RELIABLE POULTRY REMEDIES

Poultryman's Hand-Book of Tried-and-Proved Remedies for the Common Diseases of Poultry. . . . . .

SIXTH EDITION.

PRICE, 25 CENTS.

PUBLISHED BY THE
RELIABLE POULTRY JOURNAL PUBLISHING COMPANY,
QUINCY, ILLINOIS.

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INTRODUCTION.

THIS little book was first published more especially for the benefit of the friends and patrons of the Reliable Poultry Journal. It was not put forth as a money-making scheme, except as a time-saver. We were led to publish it on account of the hundreds of letters received each year from readers of the Journal, asking for advice and help in the care and treatment of their poultry, both in health and sickness, and owing to our inability to give them in the short space of a "reply by mail" the help they needed. It is hoped this book will be of real service to them. In later editions the size of the pages has been materially increased, still they are but half as large as the regular size of the other books issued by this company, because of the greater convenience in handling this sized book in the chicken yard.

A number of remedies given for the same disease need not confuse any one. 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. So in doctoring sick chicks and fowls, use whichever remedy is at hand. Time is often an important factor in a cure.

We expect to continue to revise and re-issue RELIABLE POULTRY REMEDIES from time to time, with a view to improving it, and we ask the co-operation of interested persons. Reports, therefore, of your success in applying the remedies given in this edition, also new remedies that you have tried and found to be good, will be much appreciated.

Fraternally yours,

RELIABLE POULTRY JOURNAL PUB. CO.

Quincy, Ill., April 1, 1901.

STANDARD POULTRY BOOKS.

In the back pages of this book will be found a description of the other books published by this company and of the American Standard of Perfection. We present this list of books with pleasure and confidence—pleasure that we can serve our friends and patrons, confidence that in these books we have given to the public the best thoughts and experience of the leading authorities on the different subjects. To the beginner the books treating of the subjects most interesting to him, will be almost invaluable, while even the veteran in the poultry business will find much to interest him and we doubt not, some new knowledge.

PREVENTION AND CURE OF POULTRY DISEASES.

An Exhaustive Treatise on the Diseases Common to Fowls, both Old and Young, with Causes, Symptoms, Treatment and Remedies.

DR. N. W. SANBORN.

IN RECENT years we have been handling poultry ailments from the wrong end. Too many times we have sought a remedy for a disease when we should have learned the cause that produced the condition so as to avoid it in the future. For every inch of space given in poultry journals to prevention, one hundred have been devoted to remedies and cures. This is wrong. There is more satisfaction and profit in keeping healthy poultry than in curing sick birds. With sick birds we not only have the care and expense of the cure, but there is the loss of production during the time, as well as the still greater danger of having on hand birds weak in vitality when the hatching season arrives. The corner stone of successful poultry keeping is healthy stock. Healthy birds will grow well, lay satisfactorily and reproduce themselves, while sick birds are a source of trouble to the owner. We can only think of succeeding with poultry when we have learned the causes as well as the cures of poultry diseases. The man who is constantly asking about his sick birds is not getting financial returns from his plant, and probably counts himself among those who are having "bad luck." Too many beginners with poultry fail because they start with birds that have not the vigor of well-bred stock. Too long inbred, late-hatched, weak stock never give good results. It does not pay to breed from a bird that shows a tendency to weakness, no matter how high it may score. Every breeder should be sure that his stock is healthy and that it was bred from healthy stock, and his chicks will have vigor.

Inbreeding and Its Limits.

Inbreeding may or may not be a factor in causing disease. The mating of two perfectly healthy birds can be expected to give good results. The danger is that both birds may have a tendency toward a certain diseased condition and the mating will intensify the trouble in the chicks. To a certain extent it is right for the poultryman to inbreed but the more he practices it the more sure he must be that he is using only strong, well birds. The beginner in keeping hens should buy fresh blood every year until he has learned to succeed with common matings. It is not necessary to "have all kinds mixed," as a woman

recently said to me. The day of the barnyard fowl is passed. The standard-bred bird of to-day is stronger and gives more eggs and pounds of meat than did the bird of our childhood. Every fancier can help along the bird of his choice by keeping it high in strength and vigor. Study your birds. Learn their weak points and strive to overcome them. Much has been done along this line, but there is yet much undone. The fancier deserves more praise for what he has done in successful poultry keeping than has generally been given him. Let not the utility breeder despise the fancier, for they are more nearly related than they think. See what has been done with the horse and cow in past years, and let us not be satisfied with the hen until we have attained as good results. Inbreeding is a subject that has attracted a deal of attention and there has been much contention over the questions involved. Volumes have been written and the ground gone over thoroughly, yet the last word to be written seems far in the future.

Care Required in Feeding.

Wrong feeding is another prolific factor in producing disease. The best stock, if fed incorrectly, will give only indifferent results and is sure to develop some form of sickness. There is no "best ration" to suit all breeds, all ages, all seasons or conditions. Along the line of careful study in poultry feeding very little has been done. Here and there a breeder has done good work, but it has been lost because not reduced to writing. Experiment stations seem to have forgotten that the poultry industry produces more wealth than any other branch of agriculture. Hundreds of thousands of dollars have been expended on the study of cows and their feeding (well spent, too), but time and money should have been given to the investigation of poultry. Stations in New York, Utah and especially in Rhode Island, are to be commended for the good already accomplished and for the promise they give to devote more time to this important economic subject. Rhode Island is not only working out these problems and putting them in print, but is also impressing them directly upon the minds of poultrymen through its winter class in "poultry culture."

Right feeding will eliminate much sickness. Overfeeding induces a plethoric condition of the bird which is liable to be followed by indigestion. On the contrary, the giving of a ration insufficient in food value produces an anaemic state of body which furnishes a good breeding ground for disease. The use of a diet lacking in any of the elements needed to sustain life and produce paying results, or the feeding of a ration in which an over supply of one of the elements is given, disarranges the animal economy and brings dangerous results from a healthful standpoint. Feeding a strictly grain diet, without any bulky food, will in time tell upon the bodily condition of the bird. Fortunately a bird with half a chance will manage to find waste of some kind, even though it be old leaves or chaff. A hen needs "filling" just as much as a cow, and it is as much common sense teaching to advocate the giving of clover hay to one as the other.

Necessity of Grit.

Another pitfall to healthy poultry is a lack of grinding material. To give good grain to your birds and then have it wasted because they can not find sharp grit to grind it with is poor economy. A short time ago I saw a flock of four-months-old chicks dying because they were unable to reach grit. In some sections of the country there is little available grit, and it is important to health as well as to profit that grinding material be supplied. Some of the so-called cases of cholera are simply indigestion and diarrhoea from lack of grit.

Impure Water a Disease Breeder.

Impure water is a cause of many sick birds. All birds drinking bad water do not become sick. If they did, the letters to poultry editors asking what to do "for my sick birds" would be too many to answer. Towns and cities known to be healthful are sure to have a pure water supply, and poultry plants that are known as producers of sturdy birds are careful to supply clean water. Not only must good water be given, but the dishes must be kept free from filth. Water is so cheap, and so easily given, that it seems a pity that so many seem to think it is something to be supplied or not, as is convenient. Hens insufficiently supplied with water are poor layers, and if the available water is bad they are in a condition to contract disease because of their lowered vitality. Filthy water is a good carrier of catarrh, roup and cholera germs. Cleaning daily the water dishes and giving fresh water diminishes the danger of these severe diseases getting a foot-hold. Many a promising lot of brooder chicks have died solely owing to being obliged to drink warm, filthy water, while the owner of the birds comforted himself by thinking that the diarrhoea must have been owing to a "cold."

Filthy or Wet Quarters.

Filthy brooders, houses or yards are a constant source of danger to any flock. To be obliged to breathe the air of a long uncleaned brooder, or to pick up grain or mash from a dirty floor, is to run a risk too great to be safe. Houses that are strong smelling from uncleaned dropping boards and damp, filthy floors are hotbeds of disease. Yards that are sticky with filth after every rain are not to be desired from a healthful standpoint. Filth in any form is a constant source of danger that should at all times be guarded against. Many of the acute diseases that take off whole flocks find the best conditions present in filthy surroundings.

Excessive wet or dampness presents a favorable breeding ground for some diseases. The location of a poultry plant upon or even near wet soil is to be avoided. A hen keeps in best working condition when yarded and houses upon light, sandy soil. If already settled in a damp place something can be done by draining and filling, but there must be constant care to overcome the unfavorable circumstances. It ought not be necessary to speak of dampness from leaky roofs, but I find too many poultrymen that are careless in this respect.

Houses need to be carefully watched at all seasons of the year, espe-

cially in winter, to see that no opening comes to let in water. The snow often dams up near the gutter and if the roof is not well covered the water will work in and wet both scratching material and earth floor, which is likely to be followed by catarrh or roup.

When building upon hillsides see that the natural flow of surface water is not against the building. I have seen a house, one hundred feet in length, thoughtlessly placed so that in winter the water would dam up behind it thirty feet wide, finally working under the foundations and flooding nearly all the pens. It upset all cherished plans for winter profit, and led, I think, to the plant being offered for sale through a real estate broker. Heat, moisture and filth are to blame for many failures in poultry keeping. Even the frost, which collects in winter under the roof boards and on the walls, may be the cause of trouble. There is only one way to avoid this serious condition of affairs. Ventilate thoroughly during the day, getting the house dry, and there will be little accumulation of dampness during the night. I have seen long houses built with single windows to each pen so damp as to cause severe colds. The burning of oil stoves in these houses had little effect, and the moisture was finally overcome by cutting large doors in the front of each pen, giving free ventilation all day. The scratching shed houses are seldom troubled by this cause of dampness.

Cold and Heat.

Cold and heat are important factors in the production of disease. Of the two, heat is more to be feared than cold, and at first thought it it is a strange fact that heat in winter is the cause of disease. An ordinary hen house, with only one window to each ten feet of length, unless carefully aired during the day, will get so hot at noon on bright days as to be almost unbearable. To the hen in her winter coat this heat is very debilitating, and exposure to draft or cold is often followed by catarrh or bronchitis. It is safer to have a dry cold house than one that is alternately hot and cold. Better an open front and no windows than plenty of glass and close, hot air. If the hens are kept busy during the day scratching for grain, the exercise will give them heat, and their warm coat of feathers will keep from harm all birds of rose comb varieties. Some of the most healthy birds I ever saw were wintered in open front houses, in which the doors between the scratching and roosting rooms were never tightly closed. These birds during the blizzard of last season continued to lay as if they were unconscious of weather changes. A warm house is not to be desired, if it is to be had by the use of too much glass or close air. The close-air, warm house is the one that is cold at night. The shut-in damp air is a good conductor of heat and the warmth is rapidly radiated during the night. Birds exposed to the great changes of temperature between day and night are fit subjects to all catarrhal diseases. I would not be understood as advising the use of open-front houses, but between the tight front and the open-front house there is a medium worth seeking. The more glass in front, the more need of careful ventilation.

Overheating From Crowding.

Crowding on the roost, because of too large numbers, produces an overheated condition favorable to colds, and this is as true in summer as in winter. Extremely low temperature will produce frosted combs and throw the birds off their laying. Tall-combed birds need warmer houses than those with low combs, but warmth must never be had from crowded quarters or close air. Unless you can keep your birds comfortable in a house without artificial heat, dispose of them and get a variety with comb and feathers that are safe in your climate.

Drafts and Imperfect Ventilation.

Drafts are a source of danger to healthy stock. A broken pane of glass, or a crack in the wall, will let a current of air in on a bird that will do more mischief than seems possible. There is less danger from the breeze that may blow through an open shed than a draft through a small crack. The warmer the house and more crowded the birds, the greater the danger of disease. Ventilators are the cause of many colds, because they are commonly arranged so that snow or rain find their way in on the birds. A house that is well aired during the daytime and is kept clean and is not crowded with birds. seldom needs any ventilation at night. A house that is stifling to go into in the morning generally needs better care of floors and dropping boards, rather than the introduction of more air.

Too Many Chicks in a Brood.

The crowding of chicks with the mother hen or in the brooder produces sorry results. It is seldom wise from a healthful point of view to put over fifty chicks in a single brooder or to give more than twenty to a hen. A larger number are sure to be crowded, if indeed they do not crowd themselves, the chicks inside the mob becoming hot and damp and taking cold when exposed to the outside air. This summer I saw one hundred and fifty chicks given to three hens, and after two weeks' experience the owner was glad to take my advice and remove the hens. The chicks crowded less without than with the hens. Of course if it had been earlier in the season the chicks could not have got along without some outside heat.

Foul Air and Filthy Quarters.

A factor in the causation of disease is foul air. This may come from having too many chicks or hens for the size of the house, the air being breathed over and over again, and becoming more filthy the longer the birds are confined. Foul air may arise from uncleaned floors or dropping boards, heat increasing the danger of it. The danger from many of the brooders now sold is not irregular heat, but too small a provision for pure air. The little chicks sleep in a small chamber, in which their droppings accumulate, and unless abundant currents of warm air are introduced the air is soon unfit for use. There are many good incubators, but few good brooders. With chicks out in coops or boxes in the field, arrange so that there will be air without drafts. In no better way can this be done than by having the fronts of all coops covered with inch

wire netting or laths. Foul air seems to play too important a part in cases of roup to be allowed to exist on the premises of any thoughtful poultryman.

Protection From Exposure.

Storms are a prolific cause of disease. We cannot help the rain and snow, but we must keep our birds from severe exposure. When to keep our birds indoors, away from falling snow or driving rain, is not hard to decide, but the sudden changes that come at all times of the year must be promptly met. It is only by constant watchfulness that our flock escapes illness from nature's ways. Little chicks, whether with hens or brooder, need oversight to avoid the effects of a sudden storm. It is money saved to provide room enough to keep all birds indoors on stormy days. The loss of a brooderful of chicks or a pen of birds would go far toward providing ample accommodation for the stock.

Lack of Shade from Summer's Sun.

The intense heat of summer, unless there is escape from it in some way, ofttimes produces trouble. On the farm the overheated bird can escape to the cool barn cellar or to some orchard, but on our modern poultry plant the bird has little choice of her own. If the division boards of the yards are high enough they will cast some shade for part of the day, but at high noon these boards are worth little for this purpose. The houses on the hot days are too warm to be depended upon for retreat. The arranging of brush or boards in the yards will be helpful, but after all there is no shade like that of a tree in full leaf. The wise poultryman will early plan to set out trees in all his yards. For this purpose the apple tree seems to feel at home in the conditions that are present in rich soil and grass covered yards. The apple tree in the hen yard is a rapid grower and comes early into bearing. Little chicks and fowls out in the field, if allowed shelter from the hot sun, well repay in health and growth for the trouble taken to provide their retreat.

Right Amount of Exercise.

Exercise, too much or too little, has a bearing on health, and, what appeals to poultrymen, a relation to profits. If the bird has to work for its grain in scratching material so deep that it cannot get food enough for its needs, or if obliged to range too far for its food, it will never do its best, either in growth or egg yield. On the other hand, the bird that has no work to perform in getting its living is sluggish and is a poor layer. Leg weakness can be avoided and strength gained by proper exercise on the part of the little chicks. It is a mistake to let a hen that has been shut in on the nest for three weeks drag her chicks around all day. Much better results may be obtained by yarding and feeding them two-thirds of each day. The busy, bustling hen is the bird that is well and pays a profit.

Care in Feeding.

The feeding of hens bears a certain relation to healthy stock. Not only the quantities of the articles fed, but also the way it is given, produce good or bad results. All grain fed, except just at night, should be

given in scratching material. This can be any waste hay or straw that is dry. If it is wet or even damp the food will take some of the filth that will always accumulate in a hen house, and filth is never to be desired in connection with paying poultry. Mash ought to be given in clean troughs or on boards. The arrangement should be such that there is no crowding or fighting among the birds to get the food. If the hens are obliged to seize a mouthful and run to some wet spot to eat it, in the process it will get mixed with some of the droppings and become undesirable for healthy poultry.

Brooder chicks need special care in furnishing them clean food. Too many die from dirty food to allow us to relax our efforts to keep their mash and dry grain in proper condition. Hens will stand food that will kill growing birds. When possible, feed all little chicks far enough from the house or brooder to escape most of the droppings. Never feed wet food on the ground or where it can be mixed with foul earth.

High Roosts Cause Bumble Foot.

High roosts are one cause of bumble foot. While it is "nature" for a hen to roost high, it is only when the grass covered ground is at hand that the bird is safe from danger of injury to the feet. In most cases, six inches above the droppings board is right. If there is a raised edge to the droppings board the bird can step from one to the other and then easily to the floor. The droppings board itself should only be high enough to allow room for an egg box underneath. If there is no other place for the birds to roost they will accept the low roost, thereby avoiding the dangers of one that is higher.

Droppings Boards and Their Accumulations.

Droppings boards should be kept clean. To allow the filth to accumulate is to furnish an atmosphere to the sleeping birds that is irritating to the mucous surfaces of the throat and bronchial tubes. Some of the cases of chronic bronchitis are due to this cause. After cleaning the boards, sprinkle ground plaster on the surface to sweeten and keep sweet the boards. Ground plaster is worth its cost for the good it will do when applied to the garden. If unable to procure the plaster the use of dry earth or finely sifted coal ashes will give good results. Do not use lime to dust the boards, as it sets free the ammonia contained in the droppings, and this is an irritant to the organs of respiration. During cold snaps in winter the droppings often freeze to the boards for several days. Watch for the sudden thaw some warm noon, and remove the waste before the ammonia begins to arise. Store all droppings outside of any room in which birds are kept.

Stock Weakened by Lice.

Insects play an important part in the health of poultry. Of these the ordinary hen louse and red spider are most common. Chickens infested with lice, whether from the mother hen or from a brooder, are always undersized, rough in plumage and easily fall a prey to disease. Hens troubled with lice are uneasy, restless, grow thin and do not prove

good layers. The sitting hen, afflicted with lice, often becomes weak, and her food produces looseness of the bowels. The red spider, or red mite, as it is often called from its size, lives in cracks of the house, under the roost and droppings board, or multiplies rapidly in dry droppings, and comes out at night to suck the blood of the birds. When birds are thus troubled by mites the loss of blood produces an anaemic state conducive to disease as well as to poor financial results.

Poultry plants infested with lice or mites never succeed and are a hotbed of disease. It is possible to have sickness where there are no lice, but it is impossible to keep birds well on which there are lice in any number. It is the first duty of a poultryman to be sure that insects have no foothold on his place. Destroy all insects and see that none are introduced on new birds. Never be too sure that you are free from lice. When you least expect it, some friend will show you one of your birds loaded with insect life. Keep at it, from one end of the year to the other, fighting lice, and it will be time well spent. If you relax your vigilance for awhile the pests may get in such work as to upset all your plans for a year.

Sunshine.

Sunshine is as essential to the health of poultry as it is to the health of the human being, and to keep birds in a location so poor that the sun has no chance to send its needful rays streaming toward the flock is to invite disease and failure. Sunshine is needed to dry all moisture, whether arising from a damp soil or from the lungs of the birds. Plenty of sunshine and fresh air are cheaper and better for the health's sake than carbolic acid or sulphur. The less sunlight the more disease. There is always trouble ahead for the man or bird who is obliged to live in shady quarters. To keep hens in a house with light only from the north, or in cellars with low, dusty windows, is taking risks of disease as well as probabilities of egg failure. Birds housed under such conditions are sure to become weak, pale in comb and wattles, and are likely to contract catarrh, bronchitis or roup. Sunshine may also be a source of harm if sufficient ventilation is not furnished. A house facing south, well supplied with glass, if not allowed plenty of escape for the hot air, will show in winter a temperature of 80 to 100 degrees. The birds suffer during the heat of noon only to feel more keenly the other extreme of low temperature at night. The scratching shed house is not perfection, but it does furnish an escape from a hot pen at noon, to the fresh air out-of-doors. The days of the all-glass front house are happily of the past, but even now I am occasionally asked by some one if it is not best to have lots of windows in the new house. The old idea of our childhood clings to us, but we know from experience that about one window to each ten feet of front gives the best results from both the health and profit point of view.

Condiments in Excess Are Harmful.

Condiments are an interesting subject from a health basis. Many of the egg foods sold in past years have helped send many a flock to the

market because of non-paying results. Our birds need a little spice if shut in house and yard—just enough to take the place of the wild berry or racy leaf, that are within reach of the birds at liberty. Some of the powders offered for sale will throw the birds out of condition if fed according to directions. There is danger of irritating the crop and gizzard as well as enlarging the liver. Salt the mash as you would your own food, and in cold weather add a little black pepper. You can buy nothing better and will get good results if other things are right.

Exposure in Shipping.

Train or express exposure is a factor in disease. The sending of birds to the winter shows or the transportation of breeding stock is not without its dangers. I have seen coops standing for hours in a brisk northwest wind, with the temperature below freezing, and then put into a baggage car near the hot steam pipes. The reverse often occurs and the sudden change from hot to cold is followed by some catarrhal trouble. Even the change from the warm show room to the cold of the outer air is not without its dangers. There is something wrong about this sending of birds in the way we do, else why is it that some of our larger exhibitors never have anything in the line of diphtheria except in birds at shows, or returning therefrom? To avoid disease resulting from transportation of birds the coops should be roomy, with wind-proof sides, and in cold weather a coarse burlap top cover should be provided.

Safeguards Against Poison.

Irritant poisons have caused much sickness and not a few deaths. The common forms of poisons as found on farms or the village lot are paint in some form, paris green or potato bug poisons, and "rough on rats" or vermin killer. There is great carelessness shown in the way in which these are left around. Tins containing remains of former paint contents are often thrown into fence corners or rubbish dumps, only to become receptacles for falling rain, and these cans seem to possess an attraction for the wandering hen. Paris green is an every-day article of use by the farmer or villager and seems to have lost its first impression upon the mind of the user that it is a source of danger to all animal life. Paris green, and all similar substances ought to be kept out of reach of our birds. Little chicks allowed to run in a potato field soon after it has been sprayed are very likely to get harm from the bright drops of liquid that hang from leaf or tip. Pails used in applying the paris green need to be carefully guarded at all times, and above all, not allowed to be where they can receive any rainfall. Rat poison is usually given on bread, a food that always appeals to a hen's appetite. This should be surrounded by all the safeguards possible and even then there is danger that by some mischance the phosphorous ingredients of the rat poison may be taken in the bird's digestive system.

Balancing Grain and Vegetables.

Green vegetable food fed in too large quantities or withheld altogether influences the condition of the bird's health. An over-use of

cabbage, rye, weeds or roots is likely to produce diarrhoea and weaken the fowl's general system. If largely fed in place of proper food the bird loses weight and becomes sluggish. To refrain from the use of green food is like feeding a cow on grain only and expecting good results. Hens must have some green food in order to do their best and pay good dividends. Birds so confined as to be out of reach of any green food become pale, weak and anaemic. We see this condition in hens kept in city barns or cellars or housed and yarded in a manner to cut off access to grass. There is no better all-round green food than cut clover, either green or dry and steamed. If not allowed a grass run something of the green food ought to be fed for both health and profits. Brooder chicks will be less likely to get "off their legs" if given a little lettuce or young oat sprouts. Even the waste from the hay mow is useful, not only for the exercise, but for the leaves and seeds that help make up the bulk.

Exclusive Grain Diet.

Grain in connection with diseases of poultry is worth some attention. Many cases of bowel trouble are traceable to feeding musty, sour or charred grain Any damaged grain is recommended as "good enough for poultry" by the ordinary seller, and too often the dealer's statement is accepted as good advice. A short time ago I found a poultryman feeding damaged wheat at a cost of one dollar per hundred pounds, when the best white wheat was worth one dollar and sixty cents. More than half the damaged wheat was without food value while at the same time the birds were exposed to dangers of spoiled food. One-half the quantity of good wheat was giving better results than the damaged grain and the birds were not obliged to eat and dispose of a lot of rubbish in order to live. To avoid disease, feed the best grain you can get. The best is none too good.

The feeding of an exclusively grain diet is dangerous from a healthful point of view. None of the grains contain elements rightly balanced to give perfect results. Wheat comes the nearest to perfection, but even this grain when fed to the exclusion of all other foods is followed by dumpish, poor laying birds. Any or all of the grains need to be balanced with something of the animal nature. A bird depending entirely upon grain for food will eat too much in quantity in its endeavors to obtain a sufficient amount of nitrogenous, or protein food. Birds having a farm run, with free access to the barn mows, will get ainmal food enough for warm weather work. but will need a supply of meat meal or green bone in winter. Birds fed on a meal mash in the morning and corn at night will naturally be sluggish, over-fat, and inclined to fall a prey to disease. The desire for healthy and profitable poultry ought to be strong enough in the mind of the owner to lead him to know something about balancing rations. There is much food for thought in the report of some of our state experiment stations. Poultry keepers ought to have and study them. Rhode Island, Massachusetts, West Virginia and Utah have done good work in the poultry line and their reports are to be had for the asking.

Too Little and Too Much Food.

Cramming, or over-feeding, when persistently followed results in indigestion or breakdown. By cramming I mean the giving of too much food, either to adult birds or to chicks. In these days of yarded stock there is more danger of over-feeding, than in the times of farm flocks at liberty. A bird left free to wander where it wishes will stand a better chance of keeping well than the one that is dependent on the owner for every particle of food. The only time it is best to cram a bird with food is when it is soon to be used for the table, and this process ought not to take over three weeks. A longer stuffing process is likely to be followed by the bird's getting off its feed and losing all it has gained. Many a lot of brooder chicks have "passed away" because the owner thought it best to give them lots of food often. Chicks, as well as grown birds, must not be fed so as to remain lazy, but should be cared for and fed in such a way as always to be ready to work for the next meal. There must be time for most of one meal to digest before giving the next. With the exception of the last feed of the day no meal should be enough in quantity to cause the bird to retire to some corner and "mope." The active chick is the one with a good appetite and a rapid growth. The sluggish, over-fed chick is always a source of worry and easily passes into a sick condition. Over-feeding with meat, cooked or raw, is not without its dangers. Excess of meat is liable to induce diarrhoea or tax the kidneys to get rid of the extra waste. The safe plan to follow in feeding green cut bone and meat is to find how much the birds can eat in one full meal. Then give at various times during the seven days of the week a total amount equal to twice that of the single meal. If fed in this way, very little ground meat will be needed in the morning mash.

Too little food is a cause of anaemic conditions and a source of trouble occasionally met with. The common poultry keeper does not often err in this direction, but rather leans toward heavy feeding. Giving too little food or starving the birds is not pleasant to think of, but we may well be watchful that in our system of feeding we do not starve the birds along the line of some needed element. Combine or balance your ration in such a way that the bird gets just what is needed for profit as well as to sustain life.

Diphtheria.

Diphtheria is a disease of the cold months rather than of warm months. While not so contagious as cholera, it is easily passed from bird to bird, either directly or by means of the drinking water or feed trough. Diphtheria is fatal enough to be dreaded by any poultry keeper, and even though the birds pull through they are never equal to birds that have not had the disease, even for layers, to say nothing of their doubtful value as breeding stock. Diphtheria leaves its mark on the constitution of any bird that has the disease. Diphtheria may be taken from sick birds at the shows, or it may be introduced through new birds. It always pays to have some system of quarantine even though you keep but a few birds. This is some trouble, to be sure, but it is a safeguard worth its cost to any earnest poultryman.

Many of the severe epidemics have been in connection with filthy or damp houses or yards. As we take up the various diseases, readers will be surprised to learn the part that filth takes as a factor in disease. A clean kept poultry plant seldom has diseased birds, unless introduced from without. Diphtheria manifests itself early by a sleepy appearance of the bird, a slight discharge from the nostrils. The plumage is rough, not sleek. After twenty-four to forty-eight hours the catarrhal condition of the nostrils becomes more prominent, and the sides of the mouth are sticky with a fluid that comes from within. Opening the mouth you will see that the sides and back are also sticky with the same fluid that you observed on the outside. Even as early as the second day you are likely to find the throat a bright red in color, except where covered with the characteristic leaden membrane. In true diphtheria this membrane is always firmly attached to the mucous surface, so closely in fact that its removal is always followed by bleeding. If at any time you find on the throat or mouth a membrane that can be detached without being followed by bleeding you may doubt the presence of diphtheria. The tendency of the membrane in diphtheria is to spread over the entire surface of the throat that is in view, if indeed it does not run up into the nostrils and down into the windpipe.

This disease is likely to prove fatal in severe attacks within four days of the time attention is attracted to the sick bird, and in the mild form to run a course of from ten to fifteen days. In cured cases, even after the birds are out of danger, there may be some weakness of legs or wings that lasts for weeks or months. The ordinary hen house is not the ideal place to doctor diphtheria. The bird needs a moderately warm room where a stove can have water boiling on it most of the time. During the warm months of the year any dry, sunny box of a house will do, but diphtheria is a rare disease except in the cold season. For both local and internal treatment there is nothing better than calcium sulphide. This must be fresh and very strong-smelling to give good results. One grain mixed with a little hot mash and fed so you know the bird gets it, three times a day, will do for internal treatment. A little of the dry powdered calcium sulphide dropped into a piece of paper folded into a V shape and blown into the open mouth will modify the course of the local manifestation of the disease.

Something depends upon the feeding in this trouble, just how much it is hard to say. In severe cases the bird is unable to digest food even though it be got into the crop and gizzard. In a case where the general symptoms are much lighter than you would expect from the appearance of the throat, it is well to give highly nutritious foods, such as raw or dropped eggs, beef juice and milk. For a tonic to "pick up" the convalescing birds, arsenate of iron in 1-50 grain doses, given in mash three times a day, will do good work.

Canker.

Whether this is a disease of itself or a mild form of diphtheria is not definitely known, but it is always well to consider it of danger

enough to give it prompt and careful attention. While all birds are at times attacked by canker, the Games are quite subject to it. Canker is as often seen in the show room as in the home pen. What there is about the exposure of the express travel and show room to cause this trouble is not known, but it is a risk that must be taken if we are to exhibit our birds. Your attention is called to this disease by observing that the bird has some trouble in swallowing food or water. Its neck seems to be stiff. Even when standing and doing nothing else it has the appearance of swallowing, as though it were trying to get down some substance in its throat.

The usual treatment of canker for years has been to blow powdered chlorate of potash into the throat upon the inflamed surfaces. The latest and it seems to me the best remedy, is the use of calcium sulphide, as in diphtheria. All cases of canker or diphtheria should be sent to the hospital, whether that be a dry goods box or an isolated room. You can handle the sick bird better in this way and at the same time lessen the danger to the flock at large. The previous condition of the bird has no bearing on the contracting of diphtheria or canker. If these diseases have any preference it is for vigorous birds rather than weak stock.

Catarrh.

In considering catarrh it is well at the very beginning to make prominent the fact that catarrh is not roup. Catarrh is a simple inflammation of the mucous surfaces, and the special term is only applied to the air passages above the windpipe. Unless filth enters into the cause of the sickness catarrh never passes into roup. A bird sick with catarrh is likely to contract roup if the proper exposure be given. Catarrh and roup cannot be distinguished apart in the first stages, but should receive prompt treatment even before the disease can be named.

In catarrh the bird is not sick to any extent. The inflammation of the nostrils does not upset the digestion, and unless added to by improper treatment or lack of good care, the bird does not lose weight. Catarrh is caused by long exposure to cold winds, roosting in a coop so that a steady draft of air blows through a chink onto the bird, and from contagion from other cases.

Catarrh in quite young chicks is very common from the effects of a chill, either from low temperature or as the result of crowding and sweating in a cold brooder. Many brooders do not have warm floors so as to make comfortable the chick at rest. A chick in motion requires no warm surface under him, but when he settles down on the floor of the hover to sleep he does not want a cool layer of sand or wood to steal heat from him during the night. Chicks sometimes contract catarrh by being deserted by the mother hen before feathering is far along.

Late in the fall of the year nearly matured birds are attacked by this trouble while in the roosting coops or houses. This may be due to the opening of cracks in the boards or the blowing off of a shingle or part of the paper covering of the roof. Coops that have been all right until this time give out as the result of the wet winds of November.

The first symptoms of catarrh you will notice will be a "bubbling" at the nose, on one side surely, probably on both. There may also be watery eye, perhaps diarrhoea. Dust, chaff or pieces of leaves stick to the discharge from the nostrils, calling attention to the sickness. The discharge passes through the various stages of a common cold—at first thin and scanty, then abundant, finally thick and inclined to dry on outer surface.

A case of catarrh, well cared for, will get well without medical treatment. If catarrh could be told from roup in the early stages, I should advise no drugs for this sickness, but so long as we do not know surely what we have to contend with, some local treatment should be given. Add thirty grains of sulphate of quinine to one ounce of hot water. This is to be applied twice a day by an atomizer to all inflamed surfaces, first cleansing the parts with warm water. The sick birds should be kept in a dry, sunny, roomy place, away from all well birds.

Diarrhoea.

Simple diarrhoea, like simple catarrh, is caused by sudden chills or even lack of heat, especially in young chicks. Sometimes when you are having an epidemic of "colds" (catarrh) you will find some of the birds showing signs of looseness of the bowels. Why it is that similar causes produce diarrhoea in warm weather and catarrh in cold months is too long a story to tell, but it is a fact we well know. A prolonged chill will be followed in summer by diarrhoea and a few cases of catarrh, and in winter by many cases of catarrh and a few cases of diarrhoea.

Diarrhoea in chicks is a fatal disease too often met. It is the bane of the usual way of raising a few chicks with hens. The hen, tired of her inactive life in incubating eggs, wants to roam more than is good for the chicks; and from lack of mothering; the chicks become chilled over and over again. This induces a looseness of the bowels that soon removes the chick from the flock. Brooder chicks also suffer from diarrhoea, and this is also caused by too little heat. Too many brooders do not plan for any bottom heat and there are those that cannot be relied on to keep up the heat during the latter part of the night. If the brooders were as good as the incubators, we would hear of fewer persons going out of the poultry business, and would see less empty hen houses. There are more good incubators than good brooders. To avoid diarrhoea in brooder chicks have heat enough to keep the chicks scattered out on the floor of the "mother" near the fringe of the hover. No matter what the thermometer says, keep the chicks contented. Depend on what the chicks seem to think of it rather than on any set degree of heat.

Diarrhoea in chicks or adult birds may also be caused by too coarse or rough food. The absence of grinding material (grit) will produce diarrhoea. The over-feeding of green bone or meat may be followed by looseness of the bowels. Irregular feeding—much to-day, little to-morrow—has a tendency to upset the bowels. Birds running wild on the farm seldom have bowel trouble. It is the yarded fowl, depending on man for every particle of food, that has diarrhoea from improper feed-

ing. Filthy drinking water is the starting point of many so-called "cholera" outbreaks. This is diarrhoea, too common to be ignored, and is well worth remembering in looking for causes of bowel trouble. Filth in any form, especially in the water a hen must drink, is a cause of disease against which one should constantly guard. Filth in some form or other is behind nine-tenths of all sickness in the poultry plant.

Diarrhoea from too coarse food needs to be treated by giving less bran and more of the flour ingredients of wheat. Leave out scratchy things and thoroughly cook the mash, and feed lightly of green foods, such as turnips and cabbage. If the birds can be given a free run of the place and a little food, they will be likely to do well in looking out for themselves. All these cases do well if given an astringent drink, such as one teaspoonful of tincture of iron to one quart of water. A severe case of diarrhoea from over-feeding often improves at once after receiving a dose of castor oil. Castor oil may be poured from a spoon into the mouth of the fowl, the beak closed and the bird's head held upright till it swallows. The dose does not matter so long as you give enough. An overdose will pass through with the discharge and that will be the end of it.

There is a form of diarrhoea known as "enteritis" that we shall take up later. This has the same relation to diarrhoea that roup does to catarrh. Catarrh and diarrhoea are mild in their course, while enteritis and roup are violent, hence more fatal.

Roup.

Roup is an infectious disease (purulent catarrhal in form) of the air passages. It is met at any time of the year, especially in wet seasons, most commonly in the late fall weeks. Cold breezy quarters, drafts of cold air from broken windows or chinks in walls, a house that is hot at noon and very cold at night, bad food, dirty drinking water, any or all of these when combined with filth tend toward the production of roup. Roup is often introduced into a flock through birds brought from outside, through lack of thought in quarantining them when arriving. Birds out of condition from any cause easily contract roup when exposed to the disease. Sluggish birds from improper or over-feeding seem to be fit subjects for catarrhal diseases. Persistent inbreeding weakens vitality and increases the susceptibility to disease, especially to roup.

Let me impress upon you now, and I shall have occasion to do it more than once, the great factor in the causation of disease is filth. You may labor under many difficulties with birds or food or houses, yet if you avoid filth you will have few visits from serious sickness. It is the long uncleaned, damp house that is the scene of disease. The loaded droppings boards are good breeding ground in winter for roup and cholera as well as fine summer homes for red mites. Without filth, or an introduced case, roup does not appear. Once introduced into a house it is rather hard to stamp out. The infectious matter from the discharge of the mucous surface seems to retain its life for months, even when

it is dry and dusty. Water dishes, unless baked or boiled, retain the disease spreading material for a long time. The earth floor holds for some time the germs from the diseased birds.

Outbreaks of roup vary in severity. Sometimes you hear of a flock sick with undoubted roup where every bird recovers without any treatment. Then you may next hear of a yard where every one died in spite of the most active treatment. The disease when once introduced seems to run a more rapid and vigorous course in sturdy stock. Every new bird, and all birds returning from the shows, should be kept from the home birds for at least seven days, to give disease time to manifest itself. It is always well to look under the wings of all new birds to see if there is any dried mucus on the feathers, left there from the bird's putting its head under its wing at night. Birds that have been quite sick with roup, no matter how well they may seem to have become, should not be bred from if you wish to keep strong stock. Roup seems to leave its mark on every victim, though many times it is not seen till the next generation. Whatever you may do for yourself, never sell eggs or birds that may give weak stock to your neighbor. It may upset many cherished plans and spoil the work of years. One of the experiment stations reports: "A lot of cockerels, bought of ———, of New York state, had the foulest kind of roup when received. Part were killed, and the others cured after a long course of treatment, but they were continually getting out of condition, and the mortality among their chickens was large."

The symptoms in the beginning of roup are those of simple catarrh and for a few days these diseases cannot be told one from the other. For a day or two there is a slight discharge from the nostrils, with eyes wet from mucus and often some bubbling at the inner corners; then the discharge thickens, gets darker in color, and even entirely obstructs breathing through the nose. An average case of roup shows marked debility within five days from the outset. Most cases of roup develop rapidly from the start and if confined to close quarters the odor arising from the inflamed parts becomes marked and disagreeable. There is no odor in catarrh; nearly always in roup. Some outbreaks of roup are peculiar because of the marked tendency toward swelled heads and ulcerated mouths. These "big heads" mark a severe type of the disease; a form likely to prove fatal. A roupy bird is inclined to sleep with its head under its wing, which allows the mucus to stick to and dry on the feathers.

Remember that when buying birds, and you may avoid introducing half-cured birds to healthy stock. You will find the dried mucus darkened with dust on the under side of one or both of the wings. Your bird sick with a common cold, let alone, will continue along the same course for several weeks. With roup you may expect a daily increase in the severity of the symptoms. A catarrh tends toward recovery if given any reasonable opportunity, while roup needs the best of care to have the bird become as well as before the beginning of the sickness. Many cases are marked for a fatal end from the commencement of the sickness, es-

pecially those where we see very large heads and a strong smelling discharge combined. These cases rarely live over six days and furnish good "seed" for future outbreaks.

Treatment of Roup.

The treatment of roup varies according to the severity of the attack and the stage of the disease. That it is a fatal and dreaded disease we know from the many "sure cures" offered to us through advertising columns of the poultry press. It is an indication of severe trouble when you find as many remedies offered as you meet poultrymen. The earlier roup is recognized the greater satisfaction there is in treating it. Like a fire, roup responds to medicine if taken in the beginning, but if neglected—"buckets" of drugs have no effect. At the commencement of this 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 the handling 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 and when you need to use one it ought to be ready for service.

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. If there is any watery eye give one squeeze for each. The sick birds should be kept from the others to avoid spreading the disease. After removing the sick birds, 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 the stove 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 in 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 sick that the discharge was thick and exceedingly 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 till 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 touch. 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.

Mr. A. F. Hunter, in his articles on poultry, advises the following: "A tablespoonful of clear lard, half a tablespoonful each of vinegar, cayenne pepper and mustard; mix well together, add flour till the whole has the consistency of dough, roll into slugs about the size of the top joint of the little finger, and put one down the patient's throat. The dose can be repeated in twelve or twenty-four hours, as the case seems to need it, but one slug frequently cures if taken in time. For swelled head we bathe with a glycerine-turpentine lotion made of one part spirits of turpentine to six parts of glycerine; and for sneezing, cold and swelled head combined, use both remedies; if the patient does not show signs of improvement within three days after beginning treatment, take off its head and burn or bury it." When a case of roup is referred to me to-day for the best treatment I write or say according to the needs of the occasion, "Use 'Hydrozone' one part, water two parts, in an atomizer, spraying thoroughly all diseased surfaces, twice a day." Roup has been rare in the east the past winter, many of the so-called cases being simple catarrh. If you will practice some form of quarantine, and keep everything free from filth, roup is not likely to appear in your yards. Once it gets a start in your flock, your peace of mind is likely to be ruffled for months. Be watchful, careful, in fact, be a true poultryman.

Pip.

This is presented here under this heading, not because it is a disease, as it is not, but because so many books give it a place of its own. Pip, so-called, is simply 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.

Scaly-Legs.

Scaly-leg and fish-skin diseases 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 bird, or possibly from an infested house or brooder, and works its way in between the scales of shanks or toes. As a result of its life work on the bird the scales are irritated, pushed apart, and dirt begins to accumulate in the cracks of the parts. 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 birds 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-legs on the plant is a source of danger to every other bird.

It is so easy to cure this trouble that it is foolish to set a single hen with scaly-legs.To allow a case to continue to exist when once it has attracted your attention is to let it be known you are a careless poultryman. I am willing to acknowledge that the disease has little effect on egg production, but must say that such breeding stock does not attract the eye of the buyer of birds or eggs for fancy or practical purposes. Now and then we may buy a bird afflicted with scaly legs, but it is only because it is an extra good bird in other respects and we know we can get rid of the parasites before it is put with our other birds. I went to quite a little trouble last fall to get a pullet for fresh blood from a noted strain. I had hard work to find a bird in the lot of fifty pullets that was free from scaly-legs, and finally took one that was infected, knowing that two applications of Lambert's Ointment would cure the case. The owner of the pullets knew he ought to have cured the cases long before, but had never got around to it. The pullets had contracted the trouble from the mother hens and I found several birds among the year-old breeders that were anything but a pleasure to see.

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 sev-

eral 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.

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 with 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. Do not get the oil on the feathered parts and wipe off the surface oil on the scaly parts. 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 the birds from sources of contagion and especially be diligent in having all houses clear of filth.

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 of birds, 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 picture to the eye. There is some irritation of the surface, leading to the birds 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 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.

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 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 hurt 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.

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. Birds 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.

Leg Weakness.

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 in 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 birds. The gait is unsteady, and the muscles are working at some disadvantage. In a few days the birds may be found sitting when eating, and are inclined to walk very little. Looking the bird over at this time you will find little wrong about him except the leg trouble. His comb is bright, eye clear, appetite good and feathers bright and clean. As days go by, however, he presents a different appearance. He is slow to get to the feed dish, gets less than his share of grain, is picked at by the other birds and driven from place to place, at length becomes thin and lousy, and an object of worry to his owner.

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 birds are at all crowded in house or roosts increase the space or dispose of some of the birds. 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 to all the birds 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.

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 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 "mother," 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.

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. 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 older 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. Of course if the bird is large enough, and you wish to, you can serve it in chicken-pie or treat your family to a broiler. Other broken bones, such as those of wings or thighs, are hard to handle and such cases are best suited for the cook.

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 underfeeding 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.

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 leg. Trying to straighten the limb hurts the bird. There is 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. Adult birds are subject to rheumatism, but the fatal cases are few. Brooder chicks exposed to the evils of a damp soil or dark, cool "mothers" furnish many cases of rheumatic trouble, the losses from the disease being large.

The suggestions for treatment also indicate the line to be pursued in the prevention of rheumatism. Birds 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 "mother," 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 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.

Crop-Bound.

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 bird. The bird 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 gorged themselves with it, and then drank 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. I have found an exception or two to this statement, as will be illustrated when we take up the gizzard.

A case of impaction due to over-feed 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 bird head down, thereby letting gravity help do the work. Have patience, work care-

fully, and if you do not succeed along this line then you can open and clear out the crop through an opening in the skin.

Nearly all cases of crop-bound are due to a collection of long pieces of grass or hay. These are nearly all to be helped by operation. Have some one hold the bird so you can have both hands free to work. Pluck enough feathers from the breast to give bare skin half an inch wide by two 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 half an inch long. Half an inch may seem short, but you will be surprised to see how large 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 crop. With an opening into the crop, begin with sugar-tongs, toothpicks, 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, the last thing is to 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.

Inflammation of the Crop.

Inflammation of the crop is caused by an irritation of retained food or from the effect of foreign substances swallowed. Irritating materials, such as paint-skins, rough-on-rats and pieces of unslacked 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.

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-slacked lime, give weak vinegar water; if phosphorous (rough on rats), give magnesia. Having emptied the crop, give flaxseed tea and keep the birds on simple diet for a week.

Enlarged Crop.

Enlarged crops are more a source of fret to the owner than to the bird. These crops have become large through a long continued stretch-

ing; 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 the gizzard. To remedy this trouble, pluck 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 (), 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. There is little profit in doing all this for a fifty-cent hen, but if the bird happens to be your best exhibition cockerel you will have a feeling of satisfaction when the ill looks are remedied.

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 constipation 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 the 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.

Break-down.

Break-down is easily recognized by 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 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. Because one of our state experiment stations has issued a glowing report of the results of feeding corn, do not follow too deeply in its wake. If you will try it, let it be on a single pen, and you will not run the risk of few eggs and many hens with "break-down."

Spring Ailments.

It is the first of May and the troubles of spring are at work in our flocks. The old birds are getting out into natural conditions and the little chicks are beginning to find out that there are dangers for them even when they emerge from the shell. What are these troubles that confront us at the opening of the growing season? First I would put lack of vitality. The breeding birds have been kept more or less in confinement and fed probably a ration too rich in the corn element. They have likely been too fat during the winter for best results and have just got worked down in weight to normal size. If allowed to run wild during March some of them have eaten too much dead grass and a case or two of "crop bound" may be on hand. Then lice are getting in their best work. Each day of increasing warmth adds to the number of lice that infests all hens, thereby decreasing the strength of the birds. If to the factor of atmospheric heat we add that of the internal warmth of the broody hen, we still more increase the danger from lice. A bird with weak vitality, whether from lice or other source, is subject to digestive troubles and is in danger of tuberculosis if exposed to the germs.

Another danger of spring time is the use of "egg-foods." Why it is at this time of the year that so many fly to some irritant to increase the egg yield I do not know,but I do know that it is during the late winter and early spring months that I get most letters asking for some formula

for an "egg producer," or, as many write, "a condition powder for chicks and hens." I never send any such formula, as the best recipe is good food in proper proportions, and exercise. There may be a good condition powder, but there is nothing better than food of the right kind and quantity. There is also a danger in feeding unknown articles to our birds. My own experience, and that of my correspondents, satisfy me of the truth stated in one of our poultry journals, that "condition powders waste good money and at times work mischief to our birds." A little money spent just now on some green food, even though it be only cut clover, will give better results in number and fertility of eggs than any egg producer on the market. There is nothing better for spice than black pepper and ginger, but these should be used as we would in our own food. To increase the amount is to irritate the digestive canal and stimulate too much the egg passage.

The secret of healthy birds, and an average egg yield to be proud of, is intelligent care and feeding rather than the use of any drugs. My best results in growth and egg yield have always been obtained when I fed simply a well-balanced ration slightly spiced with black pepper. I have used nothing else for five years and if I were to tell the results of some experiments six years ago with "egg persuaders" you would be surprised to see how the egg yield went down as the "egg food" was fed. Most of the large egg records have been made without stimulants. Last year, in ten and one-half months, my hens averaged one hundred and ninety-six eggs for every bird in my yards and this was without the use of any drugs or doses of any kind. These birds were raised without any condition powders and at no time were they sick in any way. It is a waste of good money to buy "egg foods." Study to feed sweet, well-balanced food and depend upon exercise for the best tonic you can obtain.

A good ration for results in egg yield and health varies somewhat according to the season and the condition of the birds. I have found the following to give satisfactory returns in every way—the mash, well cooked and fed warm, made of bran two parts, ground oats one part, cut (or ground) clover two parts, cornmeal one part, ground meat and bone one part, all by measure. Feed two-thirds of what they would eat if you gave them the chance. Wheat, barley and corn, fed sparingly in the litter after the giving of the morning mash, and given freely at night, give best results if used according to the temperature of the season. The lower the temperature the more corn and less wheat; the higher the temperature more wheat and less corn. Barley should not make up more than one-fifth of the whole grain fed. Good food alone, although properly balanced, will not produce healthy chicks and good laying hens. They must have pure air and a dry location. To oblige birds to sleep over the accumulations of the droppings boards, or to breathe the air of a crowded, poorly ventilated house, is to lessen the profit as well as to invite disease to your flocks.

Tuberculosis in Brooder Chicks.

There is a danger to our brooder chicks, often overlooked and seldom recognized, from tuberculosis. I am sure I am not wrong in stating that one-fifth the loss in brooder chicks is due to tubercular troubles. It is hard to say where the first case comes from in a new brooder, as it is believed that the disease does not exist in the newly hatched chick, but the number of cases gradually increases as the brooder continues to be used. The less care given to cleaning the brooder the more cases of tuberculosis will appear. Tuberculosis thrives in foul air and darkness. What an opportunity then there is for it to make rapid progress in many of our brooders. Remember how much pains we take to have a circulation of pure warm air through our incubators, and then see how ready we are to confine the growing chicks to the dark and close air of a pipe brooder system. How many brooders do you know that admit light? Are your brooders so made as to furnish an abundance of fresh, warm air, and lastly, do you keep them clean? What better place could be made for the development of tuberculosis than the dry, dark, foul, hot modern brooder? To get the best results from artificial brooding, we must start with germ-free brooders. They must be supplied with sweet air in generous quantity; they must be kept clean, and they must be opened as often as possible to the direct sunshine. The best destroyer of a turberculosis germ is fresh air and sunlight. In incubators we have reached a high standard, but in brooders we are still waiting for as good results. There is a small fortune for the man who can put on the market, and introduce it, a brooder that supplies a large quantity of fresh warm air, and has at the same time a well lighted hover chamber.

The Rhode Island Experiment Station states in a recent report: "The simple expedient of removing the hovers and setting them out of doors in the full sun reduced the evidence of tuberculosis in the post-mortem examinations from nearly fifty per cent to only three per cent." It also says: "For guarding against tuberculosis, give the interior of the brooder all the sun and air possible on pleasant days."

During the past winter I was asked to visit a broiler plant where the deaths from some new disease were very large. I found that under apparently the same conditions in previous years there had been a much lower death rate. The chicks as they came from the incubators were large and healthy. There were few deaths until the third week. The style of brooder, way of feeding, and amount of food seemed to play no part in the results. The chicks seemed to thrive for a while and then in tens and twenties would lose appetite, become dumpish, grow thin and die. Of the chicks brooded in the dark days of January fifty per cent died. Examination showed little change in the gizzards or bowels. The livers were slightly darker than in health, but the lungs were soft and gritty. These were tuberculosis chicks from infected brooders and the only thing to do was to clean up the brooders and keep things in as sweet a condition as possible, and arrange to start next season with brooders free from germs.

The Liver.

An over-large or solid liver (hypertrophy it is named), 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 exclusion of bulky vegetable elements. On many farms corn is the only grain raised, and to the farmer it seems too bad to buy wheat and barley when he has so much corn on hand. 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 part 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. Unless some "break down" intervenes the bird at length crawls into a corner at night.

Birds in the early stage of enlargement of the liver respond fairly well to a changed ration. Of course it takes longer to remove the diseased condition than it did to produce it, and the profits are sadly reduced during the weeks of patiently feeding the birds to overcome the hurtful state of body.

Add to the drinking water, one-half teaspoonful powdered muriate of ammonia to every quart and continue this for one week.

Atrophy.

This is due to a starvation diet, either from a badly balanced ration or from too little food. I saw a flock in this condition several years ago, due to the owner's trying to keep cheaply through the winter a lot of late hatched birds. Atrophy or wasting of the liver may also be due in a small proportion of cases to a previous condition of enlargement.

There is no better way to avoid this, and other diseases of the liver, than by common sense care and thoughtful feeding. If we would only profit from our experiences of the past we should soon see little liver trouble of any kind.

Birds in which this wasting process has begun are off condition, showing it in every part of the body. The bird is dull, inclined to stay near the house, does lttle scratching and is off color in comb and wattles. Feed these birds generously of a ration easily digested and well balanced. Give fresh water daily, adding to each quart one-half teaspoonful "Fowler's solution of arsenic."

In fattening birds for market do not take too long to accomplish your purpose. If you do, you run the risk of having some of your birds break down and go light. The fattening process is one step toward a fatal end and must be brought to its desired limit before disease has an opportunity to begin.

Constipation.

This condition is met with in both chicks and old birds, but is most common in young birds. Especially in brooder chicks do we have this trouble to overcome. Little exercise and the feeding of a mash of johnny cake containing too little of the coarser forms of grain is to blame for many cases of constipation. Even the absence of green food favors sluggish bowels. Hens kept in close houses and small yards away from all grass and weeds are subject to this trouble.

Constipation in brooder chicks is quickly cured by increasing the proportion of bran in the mash, and furnishing green food, such as lettuce, cabbage or steamed cut-clover. Also put into the brooder pens all the waste from the hay mows or baled hay. In this waste the chicks will find and eat many a seed or leaf that will help supply a craving and furnish bulk for the bowels' demands.

Adult birds, with constipation, need treatment much like that of chicks. Give them a grass run in the growing season, and in winter feed liberally of cut-clover and bran, increasing or diminishing the amount as seems to be required.

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 membane as to precipitate trouble, but it is more likely to occur from either the bursting of a blood vessel in the egg passage, 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 food 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.

Egg-Bound.

This 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 birds, such as the Leghorns, seldom take life easy enough to get fat, hence are not subject to "egg-bound." The large birds, slow in movement, but with good appetites, take on fat more readily and present isolated cases of this character.

A large proportion of birds which die from this egg-bound condition will be found on examination to be over-fat. 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 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.

You have all seen cases of egg-bound hens, and recognize the symptoms. The hen moves about, without apparent cause, going at times to the nest, but without dropping an egg. The tail feathers are lowered, looking much as they would on a rainy day. Take the bird in your hands, watch the movements of the muscles at the vent and you will see that the bird 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. If the bird is heavy and in otherwise good health serve in a "chicken pie" at your earliest convenience.

Simple cases of egg-bound hens are worth trying to help. With an oiled finger try to reach and break the egg, removing it if possible. If the egg is beyond reach, try giving twenty drops fluid extract ergot in a little warm water, and after waiting an hour hold the vent over hot water.

Birds with any trouble of the egg duct should be taken from the male bird and housed alone. Feed lightly and give warmed water to

drink. If you get the egg away safely, withhold the fat producing foods for a month, giving freely of clover and vegetables. Tone up the bird by adding ten drops tincture nux vomica to every pint drinking water.

Inflammation of 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 incease egg production are decidedly too irritating for long continued use, and are not without their dangers at any time. Cases of inflammation of the egg passage are occasionally met as the result of the spreading of the disease known as vent gleet.

Outside injuries seldom affect the egg passage except as following breaking and holding back of an egg.

Inflammation of the egg passage is a serious affair. 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 bird becomes quiet, as the 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.

This disease is a good illustration of the need of watching closely our birds and remedying 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 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, passage fatty and weak, egg retained, 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 birds a larger proportion of clover hay.

When you think they have a case of inflammation of the egg passage, begin active treatment at once by giving each bird one-half teaspoonful sulphate magnesia in a tablespoonful of warm water. Oil a small finger with castor oil or vaseline and gently try to find out by examination whether there is a retained or broken egg in the passage. Finding an egg, try to break it enough to enable you to remove it. Every motion you make should be gentle and slow. Succeeding in removing an egg, feed the bird for a week largely on cut-clover and well cooked bran. Give little grain and avoid corn and cornmeal.

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 bird 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.

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 as 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.

Cholera.

Cholera is a disease of fowls, attacking all parts of the body, but especially manifesting itself upon the mucous lining of the intestines. It is a germ disease, easily carried from place to place, passing from bird to bird with the slightest exposure. Cholera varies in intensity in different seasons, sections and countries. The cases reported and described in this country are not so severe as those told us as occurring in Great Britain. While the disease is to be dreaded, and is fatal enough, we are fortunate in not having to handle it in the true Asiatic type.

You will call to mind the emphasis I have always laid upon the part filth plays in disease. Cholera is a prominent example of this truth. There is something about the good breeding ground that filth offers that is favorable to the beginning of cholera. Just where the germ hides itself away, awaiting the right conditions, no one yet knows, but many cases have been reported as occurring under such circumstances as to rule out all reasonable doubt as to their having been introduced from without. On the other hand, given the uncleaned poultry house and bringing the disease, no matter how mild it may have been, from without, it will take on a severe type and prove very fatal.

It is also true that healthy birds easily contract cholera. Clean houses, good care and food are no protection from this disease. The adding of a single bird sick with cholera to the plant, or bringing in in any way the discharge from sick birds, is enough to keep the owner busy burying birds for a long time. There is danger of introducing the disease if there is any passing between an infected plant and a healthy one. This danger is largely due to droppings from sick birds being carried by the shoes from place to place.

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 in 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 midwinter.

Knowing the danger existing from infested flocks, take pains to avoid neighbors' sick birds. It is not hard to keep out disease, but when once introduced, cholera and roup must be fought long and hard. In no better way will the little house of detention prove its worth than in keeping out roup and cholera.

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. Your birds may look well in the morning, be sick at night, and dead the next day.

The first symptom is a slight, watery diarrhoea, lacking in color as the hours go by. With this the bird is sluggish and not easily moved by any motion of the owner. It is inclined to remain standing wherever it may be; often gets into a corner and stands in the sun with its tail drooped. There is a look of disarray to the feathers, a roughness in the appearance of the plumage, and the fluff below the vent is wet with diarrhoeal discharge, if indeed it is not stuck together. There is a general let-down to the muscular system, the wings drooping, head carried low, and even the eye-lids half closed.

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 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; gizard 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 doubtful 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 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. At any rate, poor care always enters into this disease. 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 always is 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-carbolates 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 the 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 the 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. If possible let all drinking water used for

a month be first boiled. Clean all dishes often and keep all droppings out of them.

In uncleaned brooders there sometimes develops a condition resembling dysentery, a condition to be removed by keeping the chicks' surroundings in a correct way. Winter chicks are especially prone to bowel trouble, and if fed in such a way as to make the little ones eat off the wet floor they are likely to be good subjects for dysentery or enteritis.

Dropsy.

This is a disease of the abdomen, or it may be a symptom of 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 of this section of the bird. 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 tincture of nux vomica, one teaspoonful to two quarts water, or arsenate of iron, one grain to one quart water, used as 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 yards 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. Follow 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 drinking water.

Birds that have had dropsy are to be ruled out for breeders. Birds that have a history of sickness of any form are to be viewed with suspicion, for egg yielders as well as breeders. Flocks that seem to have a tendency toward certain diseases are poor property, and should be put one side and a fresh start taken, or fresh blood should be promptly introduced.

The Lungs.

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 birds away 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 bird's life. Bronchitis in chicks is commonly caused by exposure to rain; by sudden extremes of temperature due to over-heated brooders and cold brooder houses; or by close, foul air. I am of the opinion that more cases of catarrh and bronchitis are due to bad air than to all other causes. Bad air is filthy air, and filth is a prominent factor in the causation of disease. Foul air lowers the vitality, diminishes resistance to disease, and furnishes good conditions for trouble. The close, uncleaned hen house, or the unventilated brooder, alike, are the unsuspected cause of many troubles.

There is little danger from bronchitis after the chicks pass out of the brooder, until late fall, when the birds are often caught out in the roosting coops by some storm, or are transferred from the airy summer coops to some crowded, close house.

Birds sent on the train to an exhibition or to some new owner stand a chance of developing bronchitis. The hot show room and warm corner of the express car are likely to be succeeded in winter by exposure to a low temperature that is dangerous.

Birds that have a history of roup in previous months, or birds descending from stock with a record of cured roup, seem to be fit subjects for catarrhal diseases, and no one is more likely to appear than bronchitis.

I have known air-slaked lime to so irritate the mucous surfaces as to produce what resembled an ordinary bronchitis. The droppings boards were freely dusted with the 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 be avoided.

Unless you are looking for the outbreak of this disease it will have got a start of one to three days before the bird appears to be really sick. There is from the first some rise of temperature and a little difficulty in breathing. The lining of the bronchial passages are dry and swollen,

hindering the passing in and out of air. At the end of the second day the bird 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 from the bird, and may require the putting of your ear to the side of the bird, to make out the peculiar sound. As the disease progresses there is more and more mucous 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 years' experience. These cases often seem to be well birds 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.

If you have a case of bronchitis on hand, and suspect that others are developing the disease, be prompt to attempt aborting 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 is not always to be had in convenient form for use. I have obtained such sure results from the use of the alkaloid (aconitine) in my own practice that long ago I put on one side the tincture. A good tincture should be given in drop doses to each bird, every two hours. There is no better way than to mix as many drops as you are to feed birds with a little mash and give in such dishes as to let each bird have its proportion. One day's treatment persisted in will abort nine-tenths of the cases. Feed a hot mash of at least one-half bran, and keep all birds 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 five years ago, for the cure of chronic bronchitis. It has done good service.

This pill, containing iron, strychnine and quinine, should be given in a little bit of 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. A little better feeding of easily digested food should be given these chronic cases.

Pneumonia.

Pneumonia is a catarrhal inflammation of the lining of the air cell 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.

It pursues so peculiar a course in many instances that we cannot think otherwise than that a single case on a poultry plant is of danger to all the other birds.

Pneumonia arises under various conditions and circumstances. It sometimes appears in a flock that has been shut in a tight house, in close air and damp floors, and then let out one day into the cold zero weather of our northern states. Chicks and fowls alike suffer from pneumonia when kept on the "hot house" plan. All ages, except under three weeks, require the daily exhilaration to be obtained only by exposure to the fresh air. The moment you begin to baby a bird you are commencing a practice that is dangerous to health. There is life, vitality and profit in the reaction that comes from breathing pure air. It takes extra good judgment to ventilate the long, tight front houses, and the steam-warmed brooder houses, and many a plant has failed in the attempt. The scratching houses have helped solve the question for adult birds. Along this same line we must raise our broilers if we wish to avoid a high death rate. Close, damp air always is a source of trouble to birds of any age. There is very little sickness to be seen in the scratching shed house, and in my own "Peep-o'Day" houses I have never had a sick bird. If we make our birds scratch for part of their living and give them plenty of protected fresh air room, we shall seldom have a case of pneumonia arise in our flock. Last winter when the thermometer hung near zero for a week my Wyandottes continued to work and lay, even though the doors between scratching and roosting rooms of my "Peep-o'-Day" houses were never tightly closed. I do not advise this exposure for the tall combed birds, but Wyandottes and Plymouth Rocks will do their best if treated in the manner stated. Do you know how this life of exposure affects the soldier on the plains? No matter what the weather so long as the tent life is continued there is little sickness. But transfer the men to the red-hot stoved warmed barracks and you soon get influenzas and pneumonias.

Very young chicks, dragged out into the pouring rain by the active hen, often become chilled and develop a low grade of pneumonia. These cases seldom recover and those that do are poor stunted chicks. Study and practice prevention and let our failures only lead to renewed efforts to have healthy stock.

Chicks with well developed pneumonia show no sure sign of the disease. Most of them are without appetite, breathe rapidly, and move about little, if any.

Adult birds show the rapid (panting) breathing, dullness in appearance, sluggish movements, and loss of appetite. In fact, the full powers of the bird are put forth in the effort to get air enough to sustain life. If you put your ear over the chest wall and listen carefully you will get a peculiar sound that is crackling or snapping in character. In a short time the bird may be seen standing in a corner, in a listless state, wings drooping and a relaxed condition of all muscles except those used in breathing.

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 bird. The disease is sudden, rapid in its course, and dangerous to life. Hence be quick to see the first appearance of any sign of pneumonia and meet the indications.

If you can arrange it conveniently, place the birds in coops in a room that can be warmed to seventy 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 of the birds.

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 bird is to be sure that he 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 the mash if the bird swallows.

Consumption.

It is too bad to be obliged to consider consumption and tuberculosis together, but in presenting the subject to a lay audience they must be kept close in their relation to each other.

There is a similarity in these diseases. They 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 birds. It seems necessary to have the proper soil before either disease sends deeply its roots. Neither disease is inherited, but birds from weak ancestors fall a ready prey if the right conditions are presented.

Birds kept in a way favorable to roup are quite likely to present a few cases of consumption. Anything in housing, feed or care, that tends toward lowered vitality, is a factor in these troubles. There is no better

way to avoid consumption and tuberculosis than to keep strong, sturdy stock. Careless, persistent inbreeding leads to a dangerous tendency to disease.

Tuberculous 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 beginnings of trouble. The better the general condition of your birds, the less danger there is of consumption or tuberculosis appearing in your flock.

There is much satisfaction in having birds so well that disease finds poor soil for chronic troubles. Breeding birds should always be up to the highest standard of health. The crossing of birds with a tendency toward lung disease is a dangerous plan and is followed by many mishaps.

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 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 bird 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 bird 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 birds 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—bacilus—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 bird. It is not safe to depend upon burying the bird. It may get

exposed through the effort 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 pens and a little from the bare yards near the houses. Brush up the inside of all buildings and remove all 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.

Birds healthy from the start, well fed, given plenty of fresh air and sunshine, not crowded, do not easily contract tuberculosis, even though they may come in contact with it. There must be a lowered condition of vitality in the bird to enable the germ of tuberculosis to find a suitable soil in which to grow. If this disease ever gets under headway in your poultry yard, you have only to blame yourself for the discouraging outlook before you.

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 birds. 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 oil mixed with the mash will help nourish the bird. 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 bad the use of the syrup of hydriodic acid, five drops three times a day in mash, will do much to relieve the condition.

A poultryman who has on hand several cases of tuberculosis ought to stop at once the shipping of birds for breeding, and eggs for hatching. He has no right to impose upon some one else stock that is doubtful, if not dangerous.

Six years ago, in an article in "Poultry," an English paper of good repute, J. Woodroffe Hill put himself on record as follows:

"The broadest fact established regarding the exciting cause of tuberculous deposit is that the domesticated animal is more liable to tubercular disease than the same animal in a wild state. The stabled cow, the penned sheep, the tamed rabbit, the monkey, the caged lion, tiger or elephant, are almost invariably cut off by tuberculous affections, no doubt due to deficient ventilation, and the abeyance of normal exercise of the pulmonary functions. Compare the ordinary barnyard fowl with the highly bred show bird as to vigor, stamina and freedom from hereditary disease, and the former, generally speaking, shows the cleanest bill of health, for this reason—it lives in a more natural condition, is not crammed with artificial food or dosed with quack nostrums, and gets what grit it chooses to find without being supplied with any special form.

"The ravages of tuberculosis in the human family are too patent to ignore its gravity in the lower creation, and the poultry fancier will best consult his own interests in studiously avoiding breeding from or purchasing birds of scrofulous or tuberculous taint, and in the event of the disease manifesting itself, to dispose of his stock, thoroughly disinfect his grounds, and after a sufficient interval import fresh and pure blood."

The warning of Prof. Hill is well worth heeding. At the same time I am sure that the same danger does not exist here as in England as regards pure bred poultry. There are fully as many sick birds in farmers' flocks as in the yards of our fanciers. I am more impressed every season with the health and vigor to be seen in the birds sent to the winter shows. Given your pick of the birds at the early fall fairs in con ter shows. Given your pick of the birds at the early fall fairs in conwould take the carefully bred birds of the fancier. Let us profit from the statement of Prof. Hill, in so far as it indicates a possible danger.

The Liver.

The diseases of the liver are too numerous and too common to be passed by at this time. They generally result from too good 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 obstruct 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.

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 properly treated, most of them will recover their health. As the cause is largely one of improper feed-

ing, the return to rational foods must be the first step. If the mash is made as largely of cut clover as you can get the bird to take you will be doing well for a starter. Drop out much of the flour and cornmeal. Better feed green cut bone or fresh meat, than dry meat meal, for a month. Give the birds 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 dropping tube. After a single dose of laxative medicine I should refrain from further medication and depend upon proper food and care.

Hepatitas or Inflammation.

Hepititas or inflammation is really the stage following congestion of the liver. There is little satisfaction in doctoring cases that have been allowed to drift into this condition. As the result of the inflammatory process the liver tissues are permanently injured. Even though the trouble is brought to a standstill, the organ is partially unfit to carry on its needed work. Many of these cases of inflammation have a past history of chronic lung disease, or of break-down from over-feeding.

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. Feed lightly of heating foods, depending upon clover and bran largely for mash, with an out-of-door life when possible.

The Comb.

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. Any change in the looks of comb or wattles is plain to the most thoughtless poultryman, and presents a sign of danger if not showing the indications of a normal bird.

There are fewer cases of comb diseases in this country than in Great Britain, owing, I suppose to better care and more healthful surroundings. 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 little 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 "standard red." Any deviation from this red, whether it be to a 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—plethera. One may be a sign of under-feeding; the other that of cramming or over-feeding.

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 seems 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 substance 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 little 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 she 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.

If this disease has been allowed to grow into the condition last described, little treatment will avail. The birds are in a hopeless state, with little prospect of cure. They 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.

White Comb.

Unlike fungoid that is not contagious, white comb depends upon a low state of vitality. 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 first noticed. The nearness to the skin causes an early breaking of the little 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.

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.

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.

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 fresh air. Be sure that green food, in some form, such as dandelion or cabbage leaves or onions, be 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.

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. Do the best we can, there will, at times, come cases of frost bite into our flocks. 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.

Injuries of Comb.

Injuries to the comb and wattles are more or less common, and are usually the results 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 a little careful work. Keep the bird alone until the stitches can be cut and removed, thus preventing any picking by other birds. Whenever the blood dries on the surface of the comb and you find other birds inclined to pick at it, put the bird 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 bird is also bad and delays healing, if indeed it does not undo the good you have done. For a sore comb or one that 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.

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 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."

Chicken Pox.

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 the loss of sight, if not the destruction of the eye balls.

The more numerous the sores or ulcers the more prominent the loss of appetite, strength and color.

Chicken pox is known by the scabby ulcers appearing on any part of the body, but more often on head or wing. 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 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 a 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 moved and dry straw supplied in its place. The danger in this disease is exposure to cold and wet.

Apoplexy.

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 way and produce a brain trouble. However, let a bird 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. Birds in this diseased condition are likely to have difficulty in passing their eggs, and during the greater strain imposed upon the bird in laying it is 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 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 late, 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 getting his food in too short a time.

Cases of apoplexy, and cases resembling it in any 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. 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.

Worms.

I shall say little on the subject of worms, except as relates to the roundworm, the tapeworm and to gapes. These are three worms that are common enough to warrant suggesting treatment for the conditions that arise when they are present in our birds. There are a dozen others that are of interest as curiosities, but they are rarely seen and are not really dangerous. Our government, through its department at Washington, and some of the State Experiment Stations, is doing good work in the study of worms and their relation to poultry disease, and

the printed reports should be studied by poultrymen. The Rhode Island Station has advanced study in this line, especially in relation of worms to turkey disease. It is well to understand the dangers and symptoms of these parasites, that we may recognize their presence and so avoid serious trouble and possible failure.

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

The Roundworm.

The roundworm receives its name from its shape in contradistinction to the flat tape worm. The roundworm is much more common than the tapeworm, and is familiar to any dresser of poultry. It is not a source of 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 the digestion of the hen. The large numbers, matted and wriggling, may be a cause of stoppage; their irritation causes diarrhoea, and their appetites diminish the nutriment intended to support the hen. These roundworms are seldom passed in the bowel discharges. Now and then a worm is passed, but it soon dies in the droppings or is eaten by some other bird. It is not till a bird is killed or dies that worms are known to be present. The roundworm 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.

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

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 allowance 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.

The Tapeworm.

The tapeworm is not as common as the roundworm. I have met poultrymen who have never seen a tapeworm, even when dressing birds. Perhaps if they had taken pains to examine the contents of the bowels they might have another story to tell. Poultrymen are busy folks and have little time for looking after something that has made only a slight impression on the health of their birds. Vale tells us that this tapeworm "appears to be identical with the tapeworm found in cats (Toenia crassicolis), and it is, therefore, highly probable that it is derived from the same source—that is, the fluke of the liver of the mouse; for it is an ascertained fact that fowls will actually catch mice and eat them. I have seen brooder chicks catch little mice and tear them limb from limb."

Our birds generally show no indication of the presence of tapeworms. Sometimes the birds will be uncommonly thin in spite of a good appetite, but tapeworm 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 tapeworm 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 crop and gizzard are empty, and if the food 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 tablespoonful castor oil.

Gapes.

Gapes is a disease appearing in chicks, rather than in old birds, and is the direct cause of death of millions of young chicks and old birds every year. I have known of its resulting fatally in fifty percent of cases attacked. Gapes are caused by the irritation of a parasitic worm in the windpipe. A single worm makes little impression, but when they are present in dozens the danger is not to be courted. The direct irtation is not the only source of difficulty, for the loss of nutrition needed to support the life of the worm is felt by the bird.

Every case of gapes presupposes a previous case. It does not arise from filth or wrong feeding, but it does seem to take fresh vigor when the surroundings are unhygienic. There are fewer cases of this disease in New England than in the Middle and South Atlantic states, whether due to the long cold winter or not is uncertain. It seems to flourish in the dry sandy sections of our country, in the wet days of late summer and early fall. Heat and wet seem to go with fresh outbreaks. A few of the worst epidemics I have known have appeared in the late fall, in full grown birds, kept on wet clay soil.

Gapes have often been found in the common earth worm, in those sections of the country where the disease is to be met. This may explain why the disease appears year after year in spite of the most careful labor towards cure and prevention.

Gapes have been a subject written about since the first of the past 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-eight 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.

The history of this parasite is an interesting one and may be pursued to advantage in the reports of some of the State Experiment Stations.

The symptoms vary according to the amount of irritation and loss of nutrition. The early symptom is a little cough (hack), as though a little 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 mucous, 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 mucous 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.

Besides the gaping and open-mouthed breathing, there is at times sneezing trouble in swallowing food, and loss of flesh. Gapes is a serious disease and precautions should be exercised to prevent its entering your yards, and the subject should be studied to obtain the knowledge needed to cure cases arising in your flock.

It is always well at the beginning of any serious sickness in our birds to gain the information (to be obtained in no other way) gleaned from a post-mortem examination. It is better to know you have gapes to deal with, than to doctor for gapes when you have on hand an epidemic of pneumonia or bronchitis. The very treatment needed for gapes would surely kill the subjects of these last named diseases. Examine carefully the whole lining of the windpipe, using a magnifying glass of low power if you have one, and do not give treatment suggested for gapes unless you find the worms.

The very location of the home of the gapeworm makes its treatment difficult. If the worm lived in the crop or bowels it could easily be reached with liquid medicines, and the irritation itself would cause much less distress to the infected bird.

To reach the worm in the windpipe all sorts of combinations of wire, hair and feathers have been offered to a confiding poultry public. Some do bring up sample worms, but most of them are utter failures. The best only confirm your diagnosis, and have little effect towards the cure of the trouble. The few large worms extracted lessen irritation for a while, but the short young worms are too small to be caught in any device yet invented. The instrument in ordinary use consists of a long wire, having at its end circles of horse hair. This is pushed down the air tube, turned two or three times, slowly withdrawn, with one or more worms possibly entangled in its meshes. This is a slow process and very wearing on the bird.

The most common and satisfactory treatment is the use of lime dust. The birds are shut in a barrel or box, so arranged as to allow inspection of the birds while subjected to the process, and air slacked 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 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 coming 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 for 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 "gapeworm" 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. DR. N. W. SANBORN.

MEDICINE IN THE POULTRY YARD.

By Velma Caldwell Melville.

A prominent fancier ridicules the idea of doctoring fowls, giving as his remedy for all ills—a sharp axe. While there are times when this is decidedly the medicine, still there are a majority of instances, especially among thoroughbreds, where we may employ milder and more profitable means. We have a homeopathic "book and box"—for we do not think harsh remedies should be used in the animal world—and will, in a series of short talks under the above caption, mention some of the ills, and their symptoms, that our feathered friends are heir to, also the remedies in each instance.

First, however, we will name some general remedies and tonics which are not, strictly speaking, in the "box." These may be employed whether one goes deeper into the science of "Medicine in the Poultry Yard" or not.

Indigestion.

In fowls, as in all other living creatures, digestion plays an important part in health. Indigestion means sickness. It is needless here to repeat the old story about plenty of grit, but perhaps some of our friends depend entirely upon this, when there are instances where it fails the chick even as our teeth sometimes fail us and we have to "take something." Some are inclined to sneer at tonics for man, beast or fowl. For those who are so circumstanced as to be able to have outdoor exercise and the like this is well, but yarded fowls, like persons much indoors, have sometimes to resort to artificial means.

Here are three common and inexpensive remedies that act directly on the digestive organs—cayenne pepper, asafoetida and gentian. Charcoal acts as a purifier. For a simple tonic, we are told over and over to use iron, even rusty nails in the water being recommended. Then there is the far-famed Douglas Mixture, given elsewhere in this book. The Douglas Mixture should not be given oftener than every other day and twice a week is usually found sufficient. Sulphur we find a valued remedy in the poultry yard, but this, too, should be used with caution.

Then there are the much-noted chicken powders. Certainly we find circumstances where they are decidedly advisable. Perhaps one of the best powders is compounded thus: Equal parts copperas, cayenne, sulphur and resin. Pound together and mix well.

Lime water is excellent for fowls in both sickness and health. The formula is simple. Slake eight ounces of good lime in a little water and then add water enough to make two gallons. Let stand until clear, pour off and set the lime away to make more, which is done by adding cold water, stirring well, and letting settle as before.

Perhaps here we should insert a few cautions. In giving charcoal teach the chicks to eat it by first pulverizing and mixing with soft food; afterwards it can be kept before them in broken bits and they will take it as nature prompts. The pan of charcoal is a fixture at our "ranch." However, in soft form, the fowls are apt to get enough to clog the system.

Some directions: The size of any dose of medicine given a fowl should be the same as for a child. To a chick two weeks old give the size one would to a child of six months; to one six weeks old, the dose for a child of one year; to one half grown, that for a two-year-old child; to one full grown, the dose for a child of three or four years. Give all medicine in solution if possible; if not, in pill.

Above everything else, use common sense, a firm, gentle hand; and remember that no one remedy will cure everything; and that what will answer in one case may fail in another similar, the same as in the human family.

Symptoms.

In doctoring poultry, one must observe and study symptoms carefully.

Haven't time?

Then don't go into the business, for it takes time to do a thing well, and to stand a show in the fancier's world now-a-days one must do well, and very well. When a bird dies make an intelligent autopsy and learn something.

Of course, we all know that cleanliness is the great "preventive" and "cure" among fowls, but it is not everything. Look to the lice and mites first of all, however. Feed carefully, observe all that is written in the poultry journals and if, after all this, your fowls are sick, try some of the suggestions to be found in "Medicine in the Poultry Yard."

It pays to make a thorough study of whatever business one is going into, not more surely broking or banking than fancying. To intelligently proceed to doctor a chicken one must know what a healthy one is like. For instance, to note carefully the condition of the bird when the heart, liver, etc., are in normal condition is soon to be able to distinguish by symptoms when these organs are out of repair.

By handling birds, studying them, being with them, one learns much about them. We know at once when one of our fowls is ailing, as there is seldom an hour in the day when some one of the family does not look them over.

The inmates of one pen of heavy Barred Rocks have to be literally pushed out of one's way, they are so tame and so fond of petting. Another pen of lighter birds fly on us the minute we enter the run, two or three disputing for standing room on our arms and hands at once. And then there are the White Rocks, so gentle and tame that we call them doves. The majority have names, and, as we stated, all are watched so closely that the slightest indisposition is noticed and prompt remedies applied, allowing, of course, for nature to cure first.

Colds, Indigestion, Constipation.

Fowls have "bad colds." For this we give a few doses of aconite—third dilution—one drop every hour. If feverish symptoms accompany, alternate belladonna—same dilution and dose—with the aconite.

For foul stomach, sudden indigestion or constipation, a drop of nux vomica—third dilution—every two hours, usually corrects the difficulty.

One must, however, be cautious about forming too hasty conclusions, as ofttimes very similar symptoms indicate different diseases. In very complex or confusing cases it were well to sacrifice a bird or two for the purpose of determining the disease, thereby possibly saving the rest of the flock.

First of all, be sure that vermin, a drafty hen house, impure water, unwholesome food, or some easily removable cause is not at the bottom of your trouble. Common sense suggests that in all contagious diseases the affected fowl be removed to separate quarters and these quarters afterward completely destroyed.

Cholera.

Cholera is perhaps the most dreaded of all the ills that poultry is heir to. In ordering these articles the editor asked for personal experience, but we are happy to say that we have had no personal experience in cholera, though it has been all about us time and again. In this prevention is far more valuable and comfortable than cure, hence we will first name some preventives. Let a stiff paste of flour and water form one article on the bill of fare; corn soaked in kerosene some hours before feeding, another. One day add sulphur to the soft food; the next, soda; the next, cayenne; the next, tincture of iron. The Douglas Mixture added to the food is another preventive. Feed a little charcoal occasionally. Add carbolic acid—a little—to the drink. Last, but by no means least, thoroughly clean up the poultry houses and runs.

As to the "cures," they are legion. One excellent authority recommends ten drops of strong tincture of eucalyptus globules, five grains common salt and one-half teaspoonful ground pepper. Give in a tablespoonful of water.

Another advises one ounce of powdered garlic, two drachms tincture of capsicum, two drachms tincture of camphor, one-half ounce rhubarb, one drachm tincture of opium, thre drachms oil of peppermint. Mix well and give from six to eight drops three times a day in a teaspoonful of water.

Other fanciers have successfully carried their flocks through on equal parts cayenne pepper, alum, resin and sulphur. Mix and put in the food once a day a tablespoonful to three pints scalded meal.

Still another is, two tablespoonfuls Epsom salts, four of lime and ten drops tincture of iron added to a gallon of meal.

Lastly, we give Dr. Dickies' "heroic" pills to be used for fowls too far gone to eat, not claiming them as strictly homeopathic, though recommended by homeopathic authority: "Sixty grains of blue mass,

twenty-five grains pulverized camphor, thirty grains cayenne pepper, forty-eight grains pulverized rhubarb, sixty drops laudanum. Mix and form into twenty pills. Give one every five hours. After there or four have been taken, give each bird half teaspoonful castor oil and ten drops laudanum. Give a scanty drink of scalded sour milk with the Douglas Mixture added in such quantity that twenty-five fowls will get one gill per day. Give no other drink."

Bowel Trouble, Constipation.

If it is "actual experience" that is wanted, we feel that we are right at home, for life these days is just nothing but "actual experience." You see we take the chicks from the hens as fast as they hatch—and sometimes when several hens come off at once they hatch pretty fast—putting them in a basket beside a warm brick well wrapped. We hope it not amiss here to drop a caution—do not cover too closely (the chicks, not the brick). We did this, to our sorrow, the other day.

As soon as they commence eating, which is from twenty-four to thirty-six hours after hatching, begin the danger and "experience." It does seem as if some chicks were predestined to live, others to die. But we do not let the latter fate work out if we can help it, especially in high-bred chicks.

Bowel trouble is about the first bugbear to be faced, and we lost a half dozen with it early in the season. Vainly we searched our "book" for something that would apply to the case. It all seemed too overgrown; then we tried a little common sense. Several White Rock beauties became affected and we simply made them a "cup of tea." Does not every one know that "store" tea is an astringent? We made it rather weak, but gave them nothing else to drink for a day. It would have delighted a genuine tea drinker's heart to have seen the pretty heads bob up and down as they sipped their tea. The way we came to think of this was recalling an instance when we cured a pet kitten of a bad case of diarrhoea by dosing him with tea. Of course, there exists the danger of constipation ensuing, but only one of ours fell a victim.

For constipation we again sought the "book;" but this time we turned to the department for birds instead of fowls. Of course what would suit a cage bird would be more suitable for a baby chick than the remedy described for a full grown chicken. "A drop of castor oil every hour until the difficulty is removed." It worked like a charm.

While studying this matter we learned that the juice of yellow carrots, used alone as the drink, is a cure for constipation; also that poppy seed is an excellent remedy for diarhhoea and dysentery. In severe cases of the latter give two drops of tincture of opium in the drink.

Pip.

Then there came another morning when about thirty white chicks awoke with the appearance of having taken cold. How hoarse their voices, and—yes, there was one well-defined case of pip even to the little hard scale on the end of his tongue. Just at first, however, we were mis-

led by his continually opening his mouth. "Gapes!" we said, and straightway administered camphor, because this is our remedy—a successful one usually in gapes. But matters grew worse instead of better. When convinced that it was pip we went to work on a new line. You see the book stood by us in this instance and we diagnosed the case easily.

Symptoms of pip-scale on tip of tongue, a peculiar pip or "zip" noise; breathing disturbed and effected through the mouth; dry tongue, listless, indigestion. The scientific treatment is "warm quarters; castor oil if constipated. Apply to tongue and nostrils a weak solution of chlorinated soda, if any local remedy is used, but do not clip end off tongue as some recommend." Spongia may be used with good effect; but the best, simplest and surest treatment advocated is two or three grains of black pepper each day in fresh butter. We happened to have no spongia in the box, though it is a favorite remedy for throat trouble in man and beast here, and did not like to put the grains of pepper down so tiny a throat. We successfully cured the patient, however, by feeding him cold potato pretty freely, sprinkled with ground black pepper, giving two doses of castor oil—about one drop to the dose—keeping him very warm. The others that were hoarse required only heat, a drop of carbolic acid in the drinking water and careful feeding.

While so much is being said and written on "what to feed young chicks," it may seem superfluous and even out of place in these talks for us to have a word on the subject, but we must venture to endorse all who say use dry bread crumbs the first two or three days, giving water every two or three hours, but not allowing any one chick to drink too much. After this introduce rolled oats and millet seed, and a little later still cracked wheat. After chicks are a week old finely chopped meat is excellent for them.

Of course, feeding makes or mars the need of medicine in the poultry yard to a great extent, but it is not all. Another morning a crate of baby chicks were dumpish; would not eat, and huddled disconsolately together. We were sure they were going to die, but as we did not know what ailed them we could not give medicine. A quiet day, with a little extra heat and care and rather light feeding did for them much the same that such treatment does for a dumpish person. There are plenty of times when a judicious letting alone is the remedy needed, especially with young birds.

One day the "gude mon" carried all the crates to a place in the barn where a few hens had been fed at one time. Sitting there was a box of coal ashes, and as the hens had used it for toilet purposes the floor was thickly strewn with ashes and tiny cinders. It reminded one of nothing so much as bees around honey to see the little fellows crowd around and pick, pick, pick. It carried its own lesson.

We use sand, finely cracked charcoal and bran as regulators. A treat in the way of a baked potato, broken open, keeps the little fellows happy and busy for an hour.

Roup, Canker.

A friend gives us the following bit of experience with roup:

"I thought to improve my stock of chickens by investing in a standard-bred rooster, and he was a beauty. But one day the chore boy came in and told me my rooster was 'dumping around; seemed sick.' I had him brought into the house and I should think he was sick! Rags of canker an inch long hung from his mouth; his tongue was covered and his throat completely filled. The odor was terrible and my husband said 'Kill him.' But I determined to see what I could do. I spread newspapers on the floor and stood him on them. My husband held his bill apart while I, with a long swab and a solution of carbolic acid and water, cleaned all the canker from his mouth and throat. I had to dig pretty hard and it bled freely, but it was the only way. I then blew sulphur into his mouth and down his throat and fed him on very warm bread and milk. I had to poke it down with a stick, but I filled his crop and then put him in a warm stall in the barn. I burned everything that I had used about him. I had to repeat this treatment twice a day for several days, but finally had the satisfaction of knowing I had cured a severe case or roup. If it had been a common bird it would not have paid for the trouble." (Rather heroic treatment, but well worth knowing.)

Next to cholera, roup is the most dreaded disease among fowls. It is very contagious; begins in the lining membrane of the beak, but rapidly spreads until it takes in the whole system. An autopsy usually shows the liver and gall-bladder full of pus. It is oftener called by other names, such as diphtheria, influenza, bronchitis or quinsy. It chiefly attacks old birds, but all ages may have it. The first symptoms are like those of a bad cold; especially marked are the fever and thirst. At first the discharge from the head is thin and almost white, but rapidly grows thick.

As stated, the odor is very bad. The disease should be checked in the first stages, and an eminent writer advises that in a flock where roup is suspected every fowl should be examined under the wings in the morning to ascertain if the feathers are stuck together with the discharge from the nostrils during the night. Visit the perches late at night and listen for obstructed breathing. Immediately attend to relieving one that breathes hard and remove it from the flock. Too great care cannot be observed in regard to cleanliness where this disease exists. Burn droppings and all. Feed warm, stimulating food with cayenne pepper in it. Onions chopped fine and mixed with the feed are helpful. Keep the patients warm and dry.

One book says that no known medicine will cure all cases of roup, but that German Roup Pills will cure when anything can. As an accompaniment it recommends "three pills daily as large as a pea, made of mustard and ground ginger. Also give pepper tea."

Again we are told to try three pills a day, as large as a fowl can swallow, made of equal parts of pulverized sulphur, powdered charcoal

and new yeast with stimulant as given above. In all cases put powdered charcoal in the food. Castor oil, a teaspoonful at a dose, is advisable from beginning to finish. In the absence of any other wash for the beak, throat and head, use castile soap and warm water. When the discharge is excessive take a common machine oil can and inject some camphorated sweet oil through the external openings or from the inside, through the slits in the roof of the mouth. Where excessive difficulty in breathing exists steaming the head sometimes affords relief. Take care in this operation. When a bird begins to get well give a tincture of iron tonic, or some of the other tonics mentioned in a previous article.

Of course, almost everyone has a roup cure, but it would have to be a valuable fowl that we would handle through a siege of the loathsome disease, although if taken in time it would not be so bad. In our opinion "prevention is better than cure," and we have the idea that dry, comfortable quarters will prevent roup, at least if coupled with cleanliness and wholesome food.

There is a common canker among fowls that may be mistaken for the more dreaded disease. Wash the parts, eyes, mouth and throat, in warm castile water if there is a gummy discharge. Clean out the throat and mouth with a weak solution of chlorate of potash, alum and water. Wash off the canker and apply powdered borax in small quantities to the spots bared by the process. Powdered burnt alum may be good for white ulcers on the tongue.

Mites, Lice, Sleepiness, Watery Eyes.

More and more as the days go by are we impressed with the fact that the "ounce of prevention" is better than the "pound of cure;" and more and more are we convinced that vermin and injudicious feeding are the diseases of young chicks. Our losses this year have been almost wholly along these two lines. But as this series of talks does not deal presumably with either of these, we only pause to say that if your young chicks are not doing well, vermin is almost sure to be at the bottom of the difficulty, whether you discover the pests or not. Here is a place to exercise your faith in some of the unseen realities; yet ten to one mites are sucking the life out of the little birds by night and the gray head-louse is getting in its deadly work both night and day. Use insect powder regularly whether you think they need it or not.

We have succeeded in killing a number of fine birds this summer by feeding them on cold boiled potatoes. At first we were delighted with the plan (feeding the potatoes—not killing the chicks). The little fellows enjoyed chasing the tempting white balls and pecking at them, but when there was a failure to digest, resulting in the mass souring in the crop, there was the end of enjoyment for both fancier and fowl. The crop became distended and froth arose in the throat, producing gaping and finally suffocation. Some of the crops we opened and the seething stuff forced itself out with a hissing sound, but it did not save the chicken.

One other "fatal feature" among our young birds has been prema-

ture wing feathering. In some instances a bird of three or four weeks would have wings dragging the ground. Chicks of a week have pronounced wing feathers. Of course the feathers sap the strength and the bird droops and probably dies. Clipping the feathers will stop their growth and help the bird.

Some of our neighbors have had hens afflicted with the "sleepy sickness" this summer. The bird droops around, sleeping and drinking —that is all. Giving them no other drink than strong copperas water effected a cure.

If your fowls have been housed so poorly as to have sore, watery eyes, wash the eyes with a weak solution of sulphate of zinc, with alum water, or with a solution of alum and camphor. Put sulphur in the food and furnish clean, dry quarters.

Apoplexy, Paralysis, Staggers.

As fowls are subject to apoplexy, paralysis, staggers and kindred diseases, all similar in symptoms and treatment, it may not be necessary to be able to exactly discriminate between them. They are affections of the nervous system due to an excessive flow of blood to the brain. If unconsciousness ensues after dizziness, staggering, whirling in a circle and like maneuvers, it is probably apoplexy, and as soon as the blood leaves the head the bird will be all right. If, however, a blood vessel is burst the disease is paralysis and death is likely to result, though there may be only the loss of the use of the limb.

In any of these cases turn a stream of cold water on the head until the blood is driven away, and afterward feed lightly. Give aconite if the skin is dry and hot; belladonna for heat and convulsive movement of the head. Nux vomica at the first indications of the disease will probably prevent it. Give opium in apoplexy. For some days after recovery begins, give five grains of bromide of potassium twice a day.

Gapes.

Gapes sound as alarming to the fancier as does croup to a mother; and we more often find treatment prescribed for this disease in the poultry publications than for any other. Of course everyone has seen pictures of the gapeworm and it may be that quite a number have seen the original of the picture. At best they are not pretty things and they are alarmingly prolific. There are a number of theories rife as to how the eggs are carried, one being that lice carry them, another that the gapeworm is one of the forms assumed by the louse. Constant gaping is the symptom, but is attended by difficult breathing, coughing, wheezing, attempts to swallow, droopy appearance. Of course there is gaping without gapes, as we have already said, but it does not take a long time for an over critical observer to determine the real disease.

For treatment for gapes we have found small pills of camphor gum excellent. Some prefer to put clear carbolic acid into an iron spoon and hold it over a burning lamp until dense white fumes envelop the bird's head. Vapor from burning creosote or turpentine, or the fumes from sulphur, will do nearly or quite as well if properly applied.

There are still others who adhere to the practice of swabbing the throat with a feather wet in kerosene, turpentine, strong salt water, or a weak decoction of tobacco. Our book says: "Powdered alum or sulphur, blown down the windpipe, will often kill the worms" (and patient, too, if administered too freely or too often). Some resort to crushed corn, soaked in kerosene oil or alum water, but we could never get our fowls to eat enough of such diet to work wonders.

Here again the ounce of prevention is much handier and cheaper than the pound of cure. If the drinking water is suspected, boil it. If a fowl is attacked with the gapes, remove it at once from the rest and burn all food, perches anything and everything that it has come in contact with. Where this cannot be done, soak everything in kerosene oil or carbolic acid. Perfect cleanliness and a change of food may work wonders in an infected flock.

Worms.

Worms in the stomach and indigestion are much alike in symptoms, but otherwise very unlike.

A well-known breeder and authority thus describes a hen he bought in a high-priced trio: "I saw at a glance that there was something wrong; she was emaciated; had the appearance of chronic diarrhoea, and ate ravenously. I watched the spot where the bird roosted and found indications of mucous and slime, which, to my mind, pointed to worms. I shut her up forty-eight hours, without food, and then gave her two-thirds of a teaspoonful areca nut powder. The next morning about twenty long, white worms lay coiled together where she had dropped them. I then gave one-half teaspoonful castor oil and she got well."

Personally, we use santonine.

Diarrhoea, Dysentery.

Diarrhoea and dysentery may result from tainted food, impure water, extreme heat, filthy quarters, inflamed intestines, etc. In dysentery the droppings are frothy and mingled with blood. The bird fails rapidly. In common diarrhoea the droppings are of various colors and befoul the feathers. In old female birds there is sometimes a continual white discharge, which indicates a low state of the system and something wrong in the shell making function.

There are a number of remedies for these troubles, one perhaps as good as another. In early stages, finely powdered chalk on boiled rice will do. For the trouble mentioned with the old fowls the powdered chalk and rice is a good remedy, as is also lime water.

In all these cases a pill, to be taken twice a day and made as follows, is highly recommended: Five grains powdered chalk, five of rhubarb and three of cayenne pepper, adding one-half a grain of opium in severe cases. Camphorated spirits is another efficacious remedy—three to six grains, on barley meal, to each fowl, or fifteen drops or so in a pint of drinking water. A little alum or tincture of iron in the drinking water is also beneficial.

In an assured case of dysentery, the odds are against the bird, but if it is worth saving put it on a diet of milk gruel and give a dose of castor oil, to be followed by four or five drops of laudanum every three hours. Keep the patient in a dry, moderately warm place. If diarrhoea becomes chronic, try frequent small doses of sweet oil. Bone dust is a preventive of this disorder, and it is well to use it for some days after a case is pronounced cured. In all these difficulties one must keep the eye open for cholera.

Cholera.

Speaking of cholera, have any of our fanciers tried vaccination?

W. H. Griffith, of Zanesville, Ohio, writes: "Vaccinate a hen and in eight days her system will be thoroughly inoculated; then cut off her head and catch all her blood in a vessel; then pour it on some paper to dry. A half drop of this dried blood is sufficient to vaccinate a fowl. Catch the bird, scratch or cut a place on the thigh so as to nearly start the blood and upon this place the bit of paper on which the virus has dried and let the fowl run. You need not fear of its ever having cholera. During the last two years I have vaccinated the poultry in nineteen yards where cholera was prevailing badly. All died that were not operated on. Out of two thousand vaccinated only eleven died."

The above is interesting, to say the least. The virus, we believe, may be obtained at many of our University Experiment Stations.

Another writer tells of his success in curing cholera with table salt; also Epsom salts.

Constipation.

In constipation among fowls add ten drops of sulphate of magnesia to each pint of drinking water.

If you have homeopathic remedies give nux vomica, aconite and bryonia in the sized doses mentioned for such remedies in a former article.

Consumption.

If a cold or catarrh runs into consumption, dispatch the bird at once. There is no cure.

Rheumatism.

Rheumatism sometimes results from damp quarters or running in the wet grass. If it affects the legs, bathe them with very warm mustard water, wipe dry and anoint with witch-hazel ointment, lard or sweet oil.

Leg Weakness.

For leg weakness give rest, nourishment and tonic. Raw fresh egg and a little cooked meat are strengthening. Give iron in the drinking water.

The chief symptom of leg weakness is the fashion of continually squatting on the hocks. Wheat, barley and other articles that do not tend to make fat may be fed. If the weather is warm, bathe the legs two or three times a day in cold water. Lime water may be helpful. As a remedy give a pill three times a day, made as follows: Five grains

phosphate of lime one-sixteenth of a grain of strychnine and one-half grain of sulphate of quinine.

Molting.

During the molting season too much care cannot be given the fowls, as it is of the utmost importance that they (especially the laying hens) get through quickly and without deterioration. Keep iron, at least rusty nails, in the drinking water; feed lean meat and add a teaspoonful of Douglas Mixture to each pint of drinking water. Give soft, warm food in the morning and grain at night.

Calcarea carbonica is also a valuable remedy.

Broken Bones.

In case of broken bones, unless the bird is very valuable, the sooner its misery is ended the better. However, should you have occasion to set a broken leg, bring the ends together until they fit neatly to the touch and cover the part with thick paper previously soaked in white of egg or mucilage. Bind on bits of pasteboard, being careful that all the dressing fits the leg neatly. Keep the bird by itself and try to prevent its moving or using the limb. If fever ensues, give aconite internally and shower the leg with cold water.

Injuries; Torn Side.

We had two valuable hens badly torn and lacerated on the side under the wing; one it seemed a sin to let live an hour. She appeared to feel well, however, and as we had just paid a large price for them, we thought best to try to save them. First we washed the wounds out carefully with warm water and castile soap, dusted in iodoform and bound new unbleached muslin about their bodies. They improved slowly until one day one of the hens simply horrified us by slipping her bandage and giving herself a thorough dusting. But lo, from that hour her recovery savored of the miraculous! Blessed Mother Nature!

VELMA C. MELVILLE.

TAPEWORM.

There was brought to the Reliable Poultry Journal office in February, 1897, a bottle of alcohol containing a tapeworm three feet long, which came away from a Golden Wyandotte hen. 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 tapeworm in alcohol. The hen began to mend immediately, regained her normal flesh, and was soon as well as ever.

COLDS.

Fowls easily catch cold, especially when roosting in a draft. The eyes water, the nostrils give off a thin liquid and the face becomes red and more or less swollen. Simple, so-called roup remedies will correct this. A common practice is to clean out the nostrils with a piece of soft cloth and inject into each nostril, also into the cleft in the roof of the mouth, a couple of drops of a half and half mixture of sweet oil and kerosene, to which has been added a little carbolic acid, five to ten drops to a gill of the oils, or a little turpentine. Also rub some of the mixture on comb and face. Keep the birds up for three or four days, or longer, if necessary, protecting them from all drafts and feeding soft food sparingly. Do not feed much of anything.

Smoking Resin for Colds.

A subscriber to the Reliable Poultry Journal relates the following experience with chickens which she found with swelled heads, some being totally blind: "We prepared a hospital and smoked them with resin, putting a piece of resin the size of a walnut on some live coals in a vessel in the hospital. In bad cases we put them in a separate box and anointed the head and eyes with lard and kerosene oil, with a drop or two of carbolic acid in the mixture, and in a day or two they were all right."

Vaseline for Colds.

Another correspondent says he has cured even the most severe cases of cold with vaseline alone in from one to four days. He anoints the head and in bad cases puts a little in the mouth. Since he discovered the above remedy, he says he has never lost a bird from colds or roup.

How to Avoid Colds in Fowls.

Ordinary colds are not due to bad food or filth, and are not contagious, but they can usually be traced to one cause—some fault in the roosting quarters. Chickens should not roost in boxes in summer time, nor should more than ten or fifteen roost together on the floor. It is in roosting on the ground that the greatest harm is done. Twenty or thirty chickens may roost on perches and not get overheated from crowding, but if the same number roost on the floor, or even out in the open air on the ground, no matter how warm the weather, they will bunch up together and those in the middle get overheated and take cold. Chicks that roost on perches in the open air have the least trouble with colds. For summer roosts we make a scaffold five or six feet high and cover it with brush and weeds, which will keep off the heavy rains, and also the sun. Under this, two feet from the ground, place the perches. As soon as the chicks are well feathered out remove the coop and place the arbor with perches in its stead.

COLDS AND INDIGESTION.

Where a cold is accompanied by a looseness of the bowels, pills made as follows are recommended by the North Carolina Experiment

Station and have proved effective on Reliable Poultry Farm: One tablespoonful of lard, two tablespoonfuls of mustard, ginger and cayenne pepper. Work together thoroughly and stiffen with flour; make into pills about the size of the first joint of the little finger. Give one pill twice or three times a day, according to the severity of the case. In mild cases give one pill each day, evening preferred.

AIR PUFF, OR EMPHYSEMA.

There is a disease from which chickens suffer called emphysema, "air in the tissues." It reaches the blood through the lungs. When the lung trouble is remedied, which nature alone can do, the emphysema stops, and if not too excessive, the air will gradually disappear from the tissues by absorption; but if it is very abundant, it may result in death.

Some relief may be rendered by pricking the skin and allowing the air near the surface of the body to escape. Indeed, this may save life in some cases that would die if left to nature, but it will not save life in all cases. The lung trouble upon which the emphysema depends is one of a transmatic character—a wound of the lungs, or an abrasion of lung tissue, resulting from violence of some kind. Chicks that get trampled on by their mothers, or cockerels that fight, are more liable to suffer from injuries that result in emphysema—they become inflated with air.

LEG WEAKNESS.

Leg weakness is generally due to the body increasing in weight out of proportion to the strength of the legs. This is the usual cause, but any disease that weakens the chick may cause it. The disease usually results from too heavy feeding without sufficient exercise area. The symptoms are a trembling in the legs and a disposition to rest on the hocks. 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.

LIMBER NECK.

Chicks are sometimes affected in this manner, caused, perhaps, by unusually hot days and nights. A remedy that has been successfully used is this: Hypo-sulphite of soda; dissolve one teaspoonful in half a cup of water, and give a teaspoonful of the mixture to each affected fowl every two or three hours. A teaspoonful of the hypo-sulphite in a quart of drinking water is also a good remedy.

The following is said to never fail: Give the affected bird a piece of assofoetida about the size of a pea. Use the gum form. Repeat the dose the second day, and the trouble gradually disappears.

FEATHER EATING.

This mischievous habit is the result of confining fowls too closely and allowing them to be idle. One preventive is to keep the fowls busy as much of the time as possible scratching for their daily bread. A strip of salt pork hung up in the hen house is a preventive and will sometimes check the trouble. Another effective remedy is to bathe the feathers that are being plucked out with a half and half mixture of whisky and aloes. Aloes can be obtained in small quantities at any drug store. As soon as the fowls are given liberty they will get over this habit.

MOLTING HENS.

During the molting period when the fowls are undergoing a severe strain, it is well to feed good green bone in liberal amount, also, to mix linseed meal with the soft food. The process of putting on a full new coat of feathers is a drain on the system which good green bone and the linseed meal will largely counteract; or give them a generous supply of bone meal, charcoal, meat and vegetables. Tincture of iron in the drinking water, and a few pinches of red pepper occasionally, make a tonic for them.

KEROSENE EMULSION FOR LICE.

There is no question of the value of kerosene emulsion, or its safety when properly made and used, and its cheapness makes possible its free use up to saturation of all cracks and crevices. It should be made of strong whale oil soap, one-half pound; kerosene, two gallons. Shave the soap into thin slices and dissolve in boiling water. When fully dissolved and boiling hot, add the kerosene, away from the fire, and violently churn the solution into a thick cream. Churn and agitate violently for twenty minutes. If the oil and water separate on standing, then the soap was not caustic enough. Add to this ten gallons of water and spray the whole outfit to saturation. This solution can be made by the barrelful and if well emulsified will keep indefinitely, to be diluted when needed.

DOUGLAS MIXTURE.

"Douglas Mixture" is made thus: Take of sulphate of iron (common copperas) eight ounces; sulphuric acid, one-half fluid ounce. Put into a bottle or jug, one gallon of water, into this put the sulphate of iron. As soon as the iron is dissolved add the acid, and when it is clear, the "mixture is ready for use. In hot weather or when the flock is small, less may be prepared at once, but the above proportion should be observed. This "mixture" or tonic should be given in the drinking water every other day—a gill for every twenty-five head is not too much and where there is infection it must be used every day, but where there is no disease, not so often, or in smaller quantities if it be used every day. This preparation, simple as it is, is one of the best tonics for poultry known. It is alterative as well as tonic, and possesses, besides, antiseptic properties which make it a remedy as well as a tonic.

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Other chapters include articles by the best authorities that thoroughly cover every point in profitable duck raising, and tell how 5,000 chicks were raised in one season on a two-acre lot; articles on the care and management of turkeys from shell to market, including hatching and rearing the poults, fattening for market and preparing exhibition specimens for the show room; also how $1.25 each was obtained for common fowls by caponizing—full and explicit directions, illustrated. The symptoms of common diseases of poultry are described and remedies given, with advice on how to prevent disease.

This book has 112 pages (twice the size of these), is fully illustrated and contains more and better information than any other poultry book published. Price, postpaid, $1.00.

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How to Hatch and Rear Chickens Artificially. The most down-to-date, practical work on this important subject, contributed to by the most expert operators of incubators and brooders in America. It tells how to start right raising chickens artificially, how to handle each

detail of the work successfully and how to avoid mistakes that spoil the profits. It contains plans for constructing and using incubator houses and brooding houses, for small or large plants, so fully explained and illustrated that any one can build them. Complete directions are given for securing good fertile eggs and for hatching strong, healthy chicks. The most successful methods of brooding and feeding chicks intended for broilers, roasters or for breeding stock are given in detail. Killing, dressing, packing and marketing are fully and clearly explained.

This book contains many illustrations of successful broiler raising establishments and describes the methods that make them successful. 92 pages. Price, 50 cents, postpaid.

THE PLYMOUTH ROCKS.

Barred, Buff and White. A book of reliable and complete information on mating, breeding, selecting, exhibiting and judging America's most popular standard breed. It describes their practical qualities, explains the standard requirements for each variety, and tells how to prepare them for the show room. It gives full instructions for mating each variety to produce exhibition specimens and explains single and double mating and line breeding.

After studying this book the breeder will know what birds to exhibit, will understand the principal defects found when judging, and know how much they are discounted by prominent judges. This information is reliable; it is written by Plymouth Rock breeders and judges with national reputations. This book contains 114 pages. It is illustrated by 21 charts of fowls and feathers, 11 of which are full page plates, 58 pictures of winning Plymouth Rocks. It also contains full page plates of each variety in its natural colors made from painting by F. L. Sewell. Price, 50 cents, postpaid.

THE BANTAM FOWL.

How to Breed Bantams for Pleasure and Profit. A complete, illustrated, down-to-date book that describes all varieties of Bantams and tells the best methods of breeding and raising them. It tells how to select and mate the breeding fowls, how to feed and care for the progeny and how to select and prepare the best specimens for exhibition. The best and most convenient houses for Bantams are described and illustrated. A chapter on diseases describes the symptoms and gives simple remedies for the common diseases. 72 pages. Price, 75 cents, postpaid.

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ASIATICS.

Brahmas, Cochins and Langshans. The best information on every point in mating, breeding, selecting, exhibiting and judging all varieties of Brahmas, Cochins and Langshans is given in this work. It is written by breeders and judges who are regarded as the highest authority. It tells of the origin of Asiatic breeds and describes their development. Their value for market and for egg production is discussed and the best methods of housing and feeding are given. The standard requirements for shape and color are clearly and fully described and illustrated by charts and photographs showing the shape of the ideal male and female and the distribution of color on each section. This information cannot be obtained elsewhere and is of positive value to every breeder of Asiatics who earnestly strives to be in the front rank. The color plates from paintings by Sewell, showing Buff and Partridge Cochins in their natural color, are worth more than the price of the book, but there are 72 other illustrations, including photographs of prominent winners at the largest exhibitions. 100 pages. Price, 50 cents, postpaid.

DUCKS AND GEESE.

How to Succeed With Water Fowls. A practical manual giving in full the best methods of housing and caring for laying ducks and feeding for fertile eggs. It describes the methods of hatching, brooding and feeding the ducklings employed on exclusive duck ranches and by those who make the growing of ducks and geese a profitable branch of their business. It instructs the reader how to secure good hatches with incubators; how to heat and care for the brooders; how to prepare the food and feed the ducklings to produce the fastest growth. It tells how to develop and fatten the ducks intended for market and how to dress, pack and ship them to receive the highest prices. It tells what buildings are required and how to build them. Everything that a poultryman needs to know in order to make duck and goose raising profitable is contained in this book. 68 pages. Price, 50 cents, postpaid.

TURKEYS.

How to Raise Turkeys Profitably. Turkey raising is one of the most profitable branches of farm and poultry industry. It requires but little capital and practically no equipment. The experiences of America's successful turkey raisers, fully illustrated by color plate and drawings by Sewell and by photos, are given in this book. It tells how turkeys are raised with the least expense for labor and food, how they are grown to secure the best development and how they are fattened for market or prepared for sale as breeders. It contains full instructions for preparing exhibition birds to win in the show room. It tells what the Standard of Perfection requires in male and female Bronze Turkeys and explains and illustrates judging by score card. Any one interested in turkeys for either pleasure or profit should not be without this book. 84 pages. Price, 50 cents, postpaid.

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Brown, White, Black, Buff and Duckwing. An illustrated Leghorn Standard with a thorough treatise on judging Leghorns and complete instructions on breeding, mating and exhibiting, by America's best Leghorn breeders and judges. Every breeder of these varieties needs this book. It will enable him to "cut cross lots" to success and avoid the "stumbling blocks" that might otherwise delay his progress. It tells which bird to select for breeding and how to mate them so that they

will produce their equal or better. It describes and illustrates the standard shape and color of each section and the symmetry of each bird, so that the reader can intelligently select his best specimens to exhibit. The chapters on judging tell how much the defects in shape and color of each section are discounted by prominent judges. The book has a true-to-life color plate of Single Comb White Leghorns and 37 other illustrations, including charts and drawings by F. L. Sewell. 78 pages. Price, 50 cents, postpaid.

EGGS AND EGG FARMS.

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POULTRY HOUSES AND FIXTURES.

Plans for Practical Buildings and Equipment. This book contains plans of practical poultry houses for use on village lots and on exclusive poultry farms. It illustrates and gives all the details for constructing scratching shed houses, and houses with closed fronts, for use in warm or cold climate. It also contains a collection of plans and instructions for making roosts and drop boards; nest boxes; feeding racks and troughs, for fowls and chicks; watering devices for warm and cold weather—for old and young birds; grit and oyster shell boxes; coops for little chicks, with and without yards; coops for weaning chicks; roosting coops; shelter coops; coops for brooding hens; shipping coops; door fasteners, and other appurtenances of poultry keeping. Every house and fixture described in this book is in use on the plant of a successful poultryman, is simple, labor saving and reasonable in cost. 36 pages. Price, 25 cents, postpaid.

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