through the whole range of symptoms—one or both eyes puffed and swollen, discharge from nostrils thick and purulent or glairy, cakes and crusts on nostrils and on feathers where the head rests under the wing at night, diphtheritic patches form in the mouth and throat, cheesy masses form about the eyes; fowl often shows marked constitutional symptoms of poisoning by the disease—appetite lost, dumpishness, feathers roughed, loss of weight, followed by death, or the fowl may continue to live with a chronic form of roup.

Do not expect a roup fowl to get well spontaneously. I doubt if any fowl that had had roup was ever really permanently cured. The disease has a habit of running a chronic or a dormant course, and then cropping out to infect a lot of fresh victims. Fowls apparently cured of roup are liable to show the disease at regular periods coincident with the first attack. Birds sick with an acute attack of roup will not fatten, but those apparently cured or having chronic cases will take on fat if fed for it. Hens with chronic roup may lay eggs. Such eggs do not produce healthy chicks. Eggs from fowls apparently cured will hatch chicks that are apparently all right until the season of the year arrives when their parents had roup—then they are almost certain to contract the disease. That is where the hereditary predisposition comes in. The disease itself is not inherited, but the tendency to become a victim of roup may be transmitted for generations. Birds bred from roup stock are particularly liable to contract

RELIABLE POULTRY REMEDIES

the disease. The droppings of a fowl having roup may or may not have the "roup smell." Birds with chronic roup frequently have a ravenous appetite, but do not grow or take on flesh in proportion to the amount of food eaten. Eye inflammation in roup may lead to ulceration and loss of sight. In some cases, when the discharges are purulent, portions of the nostrils soften and come away in the slough.

The easily recognized "roup smell" is always present in this disease, and whenever you smell roup there you can find it if you look for it. Do not forget that. If you disinfect thoroughly after roup you may get the smell out of the house and runs, but if the foul odor sticks and comes up good and strong on the first warm day after a frost or light cold snap, look your flock over for new cases, and thoroughly disinfect the quarters again—first removing all sick birds.

Handling roup birds sometimes results in the operator contracting a similar disagreeable disease. Whether it is identical with the fowl's disease or not I do not know, but it has the same smell. I have seen several cases of "roup" in men, and have heard of others. One case was my own, the infection of one of my eyes by roup matter coughed into it by a bird I was handling. The eye was swollen and painful, and yielded slowly to treatment. In the fall of 1900 I saw one case and knew of two others where the men were handling a great many roup birds. The men had marked roup symptoms, and the cases ran a course of about two weeks. The eyes were swollen and "bunged up". There was roup discharge from the eyes and nostrils, and the discharge had the "roup smell."

TREATMENT

When the disease first makes its appearance, remove every sick bird from the flock as soon as you can find it; establish quarantine for all suspects; clean up and use a good non-poisonous disinfectant, like creolin, sulpho-naphthol or nap-creol, freely about the houses and runs. Kill all very sick birds and burn them. Do not keep roup birds moping about to infect others. It is not wise to waste time and money doctoring, and it is not good judgment to waste two or three dollars' worth of time and medicine on a dollar bird. If roup does attack your flock, try to stamp it out as soon as you notice the first symptoms. Don't wait for the first case to appear, but prevent the disease by good care and management. Creolin, one teaspoonful in an ordinary bucket (ten quarts) of drinking water, is an effective remedy. In individual birds the discharge can be dried up by using creolin and water, equal parts, for swabbing out the throat, and for painting the nostrils. For bathing the eyes, use a little more water. Apply it with a bit of absorbent cotton twisted about the end of a toothpick, or use the end of a stiff feather.

If the disease is taken in hand early it can frequently be stamped out by using a creolin spray. Mix one teaspoonful of pure creolin in a gallon of water. With a small spray pump that throws a very fine mist, spray this solution about the poultry houses after the birds have gone to roost. Spray it about the heads of the birds so that they may inhale the vapor.

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It will cause a great deal of sneezing and coughing. This treatment every night for ten days to two weeks will cure many stubborn catarrhal colds and frequently cures mild cases of roup.

The poultry houses should be thoroughly aired daily by keeping the south windows open for a greater part of the day throughout the year. Some poultrymen make a practice of putting all birds which contract roup colds into open front sheds, even in severe winter weather, and leaving them to shift for themselves with a liberal supply of food and water. The results of this radical "fresh air treatment" are surprisingly good.

A favorite prescription is twelve tablets of aconite, bryonia and spongia comp. (1-100 of a grain drug strength each,) in each pint of drinking water, allowing the birds no other drink. Or for individual treatment give the bird one tablet three times a day. This often cures severe cases.

One of Mr. Hunter's favorite remedies is the following. "A tablespoonful of clear lard, half a tablespoonful each of vinegar, cayenne pepper and mustard; mix well together; add flour until 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." Repeat it in twelve hours. if necessary. One dose often cures a mild attack.

Spirits of turpentine, one part, with glycerine six parts, makes a good roup lotion. Use it for bathing the face and eyes, for injecting into the nostrils, and for swabbing the throat.

Permanganate of potassium often proves an effective remedy in both roup and diphtheria. It is only of value when used for individual treatment and when used the treatment must be thorough and frequently repeated. Thoroughly mix one grain of finely powdered permanganate of potassium with one ounce of finely powdered milk sugar (confectioner's sugar may be used if desired). Blow this powder into the bird's nostrils, mouth and throat three or four times a day. Do this every day while the bird is under treatment and continue for three or four days after it is apparently well. This will kill the germs, remove the odor and remedy the inflamed condition of the mucous membrane. It is particularly useful in all cases where there are fetid ulcers or cheesy growths in the mouth, throat or nose.

Feed stimulating food, and endeavor to keep up the bird's appetite. Roup remedies containing sulphate of copper are valuable in the drinking water, but no better than and often not as good as, creolin. A weak solution of sulphate of copper in water (about a teaspoonful to a quart of water) makes a good wash for the throat and nostrils. The various roup pills are all more or less effective.

Very sick birds should always be killed and cremated. The sick birds under treatment should always be kept in quarantine apart from the rest of the flock, and the quarters should be kept thoroughly disinfected; this applies to all contagious diseases.

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DIPHThERITIC ROUP

Diphtheritic roup or diphtheria is a contagious disease affecting poultry and is prevalent in winter. While it is probably a distinct disease from roup, it is closely allied to, and may co-exist with it. It is often difficult to tell just where roup leaves off and diphtheria begins. When roup is not present the "roup smell" is absent, but a foul odor always accompanies diphtheria.

Diphtheria affects the mucous membrane of the mouth, throat, nasal passages and eyes. It is characterized by the appearance of pearly gray or yellowish patches, which form on the mucous parts mentioned. The patches of "false membrane" are small and scattered at first, but have a tendency to run together. Any attempt to remove this membrane is followed by bleeding. The breath is very foul, owing to decomposition of the discharges and portions of the membrane.

Symptoms

Fowls in apparently good health become suddenly ill, lose appetite and appear dumpish. Eyes and nose may or may not show a frothy or glairy discharge in the early stage of disease. Fowl's body and legs are hot, comb is hot and deep red, and later becomes pale and drooping. Frequently cough with sharp "pip" sound, or difficult breathing and lividness of face and comb. Throat red and inflamed, with small pearly or wash-leather colored patches on the back part of the throat or about the cleft of the palate. Patches increase rapidly in size and often run together; may grow rapidly, filling the mouth and throat, and causing death from suffocation. Any attempt to remove membrane results in bleeding. (If the membrane comes away easily and does not leave a raw bleeding surface the disease is not diphtheria). Great weakness from constitutional poisoning. Membrane may extend into the windpipe and cause death from suffocation, or may extend into the nasal passages and to the eyes, causing swollen face and head. Breath always has a foul odor. This is a decidedly different odor from the "roup smell."

Roup may have any or all of these symptoms common to diphtheria, but does not have the following sequelae which belongs to diphtheria. Paralysis of the heart may appear at any stage of diphtheria and cause death. Cases which have apparently recovered may develop paralysis of the throat, which prevents swallowing, or the fowl may lose the use of legs or wings. The paralysis is not necessarily permanent. One attack of diphtheria predisposes to another, and a fowl should not be considered well until at least six months have elapsed since the last symptoms were observed, with no recurrence of the symptoms. The fowl's system is thoroughly poisoned by the disease, and complete recovery is a matter of a very long time.

Treatment

Undoubtedly the best treatment is to kill the sick birds as soon as the disease is recognized and burn the bodies. One attack of the disease

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makes the victim susceptible to other attacks. Birds which have had the disease should not be used for breeding purposes.

Individual treatment is the only way this disease can be treated successfully. Feed stimulating food. Blow a little flowers of sulphur into the throat through a quill. Swab out the throat with a bit of cotton on a toothpick or match moistened with undiluted creolin, and bathe the throat, mouth, nostrils and eyes with a solution of creolin (one teaspoonful in four fluid ounces of water). In cases where there is a thick, tough membrane, the swab, may be moistened with undiluted creolin or with "Loeffler Solution," and then held for a few minutes directly against the membrane and moved gently over it. Don't drop any of the medicine into the windpipe unless you want to kill the patient. Give the sick bird one tablet of protiodide of mercury (1-100 of a grain strength) two to four times daily until the membrane begins to disappear. Then reduce the dose gradually until but one tablet a day is given. Continue for one week after the membrane is gone. Permanganate of potassium may be used as recommended in treatment of roup.

Follow this up by good care and feeding easily digested soft food in which is some good tonic powder. In this way the bird may often be pulled through and put in sufficiently good condition to show. Five drops of Fellows' compound, syrup of hypophosphites, made into a pill with bread crumbs, and given three times daily is a good tonic during convalescence.

INFLUENZA

Influenza, "epizootic" or "grippe" is another contagious catarrhal disease often closely associated with roup. It is undoubtedly quite distinct from the two preceding diseases, although it often appears with them. It is an acute, moderately contagious fever common to all seasons of the year, and may be met in any climate. This disease appears in many forms simulating other diseases. The most common form is a "roupy cold" without the "roup smell," which may or may not be accompanied by a watery diarrhoea. The predisposing causes are bad hygiene and unsanitary surroundings—anything tending to debilitate the fowl.

Symptoms

A sudden cold, "with watery eyes and nostrils and much sneezing." Fowl is dumpish and feverish, drinks water frequently. Throat and mouth are inflamed and contain frothy mucus. The breath may have a bad odor, but there is no "roup smell." No patches in the throat. The eyes may swell, but there is seldom any ulceration or blindness. Sometimes feverishness, loss of appetite, and a greenish, watery diarrhoea are the chief symptoms, with little or no head symptoms. The disease runs a course of a week or ten days. In epidemic form it is frequently fatal. Ordinary cases recover slowly, and there is always a tendency to another attack.

Treatment

Hydrogen dioxide solution in water (equal parts) is useful for cleansing the mouth and nostrils. A weak creolin solution is equally good, and

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cheaper. A one-grain pill of quinine sulphate given at night and morning for a few days and then only at night will often effect a cure in recent cases. The aconite, bryonia and spongia mixture (ten drops of the tincture of each in an ounce of alcohol), a teaspoonful in a quart of drinking water is a very useful and effective remedy.

The tablet form is sometimes more convenient to use. For this purpose is recommended the aconite, bryonia and spongia comp. tablets (1-100 of a grain drug strength each) twelve in each pint of drinking water, or give one tablet to each bird two or three times a day.

COMMON COLDS

In the winter season, when cold, blustery winds prevail, even fowls having the best care are sometimes liable to contract simple colds. If these are taken in time, serious trouble will be avoided, as simple catarrhal colds, if neglected, render fowls liable to roup, the inflamed mucous membrane being a very favorable site for the development of the roup germs. The common causes of simple catarrhal colds are exposure to cold, chilly winds; exposure to stormy weather without proper shelter for the fowls to run to, overcrowding the sleeping quarters, draughts, improperly ventilated houses, houses which have been closed too tightly early in the season, thereby making the fowls tender; very warm sleeping quarters, combined with cold, bleak, open scratching sheds; hot mashers; fussy coddling of the birds, making them tender; the careless application of artificial heat; exposure in shipping coops; very dusty houses, and sudden atmospheric changes.

Symptoms

Sneezing, bubbles in the corners of the eyes, watery or sticky discharge running out of the nostrils and eyes, with much coughing and sneezing. There is no odor as in roup. If the discharge has a "roupy smell," the disease is roup and not a simple cold.

Treatment

The disease may be easily controlled if taken early. Remove the cause if possible, and confine the birds to the house until they have fully recovered; air the house well daily, and do not allow the birds to be exposed to the cold winds or storms. When the first symptoms appear with a little sneezing and frothiness about the eyes, use twenty drops of spirits of camphor dropped on sugar and then dissolved in a pint of drinking water, no other drink being allowed the fowls. Do not drop the camphor into the water, or it will not mix. Use as directed. This often checks the trouble at once. If the cold is slightly more advanced, with much sneezing, and water running from the eyes and nostrils, the aconite, byronia and spongia mixture or tablets advised in preceding disease will be found a valuable remedy. For "head colds" of long standing, where there is thick discharge from the nostrils and no odor, try (after thoroughly cleansing the nostrils with hydrogen dioxide solution) injecting morning and night into each nostril a little of the following: One part of finely powdered iodoform in twenty parts liquid alboline.

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CROUP

Croup or a croupy cold is an inflammation of the upper portion of the windpipe. It may result from colds or be caused by inhalation of irritating dust or vapor. The symptoms are those of a cold, with difficult, noisy breathing, the neck stretched and held far out from the body. Examination of the throat will show much inflammation of the upper part of the windpipe and back portion of the throat. The fowl's comb, face and wattles may turn dark colored, indicating suffocation, thick masses of mucus may be seen on the back walls of throat and in the upper part of the windpipe. There is often much rattling in the throat when breathing.

Treatment

Ordinary cases, without much rattling of the throat and with loud whistling or wheezing in breathing, may be successfully treated with aconite, bryonia and spongia comp. tablet or mixture. (See treatment of influenza). When there is much rattling in the throat use arsenite of antimony tablets (1-1000 of a grain drug strength each), one tablet three times a day for individual birds, or a dozen tablets dissolved in a pint of drinking water for flock treatment. This remedy will be found effective in a majority of cases. If the bird seems to be suffocating, bathe the throat with cold water or let the bird inhale the vapor from boiling water. If half a teaspoon of creolin is added to a gallon of boiling water, the treatment will be more effective.

BRONCHITIS

Bronchitis is an acute catarrhal inflammation of the mucus of the bronchial (air) tubes, accompanied by oppressed breathing and profuse discharge of mucus from the air tubes. It is also spoken of as bronchial catarrh, cold in chest and rattling in chest. This disease is common in the fall and winter seasons from changes in the weather, exposure, dampness, inhaling irritating vapors and dust, crowding and sweating, changing from very warm quarters to cold ones, and vice versa. Birds that have some constitutional weakness and ropy ancestry are especially liable.

Symptoms

Bird is very thirsty and feverish. Legs, body and head are hot, frequent cough, labored breathing, accompanied by a whistling sound, cough later becomes loose and rattling. The rattling of mucus of the air passages can be distinctly heard accompanying respiration.

Treatment

When taken early, the aconite, bryonia and spongia mixture recommended in the treatment of influenza, often gives prompt relief. In some cases it will be the only remedy needed. If the cough is persistent, with much rattling, try the following treatment:

Obtain some tablets of arsenite of antimony, 1-1000 of a grain drug strength each, and give one tablet to each sick bird three or four times daily. This remedy may be given in the drinking water in the proportion of twelve tablets to each pint of water, allowing the birds no other drink.

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PNEUMONIA

Pneumonia, lung fever or winter fever, is an acute, infectious, croupy inflammation of the air cells of the lungs. This is a contagious disease, caused by a special germ, which needs only certain conditions to develop. These conditions are debility, with exposure to cold and damp, sudden changes in weather, too close confinement and coddling of the fowls for fear they will get cold; in fact, anything that renders the fowls tender and delicate. Overshown birds and those kept in warm, tight houses that are poorly ventilated are especially liable to pneumonia. Brooder chicks too closely confined in warm brooders or overheated brooder houses are frequently attacked with this disease.

It is the opinion of many reliable and experienced poultrymen that the open-front scratching shed plan of housing and other open-front types of buildings will do more to prevent pneumonia than medicine will to cure it.

Symptoms

Labored breathing. Every respiration ends in a grunting or groaning sound, fowl shows no disposition to move about, and seems to devote all its energies to the effort to breathe. The bird's position is peculiar to the disease. Usually it is a half-squatting, half-standing position, with wings drooped and held away from the body, neck stretched, mouth open and panting for breath. If the ear is held close to the 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 or much above 65 degrees Fahrenheit. If the atmosphere can be kept moist with steam heat, so much the better. Give an aconite, byronia and spongia comp. tablet (1-100 of a grain drug strength each) one every three hours. If the bird will not drink, give teaspoonful of a mixture of raw egg and milk. Feed nothing but egg and milk until the breathing becomes easier. Give no solid food for at least forty-eight hours. As the fowl recovers, gradually harden it to a cooler temperature, and do not return it to the flock until it is strong and able to stand the temperature of the poultry house. Feed easily digested and stimulating soft food while convalescent.

EYE TROUBLES

The most common eye trouble is conjunctivitis, a catarrhal inflammation of the mucous membrane about the eye. It may result from the extension of this inflammation of the throat or nose to the eye membrane. Sometimes it is confined entirely to the eye and not dependent upon other disease.

The causes are bad hygiene, exposure to cold winds, draughts, injuries and irritating dust. Symptoms are gumming of the eyelids with mucous discharge from the eyes. There is great swelling of the face about the eye on one or both sides. The disease may appear as a symptom of roup but

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frequently occurs in fowls that have never had roup. Some cases recover spontaneously after the disease has run a few days, the swelling subsides, a little gentle pressure below the eye will expel a lump of cheesy matter, and after this is removed the case recovers. In purulent cases, where there is a considerable discharge of pus from the eye, keratitis, or inflammation of the cornea, may result. This is an inflammation of the outer membrane covering the pupil of the eye. If noticed early, a small white spot or ulcer will be seen over the pupil. The lids may gum together, but in all cases the fowl keeps the eye closed, as exposure of the eye to the light is painful. Sight may be lost as a result of the ulceration. All cases of eye trouble, when under treatment, should be kept in darkened coops.

Treatment

For simple conjunctivitis, use fifteen drops of tincture of euphrasia in each pint of drinking water, allowing the bird no other water. Cleanse the eyes by bathing them with a mild antiseptic solution like dilute hydrogen dioxide, (one part hydrogen dioxide to two parts water), or anoint the eye-lids with a two per cent creolin ointment made with vaseline or lard. In purulent cases give tincture of pulsatilla, ten to fifteen drops in each pint of drinking water, and use the ointment after bathing the parts. If there is ulceration of the cornea (keratitis) bathe the eyes with cool water containing a little hydrogen dioxide and then anoint the inner part of the lid with an ointment made of ten grains of finely powdered iodoform in an ounce of vaseline. The nostrils should be cleansed and the nose and cleft palate dosed with the following powder: Equal parts pulverized camphor, boracic acid and sub-nitrate of bismuth, well mixed. If cases of eye trouble are neglected and allowed to go without treatment the fowl may lose the use of both eyes, as the disease has a tendency to attack the remaining eye after destroying the sight of one. Feed easily digested, nourishing food.

CANKER

Canker is an ulcerative catarrh of the mouth which occurs commonly at all seasons of the year, but is more often noticed among birds that are kept in close confinement during the winter months. This ulcerative inflammation may occur on any part of the mucous membrane of the mouth, tongue or throat and is characterized by the presence of one or more yellowish or cheesy patches on the mucous membrane. It sometimes attacks the mucous membrane of the eyes or is noticed about the vent. It is slightly contagious.

The causes of this disease are not well known, however, it is probable that it may be caused by any one of a number of microscopic germs, it being a fact that any scratching or laceration of the mucous membrane is usually followed by a cheesy or cankerous growth. Experiments have shown that these growths are chiefly made up of pus germs, pus in a fowl usually takes the form of a cheesy growth. Male birds after fighting almost invariably have canker, as they frequently pick one another in the mouth. The disease is very common among fowls that have been working in musty or moldy

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litter, or that have been fed on spoiled grain. Disorders of the digestive organs or other disturbances which cause an unhealthy condition of the mucous membrane of the mouth and throat are likely to be accompanied by an attack of canker.

Symptoms

The first noticeable symptoms of this disease are one or more small whitish or yellowish ulcers or a cheesy growth on the roof of the mouth, the side of the tongue, the angles of the jaws or sometimes at the opening of the wind pipe. The growth is hard and tough but can usually be removed without much bleeding, leaving a raw, ulcerated surface.

Treatment

Burnt alum applied to the canker sores will often effect a cure. Treating the canker spots with a swab (made by twisting a bit of cotton about a sharp stick) moistened with undiluted creolin or with "Loeffler's Solution," holding the swab firmly against the canker sore for a few moments and moving it gradually over the whole ulcer or patch is very effective in some cases. Mild cases may frequently be cured by the application of murate tincture of iron in the same manner. The following powder is highly recommended for the treatment of canker where there are a considerable number of canker spots or groups of ulcers.

Equal parts of pulverized camphor, boracic acid and sub-nitrate of bismuth, well mixed. This should be blown in the nostrils or throat by means of a straw or glass tube. For internal treatment give tablets of mercury protiodide, 1-100 of a grain drug strength each. One tablet given to each bird three or four times a day until the canker spots disappear and then the dose gradually reduced will usually effect a cure.

ROUP

THE SYMPTOMS, CAUSES AND TREATMENT OF THE VARIOUS TYPES OF THIS MALIGNANT DISEASE

PROF. F. C. HARRISON AND DR. H. STREIT

ONE of the most widely spread and destructive diseases affecting domestic fowls is commonly known as Roup, Canker, or Difteria. By some, the disease is called Cancer of the Mouth, Throat, etc., or even by the name of Fowl Diphtheria; but all these different names are given to the same disease, according as some particular symptom is more or less prominent.

This disease is probably one of the greatest hindrances in the poultry business. The direct losses from the disease vary greatly in different epidemics. Thus in a virulent outbreak there may be many deaths in a short time; while, in another, a flock may become infected and only a few birds die. Of much greater importance are the indirect losses; and these are apt to be overlooked by farmers or those who keep only a few fowls and pay but little attention to them. The diseased birds recover very slowly; and they remain thin, anaemic, and unfit for egg-production, fattening or breeding—eating just as much as if they were normal and living at the expense of their keeper.

General Condition of Rousy Fowls

The general condition of rousy birds varies very much. After the first symptom of the disease, which is usually a putrid catarrh from the nostrils, the affected fowl is generally restless, separates from other members of the flock, becomes dull, cowers in the corner of the coop or mopes in the corner of the pen, with its head drawn close to its body and often covered with its wings.

If there is a severe discharge from the nostrils or eyes, then the feathers upon the wings or back are likely to be smeared with it, stuck together, and after some time fall out; and the eyes often shut, the lids being glued together by the sticky discharge from them.

A fowl in a sleepy condition, or moping as described, frequently rouses itself for a time, takes food, and especially water, and then gradually returns to the apathetic condition.

Many fowls having the disease in a chronic form keep their normal appetite for a long time, and seem very little disturbed physically, whilst others, especially when the face or eyes become swollen, lose their appetite, grow thinner and thinner, and finally become too weak to stand or walk around, when they lie down and die in a few days. During the last stage diarrhoea, with offensive yellow or green discharge, often sets in and causes death in a short time.

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Many poultry keepers assert that roup birds show fever; and it is certain that the head is often very hot, but the body temperature is normal, or only very slightly higher than normal.

Special Symptoms of Roup

By the term Roup we generally understand a more or less putrid discharge from the nostrils, which lasts for weeks or even months. The disease often follows a common cold, to which fowls, especially young fowls and those of the more delicate breeds, are much predisposed.

In the first stages of Roup, the birds often cough or sneeze, and the breathing is noisy, caused by the partial closing of the air passages, which become blocked with the discharge from the nostrils. When the air passages are entirely closed by the discharged products, the fowl has to open its beak in order to breathe.

Sometimes a yellowish cheese-like mass forms in the nostrils, growing quickly and pressing the upper walls of the nose upwards; and if this mass is removed, an uneven bleeding surface is left, which forms a new cheesy mass in from 24 to 48 hours.

Whilst many roup birds show only the above mentioned symptoms, others become more seriously diseased. The face of roup birds is very often swollen, especially between the eyes and the nostrils; and this swelling, which is hot and sore, sometimes grows into a tumor as large as a walnut—generally firm and hard. A bird in this condition is frequently found scratching at the tumor with its claws or wings, as if endeavoring to remove it. If the tumor grows on the inner side, towards the nasal passage, it forces the roof of the mouth downward, and the upper and lower beak are slowly pressed out of their normal position, so that the bird cannot close its mouth.

On making an incision into the tumor, we find a solid, cheesy, yellowish matter, which may be pulled out like the root of a plant; but it usually has to be broken into small pieces in order to get it out. Around this mass, there is a more or less smooth, gray or brownish membrane that is capable of again forming a cheesy mass similar to what has been removed.

The mass itself, when not attended to, often grows into the nasal canals, and blocks them up completely. Generally combined with the formation of the tumor on the face, there is an affection of the eyes; or the eyes become diseased without the preliminary discharge from the nose, in which case poultry keepers speak of fowls as suffering from "Roup of the Eyes."

Roup of the Eyes

The first symptom of the eyes is generally an inflammation of the eyelids. These become red, swollen and hot; then the mucous membrane and glands of eyes become inflamed and begin to secrete a liquid—at first clear, and then of a gray, slimy, putrid character, which dries on the feathers at the side of the head, causing them to stick together or fall out. If the

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secretion is retained in the eye socket, it undergoes a change, becoming a yellowish, solid, cheesy mass of the same appearance as that found in the nasal tumor. This cheesy mass either forces the eye out of its socket, or the inflammation entirely destroys it. These cheese-like masses form in one or two days, and may reappear after many daily removals.

All these affections, described above, may be localised on one side; but often both nasal passages and both eyes affected at the same time.

Combined with the symptoms of roup above described, there often are patches of a grayish yellow exudation firmly adherent to the mouth, throat, etc. These patches are called "false membranes," and on account of their somewhat close resemblance to the membrane which is formed in human diphtheria, it has been thought by some writers that the avian and human diseases are the same. Here, however, let it suffice to say that the weight of evidence is against this contention.

We may also point out that many poultry keepers who notice the false membrane on the throat and mouth of their fowls, regard the disease as quite different from the catarrhal form, and call it "canker," which is probably a popular form of the word "cancer."

Whether the disease is characterized by false membranes, offensive discharges, or cheesy masses, the cause is the same, as we have many times experimentally demonstrated.

At one or several places in the mouth or throat, these yellowish, smooth or uneven membranes appear, and either remain small and disappear after a few days or grow thicker, spread, and become firmly attached to the mucous membrane; and if they (the false membranes) are removed, an uneven, bleeding surface is exposed, which looks like a true cancer.

After the appearance of the membranes the adjacent submucous tissue sometimes becomes inflamed, and finally the growths are found to be similar to those so often seen at the side of the face—containing solid cheesy matter in the centre.

When the throat is blocked by these false membranes, the animal's breathing becomes abnormal, and the air passing through the throat produces loud noises. Gradually, the visible mucous membrane and the comb turn blue, and the fowl finally dies from suffocation.

The Course of the Disease

The course of roup is usually of long duration. A simple, putrid discharge from the nose may stop in three or four weeks, and similarly false membranes may soon disappear; but generally the symptoms last for months. When the eyelids become swollen and tumors appear, the case is usually chronic. Affected birds may be better for a few days or weeks, and then become very weak again. Damp, cold weather usually intensifies the disease.

It is well known that fowls may be more or less sick from roup for one or even several years; and these birds should have the greatest care and attention, for they are generally the cause of new outbreaks. Once intro-

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duced, roup may remain in a flock for many years. The first cold and moist nights of the early fall and early winter cause all kinds of catarrhs, which in many instances are followed by roup. Roup spreads rapidly in the winter time and may attack from 10 to 90 per cent of the fowls in a flock. Towards spring, the disease gradually disappears; during the summer months, a few birds remain chronically affected; and then the first cold nights give the disease a fresh start.

Young fowls and fowls of fine breeds are especially liable to roup. While some poultrymen maintain that birds once having suffered from roup never take the disease again, most of the experimental evidence tends to show that no acquired immunity exists, as sometimes happens after other diseases. Some fowls are, however, naturally immune, and never take the disease. In the course of our own experiments, a white chicken which had never had roup, was inoculated with repeated and large doses of the roup germ, but without effect.

Roup is an Infectious Disease

The first experiments were conducted, to find out whether or not Roup was an infectious disease; and for this purpose, 10 healthy fowls which had never been exposed to infection, were confined in a cage with diseased birds; and after varying periods of time five of the healthy birds caught the disease. Fourteen healthy birds were then treated by rubbing a portion of the false membrane, or putrid nasal discharge from roup birds upon the normal or slightly scratched, mucous membrane of the nose or eyes; and in this way, two birds were infected with typical roup.

These experiments, therefore, show the infectious nature of the disease; but the degree of infectiousness was not large. We must, however, remember that when fowls are kept under natural conditions where they are subject to cold, etc., the infectiousness may be much increased.

To sum up, roup or fowl diphtheria, canker, etc., is a complex of suppurative processes. The disease is generally spread by sick fowls introduced into healthy flocks. The germs are spread throughout a yard by means of the secretions, although these do not always contain the casual organism. The infected fowls are not very much different in their general appearance and condition at the beginning of the disease, and thus they often take food and water for a long time, contaminating the food, troughs and cups. As the germs cannot affect fowls so long as the mucous membranes are intact and healthy, the disease does not spread for a certain length of time, although the germs may be present almost everywhere in the yard. Then comes a change of weather, such as a cold night or the beginning of fall or winter—and suddenly the infectiousness of the disease is increased and roup spreads rapidly among the birds. Unfavorable weather, which causes colds and other affections of the mucous membranes directly, opens the way for infection. But it is possible that the roup bacilli, having infected a number of fowls, may gain so much in virulence as to be capable of entering into the tissues of the fowl without previous colds. Like colds, other circumstances which weaken the constitution of the fowls

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such as unsuitable food, or feeding, unhygienic yards, bad water supply, etc., contribute towards the spread of the disease. Once present in a poultry yard, the roup-causing bacilli cannot be got rid of, unless by very careful disinfection; and this is valueless so long as any of the fowls are diseased; and, as we have already stated, fowls often remain affected with roup carrying the germ in a semi-dormant state, for months or years.

Treatment and Preventatives

As roup is not a specific infectious disease that is, a disease caused by a single species of germ, it is almost impossible to prepare a preventative or curative serum. Hence this method of treating infectious diseases cannot be used in roup, and besides it would be very costly.

The germs of roup are not very resistant; they can easily be destroyed when present in cultures, or somewhere outside the animal; but in the animal tissue, they are very difficult to kill, because they penetrate into the tissue; and unless this too is killed, the germs continue living for a long time.

Roup may be cured by remedies, if the treatment is careful and judicious.

Obstinately re-appearing false membranes can be successfully treated by burning the diseased tissue with a strong acid (hydrochloric acid 50 per cent to 75 per cent) or other caustics, such as silver nitrite. If the eyes and nose are attacked, they have to be carefully washed, at least twice a day, with an antiseptic solution, such as 2 per cent boracic acid in a decoction of chamomile flowers, or $\frac{1}{2}$ per cent solution of corrosive sublimate. Thus the micro-organisms are killed or at least, the diseased products which are discharged are removed, and the irritation caused by them, also the transformation into large cheesy masses is prevented.

We had chickens badly affected with roup of the eyes, which were cured with boracic acid and chamomile. On account of the smallness of the nostrils and nasal canals, it is very difficult to get the antiseptic solutions into the nose and nasal cavities; but it can be done with a small syringe. If this treatment is too troublesome, then the nostrils, at least, should be washed and opened several times a day, to allow the secretions to pass away. We have treated chickens for 14 days by daily washing with a two and one-half per cent solution of creolin and glycerine. After the washings, small plugs of cotton wool, filled with mixture, were placed in the nostrils and lachrymal ducts. This remedy did not cure the roup, although the same mixture readily kills the roup bacillus in cultures in from 2 to 3 minutes. The greatest hindrance to a sure cure by remedies which have been used locally, is the ability of the germ to penetrate into the tissue and the many secondary cavities of the nostrils which cannot be reached by the antiseptic.

Another method of treatment which gives excellent results, especially in the early stages of roup, is the use of 1 to 2 per cent of permanganate of potash. Fowls are treated in the following manner: The nostrils are

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pressed together between thumb and forefinger in the direction of the beak two or three times. Pressure should also be applied between nostrils and eyes in an upward direction. This massage helps to loosen the discharge in the nostrils and eyes. The bird's head is then plunged into the solution of permanganate of potash for twenty or thirty seconds, in fact the head may be kept under the solution as long as the bird can tolerate it. The solution is thus distributed through the nostrils and other canals and has an astringent and slight disinfecting action. This treatment should be given twice a day and continued until all symptoms have disappeared.

If there are solid tumors in the eyelids, they should be opened so that the skin may bleed freely. The cheesy matter should be removed and the surrounding membrane touched with a 5 per cent carbolic acid or silver nitrate solution, and then a cotton plug filled with some antiseptic, put into the cavity. The cavity has to be washed out daily with an antiseptic mixture, and a fresh cotton plug put in again to prevent the cavity from healing too quickly. We have cured chickens in this way in about a fortnight.

As all these methods of treatment demand a great deal of time and care, they cannot well be used for whole flocks, but the more valuable fowls may be treated in this manner. Farmers and poultrymen should first try the permanganate of potash method of treatment as it is the easiest to employ.

Food remedies influence roup only by strengthening the fowls and assisting nature to throw off or conquer the disease.

As in other infectious diseases, the most important thing is to prevent an outbreak, or to suppress it as soon as possible. All diseased fowls should be separated from the healthy one; and the healthy ones should be examined daily, with a view to isolate newly affected birds. After the isolation of the diseased birds, the poultry yard should be disinfected thoroughly with a five per cent solution of carbolic acid, followed by a careful white-washing of the walls, etc. Slightly diseased fowls, or any of special value, can be cured, if much care is taken. Less valuable birds, which it will not pay to treat, should be killed as soon as manifest symptoms of the disease appear, especially when the face becomes swollen. These fowls, unless the best care is taken, will remain diseased for months, or perhaps years, and give rise to fresh outbreaks whenever an unfavorable season (with much wet cold weather) occurs.

The most effective preventative for roup is to keep fowls under good sanitary conditions—in dry, roomy yards and dry, clean, airy houses which are free from draughts and can easily be cleaned and disinfected.

OTHER TREATMENTS OF ROUP

DR. N. W. SANBORN

At the commencement of the disease local medication is likely to give better results than internal administration of remedies. Both are needed, however, to give best results. In the treatment of roup, as in handling

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of all diseases of the air passages, the most satisfactory way to get the medicines where they will do the most good is through the use of an atomizer. It will be good practice to buy one costing from fifty cents to one dollar. The cheap ones are constantly getting out of order.

When you find a bird sneezing, or notice a slight discharge from the nostrils, spray all mucous surfaces you can reach with the following solution: Extract witch hazel four tablespoonfuls, liquid carbolic acid three drops, water two tablespoonfuls. Do this twice a day, squeezing the bulb five times for each nostril and twice for the mouth. The sick fowls should be kept from the others to avoid spreading the disease. After removing the sick fowls, give the drinking and feed dishes a careful washing in as hot water as can be used, cleaning the pens as thoroughly as possible. If the dishes are of iron or tin a baking in an oven will destroy all germs. If the disease has progressed to the stage of swelled-head and thick discharge, and the bird has a sluggish walk, add one part "Platt's Chlorides" to five of rain water, and bathe head thoroughly with the solution, seeing that some of it gets into the nostrils and throat. Some of the cases of five years ago used to get well under what was called the "coal oil treatment". This consisted of pouring on the surface of a pail of water about a gill of kerosene oil, which floated on the surface; the swelled head birds were taken one by one and slowly dipped, so the heads were under the surface, and held while "one—two—three" was slowly repeated, and then raised, the necks and heads being wiped. I remember seeing twenty cockerels, so thick that the discharge was thick and bad smelling, receive this treatment twice a day for two days, being obliged to take all drink from dishes that had a film of the oil always floating on the top, and come up out of the severe stage, improving from day to day, finally being sold to the butcher in nice condition.

A friend of mine who has been a breeder of poultry for twenty years insists that the oil treatment is the surest of any yet tried by him, and he has bought and used many of those advertised in the years before he began to use kerosene. He says he never was satisfied until he depended on the oil. This friend has never used what I am now sure is the coming remedy, and that is peroxide of hydrogen. This is "death to germs." It is a liquid coming in strong bottles, tightly corked, and needs to be diluted with from three to six parts of water. There is a good preparation of this known as "Hydrozone," that is often to be found at drug stores, that should be diluted with from five to eight parts of water. This solution applied to the diseased surfaces at once begins to foam, and should be repeated until there is no more bubbling. A little of the solution forced into the nostrils by the use of a dropping tube from the force of the foaming is driven higher up into the nostrils, reaching parts otherwise out of reach. The worse the case the stronger should be the solution, and the longer it must be used. The diet in roup should be simple. Green food if possible should be within reach, and all mashes should have at least one-third clover. The place of detention should be dry and sunny. Drinking water should be changed twice a day.

THE DISEASES OF THE LUNGS

THE CAUSES, SYMPTOMS AND TREATMENT OF BRONCHITIS, PNEUMONIA, CONSUMPTION, AND TUBERCULOSIS

DR. N. W. SANBORN

THE diseases of the lungs are bronchitis, pneumonia, consumption and tuberculosis. Of these, bronchitis may be either acute or chronic; pneumonia is acute, consumption and tuberculosis chronic. These diseases are not easily given one to another, but there is danger enough to make it desirable to keep all sick fowls from well ones. Bronchitis is limited to the lining membrane of the bronchial tubes, pneumonia to the air cells, consumption to the substance of the lung tissue, tuberculosis to all parts of the lungs.

BRONCHITIS

While catarrh is an inflammation of the lining of the nostrils, bronchitis is limited to a like surface of the breathing tubes. Bronchitis may be as mild as a simple catarrh or as severe as the worst attack of roup. We see all grades of severity, from a common "cold" to a suffocating catarrh dangerous to life. There is always plenty of germ life to be found in the mucous discharge, but we are not sure whether the germs are the cause or the accompaniment of the disease.

Bronchitis is caused by exposure to storms, especially when the birds are housed in too close or too warm a building; by sudden atmospheric changes; by direct currents of cold air; by irritating particles of dust or lime; or by the spreading of inflammation from diseased throat or nostrils.

Bronchitis is not so often seen in young chicks as is diarrhoea; there seems to be a tendency toward bowel rather than lung trouble during the early months of the chick's life. Bronchitis in chicks is commonly caused by exposure to rain; by sudden extremes of temperature due to overheated brooders and cold brooder houses; or by close, foul air.

I have known air-slaked lime to so irritate the mucous surfaces as to produce what resembles an ordinary bronchitis. The droppings boards were freely dusted with lime while the birds were confined to a closed house. There seems no reason for the use of air-slaked lime about poultry buildings. Ground plaster and dry earth are so much better and cheaper that they should always be used, and this source of danger avoided.

Unless you are looking for the outbreak of this disease it will have a start of one to three days before the fowl appears to be really sick. There is from the first some rise of temperature and a little difficulty in breath-

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ing. The lining of the bronchial passages is dry and swollen, hindering the passing in and out of the air. At the end of the second day the fowl is quite thirsty and is a constant visitor at the water dish. There is not a decided cough, but the noise made is more of a whistling character. It is not often to be heard at any distance, and may require the putting of your ear to the side of the birds, to make out the peculiar sound. As the disease progresses there is more and more mucus poured out, disturbing the action of the lungs, and changing the noise from whistling to rattling.

Chronic bronchitis may arise from the passing of an acute case into the chronic form, or it may be simply slow and light from the beginning. The chronic form is not unknown to any breeder of a few year's experience. These cases often seem to be well fowls except for the rattling in breathing. We dislike, however, to hear this noise, and it is always a source of danger to have even a local disease on hand. Chronic bronchitis responds fairly well to medication and any one of us is willing to take a little trouble to cure it.

Treatment

If you have a case of bronchitis on hand, and suspect that others are developing the disease, be prompt in attempting to cure the sickness. Aconite will do this in a large proportion of cases. I prefer aconitine to the tincture for quick and sure results, but it is not to be bought outside the large cities, and even there it is not always to be had in convenient form for use. I have obtained such sure results from the use of the alkaloid (aconiten) in my own practice that long ago I put on one side the tincture. A good tincture should be given in one drop doses to each fowl, every two hours. There is no better way than to mix as many drops as you are to feed the fowls with a little mash and give in such dishes as to let each bird have its proportion. One day's treatment persisted in will cure nine-tenths of the cases. Feed a hot mash of at least one-half bran, and keep all the fowls in as even temperature as possible.

The chronic cases, known by the marked rattling in breathing when on the roost at night, require a course of tonic treatment. The combination of the arsenates of iron, strychnine and quinine, known as "Dumas Anti-malarial Pill," was introduced by me to the poultry world some years ago, for the cure of chronic bronchitis. It has done good service.

This pill should be given in mash, morning and night. Quite often the only case of chronic bronchitis on hand will be one of the best males, and it annoys me to have the head of a pen sick in any way. These cases are more disagreeable than dangerous.

PNEUMONIA

Pneumonia is a catarrhal inflammation of the lining of the air cells of the lungs. It is a serious disease, often unrecognized during life, and proving fatal in a large proportion of cases. The more we have to do with this disease the more sure we are that it is somewhat infectious.

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Treatment

The treatment of this disease must be prompt and active. To wait a few days or to be afraid to use good sized doses is to lose the fowl. The disease is sudden, rapid in its course, and dangerous to life. Hence be quick to recognize the first appearance of any sign of pneumonia and to meet the indications.

If you can arrange it conveniently, place the fowls in coops in a room that can be warmed to 70 degrees of temperature, with some plan of furnishing moisture. If the room be otherwise dry and sunny, with heat enough to allow for ventilation, you will get better results. Let the food for a week be little besides raw eggs, milk and beef juice. This may be given with bran, as a hot mash, or it very likely will have to be put into the throat by means of a dropping tube. If the bird is willing to eat, let him; if he cannot, you must give him food or he is likely to die.

Among the remedies in common use are two that you must avoid, and these are quinine and liquor. They will do more harm than good, and should not be used in acute troubles. Quinine is always to be avoided in any acute inflammation of the chest. In small doses, as a tonic, it is good in chronic diseases.

There is no single remedy for pneumonia better than aconitine, early administered and given in sure doses. The tincture, if reliable, will give as good results. The trouble in giving medicine to a fowl is to be sure that it is getting the right amount in the right way. One drop of the tincture, or one-fifteen-hundredth of a grain (1-1500) of the amorphous aconitine, every two hours, during daylight, will do something toward bringing the bird through the sickness. The small dose, often repeated, will give results that are not obtained when giving large doses twice a day. Make a few pills of mash and sulpho-carbolate of zinc, one grain of the zinc in each pill, and make the bird swallow one morning and night. The liquid medicines can be given in a little water from a spoon, or dropped from a tube, or mixed with a mash if the bird swallows.

CONSUMPTION

Consumption and tuberculosis present certain symptoms in common. They are widely different in others. Consumption is likely to have followed a badly cared for case of pneumonia, bronchitis or roup. Tuberculosis is always preceded by a previous case. Neither disease is likely to appear in well cared for, sturdy fowls. Neither disease is inherited, but fowls from weak ancestors fall a ready prey if the right conditions are presented.

Tuberculosis cattle, and persons, too, are to be viewed with suspicion and avoided whenever possible. The danger is small, to be sure, but enough to call for good care in preventing the commencement of trouble. The better the general condition of your fowls, the less danger there is of consumption or tuberculosis appearing in your flock.

Consumption is a disease limited to the lung tissues, but in a small proportion of cases is accompanied by a fetid diarrhoea. It is likely to

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have been preceded by either roup, bronchitis or pneumonia. The early symptom is not one that would call your attention to the seat of the disease. It is simple weakness, apparently without cause. Perhaps in a week's time there appears some slight trouble in breathing, a little shortness of breath on exercising, or some roughness of respiration when on the roost at night. There is no real cough. The irritation produces a changed jerky breathing that must be heard to be known. It makes you wonder whether there is not some foreign body in the nasal passage, that obstructs the movement of the air. As weeks and months go by, the fowl stops laying, becomes thin and light, more and more pale in comb and wattles. Indigestion increases, the food passing from the bowels in much the same state as when swallowed. Left to take its own course, the fowl finally dies, thin, light in weight, and pale in color of skin. Any bird in this or any similar condition ought not to be allowed to live out its days. The early use of the hatchet prevents the waste of time and food, as well as reducing the danger to the well members of the place.

TUBERCULOSIS

Tuberculosis is a disease more rapid and intense than consumption. Consumption has little increase of temperature, while tuberculosis has a persistent rise of bodily heat. Tuberculosis fowls present a constant decrease in weight and the difficulty in breathing is quite manifest. In connection with every case of tuberculosis there is to be found at work as a factor in the disease a germ—bacillus—and this germ must be present to confirm the diagnosis. There have appeared cases enough of tuberculosis in poultry yards, apparently contracted from sick cows, to warrant our being on the watch for all sources of possible trouble. Even a case of a single bird "going light" should be quarantined as a possible source of future trouble.

Suppose you find you have a case on hand resembling the trouble we have under consideration. Your best plan will be to kill and burn the sick fowl. It is not safe to depend upon burying the bird. It may become exposed through the efforts of some dogs and become an object of danger. The sick birds disposed of, then turn your attention to the protection of the well members of the flock. Clean out at once all litter from the houses and yards. Take off a thin layer of soil from the earth floors of the pens and a little from the bare yards near the houses. Brush up the inside of all the buildings and remove all the dust and cobwebs from the windows. Whitewash in a thorough manner the woodwork of the buildings, not forgetting the roosts and droppings boards. Last of all, scald every drinking and feed vessel.

If you have the time and inclination to doctor some of the cases in the beginning of the disease, you will find the use of good tonics and cod liver oil to give fair results in a small proportion of the sick fowls. The chances are about equal, however, that you have had indigestion to contend with rather than real tuberculosis. Birds that are really tuberculous seldom are cured by any treatment. Any good emulsion of cod liver

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oil mixed with the mash will help nourish the fowl. For a tonic there is nothing better than the arsenate of iron in pill form, 1-50 grain each, twice a day. If the breathing is at all labored the use of the syrup of hydriodic acid, five drops three times a day in mash, will do much to relieve the condition.

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 interest 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 grounds, and after a sufficient interval import fresh and pure blood.

GAPES

A PARASITIC DISEASE COMMON IN MANY SECTIONS
AND ONE THAT IS FATAL TO THOUSANDS OF SMALL
CHICKS ANNUALLY—WHAT THE DISEASE IS—MEANS
OF PREVENTION AND HOW TO CURE IT

P. T WOODS, M. D.

THE disease known as gapes has been prevalent among poultry in this country for more than 100 years. Had the poultry raisers of 100 years ago had the advantages now afforded modern poultrymen, by the poultry press and government bulletins, for the study of poultry diseases and the best means of treatment, the disease might have been nearly, if not completely, stamped out by the exercise of proper sanitary measures and thorough use of reliable disinfectants.

Gapes is a parasitic disease caused by the presence of worms in the windpipes of young chickens and fowls. The worm is called the *Syngamus trachealis*. On hasty examination, it appears to be a small, reddish, forked worm, and is attached to the mucous lining of the windpipe by the heads of both branches of the fork. In reality, the fork is made up of two worms, the male and the female. The main branch and trunk, about half an inch in length, the female worm; the lesser branch, about one-fifth of an inch long and usually permanently attached to the female worm, is the male. The worms attach themselves by the mouth to the lining of the windpipe, and suck the blood of the chick.

Gapes prove very troublesome in many parts of the country, and many chickens die of it. Death may result from debility and loss of blood due to the presence of the worms, or a large number of worms may cause inflammation and obstruction of the windpipe, and death from suffocation. The disease is most dangerous to chicks from one to four weeks old. It sometimes affects large chicks and has been found in adult fowls, but the

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presence of a few worms in the windpipe of a large strong, healthy chick or adult bird seldom causes trouble to the bird, but it may prove a bad thing to the poultryman as a source of infection to the other birds.

How the Disease is Spread

The female worm does not lay her eggs; there are several thousand of eggs in the adult female, and when these are sufficiently developed, they escape by rupture of the body of the parent. These eggs may hatch and develop into perfect worms without leaving the windpipe of the affected bird, but as a rule, the adult worms and their eggs are coughed up and become a source of infection of other birds by contaminating the food and water. Frequently such infection may take place through the drinking water. Well chicks may eat the worms coughed up by the sick ones, or may get the eggs in food or drink, and become infected with gapes. Many wild birds are liable to gapes, and their excrement dropped in the chicken yard may prove a source of infection. Eggs of the gape worm have been found in the droppings of infected birds. Some authorities credit the common earthworm and garden slug, when found in ground occupied by diseased birds, with harboring the embryos and eggs of the gape worm and so keeping up infection. When eggs or embryo gape worms are eaten, only a small number of embryos find their way to the windpipe and it is probable that many are killed and digested or are expelled in the droppings to become a fresh source of trouble. One small forked worm, if allowed to go unmolested, is sufficient to infect a large flock of chicks, and ruin the ground for chicken raising for a long time, unless the ground is thoroughly disinfected.

Symptoms

The symptoms of gapes are frequent gaping, sneezing, a whistling cough with discharge of mucus and worms, dumpishness, weakness and drooping wings. When badly affected, the bird shakes its head frequently, gapes and coughs as if suffocating, droops and is not able to keep up with the rest of the flock, and stands in "dumpish" position with eyes closed, wings drooped, mouth open and tongue protruding.

Prevention

The most desirable method of combating any disease is to adopt and persist in some reliable means of prevention. There is a cause for all ailments. Unless you remove the cause you cannot cure the disease. If the cause is removable, a serious outbreak of the disease can be prevented by proper hygienic and sanitary measures, which make the cause much less liable to appear; or, if the measures adopted are sufficiently thorough, the cause may be prevented from putting in an appearance. Gapes is caused by the small red worms and their progeny. These parasitic worms must be gotten rid of.

In all sections of the country where gapes are known to be prevalent, small chicks should not be grown on free range. They must be confined

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in moderate sized yards which can easily be thoroughly disinfected. The fences of these yards should be portable, preferably panels of wire fencing which can be readily moved from place to place. The chicks should be moved to new ground frequently. Before the chicks are put in a yard or run the ground should be thoroughly disinfected, either by a heavy top dressing of air slaked lime plowed under, or, drenching with a two per cent sulphuric acid solution with turning over of the soil afterwards. This must be done both before the chicks use the ground and immediately after they are moved from it. When possible to do so, it will be well to start a little crop of oats, rye or other quick growing grain in the yards or runs before the chicks use them.

The coops and boxes used by the chicks must be thoroughly cleaned and kept clean. They should be well whitewashed on the inside with good hot whitewash twice a month during the chick season, and the wash will be still more effective if a tablespoonful of creolin is added to each bucketful of whitewash just before applying. The interior of all coops and boxes should be exposed to the sun and air for several hours every day when the sun shines. Coops or boxes having removable roofs are most desirable, so that the whole interior can be given a thorough sunning. Dampness and all accumulations of filth must be avoided if the disease is to be prevented.

Treatment

The most satisfactory treatment is prevention of contagion, combined with extraction of the worms from the infected chicks. All sick birds should be removed to quarters apart from the well ones. All coops and runs where infected birds have been should be thoroughly disinfected. The coops should have a thorough application of hot whitewash. The ground of runs should be well lined with air slaked lime, spaded up and should be sprinkled with one of the following solutions: A two per cent solution of sulphuric acid in water; or two ounces of copperas (sulphate of iron) dissolved in a bucket of water; or a solution of permanganate of potassium in water, half an ounce of the crystals in a barrel of water; or a strong solution of creolin, two tablespoonfuls in each gallon of water.

The ground should be well sprinkled with one of the above solutions, after infected chicks have been removed, then plow or spade and sprinkle again. Repeat this disinfection whenever infected chicks have been running on the ground. Scald all drinking vessels used by sick birds, and be sure that the water used is boiling. If there are many earthworms and slugs in ground which has been occupied by chicks with gapes, get rid of the worms with one of the patented worm exterminators sold by nearly all seedmen. Always burn all chicks which die of the gapes, and whenever you find gape worms, or extract them from sick chicks, be sure to burn the worms. Disinfect all droppings. Earthworms do not cause gapes, but may become contaminated with the eggs or embryonic gape worms and so become a source of infection in ground where the disease has existed.

A small piece of copperas placed in the drinking water is said to pre-

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vent contagion. Tincture of assafoetida, a teaspoonful in a quart of water, is used for the same purpose, and is said to have a curative action. Three drachms of salicylate of soda in a quart of drinking water is also recommended as a preventive.

How to Remove the Worms

Extracting the worms from the windpipe is absolutely necessary to effect a cure. The operation is simple and only requires patience and a delicate touch. A loop of horsehair, stripped feather tip or one of the wire gape worm extractors, is the only instrument needed. Prepare a solution of one teaspoonful of creolin in a pint of cold water. Dip the extractor in this both before and after using. The operator should sit in a comfortable position in a strong light with all things convenient for the operation, the affected chicks in a coop by his side and an empty coop to receive the treated chicks near at hand.

Hold the chick firmly in the left hand with its neck well stretched, and head firmly between the thumb and fore-finger. The mouth should be open and the neck held straight out from the body.

With the chick held firmly and neck well stretched, dip the extractor in the creolin solution, shake off any excess of fluid, insert the extractor gently into the windpipe and withdraw it with a slightly twisting motion. This will bring out most of the worms and any which remain will be killed by contact with the creolin solution. Be gentle and keep your hand steady. You may strangle a chick or two at first, but with a little patience you will acquire skill and be able to treat the chickens easily and rapidly. Wash off all worms removed, in the creolin solution, when through burn them or bury them in a deep hole covering them with quick lime. Gapes cannot be cured unless you remove and kill the worms. Do not drop any of the solution down the chick's windpipe; such carelessness may kill the chick.

A little practice will soon make a skillful operator of a novice. A few chicks may be killed in operating, but it is better to kill them in an endeavor to relieve them than to allow them to die from the disease.

Some Common Remedies

Another means of getting the worms out of the chick's windpipe, and one that has proven successful in some cases, is to confine a number of chicks in a shallow box, and sift powdered air-slaked lime over them until they cough up the worms.

A number of remedies are recommended for the internal treatment of this disease. The following are credited with curing a number of cases: Thirty drops of camphor spirits mixed with sugar and dissolved in a pint of drinking water, no other drink allowed the sick birds. Half a grain of camphor in pill form given twice daily. Garlic fed freely, either chopped and fed plain or mixed with food. Five grains each of powdered assafoetida and yellow gentian, given in soft food daily.

If possible, avoid raising chicks on ground that was occupied last season by chicks having gapes. In any case, be sure that all coops and ground

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which have at any time been used by infected birds, are thoroughly disinfected before poultry is allowed to occupy them. Gapes affect all kinds of domestic fowls and many varieties of wild birds.

LIME DUST FOR GAPES

DR. N. W. SANBORN

Gapes have been written about since the first of the last century. The national agricultural department, fifteen years ago, employed Dr. H. D. Walker, of New York, to study the gape worm. As part of the report of his labors, we are told that newly hatched embryos introduced into the windpipe of a chick gain full size in eight days. That eggs must have a temperature of above thirty-two to grow and are destroyed by freezing.

The parasite that is the cause of gapes varies in length from one-eighth to one-half inch, and is threadlike in appearance. Its color varies according to the amount of the bird's blood that it may have taken at the time of examination. It may be pale or even bright red. Often you may think you have found a double-headed worm, but careful looking will show you that what seemed at first one worm with two heads is really two worms closely united for breeding. The worm usually found in the windpipe is half an inch long and its diameter that of a medium sized sewing needle.

Symptoms

The symptoms vary according to the amount of irritation and loss of nutrition. The early symptom is a little cough (hack), as though some dust had slipped into the windpipe, and the bird was trying to eject it. As the worms increase in size and number, their presence inflames the lining membrane of the windpipe, increasing the amount of normal secretion as well as thickening the lining itself. The increase of irritation, the flow of mucus, and the swollen membrane, all work to change the character of the breathing, giving us the gasping or gaping that names the disease. The bird goes about with open mouth, as if he had taken a mouthful of too hot food. In some cases the mucus secreted is so plentiful as to partially prevent the passing of air, and in others it is drawn into the bronchial tubes, often causing the death of the chick. The inflammation itself may extend to the lungs and so kill the bird.

Treatment

The most common and satisfactory treatment is the use of lime dust. The fowls are shut in a barrel or box, so arranged as to allow inspection of them while subjected to the process, and air-slaked lime is allowed to settle slowly through the air of the chamber. This is done by having part of the top of the box or barrel covered with bagging so the dust can be admitted slowly as well as finely. The lime irritates the linings of the windpipe as well as those of the finer tubes of the chest and its use is followed by coughing and sneezing. This dislodges the worms, and repeated coughing brings up some of them. Care must be taken to limit the amount of

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lime used, and air must be admitted in fair quantities. Too little air or too much lime long administered will cause a serious inflammation of the mucous membrane of the air passage.

If gapes is introduced into your plant you should plan to raise all chicks the next season on ground that has not been used for poultry purposes for several years. Plow and plant to some hoed crop all yards or ground that have been used by infected birds. After two years such land will probably be safe to use again for poultry.

You are never sure you have the gapes unless you can find one or more of the worms. It is decidedly risky to treat for gapes unless you know you have that disease to contend with. A bird may gape or appear to have something in its throat and yet not have the "gape-worm" in its windpipe. There is little, if any, disturbance of the general system in the commencement of gapes, while in bronchitis or pneumonia there is some rise in temperature. To use lime dust on birds sick with pneumonia or bronchitis is to do that which is likely to kill the bird. Better no treatment than thoughtless diagnosis of disease and an off-hand use of strong remedies.

LIMBERNECK

A RECORD OF EXPERIMENTS THAT SHOWS HOW IT IS CAUSED AND HOW IT MAY BE PREVENTED

W. W. KULP

DURING the hot months many fowls and chicks are killed by what is called limberneck. The name describes their condition, for their necks are surely limber, but it gives no hint of the cause. The cause is ptomaine poisoning.

Because of lack of knowledge as to the cause, people do not know how best to prevent the trouble. Many know that it is noticed after the fowls have eaten maggots and the statement is made that maggots do not die when eaten and, being alive in the fowl, cause the trouble. This cannot be true, for maggots are a natural food for fowls; they are dangerous only when they contain poison from decaying flesh. The poison, if present in the maggots, soon stops the processes in the stomach, and the maggots may live longer than they would were the digestive organs of the fowl able to do their proper work.

The first I ever saw of this trouble was after I had been in the poultry business about fifteen years. I could not understand it, but thought it looked like the effects of poison. I examined several dead fowls and found all their internal organs apparently healthy. The pupils of their eyes were enlarged, as is usually the case when any animal is poisoned. I soon found that the trouble was caused by the chicks eating maggots on a dead hen. As it was my first experience, I thought I could prevent a recurrence

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of the difficulty by finding all the dead ones; but in spite of much hunting I would miss one occasionally, and a few chicks would be lost in consequence.

Some time after my fowls had the first siege of it, it started again, but I prevented serious loss by confining my birds in their yards for ten days.

I let two well-grown hens eat about fifteen maggots each from a decaying carcass one afternoon. By morning they were staggering about and could not eat. In two days they were all right again with no treatment. I expected they would free themselves of the poison for I have seen worse cases get well. I wanted to prove fully that it was not a germ disease; if it was, they would have been worse. Each fowl is affected according to the number of poisoned maggots that it eats. If the number is small, it is but slightly affected, and soon recovers, but if it eats a crop full, it dies in a short time.

I have known cases where a fowl would eat enough to make it sick for two days and still recover.

Last summer I wanted to learn some of the effects of maggots and decaying flesh on fowls and chicks and tried to produce limberneck by placing dead fowls about; but the chicks only grew faster, the weather was cool and the carcasses did not decay fast enough to become poisonous. In September I found a Leghorn hen dead in one of the houses and put her on the tin roof, intending to bury her in the morning, but I forgot all about it until a few days later, when I saw three or four dead hens and many more sick ones. Then I knew at once that the dead hen was the cause. The fowls that were dead had eaten maggots from the carcass during the afternoon and died during the following night. About as many more died the next day. I now had more experience, but I paid more for it than I had intended to.

Treatment

When sick fowls are discovered give any medicine that you may have that will counteract the poison and assist in throwing it off. Frequently cholera cure will do the work. There is no necessity for treating the well fowls for the trouble is not contagious. The best way to save them is to pen them up for ten days and by that time the maggots will have eaten the carcass which caused the trouble and will have gone into the ground.

LIMBERNECK IN FOWLS AND CHICKS

P. T. WOODS, M. D.

Limberneck, strictly speaking, is a symptom of a diseased condition rather than a distinct poultry disease. It is common in all parts of the country and easily recognized by the peculiar appearance and the partial paralysis of the neck muscles, which has given rise to the name limberneck.

The bird practically loses all control of the neck muscles and stands or squats with its neck either limp or arched, the crown of the head resting on the ground between its feet. Sometimes the bird is able to lift its head

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off the ground by making a strong effort, but in every case the head hangs downward with the neck arched like an inverted U in a peculiar fashion. In some cases the symptom assumes a different guise and the bird instead of having what is known as limberneck develops the condition known as "wry-neck," a twisting backward of the head and neck upon the body, the head sometimes being turned almost entirely around.

Causes

Both of these ailments arise from similar causes. In the majority of cases they are due to intestinal irritation of some sort. The wry neck is more likely to be a symptom of epileptic disease or direct brain and nerve irritation, while limberneck more frequently occurs accompanying attacks of colic, acute indigestion, irritation from intestinal parasites (worms), crop inflammation or other similar troubles. Where not due to direct brain or nerve disease such as epilepsy, a hereditary tendency to a disordered condition of the nervous system, the disease is easily remedied.

The most frequent causes of acute indigestion and colic are indiscretions in feeding. Impure meat food or a too one-sided ration is a common cause of limberneck, resulting from acute indigestion or colic in small chicks. Fright and over-exertion from fighting or being chased are also causes.

In chicks and fowls of all ages putrid meat, feeding upon large quantities of maggots, or eating indigestible and poisonous substance are common causes of limberneck. Where the birds either young or old have been fed raw meat in any considerable quantity or have been running on old contaminated ground that has not been properly renovated, worm parasites are a common cause of this trouble. The disease may be prevented by careful feeding and the removal of all sources of infection.

Treatment

The following treatment will be found effective in the majority of cases, and is undoubtedly the best for regular routine treatment.

When the case is first discovered administer a small dose of oil of turpentine mixed with sweet oil. For small chicks from two to ten drops of turpentine mixed with an equal amount of sweet oil will be found to be sufficient according to age, while adult fowls will take from one to two teaspoonfuls of oil of turpentine mixed with an equal quantity of sweet oil. Keep the bird warm and quiet.

Fifteen minutes to half an hour after the dose of oil of turpentine give warm sweet milk to which has been added a little ginger. Make in the same manner that you would prepare ginger tea for a youngster who had an attack of green apple colic, one teaspoonful of finely powdered pure ginger thoroughly mixed with half a cup of hot milk, and barely sweetened with a little sugar. For small chicks give one-half to one teaspoonful every hour or two. Adult fowls may have one to two tablespoonfuls at a dose.

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Another good remedy for adult birds is to use a pill made as follows: Equal parts pure lard, cayenne pepper, powdered ginger and mustard. Rub all together until thoroughly mixed, then divide into pills or slugs the size of a kidney bean. Give one of these pills or slugs at a dose and repeat in three hours if necessary.

The bird will usually show signs of improvement at once and in from ten to twenty-four hours will be ready to go back to a regular food ration, which should consist at first of a little thoroughly cooked boiled rice lightly seasoned with salt. Follow this with feedings of raw potato, raw beets and a limited supply of dry grain and pure beef scrap. The trouble will seldom recur where due to colic or other digestive disturbances, provided care is taken to supply a plentiful amount of raw vegetable food in addition to the meat food and grains.

Where the above treatment fails to act the trouble is usually due to some serious nerve or brain disease, and it will be best to kill the bird, but do not despair of saving a chick or fowl affected with limberneck until you have first given this method of treatment a careful trial.

PIP

Pip, is sometimes a dry condition of the tongue appearing in several diseases of the air passages, such as roup, catarrh, bronchitis and pneumonia. It is a symptom of disease, not a disease of itself. Pip, or the dry state of the tongue, is produced by the rapid passing over the tongue of feverish breath combined with increased temperature of the body. The natural moisture is removed and secretion diminished. The tip of the tongue being thin, shows the change plainly, becoming hard and dry. Let alone the dry covering or hard membrane; to try to remove it is to inflame the tongue and accomplish no good result. Study the whole bird, finding out the trouble underlying this one symptom, treating the real disease. If you must do something for the tongue, paint it twice a day with glycerine.

Mr. Lewis Wright, the author of "The Book of Poultry," advances the opinion that "there are occasional cases of a real epidemic of pip, which cause death unless relieved, of which this is the distinguishing symptom, and with no "dry" mouth at all. Three outbreaks in different yards have come under our notice, and in two of them the scale at the tip of the tongue was nearly as thick and quite as hard, as the nib of a quill pen, while the edges were almost as sharp as a knife. The fatal results we believe to be due to the soreness produced by these keen edges quite preventing the fowl from swallowing. It was unmistakably 'about' in these yards. If a fowl apparently well in the main, is seen to pick up and then drop its corn, the mouth should be examined. If such a hard and sharp scale (very different from the ordinary rather hard and sharp tip of a fowl's tongue) be found, it should be removed by the thumb-nail, and the spot dressed a few times with honey and borax. Give soft food for a day or two, and a couple of morning doses of 20 grains Epsom salts, and the bird will speedily be well."

INJURIES AND DISEASES OF THE COMB

THE TREATMENT OF INJURIES AND FROST-BITE AND THE SYMPTOMS AND TREATMENT OF WHITE COMB, ECZEMA, BLACK ROT AND FUNGOID

DR. N. W. SANBORN

NEARLY all so-called diseases of the comb come in connection with some other disease or condition. I suppose they are commonly classed as diseases because of the prominent position the comb symptoms hold.

It is well to remember that a change in the appearance of the comb indicates a disturbance in some other part of the bird. If to the comb symptoms are added similar changes in wattles and ear-lobes, you are to understand that the case is all the more dangerous, and needs more careful and immediate attention.

The comb tells quite a story of what is going on in the organs of the whole body. Its appearance is as helpful to the poultry keeper as the tongue of a human patient is to the observing physician.

The normal condition of the comb presents that healthy look that we all so like to see in our birds, and that is a sign of good bodily condition. As poultrymen we may call that color "bright red." Any deviation from this red, whether it be to darker or to a lighter hue, is an indication of changed action in the workings of the organs, or to a change in the vitality of the whole bird. The light colored comb shows an anaemic state of the bird, while the dark (purple) comb indicates the opposite—Plethora. One may be a sign of under-feeding; the other that of cramming or over-feeding.

INJURIES

Injuries to the comb and wattles are more or less common, and are usually the result of fighting or from getting caught in wire or lath divisions of the house or yard. Sometimes a thin comb is nearly torn from the head or a wattle is badly slit. To avoid deformity the parts should be brought closely together and stitched with a needle and fine white silk. The blood supply is so good that even though three-fourths the part is torn, a little stitching will result in the part healing and presenting a fine appearance as the result of careful work. Keep the fowl alone until the stitches can be cut and removed, thus preventing any picking by other fowls. Whenever the blood dries on the surface of the comb and you find other birds inclined to pick at it, put the specimen away by itself. It is easy to teach birds to pick under such conditions, and the habit is a bad one. The irritation to the sick fowl is also bad and delays healing, if indeed it does not undo the good you have done. For a sore comb or one that

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is slow in healing. apply an ointment of oleate of zinc one part to vaseline ten parts. This protects the sore parts and hastens the healing of the tears.

FROST-BITE

The appearance of frost-bite is much the same as that of black rot, but the bird does not lose its appetite and is nearly as lively as usual. The color of the comb or wattles is purple or black. The darker the color the more danger of the frozen part being lost. The more rapid the thawing of the part the more danger of serious results to the portion affected.

Frost-bite is, of course, due to exposing the birds to too low a temperature or the long continued heat absorbing action of a zero breeze. Low vitality, from close houses or under-feeding, increases the danger, both of frost-bite and the after effects.

The taller and thinner the comb the more it is exposed to the loss of heat, and the more care should be given to proper housing and yarding. A sudden drop of forty degrees in the night or the unexpected rise of a zero breeze, will catch our birds when we are unprepared. The best house and the best care will not prevent the appearance of a case now and then.

If the trouble is seen before the frost has thawed out, put the bird in a room that will warm up slowly, letting the circulation begin slowly. Avoid a place where the bird can get into the direct sunlight or a room that is much above the freezing point. Even the holding of dry snow against the comb will help remove more slowly the frost of the parts. Having restored the circulation, or noticing the bird after it has thawed out, apply twice a day an ointment of vaseline, six tablespoonfuls, glycerine two tablespoonfuls, turpentine one teaspoonful. This will help start into a healthy condition the blood circulation, of comb and wattles and at the same time reduce the swelling. An ointment of lard 2 ounces, quinine 1 ounce and kerosene 3 ounces, (melting and incorporating all together), rubbed on with gentle friction, is said to cure even bad cases, if not left till altogether too late.

WHITE COMB

The disease manifests itself in the same location as fungoid, but presents a different appearance. The first indication is the coming of little red or white points in the skin covering both comb and wattles. Usually these are white when noticed. The nearness to the skin causes an early breaking of the small gatherings; the contents proving to be thin, light colored and quickly drying on the surface. This gives the parts affected a scurfy, whitish appearance. The movements of the bird loosen the dry flaky substance, and it comes off in little pieces of the size of bran. As the disease spreads to neck and face the irritation causes the feathers to drop out, adding to the disagreeable appearance. With the local symptoms are to be noticed a paleness of all mucous surfaces, and a suggestion of weakness in all motions of the bird.

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White comb is the result of long continued exposure to close air, little or no sunshine, and total absence of all green vegetable food. This points, of course, to the city cellars and shut-in town back yards.

The cause suggests the remedy. Either give up the keeping of birds under such unhygienic conditions or remove them to pastures green, with sunny skies. A tonic of a little nux vomica may be helpful, but after all the best remedy is good food with proper care and housing. Oil the sore surfaces with an ointment made by mixing one part oleate of zinc and ten parts vaseline. Do this once a day until the eruption disappears.

ECZEMA

I have sometimes thought there was no difference between eczema and "white comb," and yet we seldom see the two troubles in the same bird. Eczema is a disease manifesting itself in the skin, yet due to a constitutional cause. It is caused by the over-feeding of a highly nitrogenous ration, by lack of excretion, or from closely inbred birds of a rheumatic tendency. The disease is never passed by contact from bird to bird. It is not contagious.

While eczema may appear on any part of the skin of the bird, the usual seat of the disease is the wattles. I am not sure but it appears at the same time on other parts of the bird, but being covered by feathers it does not attract our attention. On the wattles it attracts our notice by the appearing of fine white points. These are slightly raised and seem to have just the thin skin over them. They continue to increase in size, new points appearing, the contents becoming thinner and slightly lighter in color. When several "points" have united, the skin bursts, the fluid runs out, and dries on the surface, forming a scurfy crust. In severe cases the discharge has been noticed to irritate the skin of the shanks and toes where it falls on them. Birds with eczema present a tired appearance and a marked loss of appetite.

These cases need an improved diet. The mash should contain a good proportion of cut clover, green vegetables should be fed liberally, and there should be very little meat fed in any form for weeks. Green cut bone, free from meat, will be helpful in building up the bird.

One grain pill citrate of iron and quinine every morning and one grain of calomel at night for one week will help clear up the constitutional condition, and increase the health of the bird.

Apply to the diseased wattles several times during the week the same ointment as recommended for "white comb."

BLACK ROT

This is a condition of the comb resulting from imperfect circulation of blood through it and is really evidence of the death of the tissue involved. It is a rare occasion when we meet black rot except in tall combed birds. Nearly every case that has been examined after killing has shown some disease of the liver. It is probable that the comb symptoms are secondary to the real disease.

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The first indication of the approach of this trouble is a darkening of the color of the comb. The points only may be involved at first, or the purple hue may extend to the whole structure. From purple, the color changes to blue and then to black. If the bird in other respects is healthy, he may live long enough to have the diseased portion separate from the healthy portion, leaving an unsightly stump. The diseased portion of the comb may be either dry or moist, "dry rot" or "moist rot" according to the case. In connection with an inflamed, dying comb, there is nearly a complete loss of appetite and a looseness of bowels. The bird shows little desire for exercise and remains on the roost or under the droppings boards for hours at a time.

The varied circumstances under which cases of "black rot" have been noted give little idea as to the cause of the disease. In a few cases there is a history of a sudden chill and in others the houses were close and damp.

If the disease gets a good start, treatment does little good. The combs should be painted twice a day with a lotion of one ounce of water, one-half ounce of glycerine, and carbolic acid crystals, two grains. Keep the bird in a dry, sunny, clean room, giving pure water and be sure that green food, in some form, such as dandelion or cabbage leaves or onions, is within reach at all times. The adding one-half teaspoonful muriate of ammonia to each pint of drinking water will help relieve the congested liver.

FUNGOID

This disease attacks birds when exposed to previous cases, and seems to break out also in flocks that have been fed a ration rich in starches. It is easily passed from bird to bird, and is seen in its worst aspect when the birds are suffering from a low state of vitality.

Fungoid presents indications of a local rather than a general disease. It appears to affect only lightly the workings of the bodily functions. The full force of the disease seems to show itself in the comb and wattles. The first indication is the appearance of little bunches of hard substances under the skin covering the wattles and comb, about the size of bird shot, and feeling to the touch like shot, and no change from normal in color of skin over the swellings. In a few days these shotlike bodies soften, flatten a little, break through and discharge through the opening in the skin, a watery straw-colored fluid.

There may be a dozen of the discharging openings. In a day or two there are likely to appear near these openings or ulcers other shot-like bodies that follow the course of the first lot. Crop after crop of these may appear until the comb and wattles are closely covered with them showing various stages of the disease. The discharge darkens slightly as it diminishes in quantity, drying on the surface, and presenting a disagreeable appearance to the sight. The dry surface is itchy to the bird and it is sure to do more or less scratching, causing more irritation and some bleeding. In a third of the cases the disease spreads to the skin of the head and neck, increasing the size of these parts and presenting a picture disagreeable to any lover of poultry.

HEAD, THROAT AND LUNGS

If this disease has been allowed to grow into the condition last described, little treatment will avail. The fowls are probably thin, with no appetite, and present the appearance of tired out birds. Kill and bury every one of the long continued cases, and give your attention to new cases. The legs should be tied together, yet loose enough to allow walking, while close enough to prevent any scratching of the inflamed surfaces. Wash as often as you can the whole surface of comb and wattles with a solution of carbolic acid crystals, five grains to a pint of water. This lessens itching and diminishes the danger of the spread of the infection. The food should be highly nourishing and fed warm. Of course every sick bird should be removed from the flock to lessen the danger of exposure. This disease, introduced into a flock of healthy birds, runs a more rapid course than when the stock is low in vitality.

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CHOLERA AND DIARRHOEAS

HOW TO DIAGNOSE THE DISEASES ACCOMPANIED BY LOOSENESS OF THE BOWELS—MEANS OF PREVENTION—SYMPTOMS, REMEDIES AND TREATMENT

P T. WOODS, M. D.

DIARRHOEA is the result of disturbances of the normal action of the digestive organs, and is a frequent symptom in many diseases of poultry. Many simple ailments of poultry are accompanied by a "looseness of the bowels," or diarrhoea. It is common in many sections of the country to misname all severe diarrhoea, cholera, particularly those in which the excrement has a greenish color. To this fact is due the belief that fowl cholera is a very common disease. Fowl cholera does not very frequently attack domestic poultry if the fowls are kept under reasonably sanitary conditions. It is, however, sufficiently prevalent to warrant a wholesome fear of it and to make necessary precautionary measures to prevent its appearance in a flock. The poultryman should bear in mind that all diseases accompanied by a troublesome diarrhoea are not necessarily cholera.

FOWL CHOLERA

The cholera of domestic poultry is a virulent, usually fatal, contagious disease. It is caused by infection with the specific germ of the disease. It attacks all varieties of domestic fowls, and has been observed in wild birds habitating an infected district. It is more common in foreign countries than in the United States. When it once makes its appearance in a flock, the disease is difficult, almost impossible, to control where the birds have free range. Where fowls are kept in semi-confinement, the disease may be readily stamped out, if prompt measures are taken as soon as it is discovered. Infection usually takes place through food or drink which has been fouled by the discharges of the diseased birds. A male bird having cholera in the early stages may transmit the disease to a flock of hens when serving them. The germs sometimes gain entrance to the body by the inhalation of dust in infected coops, which have not been properly disinfected, or by inoculation of wounds with the germs contained in discharges which have fouled the feet, claws, and beaks of the birds. The blood and raw flesh of diseased birds will, if eaten by well fowls, transmit the disease to them. When the disease is present in a neighborhood, pigeons, sparrows and wild birds may spread the contagion. The disease may be introduced by the purchase of an infected bird. For this reason, all new birds should be quarantined for two weeks (particularly in warm weather), until it is

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certain that they are free from disease, before they are permitted to run with the home flock. On no account should any diseased bird be allowed to contaminate the home flock through carelessness or neglect in quarantining new arrivals. This rule applies to all poultry diseases and to infection with lice and mites as well. Always be sure that a bird is healthy before you permit it to run with well fowls.

Cholera makes its appearance in a flock in from a few days to nearly three weeks after infection with the germ. The length of time for its appearance and the severity of the early symptoms depend largely on the susceptibility and condition of the bird exposed to contagion.

Symptoms and Diagnosis of Cholera

Loss of appetite, great thirst; drinks water eagerly until it cannot retain the water in the crop, and spills it whenever head is lowered. Bird has high fever, and if the bulb of a thermometer is placed close to the flesh under the shoulder, it will often register a temperature of 108 to 110 degrees. Legs hot and dry. The crop is usually distended with food which cannot pass on, owing to paralysis of that organ. The bird shows a disposition to sleep, bunches itself in a dumpy ball of ruffled feathers, with wings drooped, and avoids the rest of the flock. The comb is pale, almost white; face and wattles appear bloodless, eyes are dull and mostly closed. The bird loses strength and flesh very rapidly. Frequently an attempt to move, results in the bird falling unable to rise again. Diarrhoea is always present, and is one of the chief symptoms. At first there is a slight looseness of the bowels; that part of the excrement which is in health pure white, becomes yellowish or yellowish green. Copious diarrhoea of glairy mucus follows rapidly, and it may be frothy and streaked with yellow and green. The droppings are voided frequently, and vary from deep yellowish color to a mottled green and yellow, becoming later a deep, bluish green or grass green color. The excrement is thin and often frothy. The vent frequently appears raw and scalded by the excrement. Feathers about the vent are soiled and caked with the discharges. Death usually takes place in a few days after the appearance of the first symptoms of sickness. Convulsions frequently precede death, the bird appearing to be in great agony, often uttering sharp cries of pain.

Some cases appear in a mild form, and merge into a chronic infectious diarrhoea; all such should be killed and cremated. Examination of the body after death shows great wasting of flesh. Pale face and comb. Full crop, inflamed and discolored intestines. Liver greatly enlarged and soft; filled with dark blood. Gall bladder distended, contents thick and dark greenish. Kidneys and the small tubes leading from them are usually filled with yellow or yellowish-green masses. Ulcerations in and about the vent. The spleen is about normal size.

The chief symptoms to depend on in diagnosing cholera are: A rapidly fatal, wasting disease, accompanied by copious, yellowish or deep blue green diarrhoea. Frequent discharge of excrement. Pale face, comb and wattles. Sleepiness which may last until death. Infection of a large number

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of birds in one flock. The presence of the disease may be determined positively by the discovery of the oval shaped cholera germ in the blood and excrement by microscopical examination. If you are convenient to your state experiment station, the officers will gladly make a microscopical examination of the blood and excrement for you.

Prevention and Treatment of Cholera

Medicinal treatment for true cholera is of little value. The disease is so rapidly fatal that it is rarely discovered until too late to attempt treatment. No attempt to treat birds sick with the cholera had better be made unless they are very valuable. For the safety of the rest of the flock, they should be strangled and cremated. No particle of the flesh or blood of the diseased bird should be permitted where a fowl might get it, and so become infected.

The treatment is mainly preventive. Observe cleanliness and the usual common sense rules of keeping poultry. Quarantine all new birds brought home from shows. Do not use eggs for hatching unless you know they are from healthy stock. In hot weather, when diarrhoea is prevalent in the neighborhood, do not feed eggs to fowls without first thoroughly cooking them. Keep wild carrion birds off the premises by use of some "scare crow" device.

I had an experience with the disease in southern New Jersey several years ago which gave me ample opportunity to study it, and at the same time was an experience which I do not care to have repeated. In this case the disease was traced to two probable sources. We were then buying large quantities of eggs for hatching from collectors, and at the time an epidemic of cholera broke out in an adjoining township, the nearest case being six miles from the farm. It was our custom to take the infertile eggs from the incubators and boil them up for the stock. Through carelessness on the part of some one a quantity of these eggs were mixed raw with the mash food, which received only a slight scalding. Under ordinary conditions no evil would have resulted, but it so happened that some of these eggs had been collected in the district where fowl cholera was epidemic. At the time we did not know of the epidemic until birds were affected. A considerable number of birds eating this mash contracted cholera, but the majority eating of it did not show any symptoms of the disease. The other possible source of our trouble, and to my mind the most probable source, was the presence of a large number of turkey buzzards flying to and from the infected section. I found several buzzards apparently affected with the disease. It was only by prompt recognition of the disease, careful isolation of all suspected birds, thorough disinfection, and by killing and cremating all birds showing advanced symptoms of the disease, that we were able to stamp it out effectually with only comparatively small loss.

As soon as the disease is discovered, establish a pest house remote from the other poultry buildings, a place that can be easily and thoroughly disinfected. Isolate all suspected cases in the pest house as soon as you

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can find them. Give these birds a few drops of creolin in their drinking water (just enough to turn it faintly milky), or give them drinking water in which has been dissolved one one-tenth of a grain tablet of corrosive sublimate to the quart of water. A good home remedy in any severe diarrhoea, and often in mild cases of cholera, is to drop twenty to thirty drops of spirits of camphor on sugar and dissolve the whole in a pint of water; place this before the sick birds and allow no other drink.

All birds which show marked symptoms of the disease had better be killed and cremated at once. This is safest and best. Kill them by strangling or by a sharp blow with a blunt club, breaking the neck. Do not draw blood, as the blood is infectious, and you do not want to spill it. If they bleed, scrape up all blood and burn with the body, and disinfect the place where it fell. Rake up and burn all litter used in houses or runs occupied by infected birds. Spray the runs and all parts of the buildings with a strong solution of creolin, or a one per cent solution of sulphuric acid in water. Do not use any litter until you are sure that the disease is eradicated. Thoroughly disinfect everything that could possibly be contaminated by the infected fowls, and repeat this as often as you find a new case. The runs or yards should be thoroughly disinfected and should be ploughed up often.

Some of the quarantined birds may recover without other medicine than that advised for the drinking water as before mentioned. The proportion of creolin is about one teaspoonful to an ordinary wooden bucketful of drinking water. I prefer the use of corrosive sublimate unless a large number of birds are to be treated. This manner of general treatment is the cheaper and the easiest way of handling the diseased birds. Individual cases may be treated in the case of valuable birds. These I give a one one-thousandth of a grain tablet of corrosive sublimate (mercury bichloride) every three hours. Food given should be easily digested soft food, and fed sparingly. All droppings should be disinfected and burned or buried deeply.

If no new cases develop within twenty days after the last known case was quarantined and the premises disinfected the disease can be considered checked. Remember that it is a germ disease, highly contagious, and that prompt recognition and treatment and thorough disinfection are the only means of stamping it out.

ORDINARY DIARRHOEA

Simple diarrhoea is an inflammation of the digestive organs causing whitish, yellowish or even greenish loose discharges from the bowels, and may result from a variety of causes. The more common causes are: Climatic changes; a long, tiresome journey; too much food or drink after fasting; exposure; too much "loosening" food (such as meat, oat feed, bran, etc.); overdosing with pepper and condition powders; foul water; becoming overheated and exhausted from being chased; want of shade in hot weather; dampness; uncleanliness; crowding and vermin; these may one or all cause diarrhoea.

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Treatment

The only treatment necessary in most cases is to remove the cause. Correct the diet and provide pure drinking water. In mild cases, the comb does not change color; the feathers may be ruffled and the fowl a little dumpish. A little powdered charcoal in the mash food is an effective remedy. It is a good plan to keep granulated charcoal constantly before the fowls in a box like the grit box. For obstinate cases of diarrhoea, give the fowl a tablespoonful of olive oil to cleanse intestines. Follow by using twelve tablets of mercury bi-chloride one one-thousandth of a grain, drug strength each, in each quart of drinking water. Feed sparingly and avoid grain with coarse hulls, like oats and barley. Decrease the amount of meat food, use less oats and bran in the mash, and use more middlings or some low grade flour in the mash. Scalded skim-milk may be advantageously used for mixing the mashes.

DIARRHOEA FROM POISONS

Paint skins, coarse salt, salt meat, white lead, lye, unslaked lime and fertilizers are the more frequent poisons which cause diarrhoea in poultry. Sometimes arsenic, Paris-green and spray mixtures also cause trouble. Such cases of poisoning should be prevented by keeping these substances out of the reach of fowls. The cases of poisoning are seldom discovered in time to save the bird. The most common symptoms of poisoning with any of the above named poisons are: Inflammation of the crop, with copious watery discharge from the mouth, frequently blood-streaked, sleepiness, diarrhoea, convulsions or twitching of body, dumpishness and sore mouth.

Treatment

Give whites of eggs freely and an abundance of flaxseed tea.

ENTERITIS

Enteritis or bacterial enteritis is a very common disease among poultry. It is caused by a disordered state of the digestive organs, which favors the development in large numbers of several varieties of bacteria in the intestinal tract. The disease is often mistaken for true cholera. The predisposing causes of this ailment are uncleanness, foul drinking water, putrid meat food, and filthy or rotten food of any sort.

Symptoms

The affected bird is inactive and dumpish. The comb is at first pale and limp, and later becomes dark and purplish. There is an abundant dark or greenish diarrhoea. Diarrhoea may become bloody. The bird appears sleepy and unwilling to walk around. The bird may be sick a week or several weeks before death takes place. Some birds recover without treatment. The appetite may be voracious, or the bird may refuse to take food. The crop may be full of food, or may contain only a little slimy fluid. When the bird dies, the comb is always dark. Often the bird may appear dumpish and sleepy, and show a bad diarrhoea; the owner, picking

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the bird up to examine it, finds it has lost weight; holding it head downward, a stringy, dirty liquid runs from the mouth, and death of the bird soon follows. In such cases, the bird has been sick several weeks before it was noticed. Examination of the body after death shows the liver enlarged or shrunken, according to the duration of the disease. If of long duration, the liver is shrunken. The spleen is usually enlarged. The intestines are inflamed and are full of mucus.

Treatment

Prevent the disease if possible by cleanliness and pure food and water. Quarantine all new arrivals; this disease is contagious. When the disease is discovered, isolate all sick birds. Clean up the poultry houses and runs, and disinfect everything. Give all coops, nests and houses a thorough whitewashing. Use, also, powdered charcoal in their soft food; do not use enough to make their mash dark and uninviting. Clean up everything, and keep it clean. Do not feed too heavily. Use low grade flour or white middlings in the mash, and use less bran. For the sick birds which have been removed for treatment, give a one-tenth of a grain tablet of calomel three times daily. For flock treatment, twelve tablets, each representing one one-thousandth of a grain mercury bichloride, dissolved in each quart of drinking water and no other drink allowed, will be found to be effective. Feed on bread moistened with boiled milk. Avoid all sloppy masses, and be sure to supply pure water. Keep up your treatment in all cases until you are sure that your birds are cured, and the danger of contagion passed.

CHOLERA AND DIARRHOEAS

DR. N. W. SANBORN.

Cholera knows no breed. The sluggish Cochin and the active Leghorn show no difference in susceptibility to this dread disease. Chicks and adult fowls are alike fair prey to this trouble.

Temperature is a factor in spreading, as well as controlling, cholera. Warm, damp days are favorable to the increase of an epidemic, while a continued freeze often holds in check an outbreak of cholera. Cholera shows itself in the wet days of autumn or early spring, rather than in mid-winter.

Prevention is more satisfactory than medicine. In fact, unless you early recognize the trouble you have to contend with, you stand little chance of curing the birds. Cholera runs so rapid a course that there is short time to do any active medication.

There is no desire for food, but the bird is decidedly thirsty. The desire for water is offset by the sluggishness of the bird, and it may be seen starting for the water dish, then stopping to wait on the way. The first discharge from the bowels is thick from the usual contents of the intestines, but as the bowels become empty the discharge gets less solid and quite

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watery. As the inflammation of the bowel lining increases there appear slight bloody streaks in the discharge, and this may increase until the flow is nearly pure blood.

Severe cases show some irritation of the throat and nostrils, a slight discharge appearing in mouth and eyes. At the end of the first day you may expect to find the bird decidedly weak. The comb gets darker than in health, passing from red to purple as the disease progresses. Hill, in his book, "Diseases of Poultry," gives the best description of the post-mortem appearance of this disease, as follows: "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, acrid nature; liver deeply congested and increased in volume; lungs slightly congested and pleuritic exudation; heart purplish red and studded with echymose of extravasated blood spots pericardium contained an excessive amount of straw colored fluid."

The treatment of such a disease as cholera, running so rapid a course and with such violence, must be prompt and active. To wait a few days to see whether any more birds take the trouble is giving yourself a hard, discouraging season in which to get rid of the last case. The man who is quick to see any change in appearance of his hens will early note danger in the first few hours of cholera. At the first suggestion of a possible cholera case quarantine all doubted birds; at once scald or bake every drinking dish; scald all food utensils, and clean up every house. In other words, destroy every lurking germ that can cause future trouble. If the sick birds can be kept by themselves so much the better.

Add to each quart of drinking water for the sick birds spirits of camphor, one teaspoonful, and one-fourth ounce of sulpho-carbolate of zinc. The sulpho-carbolate of zinc should be white in color. The more red it shows the more impure and irritating it is. Much of the sulpho-carbolate offered is not white and should be avoided for internal use. You will notice that this salt of zinc is often suggested by me. I get much satisfaction from it, as an internal antiseptic. For drinking water for the apparently well birds, add to every quart one-eighth ounce sulpho-carbolate of zinc.

If the diarrhoea is excessive give a pill of "Dover's Powder," one grain every two hours until the discharge lessens. The opium in the pill relieves pain and quiets the muscular action of the bowels. The diet question is difficult to solve. Anything bulky is out of the question, if indeed the bird does not directly solve this by refusing to eat at all. Highly concentrated food is needed to sustain life; something easily digested, and this requirement is best found in meat juice. One tablespoonful, every four hours, given by means of a spoon or glass dropping tube, will help the case. The meat

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juice is prepared by half cooking steak, squeezing the liquid out and adding a little salt and pepper.

The treatment of cholera is not satisfactory in results. If you succeed in curing more than one-half your birds, you may well doubt the presence of that disease, and may make up your mind that the trouble is simple diarrhoea, enteritis or indigestion.

The successful plan of handling cholera is prevention, rather than the time and labor needed to doctor sick birds.

DYSENTERY

This may be a neglected diarrhoea running on into deep inflammation, or it may be a disease of itself originating from some filthy condition of the poultry plant. It may be from wrong ideas of what is needed to keep healthy birds, or from allowing the disease to be introduced through outside birds. Filthy water or foul floors are likely to spread dysentery, if indeed, they are not the direct cause of it. Dysentery is always accompanied by a looseness of the bowels. The discharge is thin, often watery, with more or less blood, according to the severity of the disease. The bird early shows weakness of the muscular system, and is soon "off its feed."

This disease is not highly infectious, but there is much danger if the plant is not well cleaned up at the very beginning of the outbreak. There is danger enough to call for the division of the flock into well and sick birds. The disease seems to spread by means of the droppings.

All suspected, as well as all decidedly sick birds, should have an intestinal disinfectant given in the drinking water. Here we find another use for the sulpho-carbolate of zinc, or for a combination of the sulpho-carbolate of zinc, soda and lime. One ounce of the zinc, or of the combination, added to two quarts of boiled water, should be the only drink for four days. The best results will be obtained by placing this drink before the birds, for ten minutes at a time, soon before feeding, four times a day. If the discharge is decidedly bloody, a pill of Dover's Powder of one grain can be administered in a little mash twice a day. If there seems to be much pain, give three doses of Dover's Powder per day.

The diet of all the birds, sick and well, ought to be non-irritating for a few days. Feed lightly of the coarsest parts of wheat, giving middlings rather than bran, making at least one-third the mash of clover hay thoroughly cooked. Feed wheat rather than corn for a week, supplying grit in abundance.

GASTRITIS

Gastritis is a disease of the enlargement of the food passage just before it reaches the gizzard. It seldom is met except in connection with inflammation of the crop. The same cause of irritation works in both cases. Long continued over-feeding or the over use of spice, or the ill effects of the taking in of some poison, are behind gastritis. The mucous lining is red, over moist and the blood vessels large. The symptoms are those of indigestion—lack of appetite, diarrhoea one day and constipa-

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tion the next, some little rise in temperature and general weakness. Study to find out the cause of the case you may have on hand. Do not let the irritating cause continue its work. Make the drinking water soothing by adding some rice and then boiling it. Omit from mash all bran and mix it with clover tea. Add to every pint of the drinking water one-tenth of a grain of arsenite of copper.

INDIGESTION

This is a disorder affecting the entire digestive system from the crop to the intestines. It may be an indication of a naturally weak digestion, or it may be the result of an over-feeding process. Even the persistent use of an imperfectly balanced ration is likely to give symptoms of indigestion. There is danger in feeding too often, especially young chicks. There is quite a difference between letting a bird hunt for its food all day and giving it a full meal too often. Exercise is needed as well as good food to give the best results. In fact, lazy birds are especially prone to dyspepsia, and commonly it is the owner who is to blame for lack of exercise. The use of ground grains and meat to the exclusion of clover hay and vegetables, is responsible for many a flock of dyspeptic hens.

Given a flock of hens with indigestion, the first step is to put them into every-day common sense care and feeding. Have the house free from dust and cobwebs, that is, let the sun shine in and sweeten the pens; clean every water dish and see that the supply in future is pure; decide on a well-balanced ration and feed at regular hours; provide scratching material enough to give exercise sufficient to produce good appetites. If for one week at the beginning of the improved care you will add one teaspoonful of sulphate of magnesia to every quart of drinking water, and follow this for two weeks with one-eighth of a grain of strychnine to each quart of water, you will hasten the time when the birds will be well.

A REMEDY FOR CHOLERA

A PRESCRIPTION IN USE FOR TWENTY YEARS

J. M. W. SMITH

I herewith submit a poultry remedy which I have used for twenty years with most satisfactory results. For chicken cholera or hog cholera the following prescription is the most effective remedy I have ever seen tried:

Flowers of sulphur 8 ozs., pulverized charcoal 4 ozs., pulverized capsicum 2 ozs., pulverized rhubarb 3 ozs., carbonate of iron 8 ozs., pulverized opium $\frac{1}{2}$ oz., pulverized golden seal 1 oz. Mix thoroughly when it is ready for use. Put in an air-tight package to preserve the strength.

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For chicken cholera make a pill of this remedy about the size of a small English pea and force the infected fowl to swallow it by forcing the mouth wide open and dropping the pill into the throat.

To use as a preventative of cholera, put one teaspoonful in feed enough for twelve hens and feed three times a week. It will not only prevent diseases but will fatten them quickly and increase the egg production at least 50 per cent.

For hog cholera give each adult hog one teaspoonful in slop or swill; pigs half that amount.

BOWEL TROUBLE IN SMALL CHICKS

SIMPLE MEANS OF PREVENTING DIARRHOEA OR BOWEL TROUBLE IN SMALL CHICKS AND THE BEST TREATMENT FOR SAME WHEN IT MAKES ITS APPEARANCE

P. T. WOOD, M. D.

A BOWEL trouble in the form of diarrhoea or "white diarrhoea" is one of the most common diseases of small chicks. Diarrhoeas in small chicks are very similar to diarrhoeal diseases of children and arise from similar causes.

During the past year or two several investigators have endeavored to show that white diarrhoea and other diarrhoeas are more common among incubator hatched and brooded chicks than those reared under hens. I have carefully investigated this matter and do not find any ground for attributing the cause of this trouble to the method of incubation employed whether artificial or natural.

In cases coming under my observation during the past several years there have been proportionately quite as many cases of bowel trouble among hen hatched chicks at the same season of the year as among brooder chicks. Many investigators are misled in their observations in this regard owing to the fact that such a very considerable portion of chicks are hatched in incubators and reared in brooders nowadays as compared with those brought up by the so-called natural method. Naturally a greater number of artificially reared chicks come under observation, and from this fact, their numbers make a deeper impression upon the observer, leading to hasty conclusions as to the percentage of chicks affected with diarrhoea. Were it possible to obtain reliable statistics I feel sure that it would be demonstrated that quite as great if not a greater percentage of hen-hatched chicks are lost through diarrhoeal diseases than are brooder chicks.

In the majority of cases diarrhoea in chicks is simply a case of acute intestinal indigestion, dependent chiefly upon the inability of the intesti-

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nal organs of the bird to digest the foods administered. The undigested foods act as an irritant and diarrhoea results. All conditions of bad hygiene, careless feeding, too little or too much heat, impure drinking water, infected food and unsanitary surroundings are all causes of diarrhoea.

Chilling a Common Cause

With early hatched chicks undoubtedly chilling and exposure is commonly a cause of bowel trouble. When the weather is cold little chicks need much more heat and hovering than when the weather is warm. There is very little danger of overheating brooder chicks in wintry weather, or when the outside temperature is below 50 degrees. When the outside temperature gets to 65 degrees and upwards great care must be taken not to overheat the chicks. Flocks that would readily stand a temperature of 110 or 115 under the hover of the brooder in cold weather would, when the outside (outdoor) temperature stands at 75, be seriously injured by long exposure to any temperature above 100, for the reason that there is not sufficient difference between the temperature under the hover and that immediately outside in the hover apartment, and the chicks do not have the same opportunity to get away from the heat that they did when the weather was colder. Crowding chicks in poorly ventilated coops and brooders where they are subjected to stifling heat and an insufficient supply of pure air is a prolific source of trouble. All of these causes are easily avoided.

Little chicks require to be kept comfortably warm at all times whether they are reared under a hen or in a brooder and just what temperature is comfortably warm is one that will have to be decided by the care-taker through observation of the chicks. A great deal depends upon the particular brood under observation. Chilling and overheating must both be avoided if diarrhoea is to be prevented. Late hatched broods more commonly have diarrhoeal trouble than earlier ones because they frequently are less carefully tended than early broods and because of weather conditions.

Indiscretions in feeding or careless feeding are undoubtedly the most prolific causes of diarrhoea and "white diarrhoea" in chicks, with the possible exception of chilling. If the chickens are given an opportunity to balance their rations for themselves, being supplied with a liberal variety of necessary foods, there will seldom be any trouble from this source. It is only where chicks are kept on short rations and starved into eating things that are not good for them, or fed on too one-sided a ration, that digestive troubles are common. Chickens are naturally healthy and hardy if bred from good, sound, healthy breeding stock and they are not as a rule subject to digestive disorders when a reasonable amount of common sense is employed in taking care of them.

Too heavy grain and meat feeding with an insufficient supply of raw vegetable food, or perhaps none at all, is a common cause of digestive disturbances resulting in diarrhoea. When chicks have free range upon grass land and there is plenty of fresh crisp grass and tender green stuff for them

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to pick up, there is little need to pay any attention to the supply of vegetable food, but just as soon as the chicks are kept in confinement or an attempt is made to raise them on bare ground or in buildings where they cannot get fresh succulent green food, this item becomes of the utmost importance, although it is frequently overlooked. It is possible to bring some broods to maturity with only a very limited supply of green food, but in the majority of cases unless raw vegetable food is fed freely the results will be disastrous.

Raw Vegetable Food is Necessary

One of the most satisfactory food rations is a dry grain chick food kept always before the chicks with a constant supply of granulated bone, pure beef scrap of good quality, charcoal, grit and pure fresh drinking water. This ration should be supplemented with daily feeding of raw vegetable food unless the chicks are running on grass land. Raw potatoes and raw beets are undoubtedly the most satisfactory raw vegetable foods for feeding small chicks. They should be fed cut in large pieces scattered about so that all chicks have an equal opportunity to pick at them. Scalded cut clover may be fed occasionally, also rye, oats, or wheat sprouts but cabbage should be fed very sparingly as it is liable to cause digestive disturbance and diarrhoea, particularly if it has been frosted. Where the chicks have already developed diarrhoea raw potatoes are the best form of raw vegetable food.

In addition to the dry grain food, which should be supplemented as the chicks get large enough with hard wheat and fine cracked corn, some cooked food should be fed occasionally to afford variety, and for this purpose there is nothing better than thoroughly boiled cracked rice or boiled wheat. These grains should be seasoned slightly with salt while cooking, and should be boiled almost dry and fed when cool.

Beef Scrap Should Be Tested

Extreme care must be employed in selecting the meat food or beef scrap, as it is through infected beef scrap that many cases of bowel trouble due to impure food arise. Good beef scrap should not have a foul odor, neither should it be lumpy or full of vegetable fibre (adulteration with cotton seed hulls). If the scrap is lumpy and the lumps show white in the interior on being broken apart the scrap should not be fed to either young or old stock, as it is only fit for fertilizer.

A good way to test beef scrap is to examine it first for lumps. If none are found and the scrap smells reasonably sweet wet up a little of it with scalding water. If a foul odor is given off the scrap is not fit for feeding small chicks. If the odor remains sweet and meaty it is usually safe to feed the scrap. Scrap should always be tasted to ascertain if it is salt, as sometimes scrap is sold for poultry feeding that contains a considerable proportion of salt, and when fed trouble results. Good pure meat scrap may

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be fed freely with no danger of harmful results if the chicks have plenty of raw vegetable food.

One other common cause of diarrhœal troubles in chicks is breeding from debilitated and unhealthy birds or stock that is not in the best condition. The diarrhœa itself is not inherited but the chick coming into the world with a weak constitution is unable to resist the disease and so falls a ready victim.

To Prevent Disease Remove The Cause

Crowding chicks into too close flocks and using brooders or brood coops that are filthy with the excrement of the last or earlier broods are common causes of disease. It is a wise plan to never put more than fifty chicks in one flock, as this is about as many as it is possible to care for properly in one brood and give the chick an equal chance with the others.

All of the above mentioned causes are easily preventable and if guarded against, diarrhœa will seldom make its appearance in a flock. Preventive treatment may be summed up as follows:

Breed only from sound, healthy, vigorous, well-matured, hardy stock. Keep the eggs at a temperature of not lower than 40 nor higher than 50 degrees, while saving them for hatching. Incubate only fresh, well-formed eggs. Keep the chicks quiet and warm for the first 24 to 36 hours after hatching, and give no food during this time. Give the chicks an opportunity to properly balance their ration from the start, seeing that they are supplied with all necessary food at all times. Be sure that they are comfortably warm and that they get a plentiful supply of pure fresh air. Avoid exposure during the first week as chicks are very susceptible at this time. After they are ten days old they are, if properly trained and cared for, past the most dangerous period. If diarrhœa makes its appearance in a flock it may be frequently checked by simple home treatment.

How To Treat Diarrhoea In Chicks

One of the most satisfactory plans of treating diarrhœa when the first symptoms are noticed is to give the chicks all they will drink three or four times a day of scalded sweet milk to which has been added a little grated nutmeg. On the following day they may have a little cracked rice that has been thoroughly boiled and lightly seasoned with salt. Let the rice cool before feeding, and scatter over it a very little raw bone meal. The scalded milk and nutmeg may be continued. If the chicks have not been supplied with raw vegetable food, cut a raw potato into large pieces and give it to them to pick at.

Should the diarrhoea persist, obtain from any homeopathic physician or any homeopathic pharmacy some tablets of mercury bi-chloride, 1-1000 of a grain drug strength each, and dissolve 10 of these in each pint of drinking water, allowing the chicks no other drink.

Keep the chicks confined close to the brood coop or brooder while under treatment. Be sure that they have an opportunity to get comfortably

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warm at all times. Do not let them huddle in sunny spots, and keep their quarters dry and clean. For a little while each day expose all parts of the brooder or brood coop to fresh air and sunlight.

If these rules of prevention and treatment are carefully followed the poultryman will have little to fear from diarrhoea in small chicks.

DISEASES OF THE LIVER

CONGESTION — INFLAMMATION — HYPERTROPHY—THE SYMPTOMS AND TREATMENT

DR. N. W. SANBORN

The diseases of the liver generally result from too heavy feeding or from the over use of condiments. Nine-tenths of these liver troubles are due to the giving of a ration too rich in starch elements. The single flock of the village lot is especially prone to liver disease because of the large proportion of bread foods in the table waste. Unless you can control the feeding of this waste it is safer to depend upon a mash of balanced ground grain and meat.

Congested or sluggish liver is the beginning of inflammation of the organ or may be a serious trouble in itself. If left to follow its own course, with no change in diet, the chances are that inflammation and enlargement will follow.

Any trouble with the other organs of the abdomen that obstructs the circulation of the blood will congest the liver. The persistent feeding of many of the so-called "egg foods" to birds closely housed and yarded irritate both liver and egg organs. The use of a ration in which potatoes form too large a part throws so much work upon the liver that, in its endeavor to perform its part, it becomes at first congested, then inflamed, and ends in permanent enlargement or in atrophy.

CONGESTION OF THE LIVER

The early symptoms of a congested liver are seldom noticed. There is a lack of color in comb and wattles that makes one wonder what is to follow. Usually your first sign of trouble is a watery diarrhoea, dark at first, but changing in a few days to a yellow cast. The feathers do not look smooth and shiny, but have a dull, rough appearance. At this time the color of comb and wattles has begun to change from the natural hue to a dark red or purple, often getting nearly or quite black in color. The sick birds show no appetite for food, but move from place to place without ambition to eat or exercise.

If these cases are early noticed and promptly treated, most of them will recover their health. As the cause is largely one of improper feeding,

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the return to rational foods must be the first step. Make the mash as largely of cut clover as you can get the bird to take. Drop out much of the flour and cornmeal. Better feed green cut bone or fresh meat, than dry meal, for a month. Give the fowls as scratching material the waste from the hay mows. If the cases appear in warm weather give the birds access to a clean grass run.

At the first appearance of liver trouble give each bird a teaspoonful of castor oil. If this is not easy for you to do, the next best plan will be to get the same results by adding one-half teaspoonful sulphate magnesia to the drinking water of each bird. If the birds are not thirsty, you must give it from a spoon or a dropping tube. After a single dose of laxative medicine I should refrain from further medication and depend upon proper food and care.

Dr. J. Woodroffe Hill recommends the following treatment: "Ten grains each of sulphate magnesia and bicarbonate of soda daily, until four or five doses have been given; afterwards a little powdered gentian should be mixed with the food, and a few spots of nitrohydrochloric acid mixed in the drinking water. A plain diet should be allowed, also exercise."

INFLAMMATION OF THE LIVER

The symptoms of this stage follow those of congestion of the liver. The diarrhoea is watery and yellow, poor appetite, and increased desire for water. There is a sluggish manner in breathing, suggesting lowered vitality. The birds show little inclination to move about; lose weight rapidly; becoming little more than skin and bones in the course of two to three weeks.

Treat these cases, if at all, by clearing out the bowels once with castor oil or sulphate of magnesia, following this by the use of tincture of nux vomica one-fourth teaspoonful to every pint of drinking water given the birds.

Dr. Hill gives the following:

"Symptoms—Tenderness on external pressure, sometimes enlargement of the abdomen, great depression, bilious diarrhoea or dysentery, quickened breathing, rapid emaciation, yellow hue of skin, thirst, loss of appetite. Not unfrequently lameness in the right leg is manifested.

"Treatment—Half a grain each of calomel and opium, repeated in six hours, and followed by ten grain doses of tartrate of potash morning and night. Diarrhoea or dysentery to be checked with astringents; breast and abdomen to be held over hot steam; acidulated water to drink, as in the preceding disease. The birds should be kept perfectly quiet, and fed sparingly with bread soaked in milk or lime-water, or boiled rice."

HYPERTROPHY OF THE LIVER

An overlarge or solid liver is most common in the late winter or early spring months, especially in hens completing their second year. This result is due to the constant over-feeding of heat producing foods to the

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exclusion of bulky vegetable elements. Then there is the lack of exercise due to close houses and small yards, and no scratching material. Over-feeding and little work cause the deposit of fat in various parts of the body and no organ suffers more from this cause than the liver.

At the beginning of this trouble the hen shows an increased brightness in comb and wattles and is an extra good layer. Soon, however, the reaction comes. The comb becomes less bright and the bird takes little pains in the care of its plumage. As the bird becomes more and more heavy it moves about slowly; taking time in all motions, staying on the roost late in the morning and returning to it early in the afternoon.

Vale states that "as a precautionary measure, poultry keepers should occasionally take up each fowl and gently grasp the abdominal walls between the fingers and the heel of the hand. If found to be firm and unyielding it is pretty certain that they are too fat. To remedy this state of affairs, reduce the quantity of fat-forming food given, and add a little Epsom salts to their drinking water.

Treatment

Add to the drinking water, one-half teaspoonful powdered muriate of ammonia to every quart. Feed very sparingly upon unstimulating food, and give plenty of green food.

APOPLEXY

DR. N. W. SANBORN

By apoplexy I mean the condition resulting from a break in a blood vessel of the brain. This break may come because of a weakened state of the artery itself, or from too great a blood pressure on it from over action of the heart. The common cause of weakness of the blood vessels of the brain is an over-fat condition of the whole bird. In common with other parts of the muscular system, the little muscles of the arteries suffer from fatty degeneration, which produces a weakened wall to resist pressure. Without some other direct factor this fatty wall would seldom give away and produce a brain trouble. However, let a fowl in this fatty state be chased violently about the farm, and the increased action of the heart brings to bear on the brain vessels increased pressure that is likely to produce serious results. Hens in this diseased condition are likely to have difficulty in passing their eggs, and during the greater strain imposed in laying they are liable to burst a vessel in the brain, and apoplexy results. This accounts for many laying hens being found dead on the nest.

Filling crop and gizzard to extreme fullness, in an over-fat bird has been known to produce apoplexy and death. I remember a case in my own yards several years ago. A two-year old male, a Wyandotte, at the end of a long breeding season was put into a pen with a dozen half grown cockerels. While in the breeding pen he was all attention to the hens, seeing that they had food enough before he would help himself, but under

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his changed circumstances he was greedy to get all he could from the young males. As I fed them one night, I noticed how lively the cock was, how he was eating as I had never seen a bird eat before. Apparently he was in perfect health. Half an hour later I found him lying on his side dead, with purple comb and wattles. His crop was stuffed with grain, and his gizzard was tightly packed with food of all kinds.

In times of long continued hot weather cases resembling apoplexy may be met. These are usually sunstroke, and while there is brain pressure, there is no clot of blood to be found in the brain as in apoplexy.

Prevention of apoplexy is along the line of proper care. First, the feeding a well balanced ration; second, no chasing of birds by dogs or boys; third, moderate feeding in such a way as to prevent a greedy bird obtaining his food in too short a time.

Treatment

Cases of apoplexy, and cases resembling it in a way, should be bled at the first indication of the trouble. To wait awhile is to see the bird die. With a sharp knife open a blood vessel on the under side of the wing. Let two teaspoonfuls of blood flow before allowing the blood to clot. Even this small amount will reduce the pressure on the vessels. Apply ammonia vapor to the nostrils, turpentine or strong tincture of iodine to the back of the head. A laxative, such as castor oil, or one drop croton oil, should be given if the bird can be made to swallow.

Few cases of apoplexy ever regain good health. There is always something wrong about the birds, and they are constantly getting out of condition. If a number of cases appear in a flock, it will be well to make a few changes of diet. Reduce the quantity of corn and cornmeal; increase the amount of clover and green vegetables, and give the birds their freedom, or yard them on large grass fields. Provide some protection from the heat of noon day.

INTESTINAL WORMS

THE ROUND WORM—THE TAPE WORM

DR. N. W. SANBORN

There are two kinds of worms that are more or less common in the digestive canal of fowls—the "round worm" and "tape worm."

THE ROUND WORM

The round worm receives its name from its shape in contradistinction to the flat tape worm. The round worm is much more common than the tape worm, and is familiar to any dresser of poultry. It is not a source of

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trouble except from the massing of large numbers. A few worms make little impression on the health of a bird, but if they abound in hundreds they will have a decided effect on digestion. The large numbers, matted and wiggling, may be a cause of stoppage; their irritation causes diarrhoea, and their appetites diminish the nutriment intended to support the fowl. The round worms are seldom passed in the bowel discharges. Now and then a worm is passed, but it soon dies in the droppings or it is eaten by some other bird. It is not till a bird is killed or dies that worms are known to be present. The round worm varies in size from one third to five inches in length. Its color is white. The head is pointed like the sharpened end of a pencil; the tail blunt like the end of a finger.

Symptoms

The symptoms of worms are those of indigestion. The comb and wattles are pale, bird thin, with possibly a slight diarrhoea.

Treatment

If you suspect worms, try to remove them. Dissolve in the water that is to be used for mixing the mash, two grains santonine for each bird to be treated. Mix a small amount of mash, quite dry, and add castor oil, one-half teaspoonful for each bird. Feed this to the suspected birds, watching for the results of the "worm treatment." All droppings should be collected often and put out of reach of the birds.

W. Vale advises: "Beat a new-laid egg, with one tablespoonful of oil of turpentine, and mix thoroughly by agitation. Give a teaspoonful of this mixture night and morning for a few days; or divide a quarter of an ounce of areca-nut in powder, into four parts, and give one part every morning, fasting, with a dessertspoonful of sweet oil two hours after each powder."

THE TAPE WORM

The tape worm is not as common as the round worm. I have met poultrymen who have never seen a tape worm; even when dressing fowls. Perhaps if they had taken pains to examine the contents of the bowels they might have another story to tell. Vale tells us that this tape worm, "appears to be identical with the tape worm 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 catch little mice and tear them limb from limb."

Our fowls generally show no indication of the presence of tape worms. Sometimes the birds will be uncommonly thin in spite of a good appetite, but tape worm is not thought of. When the worm gets quite long, pieces of the tail may be seen in the droppings, looking like narrow tape.

Knowing, or even suspecting, that you have a case of tape worm to deal with, give the bird six drops oil male fern in one teaspoonful castor oil. The proper time of the day to give this is in the morning while the

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crop and gizzard are empty, and if the feed of the night before is a light one, so much the better. Two hours after giving the male fern, give a light mash containing for each bird treated one teaspoonful castor oil.

Dr. Hill states "in my opinion santonine, in one grain dose, combined with seven grains of areca-nut, is the most useful and effectual poultry vermifuge.

"Food should be withheld for three hours after the administration of worm medicine, and then a warm, soft meal should be allowed, and this diet continued for a couple of days before returning to ordinary food. It is most essential that all parasites expelled should be vigorously destroyed."

A Specimen Three Feet Long

A bottle of alcohol containing a tape worm three feet long which came away from a Golden Wyandotte hen was brought to the office of the Reliable Poultry Journal. The worm was complete, head and all. The hen in question ate heartily, but lost flesh and gradually weakened. The owner could not discover what was the matter with her. She had no cold, ate well, but became distressingly poor and weak. Finally he thought of worms. Acting on this theory, he kept her without food for thirty-six hours, then gave her a full feed of stewed garlic, cut in short lengths. She ate heartily of this and the next day the owner had the three-foot tape worm in alcohol. The hen began to mend immediately, regaining her normal flesh, and was soon as well as ever.

THE CROP

THE CAUSES AND TREATMENT OF ITS DISEASES

DR. N. W. SANBORN

Impaction of the crop is a condition known to many keepers of poultry. This is caused by the retention and swelling of grain, by the accumulation of long pieces of grass or hay, or by some obstruction at the outlet of the crop. In rare instances it results from the damming of food from impaction of the gizzard. Birds kept closely housed all winter are eager in the spring time to eat the dead grass that has laid under the snow for months. This is quite tough and is likely to give way near the ground, giving lengths from two to five or more inches. By swallowing these in large numbers there is danger of the pieces rolling and matting together and forming a round ball in the crop. There is also a source of danger in the scratching material furnished, unless vegetable food is provided to satisfy the craving of the fowl. It will get "filling" in some way, even though it eats its bedding of leaves and straw.

Cases of impaction caused by cracked corn have come to my attention. Nearly grown cockerels fed at night a very full feed of cracked corn have

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gorged themselves with it, and then drunk water, causing the corn to swell so as to stretch the crop to its utmost. Such cases usually correct themselves, or with a little manipulation soon get cleared of the packed contents. Now and then you will run across a case of impaction caused by some foreign substance filling the outlet of the crop. This may be wood or bone, with a sharp point sticking into the sides of the crop, or possibly lying across the outlet. So far as the size of any substance is concerned, you may accept it as a fact that anything a hen swallows will pass through the digestive system safely.

Treatment

A case of impaction due to over-feeding or swollen grain should be handled by manipulation. Try to get a little castor oil down the food passage, then gently begin at the part of the crop nearest the mouth and push a little grain toward the head. Hold the birds head down, thereby letting gravity help do the work. Have patience, work carefully, and if you do not succeed along this line then you can open and clear out the crop through an opening in the skin.

Opening the Crop and Removing the Food

Have someone hold the bird so you can have both hands free to work. Pluck enough feathers from the breast to give bare skin $\frac{1}{2}$ inch wide by 2 inches long. Then with a sharp knife cut through the skin, lengthwise of the bird, an opening one inch long over the place of the swollen crop. Cut only the skin, leaving the crop untouched until the blood of the first incision has ceased to flow. Then cut through the crop a line a little over $\frac{1}{2}$ inch long. Half an inch may seem short, but you will be surprised to see how long the opening is after you have worked through it for a while. In removing substances from the crop be careful to let as little as possible slip between the skin and the crop. With an opening into the crop, begin with sugar-tongs, tooth-picks, or anything else handy, to remove the contents. If filled with grass or hay, it may be necessary to cut the mass with scissors before any start can be made. When the crop is apparently empty, push your little finger into it, feeling to know whether there is any obstruction at the outlet. If you find the opening clear, sew up the cut. With needle and white silk thread, take two single stitches in the cut in the crop, leaving ends long enough to hang out of the wound an inch. Then, in the same way, take three stitches in the skin, being careful not to include the crop in the knot tied. After the operation, feed lightly on well cooked mash, omitting grain for a week.

Additional Treatment

Some cases can be entirely cured by putting the fowl in a coop by itself, giving a plentiful supply of sharp grit and oyster shell, and feeding exclusively on hard dry grain. Cases that will not respond to this form of treatment may be operated on in the following manner:

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Obtain a rubber tube about the size of a lead pencil and attach to one end a tin or glass funnel. Provide about a pint of luke warm water, moisten the rubber tube in this and introduce it into the crop, passing it through the mouth and down the throat, taking care to avoid the wind-pipe. Pour a quantity of warm water into the funnel and allow it to flow slowly into the crop, gradually working the contents of the crop with the fingers until the whole is soft, then turn the bird up side down and by working the crop make it vomit the obstructing mass. This is much more simple than cutting open the crop.

After treating give the bird a drink of flaxseed tea or a little warm water and feed sparingly on soft food for a few days. Give a tablet of nuxvomica and sulphur comp. (1-100 of a grain drug strength each) morning and night until the bird is able to digest its food normally.

INFLAMMATION OF THE CROP

Inflammation of the crop is caused by an irritation of retained food or from the effects of foreign substances swallowed. Irritating materials, such as paint skins, rough-on-rats and pieces of unslaked lime, produce the trouble through direct contact with the mucous lining of the crop. The feeding of too large a quantity of black or red pepper in the mash has caused inflamed crops, as well as trouble with the egg functions. With a crop that is tender, and even painful, the hen is restless, moving about without aim, giving one the impression that there is trouble with digestion. Now and then the bird may be seen trying to swallow when it has taken no food for hours. The motions of breathing are jerky, made so by the pulling of the muscles on the crop.

Treatment

If the cause is recent, still getting in its work, try to empty the crop. If the contents are small, it may be well to dilute them by pouring into the mouth a few spoonfuls of water and then empty as before. If behind the trouble is the effect of air-slaked lime, give weak vinegar water; if phosphorus (rough on rats), give magnesia. Having emptied the crop, give flaxseed tea and keep the birds on simple diet for a week.

Dr. J. Woodroffe Hill's treatment is: "Mucilaginous ablutinous fluids, such as barley-water, milk, and isinglass, or a thin solution of gum, should be freely administered after first evacuating the crop. Should phosphorus have been taken, magnesia should be given, followed by turpentine mixed in cream. Oil being a solvent of phosphorus, must on no account be administered. Lead is often a cause of poultry poisoning when painters are about. The crop should be immediately evacuated, and half a teaspoonful of sulphate of magnesia and five minims of sulphuric acid, mixed in a wineglassful of water, be administered without delay. In a couple of hours, five grains of iodide of potassium may be given in a desertspoonful of water. Afterwards feed on mucilaginous liquids.

"If purging commences, give a teaspoonful of castor oil, with a grain of opium. Crude or unslaked lime is an irritant poison to fowls, produc-

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ing inflammation of the throat, gullet, crop, gizzard and intestines. Oil should at once be administered, followed by full and frequent doses of mucilaginous or albuminous fluids."

ENLARGED CROP

Enlarged crops are more a source of worry to the owner than to the fowl. These crops have become large through a long continued stretching, sometimes from over-feeding, more often from impacted crops allowed to correct themselves. The appearance of a bird with an over large crop is not pleasing and there is always food in it that the weak muscles cannot push on to the gizzard. To remedy this trouble, pluck the feathers as for impacted crop and make incisions as before, only making them much longer. Cut out with blunt pointed scissors, both skin and crop, so the opening will look like a pair of brackets, removing quite a little membrane. Sew it as described for impacted crop, being sure to stitch the crop and skin separately. Feed lightly for a week, removing such threads as are in sight at the end of four days.

TYMPANY OF THE CROP—CATARRH

Fowls sometimes have greatly distended crops, which upon examination are found not to be impact but filled with gas, some foul smelling fluid, but very little food.

The fowl becomes sluggish, the plumage rough and lusterless, the comb and face dull in color. The condition may become chronic and differs from what is commonly called enlarged crop.

Treatment

The condition yields best to antiseptics. Inserting a rubber tube as described in "additional treatment" for impaction, thoroughly cleanse the crop with warm water to which has been added a little carbolic acid. Give bichloride of mercury (corrosive sublimate) tablet 1-10 grain to the quart in drinking water. Feed on easily digested soft food.

THE ABDOMEN

THE DISEASES OF THE EGG ORGANS

THE CAUSES AND TREATMENT OF EGG-BOUND INFLAMMATION OF EGG PASSAGE—SOFT-SHELLED EGGS—PERITONITIS—BREAK-DOWN—DROPSY

DR. N. W. SANBORN

EGG-BOUND may be due directly to the condition of the egg passage or to some more remote cause. There are more deaths from this trouble in late winter than in all the rest of the year. This is largely owing to an over-fat condition of the entire system, in which the egg passage is pressed upon by the accumulation of fat about it, hindering the passage of the egg. Egg-bound is most common in sluggish birds or those closely confined without opportunity to exercise. Active fowls, such as Leghorns, seldom take life easy enough to get fat, hence are not subject to this disease.

Not only are there large collections of fat in the abdominal cavity, but much of the muscular tissue is replaced by streaks of fat. This weakens the muscles of the egg passage, so that between the extra straining and the weak walls it gives way, allowing the egg or its contents to pass into the abdominal cavity. The presence of a foreign body excites inflammation and peritonitis follows.

This same egg-bound condition may cause death from heart disease. The bird goes on the nest to lay. It strains violently to pass the egg. The heart muscles, in common with the general muscular condition, are decidedly weak from fatty degeneration. The extra exertion is too much for the weakened heart, and it gives out, the bird being found on the nest dead.

Even the collection of fat at the lower end of the abdominal cavity is sometimes sufficient to prevent the passage of the egg. Over-fat hens are inclined to lay double yolk eggs, and the extra size adds to the difficulty in the passing the egg. Then there are cases where an egg gets broken on its passage through the oviduct, obstructing the passage of eggs following the broken one.

Sometimes pullets are egg-bound for a few days when trying to pass their first egg, but these cases commonly adjust themselves after a short time.

Symptoms

The hen moves about, without apparent cause, going at times to the nest, but without dropping an egg. The tail feathers are lowered, look-

THE ABDOMEN

ing much as they would on a rainy day. Take the hen in your hands, watch the movements of the muscles at the vent and you will see that she is trying to eject an egg. Pass your little finger, well oiled, into the passage, and you will feel the muscular movements and perhaps run the finger tip against the egg itself.

Long continued cases of egg-bound birds are seldom helped by any treatment. The over-fat condition has existed too long to be helped by any change in diet.

Treatment

Hold the fowl with her vent in the steam arising from a dish of boiling water. If this does not sufficiently relax the parts to effect the delivery of the egg, carefully inject a tablespoonful of olive oil, and give the fowl half a teaspoonful of linseed oil or sweet oil every two hours.

The fowl should be fed on soft, unstimulating food, and if over-fat the food should be reduced in quantity.

INFLAMMATION OF THE EGG PASSAGE

Inflammation of the egg passage may occur in connection with an egg-bound condition or may be due to the over-use of stimulating condiments and medicines. Some of the "egg-foods" for sale, warranted to increase egg production, are decidedly too irritating for continued use, and are not without their dangers at any time.

Inflammation of the egg passage is a serious disease. The effect of it is at once seen in the bird's movements and general appearance. There is almost a constant desire to strain, as if an egg was in the end of the duct. This straining is sometimes so violent that a blood vessel is broken, causing death at once. As the bird stands, or moves about, you will notice that the wings are dropped a little as though there was a relaxation of the muscles. The feathers are ruffled and stand out from the body more than normal. The vent of the bird is hot, red and in motion. In a day or two the hen becomes quiet, as a result of exhaustion, gives up some of the straining, and shows an increasing paleness in comb and wattles. The temperature drops day by day, till at last the bird dies of the widespread inflammation.

The disease is a good illustration of the need of watching closely our fowls and remedying the trouble in the very beginning. So many of these cases are preceded by a retained egg that might be removed, that we should learn to attack the disease at the outset. This disease is incurable unless the cause can be removed. Back of some of the cases is an over-fat condition. The eggs are large, the passage is fatty and weak, an egg is retained and inflammation follows. These cases are likely to be hens fed with pullets. They are less active, have good appetites, and put on fat on the same ration that makes the pullets fine layers. Some of these cases can be avoided by cooping hens and pullets separately, and feeding the old fowls a larger proportion of clover hay.

RELIABLE POULTRY REMEDIES

Treatment

Dr. Hill recommends: "If the disease proceeds, from a broken, and unexpelled egg, immediate removal of the latter is imperative; for so long as this (the cause) remains, it is perfectly useless to attempt the reduction of inflammation by administering calomel, tartar emetic, or any other medicine. The finger oiled should be carefully introduced to explore the passage at its lower end, and if the broken egg is within reach it may with patience be removed with the finger. If too far away, then repeated injections of olive oil should be used, which will sooth the lining membrane of the duct, and facilitate the passage of the collapsed egg. These measures failing, then a proper pair of forceps is to be introduced, and the offending object removed without further delay. This accomplished, the passage should be syringed with a weak solution of carbolic acid, and tepid oil, and 20 to 30 grains of sulphate of magnesia administered and repeated two or three times. For some days the fowl must be kept quiet and free from stimulating food."

SOFT SHELLED EGGS

This is not exactly a diseased condition, but may be the first symptom of approaching danger. Over-stimulation of the egg organs by use of spice, or so-called "egg foods," tends toward the production of thin-shelled eggs. Even fright may hurry along the eggs before the shell has been added. Worms may increase in the intestines to such an extent as to stimulate the egg passage to push along the egg beyond its usual distance. An over-fat hen has a tendency toward laying thin-shelled eggs. In fact, this is the usual cause of soft-shelled eggs.

There come times when a knowledge of the causes of this condition is useful, but even then we sometimes fail to correct the tendency to thin or soft-shelled eggs. The hen that laid the brown eggs that took the first prize and several specials at the Boston show in 1899, was sold to a man in the west for twenty dollars. In spite of the fact that he wished to set some of the eggs, and above all to be able to exhibit the best brown eggs at the Nashville show, the bird at once developed a tendency toward thin-shelled eggs. It seemed to be in perfect health. Food, exercise, magnesia in drinking water, grit and oyster shells, everything thought of was tried, but nothing seemed to make the slightest change. I think it likely that the bird started by being over-fat, and this in some way set up an irritation of the egg passage. Being unnoticed or neglected, the condition became chronic and apparently incurable.

Provided the cause is an over-fat condition, you can meet this difficulty by providing a diet low in fat-producing elements, supplying grit and oyster shells in abundance, making the birds work for much of the grain, and adding a liberal amount of cut-clover to the mash. One or two doses of sulphate of magnesia (one heaping teaspoonful to a pint of drinking water) kept before the hens for a day, twice a week, will help remove the layers of fat.

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Avoid this unsatisfactory condition by feeding a well balanced ration, not trying to increase the egg yield by means of anything that does the work by irritation of the egg organs. Know the condition of the bodies of your birds and so feed to keep them in a laying state, but not over-fat. Do not be afraid of a little fat during the winter months, but furnish sufficient exercise to do all the stimulating needed.

Dr. Woods gives this advice: "Fowls kept closely confined in cold weather and not given a sufficient variety of food are especially liable to lay soft-shelled eggs. The trouble may be due to some disturbance of the egg organs or to improper food and careless feeding. It usually responds very promptly to treatment.

"See that the birds are supplied with plenty of good grit and oyster shell. Feed green food like scalded short-cut alfalfa or clover or scalded dried beet pulp freely. Also give cabbages, beets and turnips fed raw whenever they can be obtained. Feed a variety of good sound grain food and some animal food. Five drops of fluid extract of ergot in a quart of drinking water, allowing the birds no other drink, given on alternate days for a week will usually entirely check this trouble, provided care is taken to see that the birds get a sufficient supply of proper food."

PERITONITIS

Peritonitis, or an inflammation of the membrane covering the organs in the abdomen and lining that cavity, is a serious and fatal disease. It is seldom a disease originating in the membrane, but extends from some other part or organ of the abdomen. Some outside violence may so irritate the membrane as to precipitate trouble, but it is more likely to occur from either the bursting of a blood vessel in the egg, or from tuberculosis.

The fever in peritonitis runs high, from 105 to 110 degrees. The bird is decidedly hot to the touch, especially over the bowels. There is much uneasiness in the bird's motions, though at the same time the tenderness of the inflamed parts is extreme. As the inflammation progresses the bird becomes weak, finally falling on its side with legs drawn close to the body. The appetite is gone and breathing is difficult.

These cases are seldom cured. Most of them are hopeless from the start. Opium pills, one grain each, given twice a day, will ease the pain and quiet the bird. All foods should be liquid, milk and beef juice, and will have to be fed to the bird. Equal parts of beef juice and milk, fed warmed to blood heat, and given in tablespoonful doses three times a day, will be the best you can do for diet.

It is seldom, however, that a case recovers from peritonitis.

BREAK-DOWN

Break-down is easily recognized as the prominent "baggy-condition" of two and three-year old hens. I have seldom seen it in pullets and never in male birds. Break-down is the result of a corn diet. The birds are not satisfied with the elements furnished in the corn and cornmeal and to supply

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the need existing in their system eat to excess. In this they get too much of the fat-producing parts and too little of muscle and egg elements. There is a large fat deposit in the abdomen, bulging and dragging down the skin and muscles, giving an ungainly appearance to the bird. It is a question to be decided on its merits at the time whether to diet these cases or to market them. They probably are salable and if cured will be worth little for breeding or egg laying. The real good to be gained from recognizing the cause of the "break-down" condition is that of avoiding it in the future. Having made the mistake of using too much of the corn products, be careful not to do the same another year.

DROPSY

This is a disease of the abdomen, or it may be a symptom of a disease in some other part of the body. There is always a collection of water or serum to be found in or between the tissues. Anaemic chicks sometimes develop dropsy as the result of filthy surroundings or incorrect feeding. The dropsy is secondary to the anaemia. Old birds may have this same condition as the result of poor surroundings or care, or it may result because of obstruction to blood flow from diseased organs, or from the pressure of tumors.

Tonics, such as mixture of nux vomica, one teaspoonful to two quarts water, or arsenate of iron, one grain to one quart of water, used as a drink for the sick birds, will help improve the general health of the fowls and sometimes this is followed by the disappearance of the dropsy. With tonics, good food, dry, sunny houses, clean yard and houses, you may look for improvement.

If the collection of fluid is large it will be well to insert a hollow needle, first boiling it in water, through the tense skin, letting much of the liquid run out, following this by giving in the drinking water one tablespoonful sulphate magnesia to each quart, and keep this up for a week, or until you see a change for the better. When this improvement begins, change from magnesia to iodide of potassium, twenty grains to each quart of drinking water. Fowls that have had dropsy are useless for breeders.

VENT-GLEET

THE CAUSE, SYMPTOMS AND ADVICE REGARDING TREATMENT

P. T. WOODS, M. D.

This arises from inflammation of the lower portion of the bowel. It usually begins by redness, and swelling, and the first symptom to be observed is a discharge first rather milky, but soon offensive which excoriates the vent and forms crusts. Vent-gleet always begins with a hen, generally

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from a broken egg, causing septic inflammation; it is propagated in copulation and hence may spread in a yard or be introduced by an infected male. A hen found with it should be at once isolated and the male carefully examined, and if necessary isolated and treated.

Treatment

Prepare a warm bath of water as hot as it can be borne on the wrist. Add to two quarts of this hot water one teaspoonful of creolin. Remove the scabs from the ulcers and immerse the fowls' abdomen and vent in this hot water and hold the bird there from fifteen to twenty minutes. Then dry the parts and apply a little unguentine to the sores and to the vent rubbing it well in with the finger. Place the bird in a clean dry coop well bedded with straw, and feed sparingly on dry grain to which a little granulated charcoal has been added. Repeat the treatment once a day until the bird is cured.

Mr. Lewis Wright recommends "a dose of 30 grains Epsom salts, and twice a day inject first a 4 per cent solution of cocaine and immediately afterwards a solution of nitrate of silver 4 grains to the ounce. The fifth day commence a small copaiba capsul daily and inject acetate of lead 1 dram to the pint. Feed rather low meanwhile and dust any sore places outside with iodoform or aristol. If not well after two or three weeks we would kill the bird as the disease is not quite free from danger, for if the operator should touch his eyes accidentally before he has cleansed his hands, the result might be a most violent inflammation.

"Many of the symptoms so closely resemble those of gonorrhoea that identity has been suspected by some, but we have never been able to detect in the discharges by any of the usual microscopical methods a true gonococcus.

LEGS AND FEET

THEIR DISEASES AND INJURIES

LEG WEAKNESS—BROKEN SHANKS—CRAMP—RHEUMATISM—SCALY LEGS—DROPSY OF FEET—BUMBLE-FOOT

DR. N. W. SANBORN

LEG WEAKNESS is seldom to be seen except in half-grown stock. It appears in growing birds, between sixteen and twenty-four weeks old, cockerels rather than pullets, in heavy rather than in light weight breeds. Behind leg weakness we usually find a history of over-feeding of fat-producing foods, or the giving of too little of bone and muscle foods, or both. Some cases have been seen in flocks fed a large quantity of condiments or "egg food." Increasing the weight of the body beyond the ability of the legs to support it, or any process that intends to gain size at the expense of time, is liable to end in leg weakness. The first symptom is a slight weakness of the legs in walking, hardly noticeable to a stranger, but suggesting trouble to one who is observant of his own fowls. The gait is unsteady, and the muscles are working at some disadvantage. In a few days the fowl may be found sitting when eating, and it is inclined to walk very little. Looking it over at this time you will find little wrong except the leg trouble. The comb is bright, eyes clear, appetite good and feathers bright and clean. As days go by, however, it presents a different appearance. It is slow to feed, gets less than its share of grain, is picked at by the other fowls, and driven from place to place, at length becomes thin and lousy, and an object of worry to the owner.

Treatment

At the first appearance of leg-weakness, reduce the quantity of fat-producing foods to a small amount. Take away corn and cornmeal, and feed little condiments. If the fowls are at all crowded in house or roosts, increase the space or dispose of some of them. Stop feeding every time you go near them, giving food three times a day, but never to crowding the crop. If possible, put the weak birds in a place by themselves, thus avoiding their being imposed upon by stronger members of the flock. Feed steamed cut clover as a noon meal, whether it be summer or winter. As is the case with all birds, clean water and houses are needed to go with improved care. Rub the legs with tincture of arnica and add one-half teaspoonful of tincture of nux vomica to each quart of the drinking water. A good brand of meat meal, containing at least one-fifth bone, should be made part of the morning mash in the proportion of one part meal to six of grain and clover. If you have peas or beans that you can boil and add to the mash it will be helpful in building up the strength of the birds.

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Mrs. V. C. Melville states: "If the bird is vigorous it will outgrow the trouble, but any treatment to be beneficial must be resorted to on the appearance of the first symptoms. For food, give bran, wheat and oatmeal; instead of water, give skim milk. Cook oatmeal, and when cool, add thirty drops of diluted phosphoric acid for each bird affected, and give twice daily. Be careful not to confound leg weakness with rheumatism. In the latter disease there is always swelling of the joints. If ducks are attacked by leg weakness, feed them more bulky food, bran, shipstuff, etc. Give them chopped vegetables. Stop giving them corn until they are strong again. Then feed in moderation.

BROKEN SHANKS

Hardly a season goes by in which we do not see a case or two of broken bones in our yards. A chick or fowl is caught in a wire fence or between pickets, and in its endeavors to escape it snaps the bone of the shank. Or a chick is run over by a team, or stepped on in the yard, and a break results.

Treatment

Breaks of this kind unite quickly if the parts are put together and kept there. For little chicks you will find common toothpicks handy for splints, while for other birds you can easily make splints of pine. Even stiff pasteboard, slightly wet when applied, will do good service. Take a bandage of cotton cloth, wide enough to cover the length of the shank, wind it around twice, then put the splints outside and finish by winding the cloth round three times more. With needle and thread sew the edges of the bandage that it may remain in place. The younger the bird the sooner the splints can be removed. Other broken bones, such as those of wings or thighs, are hard to handle and such cases are best suited for the cook.

CRAMP

Cramp is an affliction of young chicks, somewhat as leg-weakness is to half-grown birds. Cramp is caused by overheated brooders, too many chicks for the size of the brooder and too little exercise. The prevention as well as the cure of this discouraging condition is summed up in a few words—have larger brooders or fewer chicks in each brooder; heat the brooders so that the chicks will spread out on the floor of the hover, avoiding crowding to keep warm; lastly, furnish chaff enough to make every chick work to get its grain. Sand or earth will do if you cannot get chaff, but a small clover cutter will soon cut you enough fine hay or straw to fill half a dozen brooder pens. Exercise of itself will do very much to prevent the appearance of cramp in young chicks. Cramp seems to be a weakness of the muscular system from over-weight of the other parts of the body, too little use of the muscles themselves and too rapid growth of the bones.

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RHEUMATISM

While this is a disease affecting all parts of the body, the prominent symptoms are those located in the legs. Rheumatism presents some rise in temperature, swollen joints, contraction of some of the muscles and pain in motion. Rheumatism may result from long exposure to cold and moisture. It may be produced by the over-feeding of meat, induced through the the under-feeding of vegetable foods, and is helped along by previous rheumatic tendencies of ancestors. Rheumatism is most likely to appear during damp winter weather in adult birds, and during the brooder stage of chicks.

Symptoms

The early symptom of rheumatism is contraction of some of the muscles of the legs. This generally draws up the toes and flexes the shank on the knee. Trying to straighten the limb hurts the bird. There are inflammation and pain enough in the muscle or joint to cause the bird to try to get ease by sitting most of the time. An acute case of rheumatism, attended by high temperature, is sometimes complicated by an effusion of liquid into the sack covering the heart, disturbing greatly the heart's action. These cases often die suddenly and without apparent cause. The heart complication is unsuspected until made evident as the result of an examination after death. Rheumatic cases also present congested livers, especially in chicks. Fowls are subject to rheumatism, but the fatal cases are few. Brooder chicks exposed to the evils of a damp soil or dark, cool hovers furnish many cases of rheumatic trouble, the losses from the disease being large.

Treatment

The suggestions for treatment also indicate the line to be pursued in the prevention of rheumatism. The fowls should be housed in dry and sunny quarters. Give as large a variety of green vegetables as possible, not forgetting clover in the mash. Provide easy access to grass if in the growing season. The water dishes should be protected to keep the birds and floor as dry as possible. Rheumatic brooder chicks need an even temperature of the hover, some facilities for scratching, enough sand or chaff on the floor to lessen bottom heat, and water dishes arranged to keep the chicks dry. The chicks must have daily feeds of lettuce, cabbage, or some green vegetable. In the winter season, turnip or carrot tops, the little shoots that start on the roots when in the cellar, will be found to be useful. Finely cut clover, and the clover tea to mix the mash, are also helpful at any time of the year.

Swollen joints or muscles can be rubbed with tincture of opium or extract of witch hazel, or bathed with weak alcohol. For internal treatment there is no better remedy than iodide of potassium. This is given in the drinking water, for chicks and adult birds alike, fifteen grains of iodide of potassium to every quart of water. Give in small dishes, so that

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it all may be used while fairly fresh, and thus avoid waste that comes from having to throw away any because it is mixed with dirt or leaves. Common cooking soda, one level teaspoonful to each quart of drinking water, or salicylic acid one grain twice a day, has given good results with old birds, but the iodide is the best and most satisfactory.

SCALY-LEGS

Scaly-leg and fish-skin disease resemble each other, but are totally different in causation. The first is the result of the irritation of a parasite, the second a constitutional defect. Scaly-leg is decidedly contagious, while fish-skin disease is perfectly non-communicable. Scaly-leg does not appear without the irritation due to a parasitic insect. This parasite comes from another fowl, or possibly from an infected house or brooder, and works its way in between the scales of shanks or toes. As a result the scales are irritated, pushed apart, and dirt begins to accumulate. The irritation of the filth, added to that of the parasite, produces a disgusting appearance of the legs. Scaly-leg introduced into a flock well cared for does not do as much mischief as when it appears in a lot of fowls kept in dirty houses. Scaly-leg passes from diseased to well birds on the roost, or is contracted by chicks when with the mother hen. A single case of scaly-leg on the plant is a source of danger to every other bird.

If a little of the scurvy looking material is scraped off and examined under a magnifying glass, a few trials will surely show the little parasite. Knowing what you have to handle, do not put off treatment, but clean up the disease at once. Scaly-leg is so easy to cure that no intelligent poultryman is excusable for its presence on his place for over a week. Every bird bought ought to be examined for scaly-legs and any doubtful one receive immediate treatment. If you at any time find several cases on hand I would advise the applying of the proper treatment to every bird on the place. This is not much trouble and prevents the cropping out of new cases in a short time.

Treatment

A good ointment to kill the parasite is made of one ounce of sulphur and ten tablespoonfuls of lard or vaseline. Rub this into the rough parts of the shanks and toes every other night for a week, and give one more application about three weeks from the first treatment.

Another good method of proceeding is to fill a common wooden pail nearly full of water, adding one gill of kerosene oil carefully so it will float on the surface. Then take each bird and dip both the legs down through the oil into the water, holding for half a minute and then slowly withdraw. Repeat the treatment in four or five days. If the birds have feathered shanks be very particular in drying the feathers, as they will hold the oil and cause the bird much discomfort by irritating the legs. If the shanks are allowed to soak in pure kerosene you are likely to have swelling and inflammation of the parts. Avoid the danger of scaly-legs by keeping

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the birds from sources of contagion and especially be diligent in having all houses clear of filth.

According to Dr. Woods the best remedy is to use a saturated solution of naphthalene flakes in kerosene. Dissolve in kerosene all it will take up of the crude naphthalene flakes. Dip the legs in this solution, being careful not to get the fluid on to the soft parts as it will blister if it reaches the tender skin. Give the treatment in the morning. After dipping the legs wipe off any excess of the fluid and put the bird in an outdoor run, or down in the litter where it can go to exercising. Do not permit the bird to go to roost or to squat down in a dark place, as the legs wet with kerosene will saturate the feathers along the breast and thighs with kerosene, and if the bird remains quiet in a warm place for any length of time with the wet legs against the body it will cause blistering, just as kerosene applied to the human body on a piece of flannel would raise a blister. Please be careful in this regard when using this remedy for scaly-legs. The bird may need more than one treatment. Give treatments one, two or three days apart according to the severity of the case. If carefully applied the remedy will effect a permanent cure and prove entirely satisfactory. After one or two applications the scales will come away quite easily. When the legs are fairly clean they should be washed in soap and warm water.

DROPSY OF FEET

This may be due to a gouty or to a sluggish condition of the circulation. Anything that holds back the return circulation of blood, whether a congested liver or pressure of a tumor, tends to increase the size of shanks and toes. Freezing of the feet is followed by a dropsical state of the parts involved. Crowding with food, or furnishing no incentive to exercise, tends toward appearance of this trouble. Unless there is serious organic disease that causes enlarged legs, plain (unstimulating) food, green vegetables in abundance and a dose or two of castor oil will improve and probably cure the disease. As the legs reduce in size, provide more and more exercise to stimulate the functions of the entire body. Brooder chicks, developing this condition, need to be fed their grain in barn chaff or finely cut straw. Overfeeding and no exercise are the usual causes of dropsy of the legs of growing chicks.

BUMBLE-FOOT

Bumble-foot is a tender, inflamed condition of the bottom of the foot, involving the tissues lying beneath the skin and usually is accompanied by the formation of matter. In the very beginning of bumble-foot there is a slight thickening of the sole of the foot, with some tenderness of the irritated layers. Pressure is increased, the blood supply is shut off, pus forms and has a tendency to work out into other parts of the foot or leg. In most cases bumble-foot seems to be the result of a bruise, as the general belief of poultrymen is that it is caused by jumping from the high roost onto a hard floor. I have known several cases where the birds have never been

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allowed to roost at all. I have always thought that every case of bumble-foot was caused by an irritation of some foreign body, such as splinters, bits of glass, or briars, or from germs introduced through the skin by some puncture by one of the substances named. I have looked for foreign bodies, but never found any except glass. A bird with bumble-foot limps slightly, as though it hurts to press the sore part on the ground. If resting, it is inclined to stand on the well foot. If walking, it hurries to get from the bad to the good leg. As pus forms the limp is decidedly pronounced and diagnosis ought to be easy without examination of the sore foot.

Treatment

A case caused by a simple bruise is often aborted by washing the foot in strong vinegar, or painting the thickened skin with tincture of iodine. Most of the cases that have come to our attention had developed pus. These should have the pus cavity opened with a clean thin knife, the matter washed out with carbolized water, and the entire surface of the cavity itself painted with a solution of nitrate of silver—ten grains to one ounce of distilled or rain water. Bumble-foot cases are often neglected until the bottom of the foot gets into a condition of chronic inflammation that is hard to relieve. Fowls that have had the pus cavity opened should be kept on clean, dry straw for a week. Many cases have had bad results from treatment because obliged to walk about in the filth of the yard or house. The cut opens the tissues to the dangers from germ life, and it is little wonder that many cases have to have the pus discharged over and over again.

THE SKIN

THREE SKIN DISEASES

CHICKEN POX—ECZEMA—FISH-SKIN DISEASE

DR. N. W. SANBORN

WE SELDOM have cases of chicken pox among our adult birds, but run across it in the autumn of the year in the nearly matured stock. Cold, damp, dark days increase the number of cases and intensify the disease. While the eruption may appear on any part of the skin of the bird, we usually see it on the face or underside of wings. These places are easy to get at, and from the character of the eruption we name the trouble. The eruption may extend to the eye balls, or appear directly on them, and may cause loss of sight, if not destruction of the eye balls.

Chicken pox is known by the scabby ulcers appearing on any part of the body. These ulcers exude a liquid that is inclined to dry on the surface and present a scaly, dirty coating. The sores present themselves in crops, and have no great depth. Unlike white comb, they do not present at first a fine white point. Along with the coming of the eruption the bird shows more thirst than common, and a slight rise of temperature.

Chicken pox does not prove fatal unless there is a marked lack of care in housing and feeding. Birds kept dry and out of cold winds on simple, nourishing foods, need little medicine. If chicken pox appears during a long continued storm in the fall of the year and the birds are not kept from exposure to it, there is likely to be large death rate.

For the eruption there is nothing better than common carbolated vaseline. Feed a simple mash of at least one-third clover mixed with boiling milk. See that all damp scratching material is promptly removed and dry straw supplied in its place. Avoid exposure to cold and wet.

FISH-SKIN DISEASE

This resembles scaly-legs in as much as it presents a dry, rough appearance of the covering of shanks and toes, with more or less dirt worked into the spaces between the scales. There is no insect life at work in this trouble, but it is due to some disturbance of functional action of the bird. It is not passed from bird to bird, but it does seem to be inclined to appear in certain strains, as if heredity played a part in its coming. The skin of shanks or toes seems to be lacking in oil, and presents a dry, scaly appearance. There is some irritation of the surface, leading the birds to picking or scratching the parts, thereby increasing the difficulty.

Daily rubbing with an ointment (oleate of zinc, one teaspoonful, to vaseline, five teaspoonfuls) will soften the dry scales, remove the itching

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and improve the appearance of the legs. Changes in diet have not seemed to make any improvement in these cases, and the local treatment is all we can pursue.

ECZEMA

I have sometimes thought there was no difference between eczema and white comb, and yet we seldom see the two diseases on the same fowl. Eczema is a disease manifesting itself in the skin, yet due to a constitutional cause.

It is caused by the over-feeding of a highly nitrogenous ration, by lack of excretion, or from closely inbred birds of a rheumatic tendency. The disease is never passed by contact from bird to bird. It is not contagious.

While eczema may appear on any part of the skin, the usual seat of the disease is the wattles. I am not sure but it appears at the same time on other parts of the bird, but being covered by feathers it does not attract our attention. On the wattles it attracts our notice by the appearing of fine white points. These are slightly raised and seem to have just the thin skin over them. They continue to increase in size, new points appearing, the contents becoming thinner and slightly lighter in color. When several "points" have united, the skin bursts, the fluid runs out and dries on the surface, forming a scurfy crust. In severe cases the discharge has been noticed to irritate the skin of the shanks and toes where it falls on them. Fowls with eczema present a tired appearance and a marked loss of appetite.

Treatment

These cases need an improved diet. The mash should contain a good proportion of cut clover, green vegetables should be fed liberally, and there should be very little meat fed in any form for weeks. Green cut bone, free from meat, will be helpful in building up the fowl.

One grain pill citrate iron and quinine every morning and one grain calomel at night for one week will help clear up the constitutional condition, and increase the health of the bird.

Apply to the diseased wattles several times during the week the same ointment as recommended for white comb.

Dr. J. W. Hill recommends as a treatment: "Ten to twenty grains of sulphate of magnesia and a grain of calomel, followed by three grains of carbonate of iron twice a day in a teaspoonful of water.

"Locally—The application of benzoated oxide of zinc ointment twice or thrice a day, or, in severe cases, when the scabs are hard and firmly attached, they may be removed, after first softening with hottish barley water, and the parts dressed with the following preparations: Oxide of zinc and olive oil, of each half ounce; tincture of arnica, two drachms; spirits of camphor, one drachm; carbolic acid, pure, ten minims; rose water, seven ounces. To be applied with a feather or brush three or four times a day."

PARASITES

INSECTS AFFECTING POULTRY

LICE, MITES AND FLEAS—HOW TO FIGHT THEM—FORMULAS FOR LIQUID LICE KILLER AND A GOOD LICE POWDER

P. T. WOODS, M. D.

IN THE spring, the fowls, having been more or less confined to limited quarters during the cold weather, are almost certain to be quite lousy, unless their owner is more careful than the average poultry keeper.

Lice are "in season" twelve months in the year, but when the fowls are enjoying outdoor liberty, the pests are less troublesome. In the spring, too, the vermin are a menace to the growing chicks. Ask almost any poultryman whether his fowls are lousy, and the answer will be cock-sure "No!" Ten times out of ten, he is mistaken. I never saw an adult fowl that I would be willing to guarantee to be free from lice. When you feel very certain that your fowls are free from those troublesome "guests," it is a good time to be on your guard. Many of the vermin are a disgrace to any poultry keeper. It is easy to keep a flock practically free from them.

There are many varieties of lice, mites, fleas and other insects affecting poultry, but it is not necessary to be familiar with the biography of each in order to combat them successfully.

LICE

The true lice are the long-bodied, six-legged vermin which live on the body and among the feathers of the fowl. They vary in color and shape according to the variety of the louse, but their effect on the fowl is practically the same. They do not suck blood, but feed on the plumage and scales of the skin of their "host." They may drink blood or serum which exudes from abrasions of the skin, but they possess no sucking organs. Each louse possesses a pair of sharp claws on each foot. They are a source of great irritation to the fowl and, on birds having a tender skin, may cause troublesome skin disease. Their presence frets and worries the fowl, and interferes with sleep and the proper performance of the normal functions of the body. The lice may also act as carriers of disease. Many lice on a young chick may result in dumpishness, loss of appetite and stunting or death; on adult fowls, the result may be falling off in egg yield, susceptibility to disease, infertile eggs and damage to plumage. The eggs of lice hatch in from one week to ten days, and the young mature quickly. Lice are rapidly spread through a flock by contact with a lousy fowl. Wild birds, pigeons, parasitic flies and persons fresh from visiting lousy fowls may act as carriers of lice, and so spread the vermin from one flock to another.

PARASITES

In looking for lice on a fowl, examine the head feathers carefully, one by one, then look under the wings and along the shafts of the under side of the large wing feathers, examine the feathers of the cushion and saddle down to the skin, and then turn the fowl quickly and look beneath and around the vent. If you have eyes to see, you will find them. If you find only one or two, a thorough dusting of the bird will be all that is needed, but if the lice are plentiful, more vigorous treatment will be necessary. Lice breed on the fowl among the feathers where the warmth of the bird's body can hatch the eggs, which are deposited singly or in clusters among the soft feathers. They seldom if ever breed on young chicks, but are passed along to the chick by some lousy adult bird.

MITES

The most common is the red or gray mite, which breeds in cracks and crannies about the poultry house. It will be found wherever filth is allowed to accumulate, breeding under heaps of manure, in cracks or joints of the roosts, in filthy nests and dirty straw. The adult mites are oval-bodied, eight-legged little pests, with habits like a bed-bug. They suck the blood of the fowls, sallying out from their homes in the cracks to feast on their victims. They are white or grayish when empty, and red when full of blood. They are dangerous to the life and health of fowls of all ages, and are a disgrace to any poultry keeper. There is no excuse for harboring them. It is possible to keep the poultry house entirely free from them. They can live almost indefinitely without poultry to feed on, and are commonly found in old, filthy poultry houses. They attack farm animals and human beings, and on some produce an irritating, itching skin eruption. They drive sitting hens from their nests and kill chicks.

FLEAS

Two varieties of fleas are common to poultry. The common hen flea which breeds in the nests, cracks and dark, dusty places about the poultry house and attacks fowls and chicks, tearing and biting their skin, and sucking their blood. The female of this variety buries itself in the skin, and produces a warty growth, which may in time come away and leave a scar like a burn. Their favorite seat of attack is the bare fleshy part about the head, and if the fowl is attacked by many of these insects at once, it may die.

Prevention

The general rules for prevention and riddance of these pests are the same. If eggs are hatched in clean incubators, and the chicks reared in clean brooders, and thereafter kept in clean houses and free from contact with lousy or vermin-infested birds, they will be practically free from lice, mites or fleas. No fowl should ever be added to a flock until it has been quarantined and treated with remedies for lice. It does not matter whether you see lice on it or not. It should receive treatment on suspicion. For

RELIABLE POULTRY REMEDIES

general preventive measures, the following are the best: Have the poultry house clean, well-aired and well-lighted, get sunlight into it as much as possible. Provide a good dust-bath in a sunny part of the house, and change the dust often. Keep the roosts and droppings boards clean and well kerosened. Whitewash the house and the nests inside and out several times a year. If you object to whitewash, use some of the creosote wood preserving paints. Dust the fowls when ever the lice are found, and do not be content with one dusting. Give at least three thorough dustings about a week apart, or use a liquid lice destroyer. Brooders should be well washed with warm soap, water and kerosene, and thoroughly dried before being used or put away. A good, plain hot whitewashing improves them.

HOW TO FIGHT VERMIN

Remember that lice are on the fowl, down deep among the feathers and treatment, to be successful, must reach them. The mites and fleas are to be combatted in their breeding places. Whitewash, sunlight, lime in the dust and soapy water in the dark, dusty places under bushes and trees will exterminate the fleas. Hot whitewash, kerosene, creosote paint or kerosene, with naphthalene or a little creolin applied to the abode of the mites will destroy them. Dusting the fowls thoroughly, or using some good lice killer will keep the lice down so that the fowls are practically free from them. Nearly all the commercial dusting powders, are good; those containing tobacco dust or Persian insect powder are the best, as these are poisonous to the lice.

An ounce of creolin in one quart of kerosene makes an effective remedy for mites and fleas. Applied to roosts, droppings boards and nests, it will destroy and keep away vermin. A good liquid lice killer may be made by dissolving in kerosene all it will take up of crude naphthalene flakes. This is an excellent liquid to apply to roosts to destroy mites. To use it to destroy lice on fowls, make a box frame, without top or bottom, large enough to hold several hens, and fit on the droppings board. Provide a burlap cover for it. Place the frame on the droppings board, and paint the droppings board, which serves as the bottom of box, well with the liquid lice killer, also sprinkle a little on the burlap. Put the hens to be treated into this box, and cover with the burlap. Leave for half or three-quarters of an hour, and the lice will be found dead and dying on the bottom of the box, and the fowls comparatively free from them. Three treatments, one week apart, will be sufficient in most cases. The burlap should be coarse enough to admit fresh air to the fowls, and is intended only partially to confine the fumes of the lice killer. If the burlap is made longer than the box and tacked on at one end, the loose end being longer and free to lap over end of box, it can be easily held in place with a brick or two. The odor of the lice killer or the creolin and kerosene mixture will, if applied occasionally prevent mites from harboring about the roosting places. Four fluid ounces of the lice killer added to a half peck of finely sifted coal ashes mixed with half a peck of tobacco dust, makes a cheap and effective dusting powder after they are well mixed

PARASITES

and dried. Another cheap powder can be made by adding half an ounce of 90 per cent carbolic acid to a peck of thoroughly air-slaked lime; stir and mix well, and then mix with an equal bulk of tobacco dust.

In dusting a fowl, thorough work is the thing that counts. The dust must be thoroughly worked into the feathers all over the body. Dust the fowls, three times, one week apart, if you wish to be successful. In this way you catch any lice that may have been overlooked or that hatched after the first dustings. A two per cent ointment of creolin with lard makes an excellent preparation for killing lice on the heads of young chicks. A little of it goes a long way.

Don't harbor vermin in your poultry house or on your fowls. It is not only slovenly, but it decreases profits by injuring the fowls. A little effort will keep fowls practically free from lice, so much so that you cannot find any on the birds without a close and careful search. Perhaps you can secure entire freedom from them. Mites and fleas and kindred pests you can get entirely rid of if you want to. These last are the most dangerous insect pests.

CHIGOES

An insect altogether too common in warm climates is the chigoe known locally as "chigger." It breeds on weeds and when fowls are allowed the freedom of weed covered runs, this tiny red insect takes up its habitation on the tender parts of the bird's head, where it burrows into the flesh and eventually dies. This infection produces an eruption similar to chicken pox. Much of the so-called "sore head" of the south is the result of this pest. Some local poultrymen hold to the theory that it is due to the bite of the mosquito while others claim it is the sand flea.

Treatment

The first thing necessary is to remove the cause. Cut down the weeds and disinfect the runs. To kill the chigoes on the already infested fowls, apply sulphur and lard or some other good ointment. Iodoform and vaseline is good. The grease smothers the insect in its new home.

OBJECTIONABLE HABITS

EGG AND FEATHER EATING—DE- PRAVED APPETITES—CANNIBALISM

USUALLY the poultryman can blame his own carelessness when his fowls contract any of the following habits, habits that are not only annoying but productive of real loss. Improper feeding, indifferent care, overcrowding are fruitful sources of trouble. Make your fowls scratch for grain, keep the houses and runs clean, provide all needed variety of food, give them regular attention and you will not be confronted with these abnormal conditions.

EGG EATING

Egg eating is a bad habit, usually caused by over-crowding, lack of exercise and the use of low nests that are open to the light. Where open nests are near the floor the birds get into them, scratch about in the nesting material, and so break the eggs, after which the habit of egg-eating is quickly formed. Frequently the habit is started by the birds finding a broken egg under the roosts. They eat this and acquire the taste for more.

Treatment

The most satisfactory remedy is to place the nests in the dark and have them elevated at least two feet above the floor. It has also been recommended to trim the bird's beak until it is tender and then leave a few china eggs lying about on the floor. A few pecks at these eggs with the tender beak is quite apt to break them of the habit. This treatment is rather cruel and when used the birds should be fed their food in a trough or enough of it so they will not have to pick it up from the hard floor, or feed soft food.

Quite often it is almost impossible to break the bird that is a confirmed egg eater as she will stand on the edge of the nest and wait for the others to lay and at once devour the newly laid egg. We have seen this overcome by cutting a hole in the center of the nest bottom and arranging the bottom so that it will slope toward this hole. The egg when laid will roll through the hole and drop onto a piece of cloth placed a few inches below on a slant so that the egg will roll out of the way of those to follow.

FEATHER EATING

A very bad habit, usually the result of over-crowding and insufficient exercise, is feather eating. It is much more prevalent during the moult when the young feathers furnish the animal food and salt the birds crave. It can often be remedied by giving the birds a good feed of bologna sausage which provides the meat and salt needed. Keep the birds busy

OBJECTIONABLE HABITS

working for the greater portion of their food, and see that they get the animal food they require. Anoint the feathers about the picked area with an ointment made by adding a teaspoonful of extract of aloes to a cupful of lard, rubbing the same well together. After one or two bitter doses of feathers thus treated, the birds will usually stop pulling and eating them. In some cases it is necessary to get rid of the feather eating birds or else use "poultry bits." These bits are simply pieces of soft leather sufficiently large to prevent the bird from closing its beak on a feather, but not large enough to interfere with eating. They are held in place by a fine wire passed through the nostril. These bits can be made at home, but can also be obtained through dealers in poultry supplies.

DEPRAVED APPETITES

Fowls quite often develop the habit of eating every filthy thing they come in contact with, drinking from stagnant pools and barnyard filth. Young chicks will eat their droppings, etc. This is what is known as a depraved appetite and is caused by some digestive disturbance or their inability to get pure, fresh water and food to eat and drink.

Give such fowls and chicks a good grass run. Supply a little fresh raw beef daily. Keep a dry mash and pure, sweet beef scrap where they can have access to it at all times.

CANNIBALISM

Chicks often develop the habit of pecking at each other's toes, eyes, etc., sometimes with serious results. They have been known to kill and eat their companions. This is cannibalism and is generally caused by too close confinement and an insufficient supply of green and animal food, particularly a lack of green food. Another cause given for this "toe picking" is that of feeding soft or wet mashes so that the chicks can get into it with their feet. This mash gums up or forms little balls on the toes of the chicks and in picking at it they draw blood and thus form this bad habit of picking each other's toes. The habit once formed is difficult to control and the worst offenders should be at once removed or killed.

Treatment

Divide the chicks into flocks, not over 25 or 30 each, provide them with litter of mow sweepings, cut clover or alfalfa to scratch in, and see that they are plentifully supplied with granulated bone and beef scrap in addition to their grain food. Keep charcoal always before them. You will find it advisable to hang up a strip of fresh beef flanks for them to pick at. If they can be kept from picking one another until they are full feathered out the trouble will undoubtedly cease except in the case of a few individuals that might as well be killed.

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