PROFITABLE POULTRY

HOW TO MANAGE

FOWLS, TURKEYS,

DUCKS & GEESE

IN

HEALTH AND DISEASE,

BY

W. VALE.

PROFITABLE POULTRY:

HOW TO MANAGE

Fowls, Turkeys, Ducks & Geese in Health and Disease,

BY

W. VALE,

CONSULTANT FOR ALL DISEASES OF FEATHERED CREATURES,

POST-MORTEM EXAMINER FOR "THE CABLE," THE POULTRY PAPERS AND PIGEON PAPERS, ALSO EXPERT FOR C.G.A.

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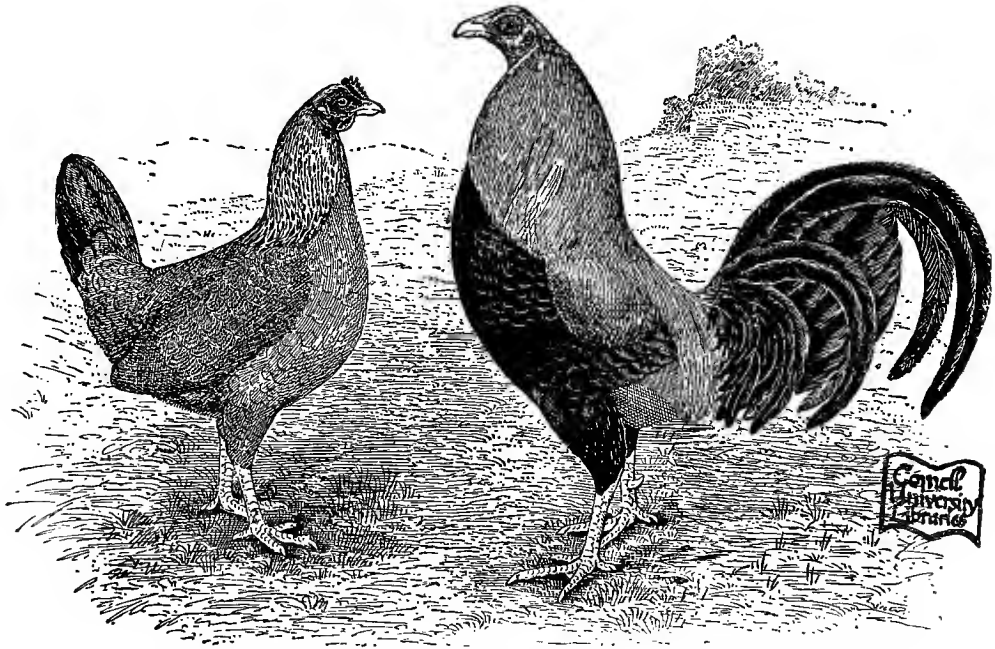


Ye Olde English Game Fowl.

CONTENTS.

Part 1.

VALE'S HYGIENIC POULTRY-HOUSE.

Part 2.

FOOD AND FEEDING.

Part 3.

SELECTION OF BREEDS—FOWLS.

Part 4.

HATCHING AND REARING.

Part 5.

PROFITABLE TURKEYS.

Part 6.

PROFITABLE DUCKS.

Part 7.

PROFITABLE GEESE.

Part 8.

POULTRY FARMING.

Part 9.

DISEASES.

INTRODUCTORY.

THIS work is chiefly founded on information acquired during an extensive experience in the examination of dead poultry and other feathered creatures.

Subjects which are only connected with "Fancy Poultry" find no place in this book because they can be better understood, and information regarding them obtained, by studying the exhibits at the Shows and by a careful perusal of matter relating to them in the current poultry papers.

In order to successfully manage any kind of stock, a fair knowledge of the requirements of the creatures to be managed is necessary. This knowledge can only be acquired by much study and experience, and then that which is most essential is generally not obtained. This is especially the case as regards how poultry should be fed and housed. One frequently hears the remark, "I give my fowls food of the best quality only." It is not a question of quality so much as it is of quantity and kind. The point is suitability, because unsuitable food is the chief predisposing cause of disease, which is the principal element of failure in managing poultry, so as to make a profit. It is necessary that this should be made clear to every keeper of poultry. While studying the diseases of feathered creatures it became evident to me that when they were fed with

certain foodstuffs too generously, they were most liable to become diseased and more difficult to cure.

These facts becoming known, the food and feeding of domestic birds became the subject of special study in order to ascertain how they should be fed under varying circumstances, and the conclusions arrived at are set out in the following pages.

It is essentially necessary for those who manage live stock to have a fair knowledge of the symptoms of disease.

In this little work the symptoms, causes and treatment of the diseases of poultry are described briefly, so that the reader may not be puzzled by a long discourse when a few words will make the subject clear.

The system of housing advocated is one that has been fairly tried, and found to be most advantageous in every respect.

The system of poultry-farming is based on the management of a single pen of fowls, and a simple and effective method of development is made clear.

W. VALE.

TOWER HOUSE,
SOUTH NORWOOD.

PART I.

FOWL-HOUSES:

HOW TO CONSTRUCT THEM ON HYGIENIC PRINCIPLES.

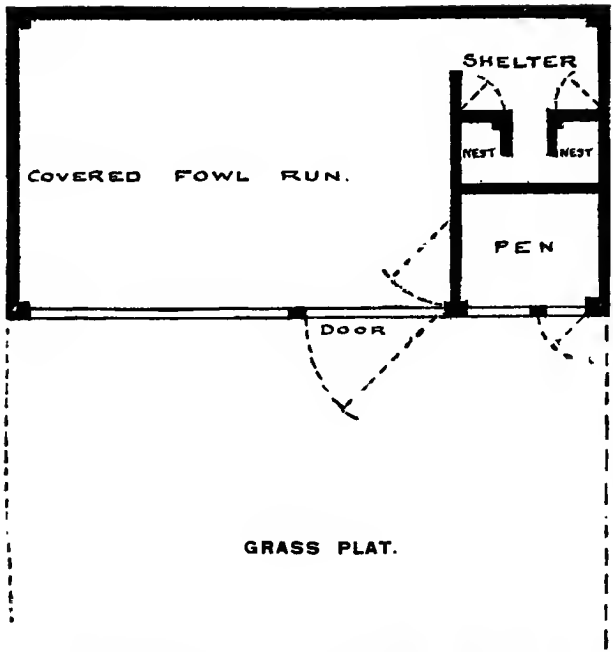
GENERAL DIRECTIONS.

BEFORE commencing to build a fowl-house, plan every detail, and picture in your mind how it will appear when completed. Be careful to place it, if convenient, so that the direct rays of the sun will shine into the covered run for as long a time as possible during the shortest days of the year. In selecting the site, endeavour to avoid one that lies low or is in any way subject to damp; should the ground lie low it is advisable to raise it. This can be done by laying down a bed of brick-rubble, clinkers, or other suitable material. This foundation should be covered with a layer of ashes, coke-dust, ballast or earth. By laying on the surface a mixture composed of one part powdered quicklime and two parts of breeze, or ashes, moistened with gas-tar, the floor will be damp proof and vermin proof, for neither rats nor mice will be able to make a road through, nor foxes through three inches of it when it has set.

For the guidance of those who wish to construct their own fowl-house, the following directions are given, and I may here remark that it is not my intention to go into too trivial details, that is, such as should be understood.

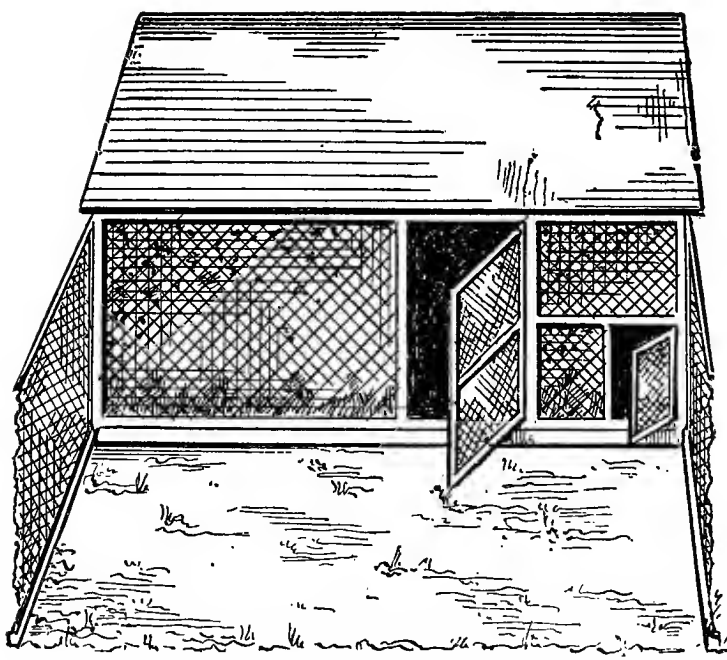
FOOTINGS.

The building should stand on footings, which would make it much more durable and a tenant's fixture. Those on the outside



GROUND SPACE INCLUDING SHELTER AND PEN, 16 FT. BY 6 FT. 6 INCHES.

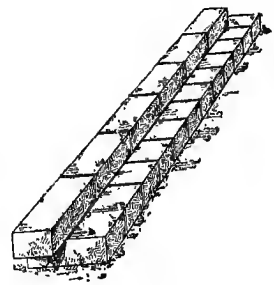
GROUND PLAN OF DETACHED FOWL-HOUSE.



HEIGHT OF FRONT 5 FT., BACK 6 FT. 6 INCHES.

DETACHED FOWL-HOUSE.

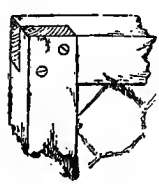
—that is, exposed to the weather—should consist of concrete or bricks bound together with cement or mortar. If bricks are used, lay them with their broadest sides downwards and pointing outwards. Bind them together with bricks laid across their inner ends. These should also be laid with their broadest sides downwards and overlapping those underneath them (*see sketch*). By laying the bricks thus, an angle will be formed in which the uprights carrying the building will stand. The boards and wire-work will be on the outside of the uprights, consequently any water running down the boards or wire-work will be caught in the angle and must run off on the outside. If the angle and brick-work on the outside were faced with cement it would have a much better appearance and be more durable. The footings underneath the inner walls may consist of bricks laid in any position, or blocks of wood. A gutter may be formed on the outside of the building to carry off the water falling from the roof.



BRICK FOOTINGS.

Having laid down the footings, proceed to construct the house as illustrated.

To construct the front section, use four pieces of quartering, two inches square and five feet long, for uprights. Let into the tops of them another similar piece of quartering sixteen feet long. Do this by halving—that is, cutting a section out of each piece to be joined together one inch deep, so that they shall be flush with each when joined (*see sketch*).



QUARTERING JOINED BY HALVING

The piece sixteen feet long will form the top rail of the front section. As a bottom rail, another piece sixteen feet long should be let in with its top side nine inches from the bottoms of the uprights. Place the uprights one at each end of the rails, one three feet eight inches from the left front, to which should be attached the inner side of the pen, and one thirty-three inches nearer the centre of the run, to which the door should be hinged. A fifth piece may be used to divide the distance between the door and the end of the run, to give increased strength to the

frame-work, and support to the roof. This frame-work can be fastened together with screws or wire nails just sufficiently long to allow of clenching. To the front fasten the wire-work, which should not reach below the bottom rail. Wire-work with a small mesh is best, it has a better appearance than a larger mesh and is more suitable in many ways. With pieces of quartering make the door frame, which should be four feet by thirty-three inches, and cover it with wire-work. Next cover the front of the *pen* with wire-work, and fit a door of wood and wire-work in the bottom of the front of it. The space below the bottom rail along the whole front should be covered with a *skirting-board* three-fourths of an inch thick and sixteen feet long. Fix the doors on their hinges and attach bolts or other fastenings. The back section can be made by nailing half-inch matchboards to two pieces of quartering. One piece should be eighteen inches from the bottoms of the boards and the other eighteen inches from the top. The end sections should be made in a similar manner, the pieces of quartering being fixed so as to meet the pieces on the back section.

ROOF.

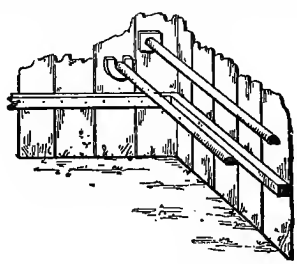
The roof should be made with boards about an inch thick and four and a half wide nailed to pieces of quartering, one near each end, one down the outside of the *shelter* and *pen*, and one down over the centre of the covered run. In putting on the boards, if they are very dry, do not fit them together tightly, but allow room for expansion. It is advisable to have all the boards of the above thickness and width. The pieces of quartering near the ends of the roof should be placed so that they will be just inside the sections at each end of the house, to which the roof can be fastened by means of screws or nails. A very suitable covering for the boards is unbleached calico fastened down with common tacks. When the calico is tacked on the boards, saturate it with boiling gas-tar. Then get some quicklime freshly burnt, and pound it into a fine powder. Add a pound of this powdered lime to each gallon of gas-tar, gradually stirring it in. The lime will slack in the tar and make it hot. Give the roof a good coat of this *black varnish*, which should be kept well stirred. As soon as the varnish is applied, give it a good coat of breeze or sand,

which will form a concrete on the calico. If the lime is freshly burnt and fiery, and the work done with ordinary care, the varnish makes the calico non-combustible and waterproof.

Another Method.—Instead of using the lime, melt a pound of pitch in each gallon of tar, and put it on the calico boiling hot. On this throw a good coat of breeze or sand. The best breeze is fine siftings from coke. By giving the roof a coat of either composition annually—and it requires very little of either—it will last a life-time, and a neater looking surface could not be found. The whole of the wood-work on the outside of the house should have a good coat of boiling tar, and when that has dried, a light coat of either composition.

SHELTER.

The angular piece forming the *shelter* should be made with matchboards held together by pieces of quartering. The bottom piece should be fixed to meet the piece on the end section and be flush with it, so that the ends and back of the roosting shelf may rest on the quartering. To give greater strength, a fillet can be fixed along the top and bottom of the matchboarding in all parts of the house.



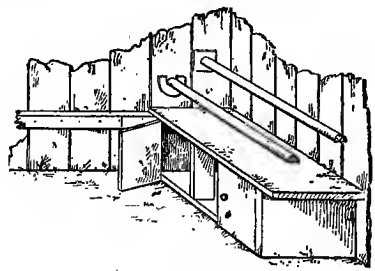
SECTION OF SHELTER WITH PERCHES.

ROOSTING SHELF.

The roosting shelf made of matchboard forms the top of the nest boxes, which are designed to prevent egg-eating by the fowls. The nests are in rather dark places, consequently a broken egg in the nest (the common cause of fowls becoming egg-eaters) is not easily seen. Over the roosting shelf perches may be placed. The best are made out of a larch pole, about three inches in diameter, cut in two and fixed with the round side up.

NEST BOXES.

These should be attached to the underside of the roosting shelf. There are two of them, one on each side of a central space, through which the fowls have to pass to go to the nests, which are entered from behind. Each consists of top (the roosting shelf), front and sides; but no back nor bottom, consequently the nest is made on the ground. In front of each nest box make a small door, so as to be able to inspect the nest, remove eggs, &c. When constructed on this principle, the roosting shelf and nest boxes can be lifted and removed in one minute from the shelter. This will allow of every crevice being thoroughly lime-washed. The advantage of this is obvious.



SECTION OF SHELTER WITH NEST BOXES IN POSITION.

PEN.

From the corner of the *shelter* to the front of the house, with matchboards, construct a partition to form the *pen*. The upper half may be divided from the lower half by a platform, and the front half of the partition cut across at the platform and hinged to the back half to form two doors. The upper half of the pen will be suitable for a variety of purposes as well as the lower one, which is very suitable for setting a hen and keeping her and her chicks in when hatched. A small horse-shoe-shaped piece can be cut out of the *skirting-board* to allow the chicks to pass through on to the grass. When they are very small, a wire run can be fitted to the *pen* on the outside, to protect them from cats, birds of prey, &c.

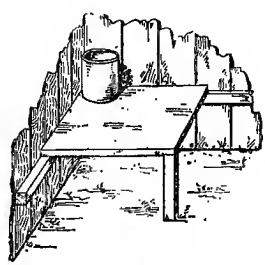
PLATFORM FOR WATER VESSEL.

In the back corner of the covered run, and opposite to the *shelter*, fix a platform about three feet by two feet. It can rest on the pieces of quartering at the end and back of the run and one

leg. Upon this platform the water vessel should stand to prevent the water getting polluted by the fowls when scratching, and in various other ways, which would certainly occur if the vessel be placed on the ground. A grating can be constructed on this platform to place the soft food in for the fowls. The soft food can be passed in from the back or through the top of the grating, which may be hinged to the back of the house. The platform, roosting shelf, nest boxes, and the whole interior of the house, should have a good coat of lime-wash, which should be made with freshly-burnt quicklime.

EXTENSION OF OPEN-AIR SYSTEM.

This system of housing poultry is subject to modification, but the most important features should be maintained. These are—constructing the building so that the fowls shall be kept in direct contact with the outer air night and day, and sheltered from strong currents of cold air at the same time. When constructed on this principle there will be no musty close-smelling fowl-houses. In small yards in towns or other places, where a width of not more than three or four feet is available, the shelter may be constructed at one end of the covered run and a pen at the other. In back yards which are long and narrow, a double shelter may be constructed in the centre, with covered runs to the right and left, so that two pens of fowls can be accommodated.



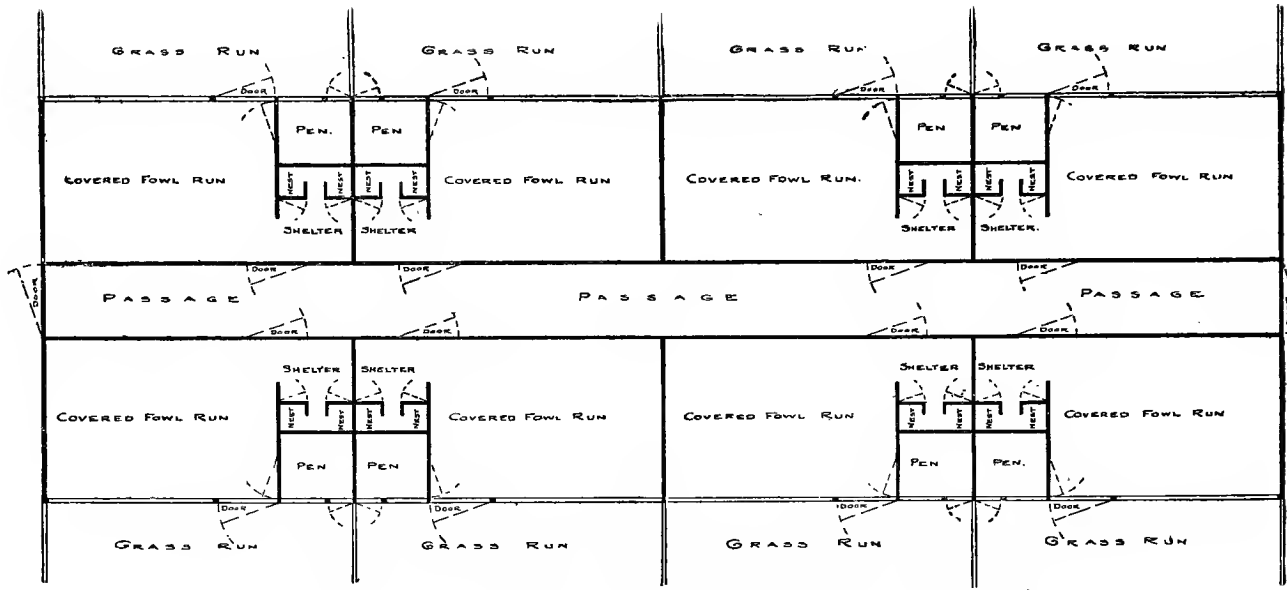
PLATFORM AND WATER VESSEL

Appended is a ground plan and sketch of eight fowl-houses with covered runs and pens, connected by a central passage under cover, with doors at each end. From the passage the fowls may be attended to, and the eggs collected in inclement

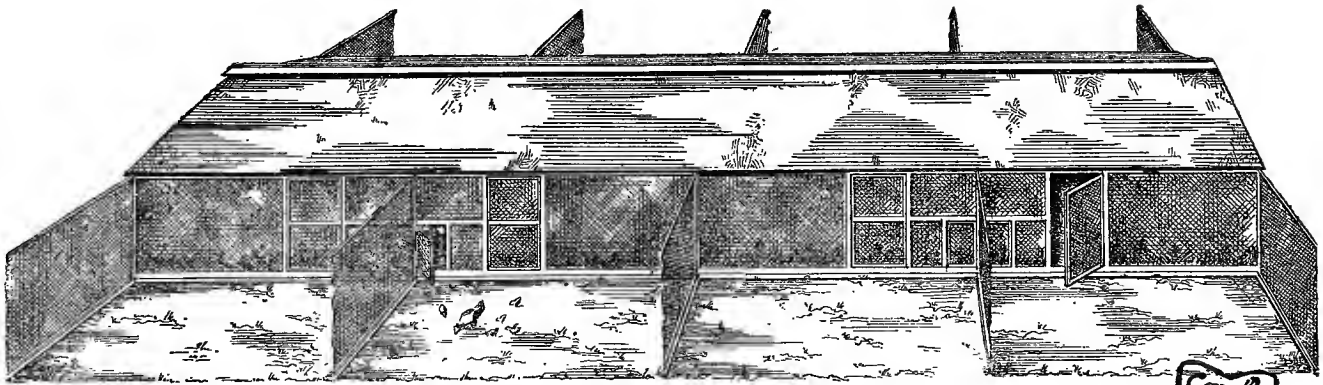
weather without the attendant having to be exposed to it. A mere glance at the ground plan makes it evident that this system of housing poultry allows of unlimited extension. Ranges consisting of any number of such fowl-houses can be connected by a covered way running across the top and bottom ends of them. This covered way could be made to connect the dwelling-house and food stores with the poultry-houses. Between each range fruit may be grown. If standard apple-trees of the best fruiting kinds suitable to the situation were planted, after a few years they should yield a sufficient quantity of fruit to pay the rent of the ground occupied by them and the poultry-houses. The trees could be nourished by some of the manure from the fowls, and if the fowls were allowed to run on the ground occasionally they would keep down the insect pests that damage the fruit and trees.

EXPENSE.

The whole of the material required for the construction of each fowl-house, run, &c., complete, can be purchased for much less than two pounds. In large towns suitable material, such as glass boxes, old floor-boards, old doors, and other old timber for wood-work; also bolts, hinges, and other odds and ends can be purchased, for very little, from men who make a business of demolishing old dwelling-houses and selling the materials.



GROUND PLAN OF EIGHT FOWL-HOUSES (SUBJECT TO EXTENSION).



EIGHT FOWL-HOUSES (SEE GROUND PLAN).

PART II.

FOOD AND FEEDING.

INTRODUCTION.

OWING to the senders of subjects for *post-mortem* examination stating the names of the foodstuffs which had been fed to the subjects, it soon became evident to the examiner, myself, that they had been fed with food which, as a whole, contained a very large proportion of starchy matter.

The discovery of this fact made it clear that the effect of unsuitable food as a predisposing cause of disease was a subject which required thorough investigation. The result has been the collection of ample proof that a course of feeding too exclusively with foodstuffs which contain a large proportion of starchy matter is not only the chief predisposing cause of disease, but the greatest hindrance to success in the management of poultry. In order to understand how this can be so it is necessary to have a fair knowledge of the nature of food and of its functions.

THE FUNCTION OF FOOD.

It is well known that every living creature is constantly undergoing change. That is, all living bodies are being acted on continually by physical agents which cause loss or wasting of the tissues.

It is the function of food to replace this loss, build up the body, and provide for the reproduction of the species. To do this without injury to any organ of the body, only about the required proportions of the constituents of food should be devoured. To make this matter clear, a brief description of the process of digestion and nutrition in poultry is necessary.

THE PROCESS OF DIGESTION AND NUTRITION.

All substances swallowed first rest in the crop, which is a membraneous pouch, and merely an enlargement of the gullet, down which the food passes to the stomach.

In the crop all substances remain for a longer or shorter time, which depends upon the rate of digestion. The crop is merely like a hopper, supplying the stomach and gizzard with successive quantities of its contents for conversion into a more or less nutritive pulp. From the crop all substances first pass into the stomach, which is supplied with glands which secrete the gastric juice.

This fluid softens most substances and prepares them for the action of the gizzard, which is specially adapted for reducing all substances to a pulp.

In addition to grinding its contents, the gizzard presses it, and forces the most fluid portions through a valvular opening into the intestines. There, bile and other secretions which assist in the process of digestion, are mixed with the pulp from the gizzard, the greater portion of which is by that means converted into a more or less nutritive fluid, which is absorbed into the blood. This should freely circulate through every tissue and gland in the body, and each should abstract from it the quantity of material suitable for building it up, or maintaining its bulk and enabling it to perform its natural functions.

The blood is formed from the substances swallowed, and any substance in solution may be absorbed into it in quantities which may, if continuous, eventually be the cause of death, even though the substance is an element of food. This is because an element which is present in excess of the quantity required may be deposited in the liver and other organs in excessive quantities.

This being the case, it may be readily understood how disorganization of various organs may take place, eggs prove infertile, chicks die in the shell or soon after hatching, and death from disease be a very common occurrence amongst poultry. As a matter of fact, the majority of infertile eggs, chicks dead in shell, and cases of early mortality, are the result of the parent birds being unsuitably fed.

During late years the writer has had very much correspondence on these subjects, and he has ascertained that the fowls which produced infertile eggs had been fed with food which, as a whole, contained more than fifty per cent. of starchy matter. In some cases four, or more, *very young* chicks have been sent by the same person for *post-mortem* examination, and in each the liver was the subject of fatty (amyloid) degeneration. The majority of the chicks found dead in the shell have disorganized kidneys and livers.

It is a common occurrence to find in chickens a week or more old most of the yoke of the egg from which they were hatched, and this is the result of the liver being disorganized.

ANALYSES OF FOODSTUFFS.

During recent years enthusiastic chemists have been pushing forward organic analyses, and now we are able to lay our hands on the analysis of almost any organic substance, by many eminent men.

In the management of stock we should seize eagerly and act on all the information science places at our command, in order to ascertain the most practical and successful method of management. It is most important that keepers of poultry should know whether they are supplying to their stock a suitable diet or not. Therefore an approximate estimate of the constituents of most of the foodstuffs which may be fed to poultry is given on the annexed table. The figures represent an average of the results of analyses by several eminent chemists.

In the attached table the various substances are divided into :—

Proteids.—Flesh-forming matter, which consists of oxygen, hydrogen, nitrogen, carbon, sulphur, and, as a rule, phosphorus. It is of these elements that the animal tissues are formed.

Amyloids.—Starch, sugar, and gum are each amyloids, which consist of carbon, oxygen and hydrogen. Owing to these elements being present in fats and proteids, poultry will thrive without having any amyloids. When an excess of amyloid matter is fed to poultry the kidneys are overtaxed, and a deposit

takes place in important organs, and proves more or less injurious to health. (N.B.—Amyloid matter cannot form one atom of muscular tissue, on which strength and vigour depend.)

Fats.—These are heat-producing elements, which may become stored up in any creature's system, and readily burnt at some future time; but amyloid matter, when stored up, forms a cheesy and not easily soluble mass.

Other Solids.—The figures under this heading represent waste such as woody fibre, alkalies, salts, and minute quantities of metals. In grain and seeds it is chiefly waste, such as woody fibre.

Water.—Large quantities of water in combination with the food are of special value, because they decrease the proportion of solids, consequently creatures may be filled and satisfied without being overfed with solids. Poultry may be overfed and underfed at the same time, that is, through there being too great a proportion of fat-forming and too small a proportion of flesh-forming matter in the food supplied to them, they are overfed with the one and underfed with the other.

In order to be able to form a fairly correct opinion as to what constitutes a suitable food, a standard is required. This is to be found in the yolk of an egg, which is proved to contain the necessary elements of food in the right proportions by the fact that it is naturally provided for the nourishment of the chick during the first twenty-four hours after emerging from its shell. The fat of an egg is in the yolk, which should be absorbed into the chick through its navel just before it emerges from the shell. The contents of the yolk sac should pass through a tube into the intestine of the newly-hatched chick, where it is subjected to a process of digestion. The proteids in the yolk nourish the chick, and the fat supplies heat and force until it is able to obtain these powers from ordinary foodstuffs. The yolk of an egg contains the exact proportion of the necessary elements of food.

A suitable diet under ordinary conditions would consist of about fifteen per cent. of proteids, thirty of amyloids and fats *combined*, five of other solids, and fifty of water, in *combination* with the food. In order to supply a diet in nearly these propor-

TABLE OF CONSTITUENTS.

(These calculations are based on grain, &c., of average good quality.)

PERCENTAGE OF	Proteids.	Amyloids.	Fats.	Other solids.	Water.	TOTAL.
In Wheat	13	67	1	5	14	100
,, Barley	10	60	2	16	12	100
,, Oats..	9	46	4	28	13	100
,, Rye	11	67	2	6	14	100
,, Maize	11	61	5	9	14	100
,, Buckwheat	8	51	2	25	14	100
,, Dari..	8	70	1	8	13	100
,, Peas..	20	55	2	9	14	100
,, Beans	24	46	2	14	14	100
,, Tares	24	48	2	12	14	100
,, Hempseed	12	16	30	30	12	100
,, Sunflower Seeds ..	13	18	21	39	9	100
,, Malt Sprouts	23	49	2	16	10	100
,, Middlings	13	48	2	24	13	100
,, Bran	14	38	3	32	13	100
,, Oatmeal	13	57	5	12	13	100
,, Barley-meal	10	60	2	16	12	100
,, Maize-meal	12	61	5	8	14	100
,, Bean-meal	24	46	2	14	14	100
,, Brewers' Grains ..	5	9	—	10	76	100
,, Potatoes	2	21	—	2	75	100
,, Rice (uncooked) ..	7	76	—	4	13	100
,, Carrots	2	11	—	3	84	100
,, Parsnips	2	6	—	8	84	100
,, Mangel-wurzel ..	2	8	—	2	88	100
,, Swedes and Turnips	2	5	—	3	90	100
,, Apples	1	19	—	3	77	100
,, Grass (meadow) ..	4	11	1	5	79	100
,, Clover (green) ..	3	8	1	9	79	100
,, Comfrey (prickly) ..	3	6	—	5	86	100
,, Green Vegetables ..	2	6	—	4	88	100
,, Green Bone (Soft Bone)	20	—	26	24	30	100
,, Meat (lean)	20	—	2	3	75	100
,, Meat (lean), dried..	72	—	10	6	12	100
,, Egg, White of ..	12	—	—	3	85	100
,, Egg, Yolk of	15	—	30	3	52	100

tions, a glance at the table of constituents makes it evident that green vegetable, vegetable roots, and animal matter will have to form a considerable portion of it. The necessary proportion of proteids in the solids of the diet is one in three and a fifth, and about one in eight and a half is the proportion in the diet usually fed to poultry.

NOTES ON FOODSTUFFS.

Wheat. — In feeding poultry, this grain food is very economical to employ for fattening, because it contains very little waste matter, but should be very sparingly fed to birds kept for breeding from, on account of the large percentage of starchy matter in it. For fattening it is excellent, and when used for this purpose it is an advantage to soak it until it is on the point of germinating. Then it should be boiled until it is on the point of bursting, but not until it becomes glutinous. As regards quality, large full-bodied wheat is most suitable for feeding birds to fatten them, but not suitable for those which are kept for breeding from and for laying, because it contains too large a proportion of starchy matter. (N.B.—The effect of an unsuitable diet is not always evident. A flock of poultry, being of sound constitution, may not show any ill effects, but their progeny are likely to.)

Rye.—The feeding value of this grain as a food for poultry is rather above a good sample of barley, and much above an average sample. When purchasing this grain, see that it is clean and free from dark purplish-coloured, horn-shaped substances —"Ergot" *(secale cornutum)*.

Barley.—When estimated from an economical point of view the feeding value of this grain is about seven per cent. below maize of the same average quality. There is very great variation in the quantity of digestible matter in various samples of barley. The difference in flesh-forming elements alone ranges from about five to thirteen per cent. Russian barley contains the highest percentage of flesh-forming matter. Small barley contains, proportionately, very much more indigestible matter than does even barley of medium quality. This should be borne in mind when purchasing this grain.

Oats.—This grain may be fed to poultry much more freely than any other, because of the large percentage of waste matter in it, preventing poultry being over-fed. When of average good quality it contains more than twenty per cent. of indigestible substances, and of course the feeding value of the grain is proportionately decreased. It is not advisable to purchase oats of a low grade, the ruling prices being above their value as a food for poultry. Those of fairly good quality contain about eight per cent. of flesh-forming elements, which is not quite sufficient to allow for the production of a fair number of eggs; but with the addition of a daily supply of meat and vegetable, an excellent diet is provided. If two flocks of fowls were freely fed, the one with oats and the other with wheat of average quality, the fowls which had the wheat would consume about twice the quantity of digestible and a greater proportion of starchy matter than those fed with oats. This is owing to the latter containing more waste matter and occupying more space. Yet the flock fed with the oats would have more than a sufficiency of starchy matter. This shows the great liability of over-feeding with it, when feeding with grain and the products of grain. In selecting oats see that they are thin-skinned. A medium sized full-bodied oat contains the greatest proportion of nutrient substances, and forms the best staple grain food. The eggs of poultry which are fed partly with oats have an agreeable flavour.

Ground Oats.—Were it not for the fact that poultry are provided with an organ for grinding grain for themselves there would be some show of wisdom in recommending ground oats for them as a substitute for the whole grain. The horse and other animals which are not provided with natural means for grinding this class of food do frequently pass a portion of it through them in an undigested state. To prevent this waste it is an advantage to grind their grain for them. It is not, however, advisable to grind up any kind of grain for fowls except for the purpose of mixing with cooked vegetables to form soft food, and for this purpose ground oats are not nearly so suitable as middlings combined with pea or bean flour and cooked vegetables, which are comparatively very much cheaper. Ground corn soon loses its sweetness and other valuable properties, and becomes more or less damaged. Therefore those creatures naturally provided with

means of grinding their own grain should certainly do so. Besides, healthy poultry are able to grind up and digest more corn than they require. When it is ground and freely fed to breeding stock they are certain to become ruined, sooner or later, by the excessive quantity of starchy matter in it. Most of the grain ground into meal is of very poor quality.

Maize.—This foodstuff should be fed sparingly to breeding stock, but not so much so as large wheat, which when freely employed will cause disorganization of the liver in less time. This conclusion is founded on *post-mortem* evidence. Maize cannot be recommended as a food for fattening fowls, because it causes the flesh and fat to have a yellow and not an inviting appearance, but it is a very serviceable food for them when they are on a free range, and are left to forage for a considerable portion of their food. In cold wintry weather it may be given to stock birds more freely than at any other time. It may be given to fowls which are kept in rather confined places, but the corn and meal should not exceed one-half the whole bulk of their food.

Malt Sprout Dust.—This is very suitable for mixing with the soft food, but not to a greater extent than about one-fifth of the whole bulk of it.

Dari.—This is not a foodstuff which can be recommended as a food for poultry, because of the excessive quantity of starchy matter in it and its comparative dearness.

Buckwheat.—This grain varies very much in quality. The best is silver grey in colour. Some samples of the dark-coloured buckwheat are of good quality.

Peas, Beans, and Tares.—When obtainable at a reasonable price a small quantity of any of these may be fed to poultry with advantage, because they are so highly nitrogenous. They produce firmness of flesh and improve the colour and gloss of plumage in dark coloured fowls.

Hempseed.—This is an excellent foodstuff for chickens in wintry weather, because of the large proportion of oily fat in it furnishing natural heat. Though it is comparatively dear the outlay for a small quantity fed to laying hens may be paid back in an increased yield of eggs.

Middlings—Sharps.—These and other names are given to the dressings from wheaten flour. The finest quality contains a fair percentage of flesh-forming matter, and owing to this and its low price it is a suitable and an economical food when combined with pea or bean meal or meat, and cooked vegetables.

Barley-meal.—When this is of the same average quality as the whole grain it is of the same comparative feeding value, but rather inferior grain is usually ground into meal. It is neither a very suitable nor economical foodstuff.

Maize-meal.—A small quantity of this may be used for fattening poultry. It is usually of the same feeding value as the whole grain, but fattens creatures quickly if freely fed to them.

Oatmeal.—This is too high in price to be considered an economical food, but a little may be used to feed chickens, in porridge with milk. It should be fed to them sparingly on account of its heating nature.

Rice.—This uncooked should not be given to chickens or other poultry because of the large proportion of starchy matter in it. When cooked it absorbs a very large quantity of water, and in this state a small quantity may be given to chickens as a relish.

Brewers' Grains.—These are in feeding value more than equal to twice their weight of potatoes, and are for this reason more suitable for mixing with meal, meat, and cooked vegetables to form soft food for promoting egg production.

Potato.—This vegetable when cooked is nearly of the same feeding value as cooked rice. It is not advisable to purchase potatoes for the purpose of feeding poultry, except to fatten them. For this purpose potatoes are excellent when cooked and mixed with meal, because they give to the flesh and fat a very delicate and inviting appearance. Of course the parings of potatoes and the wasters from the household supply may be utilized to feed even breeding stock. Small potatoes are not so fattening as large ones.

Cabbage.—Each of the varieties of the cabbage, including rape, contains valuable saline and mineral substances, and cannot be too strongly recommended as a food.

Grass.—When young and tender this is an excellent foodstuff, of which poultry cannot have too much.

Onions.—The onion and kindred vegetables contain an acrid oil, combined with sulphur, which makes them fœtid. They also contain phosphoric acid, acetic acid, citrate of lime, and very valuable vegetable matter, and are consequently a most excellent food.

Vegetable Roots.—Swedes, mangel-wurzel, carrots, &c., are very valuable foodstuffs, either cooked or uncooked, especially in the winter when green vegetable is scarce. Swedes are excellent for placing in the feeding cage (or a net) for the fowls to eat as much of as they will during the whole of the day.

Animal Matter (Meat, &c.).—This is almost a perfect food, and it may be supplied in rather large quantities. It is very necessary that it should be given to poultry that cannot themselves obtain a good supply of insect food. It is most economical to purchase dried meat sold as granulated meat, which is comparatively the cheapest of all foodstuffs.

Green Bone.—Fresh bones from the butcher's are known as green bone, and are very suitable for poultry when laying, but they contain too great a proportion of lime salts to be suitable for male birds or for females when not laying. Fowls would be induced to eat a large quantity of cut bone at any time on account of the animal matter in it.

Insect Food.—The value of insects, their larvæ and shells, as a food for poultry cannot be over-estimated, because in variety they form a complete food. In Africa I have come upon thousands of guinea-fowl busily engaged foraging for food on land where there was nothing growing but shrubby bushes, and not any green vegetable substance to be seen within many miles. I shot some and found them in a plump condition, with insect food in their crops. It is certain that where they were the chief part of their food consisted of insects, their larvæ, and shells. Fowls prove of great service in ridding orchards and fields of some of the parasites which damage the trees, fruit, and other crops, and it may be noticed that they always scratch round the roots of old trees. It is very interesting to watch chickens and ducklings pursuing

insects, and this exercise is of great value in developing their frames and muscles.

When poultry are kept where they cannot obtain a sufficient supply of insect food, worms, &c., it becomes very necessary to find a suitable substitute, and the best is meat and soft spongy bone, which is easily ground up in the gizzard and digested. Meat is very nourishing. Fresh spongy bone contains a considerable quantity of nutritive matter, besides carbonate and phosphate of lime, iron, and other valuable substances. Bone should be broken into very small pieces and given to the fowls when freshly broken, and not too freely, or it may prove injurious to the male birds. Insect food being of great value it is surprising that those who keep fowls do not adopt some system of propagating it. There are a variety of ways in which a large quantity might be produced with very little trouble or expense during suitable weather.

The following is a very simple method of causing the germination of maggots :—Take a small box or other receptacle and almost fill it with offal, other animal refuse, or the flesh of any dead animal, and leave it exposed until it is impregnated with the eggs of the blow-fly. Then place the box, embedded in fine mould, grass or hay, in a hamper or basket. As soon as the maggots are full grown they will work their way out of the hamper or basket, which may be hung up, so that chickens or fowls can devour them when they fall. In working their way through the mould or other material the maggots will cleanse themselves and be quite wholesome for chickens or other birds to eat. Where a strong odour is objectionable the material used to breed the maggots in may be placed in a hole in the ground after being well fly-blown, and covered with a light layer of mould, and the maggots can be collected as they work their way to the surface. If the chickens and fowls can have access to the place a piece of wire netting should be laid over it and pegged down. This will prevent the birds scratching away the mould and disturbing the maggots. As soon as they are fully developed they will work their way to the surface of the ground. Beetles will be attracted to and breed in animal refuse, and they are a suitable food for poultry.

SOFT FOOD.

It is not advisable to feed exclusively with soft food, as the gizzard (an organ of extraordinary muscular power when properly developed) is not sufficiently employed in digesting it. Besides, it is too fattening for laying and breeding stock when freely used. When the food is so prepared as to render the work of any organ unnecessary, the muscular power of that organ cannot become properly developed, and if it has been in active use it becomes atrophied, that is, so weakened as to be unable to do its work properly. In the natural food of the fowl, nutritious with innutritious matter is so intimately combined as to render such an organ as the gizzard necessary. Its chief work, however, is to prepare mineral or bone-forming substances for absorption into the fowl's system. Young fowls fed too exclusively with soft food are very liable to become too fat, and suffer from roup and other ailments.

One part of dried meat and five of middlings mixed with as large a quantity of any suitable vegetable (nicely cooked) as can be used to make a stiffish mass, is an excellent soft food for poultry. If the middlings are floury some bran may be added. In all cases some animal food is necessary, especially for growing chickens and fowls when laying. The refuse from the food supply of the house, when boiled and mixed with middlings, is an economical food.

As a rule poultry keepers prepare soft food which contains too much fat-forming, with a deficiency of flesh-forming substances.

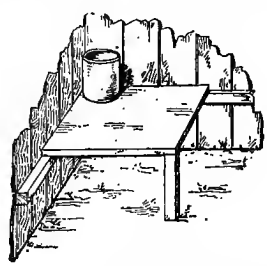
GREEN FOOD.

A supply of succulent vegetable is very necessary on account of its valuable saline and aperient properties. A good way of providing this for young chicks in winter is by sowing rape seed, mustard or cress, in shallow boxes containing a slight depth of sand. Pull it when quite tender and let them have it with the sand adhering to the roots. There are but few people who cannot find a suitable place for these boxes. The seed may be sown at regular intervals, so as to secure a succession of crops. Rape seed (when sprouting) is excellent for chickens and poultry.

Early in the season some small onions may be planted close together in similar boxes, and they will soon grow into excellent green food for chickens or fowls. The top and the whole of the onion is a first-rate stimulant of the digestive organs. Lettuce, green cress, mustard, rape, and dandelion tops are each excellent for young chickens. Cabbage, rape, turnip-tops, young clover, swedes, turnips, and mangel-wurzels are very suitable for adult birds. Grass, too, is excellent food for poultry. Green food should be given freely at all times, but there should not be any left about the runs. It should be cut into small pieces and placed in feeding dishes or on shallow wooden trays; the lids of cheese boxes are suitable for this purpose.

WATER.

Chickens and other poultry should always have an abundant supply of water except when put up to fatten. Rain water is suitable if free from impurities. Snow water should never be given. The water vessel should be placed out of the sun, and in that part of the run where the water would be the least likely to become soiled or frozen. For fowls it is advisable to place the water vessel upon a platform about two feet from the ground to prevent them casting dirt into the water when scratching, or in other ways polluting it. The water vessel should have upright sides, so that every part of the inside of it can be seen, and it should be large enough for the hand to pass into it with a brush, a piece of rough flannel or a wisp of straw to clean it.



PLATFORM AND WATER VESSEL.

Earthenware vessels or enamelled ones are the best to use. In very cold weather it is a good plan to give young chicks lukewarm water, also poultry put up to fatten, and those laying will lay more frequently if they are supplied with warm water.

GRIT AND SHELL FOOD.

It is certain that some gritty substance is at all times essentially necessary for poultry. This is made evident by the eager way in which fowls will rush for and devour it when it is thrown down to them after they have been deprived of it for some time. Feathered creatures which live on grain or seed may be kept in confinement for a considerable time in an apparently thriving condition without having any appreciable quantity of gritty matter, and, owing to this being so, some persons have presumed to say that fowls do not require any grit. Human beings manage to exist when deprived of teeth, and it would be just as reasonable for anyone to say that teeth are not required by them as it is to say that poultry do not require any grit. They naturally and quite instinctively swallow gritty substances in the quantities required when obtainable. Grit (like teeth) assists in preparing substances for the process of digestion, which by its aid is facilitated and more effectually perfected. Those feathered creatures that obtain a portion of their nourishment from grain, seeds, or other hard or firm and fibrous substances require a means of reducing them to a pulp. This the gizzard effectually does with the aid of some harder substances mixed with those to be reduced to a pulp. Though the gizzard is an organ of extraordinary muscular power, unaided it would certainly fail to prepare a sufficiency of material for the shells of the eggs which should be produced during the laying season. It is highly probable that an insufficient supply of grit and shell-forming material tends to reduce the number of eggs much below that which would have been produced had the supply been abundant. Some harder substances are absolutely necessary for quickly grinding shells, bones, &c., into minute particles, and thus prepare them for digestion and absorption into the blood. By its means mineral and other matter is conveyed to the glands employed in secreting and discharging shell-forming material into the egg passage.

For fowls sharp flint grit is most suitable, but any stone, cinders, or coke are suitable. Whatever material is supplied it is advisable to break it into rather small pieces, because large ones would occupy too much room in the gizzard. Cinders are very serviceable as a gritty substance, and are promotive of health.

When fowls are not supplied with gritty substances they are very liable to swallow nails, pins, bits of metal, and other things which may prove the cause of death. It is not an uncommon occurrence to find in subjects sent for *post-mortem* examination that death has been caused by a nail or pin which had gradually worked its way through a soft part in the walls of the gizzard, and coming in contact with some of the intestines had set up inflammation, the immediate cause of death. In some cases death was the result of inflammation set up by some of the contents of the gizzard, which had escaped through a hole made by a nail, piece of wire or bone. In large towns the shells of the oyster, whelk and cockle may be obtained, and besides forming shell food they assist in the process of reducing ordinary foodstuffs to a pulp. This and other advantages are lost when the shells are placed in the fire to purify them, a method recommended by some writers. By the action of the fire the shells are softened, and valuable substances in them are destroyed or expelled. They should, however, be cleared of any decomposing matter, which can be quickly done by placing them in a vessel with some unslacked lime, and then adding just sufficient water to slack it. The shells should be left in the lime for at least twelve hours, and then be completely cleared of it before they are broken up for the fowls. The lime may be used for limewashing the fowl-house, sprinkling about the floor of it, and mixing with some dust, which should always be available for the fowls to dust themselves in. Lime should not be placed in dust or on the floor before it has been exposed to the air for some time after being slacked. When the shells are not soon required for use they may be effectually purified by burying them in the ground and leaving them there for some time. In towns egg-shells can be obtained in considerable quantities. They should be broken up before they are given to poultry, because whole egg-shells may be the means of inducing them to commence eating their own eggs. Neither grit nor shells should ever be added to the soft food for poultry, because by doing so they may be compelled to devour grit or shells when not required, and thus the kidneys and digestive organs would be needlessly overtaxed. By an unerring instinct feathered creatures are induced to devour grit and shell food when they require it, and only then will they do so if not compelled. This was made very evident to me many years

back when I commenced to keep ducks closely confined. When laying they would greedily devour egg-shells thrown into their yard. The drake very rarely attempted to touch them, and if he picked up a piece of shell he usually dropped it again. When the ducks were not laying, egg-shells were allowed to be in their yard untouched. Ducks require very fine grit or sand, which should be placed in a vessel of water in their yard, and their shell food should be broken into very small pieces and placed with the grit. The corn for the ducks should be supplied to them in the same vessel. The grit, sand, &c., should be frequently washed by pouring a stream of water upon it.

HOW TO FEED BREEDING STOCK.

The value of a suitable system of feeding stock kept for breeding from cannot be over-estimated. Where a free range is available the birds should be left to forage for the chief part of their food until the breeding season commences, and even then rather spare feeding should be the rule, except it be with meat and vegetables. The point is to prevent the birds becoming fat internally, which they are liable to if freely fed with grain and the products of grain. As a matter of fact poultry cannot be suitably fed with grain and the products.

Still greater care is necessary in the feeding of breeding stock kept in confined runs. Infertile eggs or young dead in the shell are not found in the nests of wild fowl, unless the nest has been deserted, because when the breeding season arrives the birds are in the best possible condition for breeding. Much exercise in foraging for food and a rather scanty supply of it has made them so.

HOW TO FEED POULTRY TO INCREASE EGG PRODUCTION.

When eggs for table (and that only) is the object desired poultry may be fed rather liberally with a view to increase the yield of eggs. In doing this, however, the fowls will soon become more or less ruined for stock purposes and be only fit for table use. To obtain the greatest number of eggs and profit year after

year from a certain number of fowls, the system advocated in the chapter on poultry-farming should be adopted.

As regards feeding, in the morning give as much soft food, or grain that has been kept wet until it is on the point of bursting, as the fowls will eat up greedily. They should have a fair allowance of animal matter, which should be cooked, and it may be added to the soft food or given separately. During the day allow the fowls to have as much green vegetable or roots as they will eat, and for evening meal feed mostly with oats and maize or tail wheat on alternate days.

HOW TO FEED AILING POULTRY.

When a bird is ill it becomes especially important that it should be suitably fed. A great many ailing birds are actually killed in consequence of being fed by force when they cease to eat their food as usual. When a feathered creature is unable to digest its food if it is forcibly fed, the food remains in the crop in an undigested condition, and consequently decomposes. The decomposition of the food complicates the disease, and in some cases the creature dies, when it might have been saved if it had been correctly treated. When a bird is noticed to be ailing it should be ascertained whether it is digesting its food. If there is any food in the crop do not, in any case, give any more until the crop has become empty or until the undigested food has been removed. How this should be done is pointed out under the heading "Crop Bound." As a rule ailing birds should be fed sparingly, and, when seriously ill, with soft nourishing food. If a fowl is too ill to take any food beat up an egg with a wine-glassful of milk and give one half night and morning. If the fowl is very low a few drops of brandy or other spirit may be added to the portion of food given. As the bird improves increase the quantity of nourishment by giving some meat and soft food. In all cases of illness an unlimited supply of water should be provided, and in cold weather it should be warm. When the ailing bird begins to eat freely it should be brought gradually on to its ordinary food.

HOW TO FEED TO FATTEN POULTRY.

Soft food is undoubtedly the best for fattening poultry with. A mixture of fine middlings, barley meal, and boiled potatoes, moistened with skim milk, will cause the flesh to be of delicate appearance and flavour. Maize meal is very fattening, but the flesh when loaded with yellow fat has not an inviting appearance. Nearly all the meals advertised are very fattening. Wheat, barley, and maize are each very fattening, especially when boiled for ten minutes. Before boiling the corn it should be soaked. It is a good plan to boil some animal matter, using the liquor to moisten the meal when making soft food. Animal matter should be thoroughly cooked. A little salt should always be added to the food of poultry put up to fatten, and they should only have water given them two or three times a day after they have been fed, and in winter it should be given rather warm, so should the soft food. Changing the food occasionally is an advantage, so is the occasional addition of a little of some *mild* spicy condiment.

If healthy, poultry will fatten in two or three weeks. If unhealthy, it is no use trying to fatten them. If kept in a rather warm place they will fatten more quickly than elsewhere. It is a good plan to keep them on a bed of stable litter, straw, or peat moss. I cannot advise anyone to adopt the cramming system without having first well studied it, for those who make it pay are not one per cent. of those who try.

HOW TO FEED CHICKENS.

The chick should not be fed until it has been out of its shell quite twenty-four hours. During that period it does not require any food, because by a wonderful provision of nature nourishment is provided in the yolk of the egg out of which it was hatched. In the ordinary course of nature the yolk is absorbed by the chick during the time that it is working its way out of its shell, and affords it a sufficiency of nourishment until it is strong enough to seek it. If food is not supplied to chicks until they need it, there will be much less trouble in inducing them to commence eating, and it is certain that they thrive much better during the first few days when they are left undisturbed for twenty-four hours after

they are clear of their shells. Egg being the first food naturally provided for chickens, it is certainly advisable to continue providing it as a portion of their food for about a week. The egg should not be boiled long enough to cause it to become quite hard, but nicely cooked (set), and the whole of it should be thoroughly minced. In addition to the egg food, and as a change, stale bread or a little whole meal bread, scalded with boiling milk, may be given, or porridge made with oatmeal and milk, or middlings and milk. This may be continued until the chickens are two or three weeks old. From the time when they are two days old they should have a fair allowance of animal matter, such as maggots, minced meat, granulated meat, or ground greaves, mixed with middlings and cooked vegetables. The meat should be thoroughly cooked.

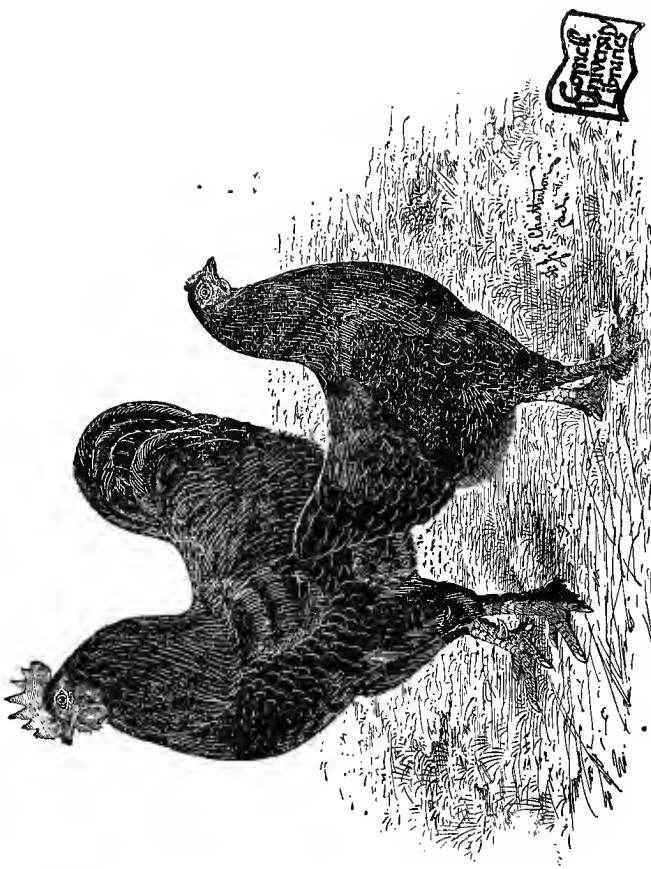
This class of food is very necessary for growing chickens. Their food should be of as varied a kind as possible, but the greatest portion should consist of those foodstuffs which contain but a small proportion of amyloid (starchy) matter. They may be liberally fed with meat and vegetables. Cabbage, either cooked or uncooked, is an excellent food. The food prepared as directed under the heading "Soft Food" is suitable for chickens, and not expensive. As the chickens grow, add to their diet some broken grain, hempseed, or the seeds screened from grain, but not any dari, millet, canary seed, or dry rice. Follow this up by giving them a little of the best French-grown buckwheat, which is in colour silver grey. When feeding yellow-legged chickens, nearly full-grown, a little Indian corn (maize) may be given daily to improve the colour of their legs. It is not advisable to feed even very young chickens more than four or at most five times a day, but the last meal should be given rather late at night. When they are ten days old the meals should be four, and at eight weeks old, three daily.

It is a very grave mistake to feed chickens which are intended for breeding from too freely with grain and the products of grain, because these foodstuffs tend to fatten and disorganize the reproductive organs. That there should not be a large proportion of starchy matter enter into the composition of the diet of chickens is made very evident by studying the subject, and under-

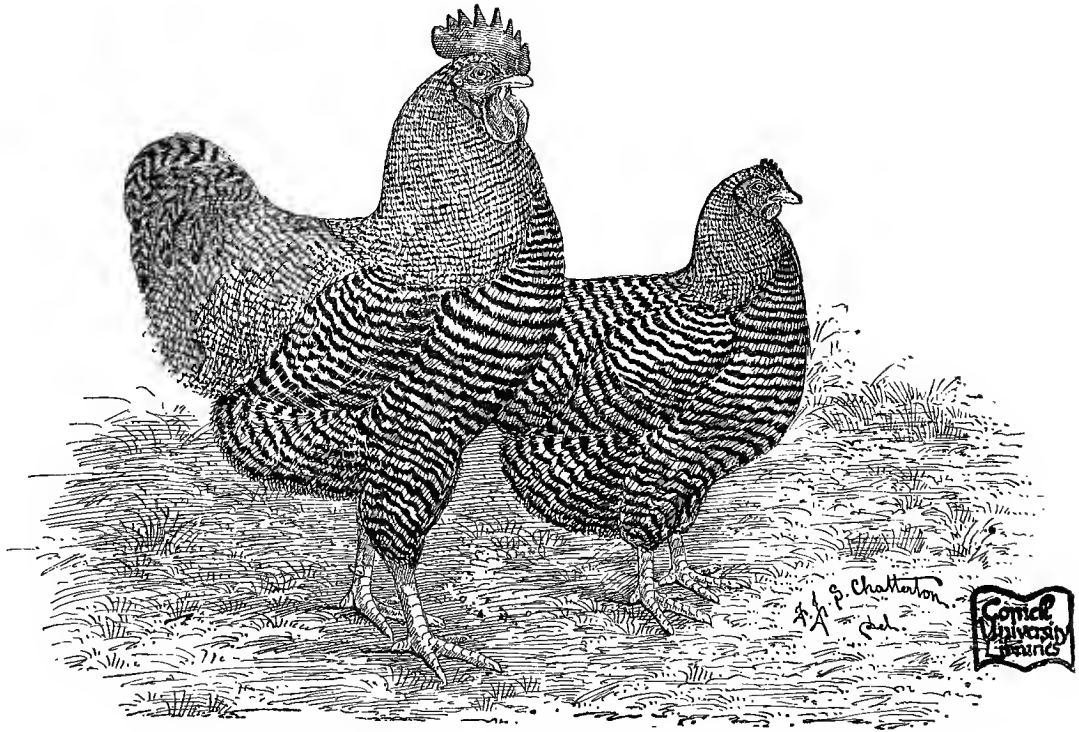
standing the nature of the elements from which the chick of a fowl in a state of nature is formed. It is erroneous to suppose that a strong and vigorous chicken can be hatched from the egg of a fowl that is overfed with amyloid matter, which must prevent there being the right proportion of natural elements in the egg.

MIXED CORN.

It is a common practice to feed poultry with a mixture of corn, but it is not advisable to do so, because some fowls will select one kind of grain and some another, so that the purpose aimed at in feeding with mixed corn—that is, to give each fowl a variety—is not accomplished. Besides, the mixtures of corn usually sold for feeding poultry with are neither economical to purchase nor suitable to use.



LANGSHANS.



PLYMOUTH ROCKS.

PART III.

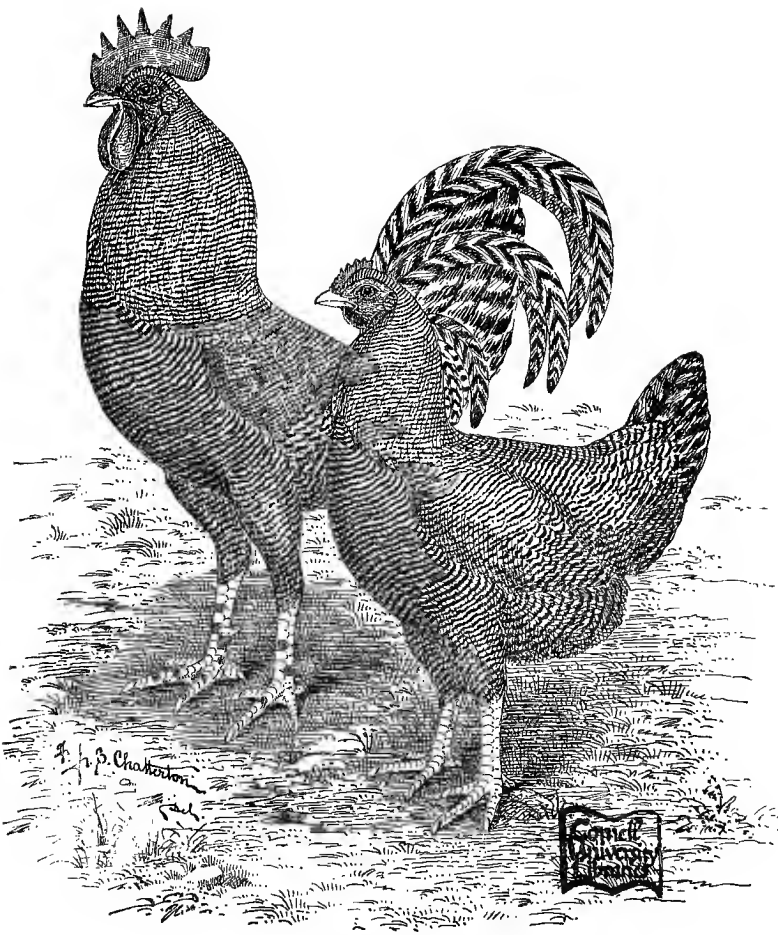
SELECTION of BREEDS of FOWLS.

THE following notes on the various breeds of fowls are intended to assist the amateur in the selection of stock. It must, however, be pointed out that the best breeds of fowls may prove indifferent layers and in other ways unprofitable if badly managed, and that in purchasing the so-called laying strains of any breed a supply of eggs is not assured.

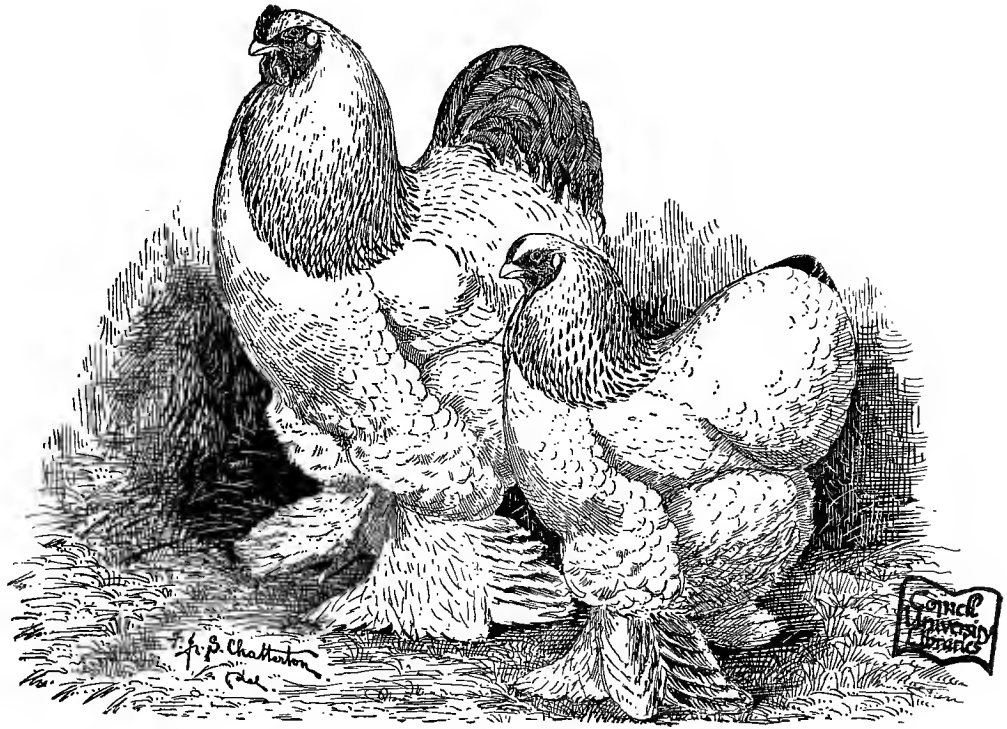
When the production of eggs by certain fowls is above or below the average production of the breed it is the result of the *previous* and present management of those fowls and their parents. Thus the average production of eggs by a strain of fowls may be increased by good management. On the contrary a strain of fowls which produces more than the average number of eggs may soon become ruined by bad management, and as a consequence prove indifferent layers. As a matter of fact some of our best breeds of fowls have in a great measure been ruined by years of bad management.

NEW BREEDS.

Some keepers of poultry are always trying fresh breeds with a view of obtaining a better yield of eggs, and owing to this new breeds are quickly adopted. Instead of doing so it is advisable to select a breed and endeavour to improve its laying qualities, and not simply by picking out the best layers but by good all-round management. When a poultry-keeper has improved the productiveness of his stock during two or three successive seasons he may advisedly take up other breeds and turn his attention to poultry-farming. A breed of fowls which will produce a good average yield of eggs is much more profitable than a breed chiefly suitable for producing flesh for eating.



SCOTCH GREYS.



LIGHT BRAHMAS.

NOTES ON PROFITABLE BREEDS.

Old English Game.—This fowl stands second to none as an all-round layer, sitter, mother, and table fowl. Its only fault, if it can be called a fault, is its pugnacious disposition, which we should admire. Owing to its fighting propensities, some strains of this grand fowl have been preserved true to type. I may here remark that I have never dubbed a fowl, and that I never intend to do so, because I consider it unjustifiable cruelty, and when it is performed to the extent of shaving off the skin about the face it is revolting. At the present time the dubbing of game is a system of faking, by which experts at it gain an unfair advantage. A coarse comb and large bones do not belong to the true Old English Game fowl, but indicate a mongrel.

I fail to know of a sprightlier, more beautiful or useful fowl than a partridge coloured Old English Game hen. As a sitter and mother she excels all others, and on a free range she will provide for her brood the chief part of their food and defend them to the death from rats and other enemies. As a table fowl it carries proportionately more choice white meat than any other fowl of its weight, and when kept in a wood or other place where insect life or green-stuff abounds it requires but little additional food. It is a very hardy medium-sized fowl, and lays a white egg of medium size, which is unequalled for delicacy of flavour. For winter laying it should be hatched before the first of June. The foregoing remarks only refer to the Old English Game fowl.

Langshan.—In late years this fowl has been steadily gaining well deserved favour, and great credit is due to Miss Croad for her long and persistent championship in defence of maintenance of purity of race in it. It lays a medium-sized egg of a rich brown tint, which makes it more readily saleable than a white egg, and a fair quantity of them are produced even in the severest weather. As a winter layer it is second to none, but for this purpose it should be hatched before the middle of May. Though its plumage is beautifully black and glossy, its skin is white and thin, and on the table a well matured cockerel is like a young turkey. This fowl may be kept in confinement, and those who require full information about it should read "The History of the Langshan Fowl," by A. C. Croad.

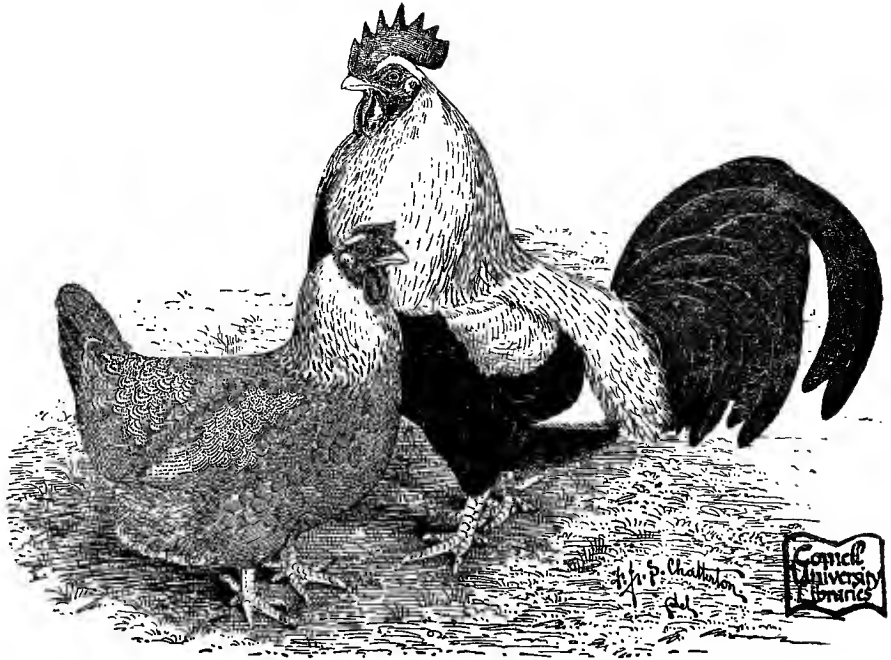
Plymouth Rock.—This fowl is well adapted for the field and farmyard, where it should be left to forage for a large portion of its food, and then it would prove a profitable fowl. This can hardly be said of it when kept in a close run, for it has a voracious appetite, and soon becomes too fat to be productive, and it is not a readily saleable fowl for table, but very suitable for home use. On a free range, when properly managed, it may be kept with advantage, for it lays a rich coloured brown egg and produces a fair average quantity of them even in winter. For winter laying it should be hatched before the middle of May. It is a close sitter, a good mother, and has a neat appearance.

Orpington.—This fowl in merit is about equal to the Plymouth Rock, and the same remarks apply to it. It has been greatly boomed, and consequently has spread through the country. That it will retain its present popularity is doubtful, yet it is a good all-round fowl, the result of crossing Langshans with black Plymouth Rocks.

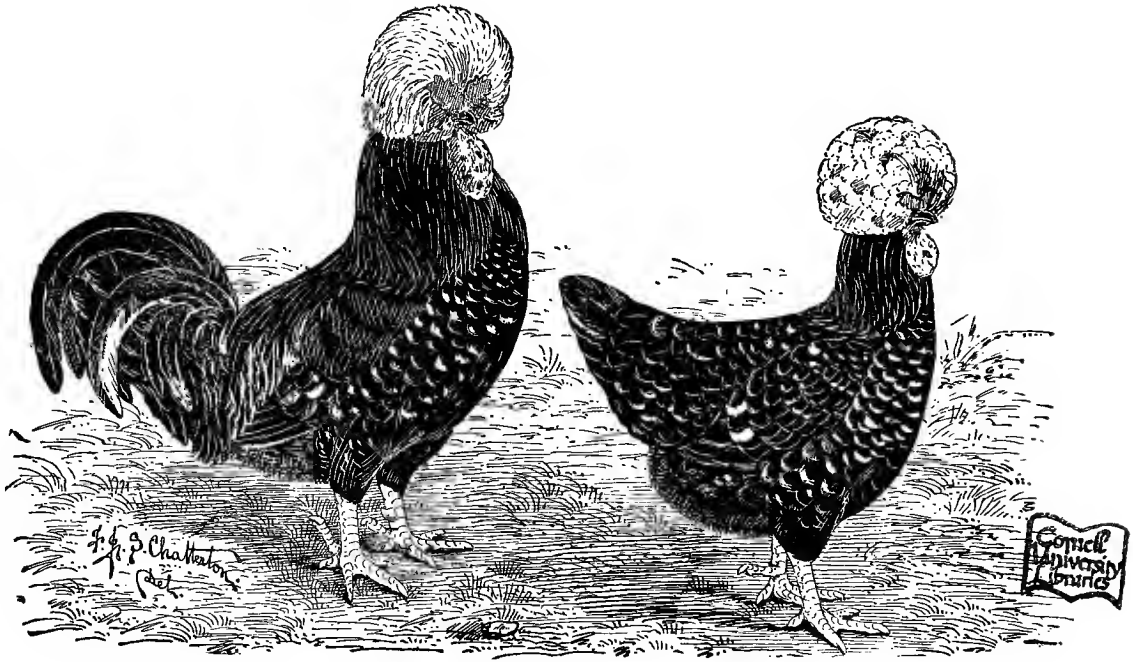
Scotch Grey.—In Scotland this fowl is highly valued because it is very hardy, sprightly, and a good sitter and mother. It is a good winter layer of a white egg of rather above medium size. I know of no better all-round fowl for a farmer to keep.

Brahma.—Though being bred for feather, this fowl, which was at one time a good layer in winter and summer, has been ruined as regards its production of eggs. It lays a brown-tinted egg of medium size, is a close sitter, rather clumsy mother, and not a good table fowl. There may, however, be some of the old kind about, and those persons who have them are fortunate. By careful management the present strains can be greatly improved and may again become first-class layers. The light Brahma is of the greatest utility, because it is a better layer than the dark Brahma, and when crossed with the Dorking a good laying and table fowl is produced.

Wyandotte.—This fowl of American production has become firmly established and a general favourite in this country, on

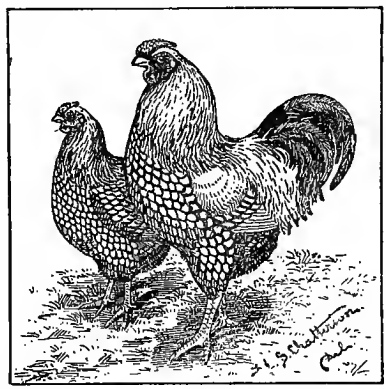


SILVER GREY DORKINGS.



HOUDANS.

account of its neat appearance and all-round good qualities. A silver-laced Wyandotte is certainly a very neat and beautiful fowl.



It lays a brown-tinted egg of fair size, and it is a good winter layer, steady sitter, and careful and attentive mother.

Dorking.—This fowl is valuable chiefly for its high-class table qualities which, on the whole, excel those of any other fowl, and when crossed with other breeds it improves their progeny as table fowls. It is but an indifferent layer of a fair sized white egg. It is a close sitter and a good mother.

Indian Game.—This is a good table fowl, but not a good layer. On a farm or other place where it could obtain a large portion of its food by foraging it might possibly be profitable to keep it. It certainly is not so for a poor man who has to purchase the greater portion of the food for his fowls.

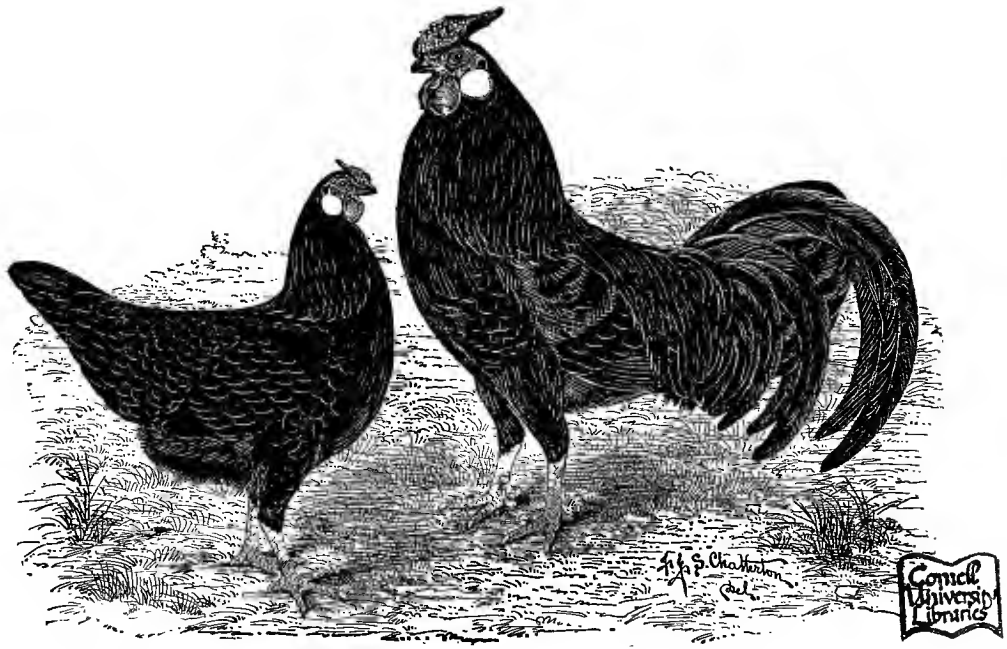
Houdan.—This non-sitting fowl was an excellent layer and table fowl, and those are fortunate who still possess unadulterated stock of the original strains, which were fair winter layers of a large white egg. The Houdan is now considered delicate, but it was hardy and matured more quickly than any fowl of equal size. For crossing purposes, to improve both laying and table qualities, Houdans and Old English Game have no equals.

Redcap.—This non-sitting fowl is a good layer all the year round, with the exception of occasional rests, and produces a medium-sized white egg. The chickens are at first delicate, but soon grow into robust and hardy birds.

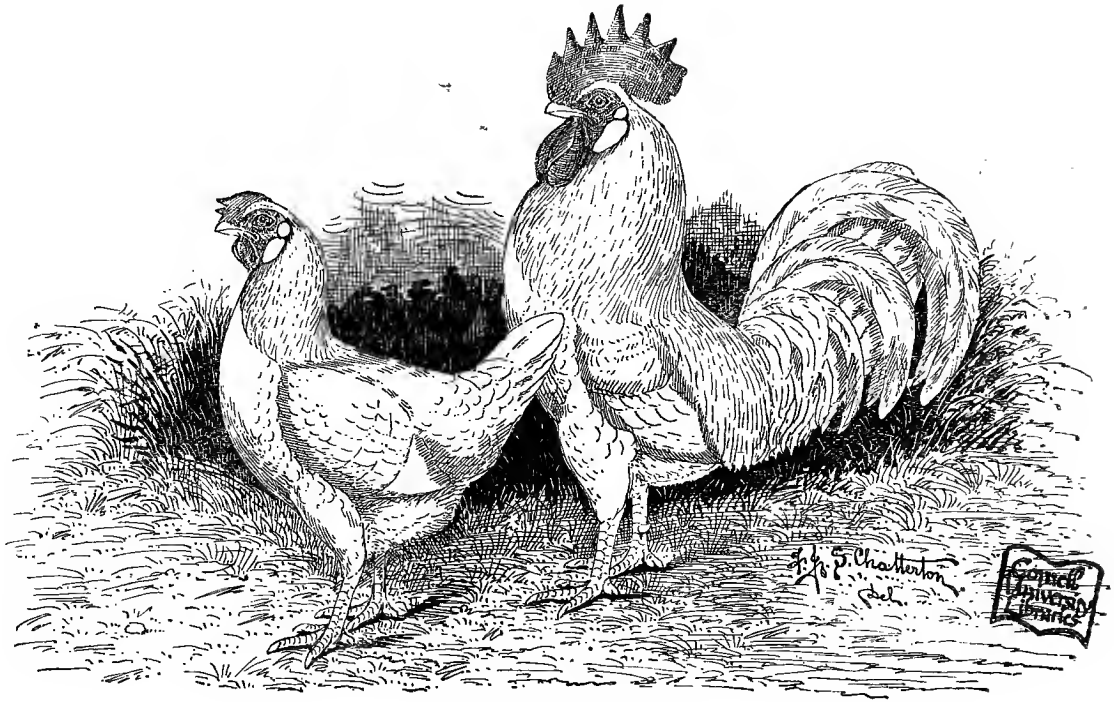
Hamburgh.—All the varieties of this fowl are good layers, but with the exception of the Black Hamburgh their eggs are too small to be readily saleable. They do not sit, and with the exception of short rests lay all through the year. The Black Hamburgh is a very beautiful and hardy fowl, produces more eggs than any other breed, and yields a greater profit because it consumes much less food. A Plymouth Rock, Orpington, or other large fowl would consume about twice as much food as a Black Hamburgh, which would produce twice as many eggs and a much greater weight of them. As a table fowl, though small, it carries a greater proportion of flesh than any of the large breeds. This is owing to its very small bones and small proportion of offal. It is exceedingly active, and when frightened can clear an eight-foot fence, Hamburgh chickens are rather delicate, but they mature quickly. They will thrive in confinement, but require sufficient room for exercise. For winter laying they should be hatched in May.

Leghorn.—This non-sitting fowl is not as popular as it should be, for it lays more eggs, and is a better winter layer and table bird than the Minorca. For winter laying it should be hatched in April and May. The chickens are rather delicate when first hatched, but quickly grow into robust, hardy birds, and the pullets commence to lay at an earlier age than most breeds. The Leghorn lays a white egg of medium size.

Minorca.—At present this fowl is very popular on account of its first-class laying qualities, and there is not any fowl finds a readier sale. It has, however, become rather delicate, and if the craze for increase in size of comb and wattle continues it will soon be ruined like the Spanish fowl has been. The male bird has now more head appendages than he can carry comfortably when in good health, and as soon as he becomes a bit out of condition his comb usually falls over, and his overburdened head is brought to rest on the ground. Already there are cradles made for their combs, why not head rests? It is not a good fowl for the table nor a good layer in severe weather, but makes up for this at other times by laying a very large number of good-sized white eggs, and is specially suitable for being kept in rather confined places.



HAMBURGHS.



WHITE LEGHORNS.

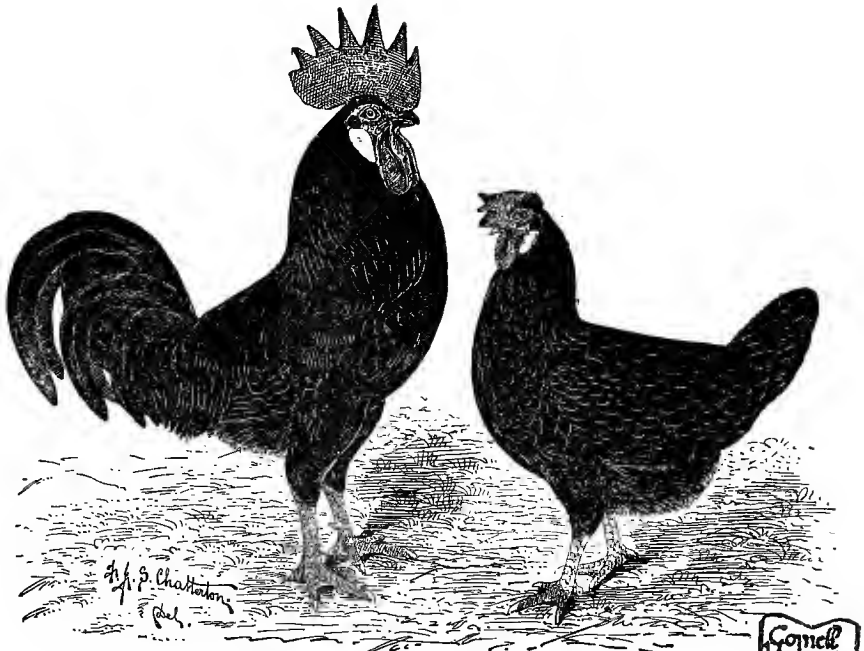
Andalusian.—As regards economic merit this fowl may be classed between the Leghorn and Minorca. According to very reliable authorities the average number of eggs produced in a year by fowls of this breed is considerably over 150. As table birds their flesh is delicate and of fine flavour, and when the cost of production is taken into account they are found to yield a better return than larger fowls. They are non-sitters, and produce eggs of medium size. For winter laying they should be hatched in May.

A CLASSIFICATION.

Fowls may be divided into those best suited to the requirements of the cottager or farmer, and those which are not of sufficient utility for either to keep.

For the cottager a small or medium-sized fowl such as the Leghorn, Minorca, Andalusian, or Black Hamburgh, is very suitable. These are non-sitters and good layers. Of the sitting breeds — all-round fowls — the silver-laced Wyandotte, Scotch Grey, or Old English Game fowl, would be very suitable.

Besides these the farmer may keep the following sitting breeds: Langshan, Plymouth Rock, Brahma, or Orpington, with advantage. Also the following non-sitting breeds, Houdan and Redcap. The Old English Game fowl, Houdan, and Dorking are excellent for crossing with common fowls to improve their laying and table qualities. Where a mixed lot of fowls are kept it is a good plan to introduce one of these in separate years.



BLACK MINORCAS.

PART IV.

HATCHING & REARING.

IN selecting birds to breed from the most important point is to see that they are healthy, and if possible they should have been and still be kept on a free range. If healthy it does not matter how nearly they are related. It is when unhealthy related, or unrelated, birds are mated together that disastrous results follow, because it is adding disease to disease, and consequently intensifying it.

Next to health age is of importance, and the best results are obtained when the birds mated together are about two years old. The females should certainly be well advanced in their second year, but the males may be a little under a year old. In the heavy breeds of fowls about seven females should be allotted to each male on a free run, and in the lighter breeds he may have twelve. In confinement lesser numbers should be allowed.

SELECTION OF EGGS.

Of course eggs for hatching should have been recently laid. When selecting them it is advisable to reject those which have thin shells, are rough or not of the proper shape, also those which are much over or under the average in size. The eggs should be marked with the date on which they were laid, and be placed large end downwards in dry bran and kept in a cool and dry place. When setting them they should be marked with the date of setting, thus—"L. 26/2 S. 2/3"—which would show that the eggs were laid on 26th February and set on 2nd March. It is especially necessary to mark them when a sitting is made up with fresh eggs, so as to avoid mistakes in testing and management.

If there is any doubt about the freshness of eggs for setting they should be tested with a strong light, and any that have a mottled appearance should be rejected.

INCUBATION.

When using a machine for hatching the eggs, it is advisable to follow the instructions supplied with it, except that it is in my opinion advisable to keep the temperature inclining to the lowest point given, and to lower it one degree on each of the three last days of incubation. When eggs are set under hens it is a very great advantage to have an incubator to hatch out the chicks to avoid loss through the hen destroying any by treading or squatting on them.

SELECTING HENS.

When employing hens for sitting, those of medium size, with a good coat of feathers and free from leg feathering, should be preferred. An Old English Game or game-crossed fowl proves an excellent sitter and brooder of chickens or ducklings. The best time to set a hen is at night, if she has to be introduced to a strange place, and she should be placed on dummy eggs if at all likely to be restless. Next morning she should be taken off the nest, and food and water placed for her, allowing her ten to fifteen minutes to feed and exercise. If she settles down properly remove the dummies and give her a sitting of eggs. Each morning she should be taken off to feed, which will make her tame and less likely to be flurried and trample on the chickens when they are hatched. If she squats down when taken off the nest she should be compelled to take some exercise, or she may become cramped and suffer in health. In taking a hen off the nest the fingers should be placed under the centre of her body, and she should be gently raised off the eggs, having first ascertained whether there are any up under her wings. In very cold weather it is a good plan to cover the eggs with a piece of flannel, in case the hen should happen to be off the eggs too long.

FOOD FOR SITTING HENS.

Grain is the best food for sitting hens, and the chief part of it should be maize, because the fat in it assists in keeping up their temperature, so would a little hempseed.

When the hen is taken off each morning, the eggs should be counted and inspected, to see if any are missing, soiled, cracked

or broken. Soiled eggs should be placed in rather warm water, and allowed to remain in it until the hen is on the nest, when they should be washed, wiped dry and placed under her. A crack in an egg should be covered with a narrow strip of gummed tissue paper. The selvage off postage stamps is very suitable for this purpose. If the nest is soiled it should be re-made.

TESTING EGGS.

The eggs of fowls should be tested on the seventh and fourteenth day of incubation. They may be tested by being grasped between the forefinger and thumb, and held between the eye and a strong light, such as the sun, or a bull's-eye lantern or a lamp placed in a box in a dark room. On the seventh day of incubation fertile eggs have a dark patch in the centre, but infertile eggs will have retained the appearance of recently laid ones, except that the shell will have become of a darker colour. An addled egg has a cloudy appearance, and the shell is discoloured in patches. Those about which there is a doubt should be marked with a D and rejected if incubation has not advanced by the fourteenth day. Those which are infertile may be used for the same purposes of food as fresh eggs, or they may be preserved in lime water and kept to feed young chickens.

NESTS.

If possible, the nest should be made in a slight hollow in the ground, or in earth placed in a box or basket. The nesting place should be where it would be well sheltered in wintry weather, and the nest should be lined with hay or chaff. Coarse straw is not suitable, because it does not protect the eggs sufficiently in cold weather, and it may be the means of the eggs being broken through the feet of the hen becoming caught in it. It is a good plan to dust the nest with a mixture composed of flowers of sulphur and powdered lime,—one part of lime to two parts of sulphur.

METHOD OF SETTING HENS.

It is an excellent plan to set two or better still three or more hens at the same time. Then when the eggs are tested on the seventh day of incubation, and those which are infertile removed, there may not be sufficient fertile eggs left to fully employ all the

hens. However, the fertile eggs can be placed under one or more of the hens, and the sittings may be made up with fresh eggs. When the chickens are hatched they may be left with the hens or placed in a " Foster Mother."

TRAVELLED HENS.

When a broody hen is received from a distance, carefully examine her to see whether she is healthy or not, and then place corn and water for her to eat and drink if she will, even at night. Then set her upon dummy eggs, which may be made rather warm if the weather is cold. The nesting place should be kept as dark as possible until the hen has settled down to her work. If she escapes, retake her quietly so as not to frighten her. Don't be in a hurry, and above all things be careful not to get in a bad temper. It is a capital plan to talk to the hen in a soothing tone of voice.

NUMBER OF EGGS.

In the early months of the year it is not advisable to place more than seven to nine eggs under a hen, the number depending upon her size and that of the eggs. When a greater number are under a hen in cold weather, some of the eggs are very liable to get chilled and spoiled. If all are hatched the hen cannot sufficiently protect the chickens when their feathers are growing out, and they most need protection from exposure to cold air, which may prevent them thriving. In cold weather small broods thrive much better under hens than larger ones.

ARTIFICIAL MOTHERS.

There are some excellent apparatus for brooding chickens, and many experienced breeders employ them in preference to hens. The same may be said of incubators for hatching. The heat in a Foster Mother should never exceed 70 per cent.

BREAKING THE SHELL.

Chickens due to hatch out on the twenty-first day of incubation should be breaking their shells on the previous day. If the eggs had been laid a considerable time before they were set, or other conditions being unfavourable, they may not hatch out until twenty-four or even forty-eight hours after the proper time. Therefore the eggs should not be shaken or broken, but may be tested

when twenty-four hours overdue by placing them in *rather* warm water. Those with live chicks in will float large end up, and bob about in a lively manner, and those with dead chicks in will sink to the bottom of the vessel. If fourteen hours after a chick has commenced chipping the shell it appears to be unable to continue the process, it may be assisted by slowly and carefully removing the top of the egg. This should be done by extending the chipped space outwards in a circle round the egg. If there is the slightest appearance of blood, cease operating and return the egg to the nest or incubator. If it can be avoided a chick should not be helped out of its shell, because its efforts to extricate itself assist the absorption of the yolk of the egg (from which it is hatching) through its vent, see " How to Feed Chickens." In some cases the chicks are stuck to the shell, which is the result of lack of moisture due to bad management. It can be avoided by always making the nest in earth and occasionally damping the earth round it in very dry weather, which is a better plan than merely damping the eggs. A certain quantity of moisture is essential to successful hatching. Chickens should not be fed during the first twenty-four hours after they have quitted their shells, and during that time it is very unwise to disturb the sitting hen more than by gently passing the hand under her to remove empty egg shells, because, if disturbed, she may become restless and kill some of the chicks by treading on them before they are able to support themselves on their legs. (See " Incubation.")

CHICKEN COOPS.

A chicken coop should have a boarded floor covered with chaff, ashes, or some other dry material, and it should be well ventilated, but free from draughts. Attached to it there should be a small wire run to allow the chickens to come out of the coop to feed and expose themselves to fresh air, but not to their natural enemies. The coop should be placed on grass or untainted ground.

PRESERVING EGGS.

The shell of an egg is chiefly composed of alkaline earths which are decomposed by the action of air and moisture, which causes the porous shell to become more porous still and thin. This allows moisture to pass out of the egg and air to pass in.

In order to preserve an egg its shell must be preserved, and various methods have been adopted such as oiling and greasing the shell, and keeping the egg in a saturated solution of lime.

To preserve eggs for setting, they may be buried as soon as laid in very dry bran with the large end downwards. If it is necessary to keep them for more than a week, some French chalk may be rubbed gently into the shell or it be oiled, and the egg wrapped in tissue paper, and then buried in the bran. Treated in this way eggs will keep good for many months, but should not be kept for the purpose of setting after three weeks.

Eggs may be oiled, placed in racks in a dry, airy and cool place, and kept for months for eating, especially if they are oiled immediately after they are laid. They may be preserved good for eating twelve months by burying them in a mixture of fine middlings and powdered salt—one part of salt to ten of middlings. The salt and middlings must be dried in an oven, and the eggs should be oiled and placed in it as soon as laid. The vessel containing the eggs should be kept closed in a very dry place.

PACKING EGGS FOR TRAVELLING.

Whether a hamper or a box is selected to pack eggs in for travelling, it should be large enough to allow of a rather thick layer of hay or some soft and yielding material being used to line it, and still leave room for the eggs to be embedded in a similar kind of material.

The best receptacle for packing eggs in which are intended for setting is a hamper of a suitable size. The bottom and sides of the receptacle used should be lined with soft hay, and each egg should be enveloped in some of it and a piece of soft paper. The eggs should be placed in layers, with hay betwixt them, and a sufficiency of it on top to prevent any possibility of the slightest displacement. If the eggs are placed in a hamper the cover may be tied down or fastened with wire. The lid of a box should be secured with screws or wire, string is not suitable for this purpose.

Label conspicuously, "Fragile—Eggs, with care." It is not advisable to send eggs which are intended for hatching by Parcel Post, but by Passenger Train, and if possible they should be conveyed to and from the stations by hand.

PART V.

PROFITABLE TURKEYS.

THIS book is written to show how to make a profit by keeping certain classes of poultry. Breeding and rearing turkeys for sale might be made remunerative, but only by those who have an extensive range for them on suitable land. Labour, too, must be cheap, for the young birds require a great deal of attention. An upland or an orchard, with large trees to protect them from the sun in hot weather, and for them to forage under, is the best place to rear them, and they thrive better when left to forage for a large portion of their food.

HOUSING.

Almost any building which is dry and secure from the inroad of foxes is suitable for housing turkeys. A shed built and roofed with galvanized iron, and having a wirework or trellised front, is very suitable. The birds should roost on broad perches placed at the back of the house, about three feet from the ground. Turkeys will not thrive when kept in a close atmosphere or on foul ground. The adult birds may be allowed to roost in trees, but it is a much better plan to keep them sheltered in an airy building, from which they can only emerge when allowed.

SELECTION OF BREEDING STOCK.

In purchasing birds to breed from, select the bronze coloured Cambridgeshire, American, or the Norfolk Turkey (black), and instead of being guided solely by the weight of the birds see that their thighs are firm and hard with tightly-fitting skin. Heavy birds with softness of thighs or looseness of skin should be rejected, also those with crooked breastbones. It is a better plan to purchase medium-sized birds of good constitution.

Another point of great importance is age. The turkey does not entirely mature until it is in its third year, therefore younger

birds should not be selected for breeding from, but hens in their second year may be bred from. About five females should be allowed to each male.

NOTES ON HATCHING.

In the early months of the year it is advisable to set the eggs under common hens, so as to get as many eggs as possible from the stock turkeys. In May the hen turkeys may be allowed to sit and nurse their own broods. The turkey hen can make her own arrangements as regards nest and nesting-place, but her eggs should be removed from the nest as they are laid (two or three dummies being left in their places), and they should be marked when laid and when set. The turkey is a persistent sitter, and should not be disturbed unless she fails to come off to feed, in which case she should be attended to by a person whom she is accustomed to see. It is not advisable to place more than nine eggs under a large common hen, or more than fifteen under a hen turkey. The period of incubation is twenty-eight days, and the eggs should be tested on the tenth day.

NOTES ON FEEDING.

In a state of nature the turkey subsists upon insects, their larvæ and shells, fruit, seeds, grasses, and other vegetable matter. Therefore, when domesticated, young birds, and *especially breeding stock*, should be left to forage for a large portion of their food. That supplied should depend upon the time of year, or I should say the quantity which they can obtain by foraging. In order to induce the birds to forage they should be rather sparingly fed, even when laying. High feeding may promote egg production, but many of the eggs may prove infertile, and the young hatched would be less vigorous than when the parent birds had foraged for a large portion of their food.

Turkeys are very partial to wandering along hedgerows, and amongst root crops, in search of insects, slugs and some species of caterpillars. This class of food is most suitable for all kinds of poultry, and when they can obtain an abundant supply of it and green vegetable they require but a scanty supply of grain or the products of grain.

NOTES ON REARING.

Whether the turkey chicks are being nursed by common hens or turkey hens they should be allowed to forage during a large portion of the day when the weather is fine and the ground fairly dry. Nursing mothers should be generously fed to encourage them to brood the chicks, especially when they are very young. If not, a turkey hen would keep on foraging and cause some of the chicks to become exhausted. They should not be allowed to get wet, and should be protected from cold winds. Exposure to cold and wet is fatal to young turkeys, which require almost constant attention during the first eight weeks or until they have "shot the red."

Turkey chickens require frequent feeding. Commencing when they have been out of their shells about twenty-four hours, feed every two hours with the same class of food advised for young chicks in chapter on "Food and Feeding," and in addition they may have the curds of milk. Turkey chicks must have a large supply of animal matter, also of green food such as dandelion, nettle, and onion-tops, minced onion, lettuce, &c. Water should also be supplied in unlimited quantities, and in vessels so constructed or protected that the water cannot be soiled or the chicks get wet by it.

HOW TO FATTEN TURKEYS.

Fattening is the result of more fat-forming substances being taken than can be used up or got rid of by the creature fed. Therefore that class of food which contains the greatest proportion of fat-forming matter should be fed to turkeys when it is advisable to fatten them. Of course the price and suitability of the food should be taken into account.

Maize is a very fattening and cheap food, but if too freely and exclusively used it causes the fat of the creature fed with it to be yellowish in colour, and the flesh has not a delicate flavour or inviting appearance. A mixture composed of one part maize-meal, three of barley-meal, four of fine middlings, and sufficient cooked potatoes to form a stiffish mass, is an excellent and an economical food for fattening turkeys.

It is a great advantage to give a change of food occasionally. This can be done by mixing cooked mangel-wurzel or swedes with the meal instead of the cooked potatoes. A little salt should be added to the soft food for fattening poultry, because it promotes the appetite of the birds for food, and being an antiseptic is in other ways beneficial to them. If just a little pea-meal, bean-meal, and ground oats be added to the soft food during the last week of fattening it will improve the flavour and firmness of the flesh. A little celery will also improve the flavour of the flesh.

Full-bodied wheat and barley are each very fattening food, more especially when soaked and boiled until quite soft.

It is not advisable to pen up turkeys during the day while fattening them, except in inclement weather, but they should not be allowed to roam at their own will. They should be frequently tempted with food and fed near their sleeping place, which should be a shed or other building without perches, but containing a bed of soft material for them to rest on. This they will do during the day if they are well fed and the place is light and airy. Turkeys should not be allowed longer than four weeks in which to fatten, and they should be examined occasionally to ascertain what progress they are making and whether they are apparently healthy. It is not any use trying to fatten those which suffer from looseness of the bowels. In killing the best plan is dislocating the neck close to the head.

DISEASES.

Turkeys are subject to the same diseases as fowls, and should be treated in the same way except that they require one-third more medicine for a dose.

PART VI.

PROFITABLE DUCKS.

IN my opinion, there is not a book on Ducks in which directions are given as to their housing, feeding, and management, which, if followed, would be likely to lead to good practical results. Space is devoted to show how a cask, or an old case, can be made to serve as a duck house, and a tub of water as a duck pond. This, and abundance of matter much more absurd and useless, is to be found in books on duck-keeping. There are some people who think that ducks are dirty creatures to keep, and no doubt they arrive at such a conclusion after seeing them kept in such a place as a cask or a barrel, and without a suitable pond. Ducks must have a pond of clean water, and then they will not fail to keep themselves clean. This is a very simple matter, as ample accommodation for a pen of ducks, that is, a house, yard and pond, can be provided at small outlay. More especially is this the case when a handy man undertakes it.

A great diversity of opinion exists as to whether ducks can be made to pay when every requirement has to be provided. With ordinary care and judicious management they can be made a source of profit and pleasure, either in town or country.

The system of management sketched out in the following pages, is the result of many years' experience of duck-keeping in a limited space.

When ducks have the advantage of a stream or large pond, and grass to forage over, they can by judicious management as regards housing, feeding, collection of eggs, &c., be made to yield much greater profits than when kept in rather confined places.

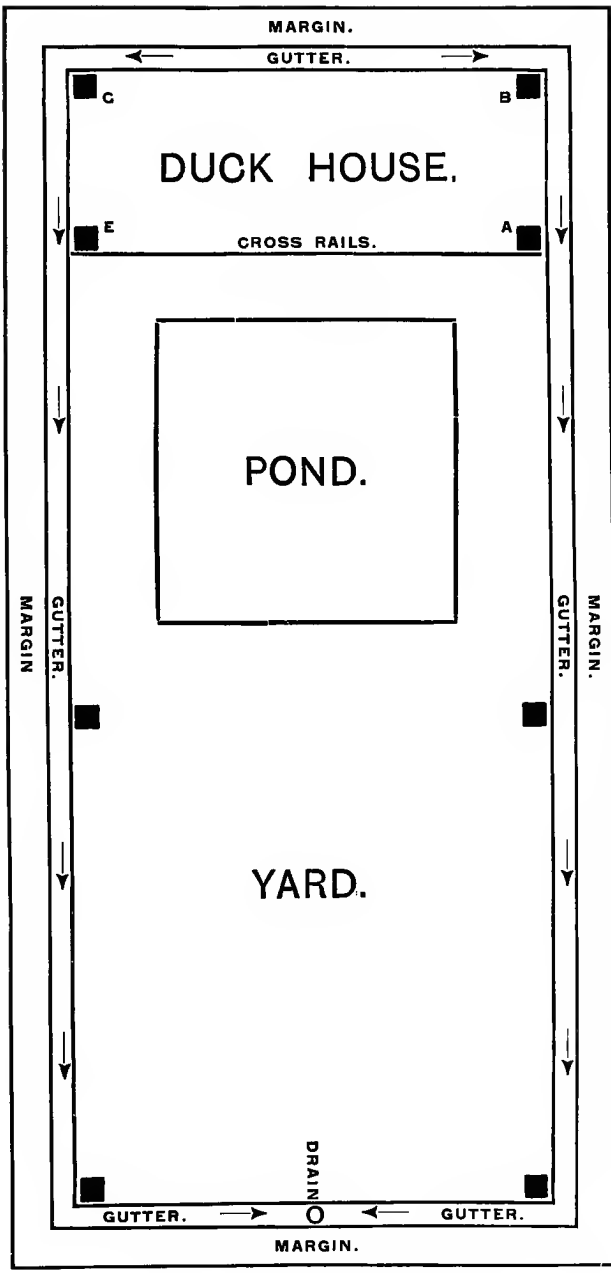
ACCOMMODATION.

Duck Yard and Pond.—The duck yard should be situated near to the water supply and a drain to receive the waste water. Having selected the site, raise the whole surface to be covered by the house and yard, from six inches to one or more feet above the ground level, so that there shall be a fall from the house, pond, and yard to the drain or course for carrying off the water. In order to be understood, and for convenience of description, I append a *ground plan*, which is, of course, subject to alteration, and the house as well, to suit any shaped piece of land.

Almost any kind of material may be used to raise the ground, which is to be covered with concrete to the outside of the space marked "margin" on the plan. The gutter should be about four inches deep, and have a fall of about one inch in the foot to the drain marked **D.** The whole of the ground should have a similar fall so that water will not remain anywhere but in the pond. A pond two feet deep and three in diameter, with sides sloping from the centre outwards, is large enough for four or six ducks, but the water should be changed daily. The soil removed to form the gutter and pond should be utilized to raise the ground in the upper part of the yard. Having raised it, and shaped out the pond and gutter, lay on the concrete, which should be made with Portland cement (slow setting), for it has to resist the combined action of damp and frost. It can be made with cement, gravel and sand, cement and clinkers from a furnace or cement and breeze (waste from coke). Whatever material is used it must be small, gritty, and free from dirt, or anything that will not form into a compact mass. Sift out the finer portions for facing and use the coarse as a foundation, mixed in the proportion of one part cement to three of coarse rubble. This should be laid down at least two inches deep all over the entire surface, including the "margin." Beat it down, taking care to retain the shape of the gutter, pond, &c. While this foundation is wet prepare the facing by mixing two parts of fine siftings, or sand, with one part of cement.

Damp the surface of the foundation and lay on the facing so that it may all set together and form a solid mass. The yard, pond, &c., *may* be made with brick-bats laid with a flat surface and

GROUND PLAN.



Scale, ½ inch to each foot.

faced with cement. A very economical way of making a duck yard is by laying a foundation of burnt brick waste from the nearest brick-kiln, and coating it with a concrete made with equal parts of ashes (dry and free from dust), tar, and quicklime powdered, not slaked.

Duck House and Fence.—The first thing to be done is to make a framework to go round the yard. All that is required is a top and bottom rail fastened to uprights (posts), thirty inches long. When a frame is completed these posts should stand on the edge of the gutter at the points marked thus ■ The rails should be let into the uprights so as to be flush with the outside. The bottom rail should be let in so that the bottom of it shall be two inches above the bottoms of the uprights, and the top rail level with the tops of the uprights. Fix on the cross rails to meet the top and bottom rail at the points marked **A** and **E.** Board round the space marked " Duck House," using boards long enough to reach from flush with bottom rail, all round, to four inches above the top rail in front, and eight inches above the top rail at the back of the house, **C B.** The sides should be sloped to meet the back and front. Thick matchboards can be used, or a second coarse of boards overlapping the first, or the joins in the boards may have strips of wood nailed over them so that the ducks shall not be subjected to direct currents of air.

Make the roof large enough to overlap the house about four inches all round.

It must be made water-tight and so that it can be taken off in order to clean out the duck house. The roof may be made with fixed ends, and the centre portion so that it can be removed like the lid of a box—thrown back. The floor of the house may consist of wide pieces of board long enough for the ends to rest on the bottom cross rail and the bottom rail at the back. These boards should be cut so as to fit in not too tightly, and left unfastened so that they can easily be removed to be cleaned, and when necessary redressed with the tar composition.

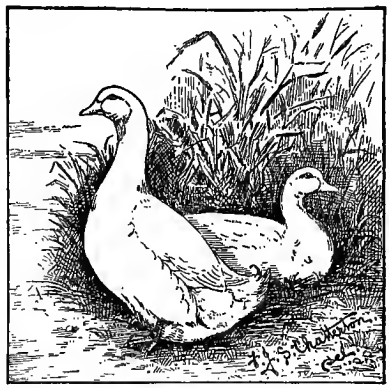
At **E** make the entrance, which should be about nine inches by nine and about three above the floor of the house. Of course the ducks will require a piece of board with strips of wood crossways on it to form a ladder to the entrance. A drop shutter is

required to close the entrance. To ventilate the house cut a piece out of the centre of the drop shutter, covering the hole with a piece of perforated zinc inside and out. If the roof fits down very closely make a similar ventilator at the back of the house under the roof at the end farthest from the entrance. Fasten wire netting to the top and bottom rail all round the yard. It is advisable to use half-inch mesh, as it is in every way better than the larger sizes. Besides the ducks cannot put their bills through it to damage ferns or flowers that may be placed in pots outside, where they would be very ornamental. When the ducks can have a greater amount of liberty a passage through the wire-work must be made for them, and from it a roadway can be constructed with wire-work. When the netting is fixed give it and the whole of the woodwork, inside the house and out, a coat of boiling tar, saturating the floor boards and every crevice where wet could enter. When this has dried in put on a good coat of tar and pitch composition, made by melting about a pound of pitch in a gallon of tar, and apply boiling hot. When dry the house will be ready for occupation.

SELECTION OF STOCK.

The Aylesbury, Cayuga, Indian Runner, Pekin, and the common duck are each good layers; therefore, those who may feel disposed to keep ducks for profit can chose any of these, and if they do not succeed it is almost certain to be owing to faulty management. Of course it is possible to have ducks of a good laying breed that may lay badly. Of the pure breeds I prefer a medium-sized Aylesbury, but I have had common ducks which produced quite as many eggs during the season. My average has been, per head, about ninety during the laying season, which were worth at least twice the value of the food consumed in twelve months. The duck produces its eggs within a period of seven months, consequently there are five months during which it is not advisable to keep it where it cannot forage for a portion of its food. A certain profit of from five to fifteen shillings per head can be obtained during the laying season, even when every requirement has to be purchased. By utilizing the waste from the food supply of the house a pen of ducks can be kept to yield a greater profit. If ducks and their management were better understood in

this country there would be hundreds of thousands more of them kept on account of their value as producers of food of the very best quality.



PEKIN DUCK.

THE FOOD VALUE OF EGGS.

As regards the value of eggs as food at average prices, they are among the cheapest and most nutritious articles of diet. Like milk, an egg is a complete food in itself, containing as it does everything necessary for the development of a perfect animal. This is made very evident by the fact that a creature is made from it and sustained by it during the first twenty-four hours after it quits its shell. It seems a mystery how muscles, bones, feathers, and everything that a creature requires for its perfect development are contained in an egg; but such is the fact, and it shows how complete a food an egg is. It is also easily digested if not damaged in cooking. Indeed there is no more concentrated and nourishing food than an egg. The albumen, oil, and saline matter are, as in milk, in the right proportion for sustaining animal life.

The eggs of some ducks have a strong flavour, but this depends almost entirely upon the quality of the food and water they have, and the sanitary condition of the place where they are kept. The effect of odorous food or water upon the flavour of the eggs is astonishing, and for this reason alone, if there were not a greater, it is very important that the food and water provided for ducks should be absolutely free from impure matter, and their place of abode kept sweet and clean.

HATCHING AND REARING.

The best way to commence is by setting two or more hens. In winter only seven eggs should be placed under each hen. When the eggs have been set seven days test them, remove clear eggs and, if possible, complete one hen with the fertile eggs. Set a third hen, and with fresh eggs make up each nest to seven. Of course this method may be carried out to any extent, or the eggs may be hatched in an incubator, and transferred to hens or to artificial mothers. The date of setting should be marked on each egg, and they may be tested on the eighth day. The best material to make the nests of is hay, and the best place is in a hollow in the ground. About the twenty-eighth day the ducklings should be hatching out. Remove the shells from the nest, but leave the young undisturbed for the first twenty-four hours, then they will the more readily take food.

FEEDING DUCKLINGS.

Commence by giving them boiled milk, and add to it egg whipped or minced, and crumbs of stale bread. When they are three days old they may have some porridge made with coarse oatmeal, and when they are a week old they should be fed on cooked vegetables mixed with fine middlings and meat. Swedes, cabbage, onion, and almost any kind of vegetable is suitable for feeding young ducks. Those who have skim milk should use it to mix with meal for the ducklings. Some animal matter is very essential —tallow-chandlers' greaves and granulated meat are each suitable. During the first week feed them four or five times a day, and after that four times a day. To develop their frames allow them as much exercise as possible until they are eight weeks old, when those intended for stock should be selected and the others penned for fattening.

FEEDING YOUNG STOCK.

The great point is size, that is, a large framed duck, not a fat one. To attain size exercise is required, and, under suitable conditions, free access to water. They must not be fed too liberally, if so they squat about and thus fail to take sufficient

exercise, which is essentially necessary for their perfect development. For the morning meal they should have soft food made with middlings and boiled vegetables. If kept in confinement some animal food should be added to it, and they should be supplied with as much green vegetable as they will eat. For evening meal, oats, maize, or tailed wheat is suitable. Bold wheat is too fattening.

FEEDING STOCK DUCKS.

The proper feeding of ducks kept for breeding from depends upon whether they are laying or not. When they are on a free range and can obtain insects, green food and other aliment, a handful of oats is sufficient for each duck when it is not laying. If laying they should have a meal night and morning. When kept in confined places ducks require animal food as well as green food daily, and soft food when they are laying, and to take the place of insect food they should have some fresh bones pounded up and placed for them to eat if so disposed. Their soft food may be composed of the refuse from the food supply of the house and vegetables (see chapter on "Feeding Poultry," which equally applies to ducks, but they require more animal matter than fowls).

GREEN FOOD.

Ducks and ducklings should have as much green vegetable food as they will eat at all times. Even those penned up to fatten should have some, as it tends to keep them healthy. Rape, lettuce, onion-tops, cabbage and turnip-tops are each suitable. It is advisable to mince the green food for ducklings.

GRIT AND SHELL FOOD.

In the corner of a duck yard there should be a vessel containing grit and shell food, and in this vessel the corn for the ducks should be placed (see "Grit and Shell Food").

FATTENING DUCKS.

Young ducks should not be penned up to fatten before they are seven or eight weeks old, and the fattening process should not occupy more than two or three weeks. Almost any kind of meal

is suitable for fattening ducks, but it should be scalded with liquor in which some animal matter has been cooked. Potatoes and skim milk boiled and mixed with fine middlings (coarse middlings are not suitable), and wheat meal or a little maize meal form a good food for fattening ducks. There should be enough meal used to make the food rather stiff, and the ducklings should be fed with it three or four times a day; and if some animal matter is cooked and mixed with the food it will greatly assist in fattening them. To stimulate the appetite mild spicy condiments and a little salt may be added to the food. The ducklings should be kept in a rather dark and warm place on a bed of stable litter, peat moss, or straw. At about noon daily they should be allowed access to water for an hour, in order to preen and clean themselves. While out they should have some green food, which would prove very beneficial and improve the flavour of their flesh. For this purpose celery, or a very small quantity of celery seed, may be added to one of the daily meals during the last week they are fattening. Wheat or barley boiled until it is on the point of bursting is excellent food for fattening ducks or other poultry.

To fatten old ducks they should be penned and treated in precisely the same way, except that drakes and ducks should not be kept in the same pen.

DAILY MANAGEMENT OF STOCK.

In the morning, before letting out the ducks, sweep the water out of the pond and wash down the yard with a bass broom, then refill the pond. The water can be conveyed to the pond by means of a piece of rubber hose, which should be coiled and put carefully away in a damp place when done with.

The grit in the "grit vessel" should be washed and the vessel refilled with clean water daily, adding fresh grit when it is required.

Place food for the ducks, let them out, then shake up and if necessary renew their bed. Add their corn to the water, &c., in the "grit vessel." The last thing at night the ducks should be shut up. The whole time required daily in looking after a pen of ducks is about half-an-hour, on the average.

Who cannot spare it?

DISEASES.

The principal ailments of ducks are Roup, Acute Enteric Disease and Cramp. The latter is usually the result of Septic Disease, which destroys many thousands of young ducks annually.

Symptoms.—Loss of power in legs, falling over on to their backs, and diarrhœa.

Treatment.—Give a dose of sweet oil night and morning, or add it to the food; also add the Krekodyne Powder to food or drinking water.

When ducks are suffering from Roup dirt collects round their eyes. To cure them of Roup add Krekodyne Powder to their drinking water. When giving medicine or oil to a duck it is necessary to draw its tongue forward to pass the dose behind it.

PREVENTION OF DISEASE.

This chiefly consists in suitably feeding both the breeding stock and their young. Ducks keep remarkably healthy when properly managed. The chief predisposing cause of disease amongst them is too generous feeding with grain and the products of grain. Of grain, the staple food for ducks should be thin-skinned, short, full-bodied oats, with medium-sized barley or Indian corn for a change. It is not advisable to feed ducks kept for breeding from more than once a day when they are able to obtain a supply of suitable food by foraging, and the meal should be given in the evening. When producing eggs two moderate meals may be fed to ducks, of which some animal matter should form part. Of this they can hardly have too much.

A supply of green vegetable or vegetable roots, such as swedes, tends to keep ducks in a healthy condition. When they are kept where they cannot obtain grass, &c., some cabbage or cooked vegetable roots should be fed to them every day.

PART VII.

PROFITABLE GEESE.

SELECTION OF STOCK.

THERE are two kinds of geese, the Embden and Toulouse, which will yield a profit when the owner has sufficient land for them to graze without having to be too frequently going over the same ground. The two varieties are of nearly equal merit. The Embden goose is the closer sitter, better mother, and also the better table bird, and is for that reason preferred by many farmers, while some prefer the Toulouse goose because it is of a more compact build. Birds used for breeding from should be not less than one year old, and they are more suitable at five years old. In selecting them long bodied birds should have the preference, and about three geese should be run with each gander.

HOUSING.

Geese are very hardy, but thrive much better when they are comfortably housed than they do when not so well accommodated. A dry and well-sheltered pen, and a dry and warm bed, are promotive of early laying. A building with a ground space of from forty to fifty square feet will be large enough for four or five geese, but more space would be an advantage. It is also an advantage for it to have an asphalte or concrete floor. As regards bedding material, there is not any more suitable than peat moss, owing to it absorbing moisture freely. For this reason it is the most suitable material for bedding for ducks. Clean straw would prove rather expensive bedding material for either ducks or geese, owing to the large quantity that would be required to keep a fairly clean bed under them. Dried fern-tops make a very suitable bed for either ducks or geese.

FEEDING.

On sufficient suitable land geese will thrive without any addition to the food they can procure for themselves during most of the year. When grass and other herbage is scanty, dried up, frozen or covered with snow they should be supplied with cabbage, turnips, swedes, or other vegetables and some oats, or cooked vegetables mixed with middlings, and a little animal matter.

INCUBATION.

The eggs may be set under geese, turkeys, or common hens, and a goose may be given thirteen, a turkey seven, and a large hen three or four. The young should be breaking their shells on the thirtieth day of incubation. It is advisable to make the nest in a hollow in damp ground, and if the weather is dry the eggs should be damped with warm water during the last ten days of incubation, more especially when they are set under a hen or turkey.

FEEDING GOSLINGS.

Young goslings should be fed on the same class of food as ducklings, but with the addition of a larger supply of green food, and if they have access to grass they will soon commence to keep themselves, but those intended for market should have some food if not on stubble. Geese to be ready for table at Michaelmas must be hatched early in the year. Those for the Christmas market should be put up to fatten in the same way as ducks two or three weeks before they are required for market.

PART VIII.

POULTRY-FARMING.

INTRODUCTORY.

THE general verdict is, "Poultry-farming cannot be made to pay." Yet those who say so do not tell us why, or attempt to dispute the facts that most breeds of fowls will produce eggs to the value of more than twice the cost of their food, that they will thrive when kept in a very limited space, and that they will then lay as many or more eggs than they do when on a free range. These facts encourage many persons to start keeping fowls on a large scale, but they usually fail because they have to manage unsound stock, and because they do not know how a poultry-farm should be managed. Eggs for setting or fowls for stock can only be purchased at very considerable risk, owing to the majority of the fowls in this country being in a more or less diseased condition. It will be made evident in the following pages that, after deducting rent of farm, cost of labour, interest of money invested, and all reasonable expenses, from the value of the eggs produced, there would be a fair income in the surplus from five hundred fowls properly managed. The great drawback to success in poultry-farming is disease and unproductiveness due to mismanagement in feeding.

Poultry-farming is generally understood to be the keeping of a large number of fowls in rather large flocks. To do this is to court disaster, for the unavoidable loss from disease is immensely increased when many fowls are kept together. When they are kept in small groups the average yield of eggs is greater than from larger groups, and the fowls are less liable to become diseased, and if contracted it may be stamped out with little loss if necessary by the destruction of the first group attacked. The system of poultry-farming advocated in these pages depends in a

great measure upon a system of dealing. It is certain that to be successful the poultry-farmer must be a person of good business capabilities.

THE FARM.

In selecting the location of the farm there are many things to be taken into consideration, such as distance from a market for the produce, terms of tenancy, nature of soil, supply of water, whether there are outbuildings or not. Good outbuildings are a great advantage, because they would save the cost of erecting storehouses, &c. It is of the greatest advantage to obtain premises where a market is near at hand for the bulk of the produce at remunerative prices throughout the year. Though the rental may be very low it is a very great mistake to take a farm in an out-of-the-way place, because of the cost of carriage and many other disadvantages. The farm should be located as near to a large town as possible, and there should be absolute fixity of tenure for twenty-one years.

Soil.—It is erroneous to suppose that fowls will not thrive upon any soil when properly managed, yet for many reasons a gravelly one is to be preferred. It is of course drier, contains most gritty matter, and the stones in it can be made use of for making concrete, which could be used to construct footings for the fowl-houses to stand on, duck-ponds, and to make roadways.

Situation.—A gentle slope facing south or south-west is undoubtedly the best aspect for poultry runs. The ranges of houses should be built up and down the slope, not across it. When the above favourable situation cannot be secured a wood or any obstacle that will protect the poultry runs from cold winds in wintry weather on their north and east sides should be taken advantage of.

Size.—A thousand fowls can be kept in a thriving condition upon one acre of land, or eight thousand upon ten acres. This space allows room for a dwelling-house and stores, also some ground for cultivation. In fact, if *only* eight fowls are placed in each of the fowl-houses, and they are built in accordance with the plans in Part I., they will not cover one half of the land. The spaces between the ranges of poultry-houses should be utilized for fruit-growing.

Having selected the farm, carefully lay out the ground for the fowl-houses to stand on, paying special attention to the means of intercommunication. The object is to enable the greatest possible number of fowls being attended to by each person employed. This is a very important consideration. The whole of the ground should be planned out, though all the fowl-houses may not be erected at the commencement.

POULTRY-HOUSES.

The part on this subject shows how the houses should be built and what is the most suitable material for the purpose. The number that should be erected in each range must depend on the formation of the ground and other circumstances. When laying out the ground for the houses to stand on arrange for the stores, boiler-house and water supply being as conveniently situated as possible. There should be a covered way to connect the ranges of houses with each other and the stores.

STOCKING THE FARM.

The main object being profit from egg production it is necessary that the farm should be kept stocked inexpensively and with fowls that will yield a good average number of eggs. The best way to do this is by purchasing farmyard poultry. In agricultural districts good-sized pullets can be purchased at from 2/- to 4/6 per couple in August and September. Earlier in the season forward chicks may be purchased. It is very important to get them all as forward as possible. Farmyard fowls are usually reared in a rough and ready fashion, consequently only the strong and healthy survive. In selecting these fowls preference should be given to short-legged and full-bodied ones. With suitable feeding some of them will be induced to commence laying in October and November, and at Christmas there should be a good supply of eggs, the number increasing as the season advances. At the end of the summer all these fowls should be killed for market when they show signs of moulting, except those which commence in or before August. These should be removed, and pens of them made up to be kept through the ensuing winter when they would be laying, and would consequently become broody early in the new year, when, if not required, they could be

sold for a good price for sitting purposes. From the end of September the fowls to be killed should be generously fed with soft food, which will have a tendency to cause them to continue laying until late in the autumn, when eggs are very scarce and will realize a good price. When stocking the houses with these farmyard fowls select those which most resemble each other to place in separate houses, and the result will be rather surprising. To a remarkable extent their mongrel appearance will have disappeared, almost every crossbreed being represented, and there would be a good percentage of white-legged fowls, which are preferred for the table.

GENERAL MANAGEMENT.

Two men, two women, and twelve boys can easily attend to eight thousand fowls in one thousand houses properly arranged, and have time to spare. The women would be mostly employed in packing eggs, dressing poultry for market, and preparing soft food for the fowls; the men in doing heavy work and superintending the boys. A manager would also be required; he should be a handy man, and a good poultry man. Upon the management of the farm success mainly depends. Everything must be done in a systematic manner. At a regular hour the fowls must be fed, supplied with green food, water, &c. In their spare time the men and boys should be employed in lime-washing and cleaning the fowl-houses, or cultivating land.

Every day, or not less frequently than every third day, the droppings should be removed from under the perches. The person doing this, supplied with a suitable rake, dust shovel, and a receptacle for the droppings, should clear each house in less than a minute. A layer of dust or dry earth, to which a little lime has been added, should be kept on the roosting shelf. About once a week the dust should be entirely removed, and replaced by a fresh supply. The runs should be bedded to the depth of at least six inches with chaff, waste from a corn mill, or sweet stable manure, which should be renewed every three or four months. In large towns stable manure can be obtained for a mere trifle, and when done with, if not required for manuring the land, it may be sold for more than it cost for carriage, &c.

TREATMENT OF BROODY HENS.

Gratings, which may be placed when required on the floor in the upper part of the pens in the poultry-houses, should be made with pieces of wood about two inches wide nailed together cross-ways, two inches apart. On these gratings broody hens should be placed to cure them of their broodiness, if they are not required to sit. The door of that part of the pen should be made of wood and wirework, so that the hens can see and hear their fellows. If they are fed once a day sparingly with soft food, and their drinking water is made faintly saline with Epsom salts, they will be cured of their broodiness in at most four days.

SYSTEM OF FEEDING.

Food and feeding is dealt with in Part II. To the information contained in it I must, when adding a caution against over-feeding, point out that *to force egg-production* fowls when laying should have as much food as they will eat greedily twice a day, except on Sundays, when only one good meal of corn would be sufficient. In addition to their ordinary food they should have as much green food or roots as they will eat.

In a convenient building one or more large boilers should be fixed to cook mangolds, swedes, animal and other food for the fowls. It should be one person's special duty to superintend the cooking and mixing of the food. A machine that will expeditiously cut up a large quantity of green food, such as cabbage, turnip-tops, swedes, and mangolds, into fragments is necessary. A good bone crusher is also requisite. For conveying food and other things to and from the fowl-houses light trolleys or very light wheel-barrows, with upright sides which can be removed, will be found most suitable. They should be three feet long and two feet wide, so as not to be inconvenient in the passages. The soft food can be mixed in large tubs, and a strong wooden shovel will be found to be a very suitable instrument for mixing it. It can be placed on trolleys or barrows for conveyance to the fowls in square boxes without lids.

The trolley or barrow with the soft food is taken along the passages, the feeding-cage doors to the right and left are opened, and with a garden trowel or other suitable instrument a sufficiency

of food for each pen of fowls is placed in the feeding-dishes. In this way a boy can easily feed one thousand fowls in one hour. In less time the fowls can be fed with corn, the boy being supplied with a vessel that will measure for each pen of fowls just their proper allowance of corn, which he should scatter in the run. The green food when minced can be conveyed to the fowls in large baskets, and be placed in the feeding-dishes.

WATER SUPPLY.

Everything must be arranged with the object of reducing working and other expenses. To do this as regards supplying the fowls with water I must recommend that a gutter be formed on the outside of the front of the runs. This gutter must be constructed so that water will remain in a part of it opposite each house to the depth of about two inches. In the skirting-board on the front of the run an aperture must be made through which the fowls can reach forward to drink. This means of supplying the fowls with water will save the cost of drinking-vessels, which are liable to be broken by frost and in other ways. If there is not a continuous supply of water it can be stored in an elevated tank and conducted to the houses from it by means of pipes and gutters. Should there be no other means of filling the tank the water can be driven to it from the source of supply by a force-pump. By adopting the above system one person can quickly supply eight thousand fowls with water, and by this system water can also be conducted to duck-ponds constructed as advised in "Profitable Ducks." The gutters must be flushed and cleansed occasionally, and water must not be allowed to remain in the pipes or gutters to become frozen.

GENERAL SUMMARY.

NUMBER AND VALUE OF EGGS.

After many years' experience it has been proved to my satisfaction that farmyard fowls, selected and treated as herein advised, will each lay on the average more than 160 eggs in one year, *if not allowed to sit.* At this rate eight thousand fowls will produce in that time 1,280,000 eggs, which at one penny each

would realize £5,333 6s. 8d. If sold at fourteen for a shilling (which is certainly below the average market value, even in the country, for a fair percentage would be produced in the winter months) the amount would be £4,571 8s. 6⅔d.

COST OF FOOD.

The fowls can be fed for less per week than one penny per head; but even at this rate eight thousand fowls could be fed for one year for £1,733 6s. 8d. That fowls can be fed for less than the above amount is made evident by the following estimate based rather above the average ruling prices during the last seven years.

Eighty-two tons of corn would allow for eight thousand fowls having one ounce each daily for one year, and there would be more than half a ton to allow for waste. Average price per ton (calculated by the average weights and prices of five quarters), £7. Total, £574.

The same weight of meal would, of course, allow of the same weight being given to each fowl. Average price per ton, £6. Total, £492.

One hundred and sixty-four tons of mangolds and swedes would provide two ounces for each fowl and allow for waste. Average price per ton taken together, 12s. Total £98 8s.

Twenty-one tons of dried meat, known as granulated meat, would allow for each fowl having one-fourth of an ounce daily. Average price per ton, £14. Total, £294.

Eighty-two tons of cabbage or other green food would allow for each fowl having one ounce daily. Average price per ton, 10s. Total, £41.

These quantities together amount to more than five ounces of dry and green food for each fowl daily, and the bulk and weight would be greatly increased by cooking the animal food (which would be dry), and a great proportion of the mangolds and swedes to mix with the meal to be given as soft food. Taking the year through, the fowls would not be able to eat all this food. Total cost of food, £1,499 8s.

COST OF FUEL AND GRIT.

Ten tons of coal would suffice for cooking the food, to burn earth to place in the dust-boxes and to scatter on the roosting-

shelf. Ten tons of coke would be required to mix with the coal, and to crush and use as grit for the fowls, if there is not a cheaper supply of gritty matter available. These quantities of coal and coke would not cost more than £17.

The refuse, cinders, ashes, &c., from a large institution may be obtained and used for fuel and other purposes. The refuse from the table and that from the kitchen in a large boarding establishment may also be secured for very little money, and made use of to feed the fowls. Of course, amongst such refuse there would be bones and animal food, which would be valuable and effect a very considerable saving in the item for animal food.

COST OF BUILDINGS.

With eight in each, one thousand houses would be required for eight thousand fowls. The number of houses, with the stores, &c., required, could be built and equipped, and water laid on, for less than £3,500. The interest on this sum at four per cent. would be £140. The houses and other buildings could be kept in good condition, utensils provided, and a fund for rebuilding created, out of £200 per annum. Total annual outlay on buildings and utensils, £340.

COST OF STOCK.

The cost of eight thousand fowls at 4/6 per couple would be £900, and the interest on this sum at four per cent., £36. Allow for the annual loss of one-twentieth of the stock (this would not be likely to occur) £45. Total annual cost of stock, £81. If the fowls are killed as directed when young they would be in prime condition and would readily sell for quite as much, if not more, than they cost, which on the average would be less than the 4/6 per couple set down.

COST OF LABOUR.

In poultry-farming, as well as in many other industries, the cost of labour has been found to be a great drawback. Every scheme by which labour is reduced has a great advantage, and it must be admitted that by the system of management advocated in these pages the cost of labour is very much reduced.

Eight thousand fowls can be attended to by two men at 21/-, two women at 9/-, twelve boys at 8/- a week, and a manager at

£100 per annum. Total £505 12s. This sum should not be exceeded, except for the cultivation of land, which would be the means of increasing the profits.

Rent.—Within a reasonable distance of even a large town the rent, rates, and taxes of the land required for eight thousand fowls would not exceed £50; but additional land would be a great advantage, for on it roots, cabbage, and other food for the fowls could be grown and a great saving effected by doing this. Fruit and other produce could also be grown, the poultry manure being made use of to fertilize the soil.

STATEMENT.

Dr.	RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.	*Cr.*
By Eggs at 14 a shilling		4571	8	6½	Annual cost of Buildings	340	0	0	
					,, Stock ..	81	0	0	
					,, Food, Fuel and Grit	1516	8	0	
					,, Rent and Labour	555	12	0	
					Profit	2079	8	6½	
		£4571	8	6½		£4571	8	6½	

The profit shown is the result of keeping eight thousand fowls, which would require a large capital; but it is made evident that any number from eight to eight thousand can be kept on the same principle. A man with the assistance of his wife and a boy could easily manage five hundred fowls, and according to the foregoing calculations there would be a profit of nearly £130 per annum *not* including wages.

N.B.—A novice in Poultry-farming is more likely to lose money than gain it.

I see no reason why a large number of fowls should not be gradually accumulated and the houses built as required. A handy man could build them one by one in his spare time; and while increasing his stock he would be gradually gaining experience and a connection of customers. The supply of reliable fresh eggs is not likely to exceed the demand, and there would be no lack of customers for fowls that would weigh not less than nine pounds the pair, if killed when young and sold at a price not exceeding 5/- per couple.

EXTENSION OF SYSTEM.

The system of poultry-farming already described may with great advantage be extended so as to embrace the rearing of pure-bred fowls for profitable sale along with their eggs.

METHOD OF DEVELOPMENT.

The addition of pure-bred stock need not and should not in any way interfere with the system of managing the stock kept merely for egg production.

As regards accommodation, there need not be any extra expense incurred that will not be covered by the advantage gained by the pure-bred fowls foraging for a portion of their food. The ground-space for each fowl-house to contain eight or more fowls is sixteen by six and a half feet, including shelter and pen. Two such houses, with a passage between them three feet wide, would occupy an area sixteen by sixteen feet. By constructing parallel ranges of these houses about forty feet apart, and keeping from seven to ten pure-bred females and a male bird in every twelfth house, counting six on each side, and allowing them freedom of the space between the houses, they would have enough ground to forage over. In each of the other eleven houses facing paddock there should be from eight to twelve hens or pullets kept for mere egg production, then there would not be any male birds in the pens to fight through the wirework at the one at liberty in the paddock. The fences between these paddocks should be such that the male birds in adjoining ones cannot get to fight at each other through the fence. Boarded or galvanised iron fences would be very suitable, against which fruit-trees may be trained to wires fastened four inches from the fence. This would allow of the fence being tarred when the trees are clear of leaves and fruit. The posts supporting the fence should be well creosoted or tarred before they are placed in the ground, or they may be coated with thick, hot lime-wash made with quicklime.

Casting Wires.—A fence five feet high with two wires run along, one four and the other eight inches above it, will keep any breed of fowls from crossing over it. These wires, which I will call "casting wires," should be very fine. They should be

stretched tightly and fastened to fowl-houses opposite to each other and not to the fence. The wires being fine, they are not noticed by the fowls, which are cast back by them when they attempt to fly on to the fence. Instead of having a boarded fence between the paddocks there may be an intervening paddock kept for cultivation, or vacant, when simple wire fences would suffice. This would allow of the fowls occupying alternate paddocks and each one being cultivated at suitable times. In them standard apple-trees could be planted with plum or damson trees between them. When the apple-trees had grown large so as to require all the space, the stone-fruit trees should be removed.

SELECTION OF PURE-BRED STOCK.

It is advisable for beginners to take up only one or at most two breeds at first. In fact, it is the best plan to cultivate and improve one breed so as to become noted as a successful breeder of that particular breed.

As regards suitable breeds to select, see "Notes on Profitable Fowls."

GENERAL MANAGEMENT.

The stock kept for breeding from should have a free range and be managed in a different way to that advised for stock kept merely for egg production. Though the fowls kept for stock purposes have a free range they should not be allowed to be at liberty when it is raining or when snow is on the ground. The pure-bred fowls, consisting of only about one twelfth of the whole stock, would have ample room in a free run between ranges of houses placed forty feet apart.

Feeding.—Fowls kept for breeding from should be fed very sparingly, yet they should have every requirement. In winter, and under any circumstances when they are unable to obtain a sufficiency of insects and other animal matter by foraging for it, one-fourth to half an ounce of animal food should be provided for them. The fowls should also have some green food given them every day when they are unable to obtain any on their run. The great point is to keep them in a vigorous and healthy condition of body. The best way to do this is by feeding them very sparingly and compelling them to forage for a portion of their food. See Part II., "Food and Feeding."

HATCHING AND REARING.

By referring to Part I., "Fowl-Houses," it will be seen that there is a small pen in each fowl-house where a hen and her chicks can be kept. The hen may be confined in the pen, and only the chicks allowed to go on to the land outside, where they may be fed, and the hen thus prevented eating their choice food. While the chicks are small, it may be necessary to place a wire screen over a portion of the ground on the outside of the pen to protect them from cats and birds of prey.

Those who prefer to place eggs under hens to be incubated can set one in the corner of each pen. It is on the whole a much better method to hatch the chicks in an incubator and to transfer them to broody hens to be reared in the pens. The hens should be allowed to sit on dummy eggs for two or three days, and then the chicks should be placed under them at night after it is dark. In this way a much larger number can be reared and with less trouble than having to look after broody hens during the full period of incubation, and the hens not being occupied a long time sitting would consequently lay more eggs during the year. This is a great advantage gained. For those who have many chickens to hatch, a good incubator is a positive boon, more especially in the early months of the year when naturally there are not many hens broody. Artificial Mothers may be used for brooding the chicks, and there are now a variety, most of which have been found to be very satisfactory. In any case there should be very little artificial heat used to keep the chicks warm, even in the severest weather, as it has a tendency to make them very susceptible to atmospheric influences. A warm close atmosphere favours the development of disease. On the contrary cold checks it, and free exercise in the open air is especially favourable to the maintenance of perfect health. For fuller information see Part IV., "Hatching and Rearing" and "How to Feed Chickens."

DISPOSAL OF STOCK.

The greatest difficulty that the poultry-farmer has to encounter is the disposal of pure-bred stock at remunerative prices. Before he is likely to be able to dispose of a large quantity of eggs and stock he must gain a high-class reputation. This may be obtained by successfully exhibiting some of his stock time after time. This,

however, is a very uncertain and expensive method of obtaining a reputation, for not only have the expenses to be borne but you must also extensively advertise the fact that certain prizes have been won, and certain distinctions gained, together with the facts pertaining to them. There are those who independently of prize-winning have by systematic advertising and fair dealing worked up a good connection of customers. This, though a slow process, is the surest and most commendable.

The question is constantly being asked, Is——a person from whom it is advisable to purchase stock or eggs? The necessity for enquiring arises from the fact that there are those whose system of dealing is in many instances little better than swindling, for they send out eggs and fowls that they have purchased as if they were from their own stock. The eggs frequently prove infertile, and in many instances the chicks hatched are not of the quality or kind bargained for, and the only redress usually offered is another sitting of eggs at half-price. There are poultry-dealers who are sending out from their yards diseased poultry, and from all parts of the United Kingdom cases have been brought under my notice where large stocks of poultry have been ruined by the introduction of diseased stock.

ADVERTISING.

Of all things advertising requires the greatest amount of discrimination, and however careful the advertiser may be mistakes are certain to be made. There is an old saying about sending coals to Newcastle, which infers that it is not wise because there are enough there already. On the same principle, even if the scale of charges is very low, it is not advisable to advertise your goods in papers read chiefly by those who are not likely to become purchasers. The poultry-farmer will be most likely to find customers by advertising in papers which are the means of disseminating a general knowledge of matters interesting to poultry-keepers. It is advisable to select one paper or more and to become a regular advertiser, for it is necessary that the readers should become familiar with the name of the person advertising, because there is a general distrust of dealing with strangers. It is not necessary to spend a large sum weekly, nor is it advisable to be advertising anything out of season. A simple straight-

forward statement of what you have to dispose of forms the best advertisement.

ADVICE TO BUYERS.

To ascertain the state of health of a fowl it should be systematically examined (see " Health Examination," page 89).

If purchasers cannot see fowls before purchasing them they should take advantage of the deposit system, or have a written warranty, without which there is not any legal remedy. In legal phrase *caveat emptor*—buyer beware.

BLOOD IN EGGS.

In an egg when cooked a small dark-coloured substance is sometimes found, which is simply cooked blood. It certainly has not an inviting appearance, but it does not cause the egg to be unwholesome, or in the slightest degree unfit for consumption. When blood is found in the yoke of an egg it is the result of the rupture of a blood-vessel in the ovarium ; and when in the white it is from a vessel in the oviduct.

As a rule the predisposing cause of the rupture of the blood-vessel is fatty degeneration, but in some cases the immediately exciting cause is over-stimulation, due to feeding with food to which pungent spicy condiments have been added. When blood is found in the eggs of fowls it is advisable to feed them sparingly, and to add as much Epsom salts to their drinking-water as will make it taste faintly saline. If this does not prevent the bleeding a dram of tincture of iron should also be added to each quart of the drinking-water.

EGG EATING.

This is generally the result of an egg becoming broken in the nest or run. The fowls having an instinctive desire for shell-forming matter they seize the broken shell, and having tasted its contents they will consequently attack any eggs they see in the nests or lying about the run. Remedy, also prevention, lies in placing china eggs in the nests and about the run. If obtainable, to stop egg eating place rotten (putrid) eggs about the run. Of course the fowls should have an abundant supply of shell-forming material. If putrid eggs cannot be obtained, egg shells may be filled with a soft paste composed of linseed oil and whiting, and just a trace of powdered aloes.

PART IX.

DISEASES.

INTRODUCTION.

IN this chapter an effort has been made to describe briefly and clearly the symptoms, causes, and a method of treating the diseases which most frequently affect poultry.

In studying the diseases of feathered creatures, the writer has had very many great advantages, amongst which may be mentioned the large number of birds sent to him for treatment, and the numerous subjects received for *post-mortem* examination. In studying disease in living subjects other than human, there is the decided advantage of being able to purposely kill them at *any stage* of the disease, to note its effect on the internal organs. Besides these advantages, thousands of letters upon the subject disease have been received from experienced keepers of poultry, including many medical men. From these letters much valuable information has been gained and employed experimentally in the treatment of diseases amongst poultry.

HEALTH EXAMINATION AND SYMPTOMS OF DISEASE.

It is essential that the keeper of poultry should be able to readily detect any serious disease affecting his own stock and any he may be purchasing. This chapter is written in order to guide those who are unacquainted with the ordinary symptoms of disease. *It must, however, be distinctly understood that the whole of the symptoms of a disease may not be present; besides, the subject may be suffering from more than one disease, in which case some symptoms may cause others to be obscured.*

To ascertain the state of health of a fowl, it should be systematically examined from head to foot.

A dark or purplish coloured comb indicates defective circulation, which may be the result of congestion of the liver or lungs, see "Congestion of Liver."

Wart-like swellings upon the face or wattles indicate a contagious affection, see "Fungoid Disease."

A white scurf spread evenly over the comb, a flabby or a pale comb unaccompanied by other symptoms of disease, merely shows that the fowl is debilitated (anæmic); so does a pale face and hollowness under the eyes, see "Anæmia."

Minute raised spots on scurfy parts of the comb indicate a very contagious disease, see "Parasitic Disease of Comb."

When the head is held to one side (wry neck) it may be the result of defective vision, deformity inherited, or disease. The head depressed, or unsteadiness when walking, shows that the brain is affected, see "Vertigo."

Watery eyes or sneezing may be merely the result of a slight cold, see "Catarrh."

Puffiness about the eyes or watery bubbles in the corners indicate "Wet Roup."

An enlargement under the eyes, and swelling of the wattles are symptoms of tubercular disease, see "Swelled Head" and "Dropsy of the Wattles."

Thickening of the secretion in the mouth, ulceration (Canker), and yellowish coloured patches are symptoms of "Diphtheritic Roup," &c.

Opening and shutting the mouth without any apparent cause, and gaping, are symptoms of Roup, see "Gapes (False)."

Difficulty in breathing, or a cough, may be due to an obstruction in the windpipe, bronchitis, or disease of the lungs, see "Pneumonia," "Bronchitis," and "Diphtheritic Roup."

Laboured breathing may be due to inflammation of the lungs, a diseased heart, or even an over-fed condition.

Loss of muscular tissue (wasting) is usually due to disorganization of the liver, or tubercular disease, see "Chronic Tuberculosis" and "Enteric Disease."

Tail depressed and straining are symptoms seen when there is some irritant matter in or near the vent, see "Cloacitis" and "Metritis."

Frequently going to nest and not laying, see "Egg Bound."

Indigestion, see "Crop Bound."

Unnatural thirst shows that the creature is in a feverish condition, the result of disorder, needing prompt attention.

Weakness in the legs is due to disease affecting the liver and bowel.

Enlargement on sole of foot, and redness between the toes, are the results of inflammation, see "Synovitis—Bumble Foot."

Thickening of the scales on the leg, with a white substance like powder between them, see "Scaly Leg."

Stupor, accompanied by diarrhœa and retention of food in the crop, are marked symptoms of "Acute Enteric Disease (Cholera)."

ANÆMIA.

("White Comb"—"Scurf.")

Symptoms.—A fine white scurf on the comb like a white powder. This is composed of minute scales of the scarf-skin detached from the comb, which is usually pale and flabby. Hollowness under the eyes, dullness of eyes, loss of gloss on plumage, and soft and flabby thighs, also denote an anæmic condition.

Causes.—The white scurf is simply the result of pronounced anæmia, that is, impaired vitality, which may be due to imperfect nutrition or insanitary conditions. Being kept too crowded, in a damp place, without pure air and sunlight, or without a sufficiency of green vegetable food, will cause fowls to become more or less anæmic.

Treatment.—It is most important that anæmic fowls should have an unlimited supply of green vegetable food, and that they be allowed the advantage of pure air and wholesome food. Medicine is unnecessary, but a saline tonic would prove very beneficial.

PARASITIC DISEASE OF COMB.

("White Comb"—Favus.)

Symptoms.—At first there is a circumscribed spot on which very small protuberances may be seen—enlarged papillæ. As the disease advances over the comb, irregular marginal lines are usually maintained. The skin on the surface of the affected parts is soon destroyed, and becomes detached in minute scales, so that the comb has a whitish appearance, hence the name "White Comb." The affection soon spreads to the face, head and neck, and its mode of advance makes it very evident that it is a distinct and contagious disease, which should not be mistaken for "White Comb," due to an anæmic condition. When the disease is in an advanced stage, a peculiar odour is perceptible, and the feathers, which can be easily drawn from the affected parts, are covered at the quill end with epithelium in scales.

Cause.—A parasite which is reproduced by spores in the skin and feather sacs.

Treatment.—This disease is difficult to cure, and therefore requires persistent treatment to stamp it out. Commencing at the spikes of the comb, apply Parasiticide lotion to every part of the head, lobes, wattles, and a little way down the neck, also to the legs and feet. Do this daily until three dressings have been applied. Also give the affected birds a small pinch of flowers of sulphur daily for a week or ten days.

FROST-BITE OF COMB.

Symptoms.—The spikes of the comb and other affected parts turn purplish in colour, and if the circulation is not soon re-established become black and die.

Cause.—Exposure to intense cold. It is my opinion that the cold is never intense enough in Great Britain to injuriously affect the combs of fowls in perfect health. It is only when the circulation is defective, and the comb previously more or less congested, that it becomes frost-bitten in our climate.

Treatment.—The comb should be gently rubbed, at the same time applying some camphorated oil or any other mild stimulant.

It is necessary to ascertain the cause of the congestion of the comb and lowered vitality of the fowl, and to treat it with tonics or other necessary remedies.

INJURIES OF COMB.

These should be treated as directed under the heading of "Poultry Surgery." If the comb has been cut through or torn asunder, each side of it should be stitched together separately.

ULCERATION OF COMB.

(CANKER.)

In heavy-combed birds a dark or yellowish coloured patch like a scab appears, which will not easily peel off, and when removed the comb underneath is found to have become yellowish and dead. Sometimes a crack or fissure is formed at the junction of the comb with the head, and in consequence of dirt or dust collecting there, it in some cases becomes a festering sore, which is not easily healed.

Treatment.—Clear away as much as possible of the dead matter, and apply antiseptic lotion or ointment.

POULTRY SURGERY.

It is very necessary for those who keep poultry to be able to perform minor operations, such as dressing and closing wounds, setting broken limbs, opening and closing the crops of poultry, and removing superficial tumours. In performing these operations the chief essential is a knowledge of the right things to use. Neither silk nor any vegetable substance should be used where it cannot be removed when the wound has healed, because these substances will not become absorbed. Catgut, kangaroo tendon, and horsehair are suitable substances to use.

As regards instruments, a sharp knife, a pair of scissors and some suitable needles should always be kept ready for use, also some antiseptic lotion and ointment.

WOUNDS.

When it is necessary to draw the edges of a wound together, it should be done with interrupted sutures—ordinary single

stitches. Before a wound is closed it should be seen that there is not any dirt or other foreign substance in it or on its surface. As a precautionary measure it is advisable to pour a stream of water upon a wound before closing it up.

Of course, before operating, the hands should be cleansed, and the instruments and everything used should be scrupulously clean. Catgut or any other animal substance used should be previously soaked in rather warm water to soften it. To arrest bleeding and for the first dressing of simple wounds, Friar's balsam is very suitable. For healing and dressing sores a suitable antiseptic ointment should be used.

TUMOURS.

It is necessary to dissect out fleshy and fatty tumours. Some tumours just underneath the skin may be removed by a simple incision and enucleation (pressure with the thumb-nails) or with the point of a stout quill. They are usually not attached to the neighbouring tissues. After removal the wound should be treated as directed under the heading "Wounds."

FRACTURES.

When the bone is not broken into numerous pieces or protruding through the skin, fractures are easily set right. Having placed the bone and limb in a natural position, an assistant should hold it there until it is secured against the possibility of displacement. A broken leg can be secured in position by wrapping it in cotton wool, and over it applying a bandage rather tightly. Strips of wood or other suitable material to give support should be bound in the outer folds of the bandage, which should be saturated with a freshly-made solution of starch. The cotton-wool and bandage may be coated with glue or set in plaster of Paris instead of the starch. The best way to secure a broken wing in a natural position is by gluing it to a piece of cardboard the size and shape of the wing. Then make a saddle with a pocket for each wing, and sew up the pockets with wings inside.

POISONING.

In all cases of *supposed* poisoning it is advisable to at once endeavour to wash out the crop with rather warm water. Whether this is done or not, give a tablespoonful of sweet or salad oil and

a large wineglassful of rather warm water as soon as possible; repeat at the end of one, three, and then four hours. If at the end of that time the patient is passing slimy and greenish-coloured matter or traces of blood, continue giving the oil with a little raw egg and two or three drops of Chlorodyne. After about twenty-four hours, if the crop is empty feed sparingly with crust of bread scalded with boiling milk. Of course, when the poison is known the most suitable antidote should be given.

CLOACITIS.

(Septic Inflammation of the Vent Pouch.)

Symptoms.—The vent is swollen and very red, the fowl pecking at its vent and straining to expel some irritant. At first a muco-purulent glairy discharge comes away, increasing in volume as the disease progresses. The discharge gives off a peculiar offensive odour, cakes round the vent, and if not cleared away the stench becomes abominable. When the disease is advanced the fowl walks clumsily and with its tail depressed.

Cause.—The disease is due to septic matter which is acquired and spread by contagion. So far as I am aware the means of introduction of the disease to any group of fowls has not been discovered.

Treatment.—At once isolate all affected poultry, and if there is a male he should be placed in a pen by himself until the disease has been stamped out. The inside and outside of the vent should be washed with an astringent lotion at least twice a day. After washing out the vent, insert a small pledget of white rag covered with Krekodyne Ointment. By adopting this treatment and giving a teaspoonful of sweet oil night and morning, the disease can be cured in a few days.

FATTY DEGENERATION OF THE LIVER.

(Lardaceous—Amyloid Disease of Liver.)

Symptoms.—Squatting about and laying but few or small eggs; being full and heavy behind.

Causes.—It is the result of feeding poultry too generously

with grain and the products of grain, especially when they are kept in limited space and without sufficient exercise.

Treatment.—Feed very sparingly with grain and the products of grain, and add as much sal-ammoniac to the drinking-water as will make it taste faintly saline.

CONGESTION OF THE LIVER.

Symptoms.—Food remaining in the crop. The spikes of the comb turning dark in colour. Loss of appetite, and a more or less dejected appearance.

Causes.—A chill, a close insanitary house. Unsuitable food, the too free use of spicy condiments. Invasion by disease germs is, however, the most common cause of congestion of the liver.

Treatment.—If there is a rather large quantity of food in the crop treat the case as advised for crop-binding, and add Krekodyne Powder to the drinking-water.

HEPATITIS.

(Inflammation of the Liver.)

Symptoms.—A very depressed and sleepy appearance. It is impossible for the most scientific observer to diagnose this affection or congestion of the liver with positive certainty. It is, however, necessary to describe the causes, &c., so that keepers of poultry may be forewarned of the evil results of bad management. When the disease is not quickly fatal diarrhœa is set up, and the droppings soon become rather yellow and are generally frothy. In prolonged cases of sub-acute inflammation of the liver the subjects waste away to mere skeletons, and frequently become lame. They also drink greedily, and when the disease is advanced eat but little food.

Causes.—This affection is set up by the same means as congestion of the liver, which it usually follows.

Treatment.—Give about twenty grains of sal-ammoniac in a wineglassful of rather warm water twice a day and feed sparingly. If the patient continues lame or does not quickly improve, it is not advisable to continue treatment.

APOPLEXY.

Symptoms.—If death does not take place immediately, the subject will be found with its head hanging down, thrown back, turned to one side or depressed. These symptoms may be the result of disease of the brain or pressure upon it from without.

Causes.—Intense and suddenly developed congestion. Rupture of a cerebral capillary with extravasation of blood into some part of the brain.

Treatment.—Place the patient in a rather dark place and every three or four hours give it half a wineglassful of rather warm water made faintly saline with Epsom salts. To each dose add about twenty drops of tincture of iron.

VERTIGO.

Symptoms.—Inability to walk straightly. Turning round and round.

Causes.—Congestion or some other affection of the brain.

Treatment.—Keep the subject in a rather dark and quiet place. Feed very sparingly and add some saline aperient to the drinking water.

METRITIS.

(Inflammation of the Oviduct.)

Symptoms.—Standing with feathers puffed out and tail depressed. Occasional straining and going to nest.

Causes.—The most common cause of inflammation of the egg passage is the retention of the shell of an egg. The too free use of spicy condiments, such as cayenne pepper, will set it up.

Treatment.—An expert may succeed in removing an egg-shell from the oviduct. It is, however, advisable for the ordinary keeper of poultry to merely give a teaspoonful of sweet oil every four hours. If killed for table use the flesh of a fowl simply suffering from Metritis would be quite wholesome.

SOFT-SHELLED EGGS.

An overfed condition is the most common cause of soft-shelled eggs being laid. Poultry also produce them through fright, worms, sexual irritation, pungent spicy condiments being added to the food, or through an insufficient supply of shell-forming material.

Treatment.—Feed sparingly and with unstimulating food, and an abundance of green vegetables. Of course a sufficiency of shell-forming material should be supplied, but it should not be added to the soft food. See article on "Grit and Shell Food."

DIARRHŒA.

Symptoms.—The excrement is watery and dark in colour at first, but later on changes to a greenish or yellow hue. The colour is mainly dependent on the condition of the liver of the subject.

Causes.—It may be the result of almost any disease affecting the digestive organs, or unsuitable food. Worms, and even a sudden change of temperature, will sometimes cause it.

Treatment.—If the diarrhœa is supposed to be due to any specific disease adopt the treatment prescribed for that disease. As a rule, give a teaspoonful of sweet oil every four hours, and feed with crust of bread scalded with boiling milk.

GAPES.

Symptoms.—Difficulty in breathing, gaping, coughing, and sneezing.

Cause.—A worm—*sclerostoma syngamus*—of a pale-reddish colour, thread-like in appearance, and measuring from one eighth to half an inch in length, which attaches itself to the inside of the windpipe.

Treatment.—Upon a tin plate or on the bottom of any suitable vessel place a tablespoonful of carbolic acid, creosote, or some coal tar. Set the vessel over the flame of a very small lamp to slowly diffuse the fumes which the chickens must inhale. The fumigations can be managed with two good sized hampers, thus—turn one down over the lamp and vessel with the fuming substance, and place the chickens to be treated in the other hamper,

and stand it upon the one turned down. Some sacking or such like material should be wrapped round the outsides of the hampers but not over the top. The chickens should be subjected to the fumes night and morning. Three or four fumigations of a few minutes' duration will be sufficient to cause all the worms to be expelled. The fumes cause them to lose their hold upon the internal surface of the windpipe, and the chickens cough them up. To ensure their complete destruction, the floor of the place where the chickens are kept should be well dusted with lime. Do not on mere suspicion treat chickens to expel the gape-worm, because the symptoms may be due to some other affection of the air passages for which the treatment would not be suitable. The only proof that chickens are suffering from gape-worms is seeing them.

WORMS.

A species of round worm (*heteratis inflexa*) is the only one commonly met with in poultry. In some cases the subject is infested by a large number of them, and occasionally they are the cause of death. They vary in size and length, are whitish in colour, and have a pointed head, which enables them to crawl into the bile ducts where they are sometimes found in subjects sent for *post-mortem* examination.

Symptoms.—There is not any reliable symptom to show when poultry are infested by worms but seeing them. Suspected cases may be tested by giving a purging dose of jalap or Epsom salts, which will bring some worms away from a subject infested by them.

Treatment.—Give from ten to fifteen drops of oil of turpentine in a tablespoonful of sweet oil night and morning for three days, or give a third part of a quarter of an ounce of areca nut in powder every third morning fasting, and a tablespoonful of sweet oil two hours after each powder.

LICE.

Some species of these parasites subsist upon the feathers, and others obtain their nourishment direct from the body of the creature infested by them. The latter kind will attach themselves to the heads of newly-hatched chicks. There they remain,

become very much enlarged, and if not relieved of their presence the chickens may pine away and die.

Treatment.—To clear vermin off the heads of chicks, apply the following mixture:—Fluid carbolic acid twenty drops, sweet oil one tablespoonful, flowers of sulphur as much as will make with the other ingredients a thin paste. To clear lice off the bodies of poultry, dust well amongst their feathers and under their wings a mixture composed of one part of powdered lime and three parts of flowers of sulphur. Powdered pyrethrum (known as Dalmatian insect powder) used in the same way will prove effective in ridding poultry of vermin, *if it is freshly ground.*

FOWL FLEAS AND MITES.

These pests not only infest the fowls, but take possession of their abode. The crevices are their especial resort, where they soon multiply to a vast number if allowed to remain. They are irritating to poultry and to any person who enters a place infested by them. When subjected to their attacks, young chickens soon die through the constant irritation and loss of fluids abstracted by these parasites.

Treatment.—Thoroughly lime-wash every part of the building, perches and nest-boxes, and burn the nests and all rubbish and dirt. The lime-wash should be made with freshly-slacked lime, and it should be worked into every crevice. I must here call attention to the advantage of my Hygienic Poultry-house not having any part which cannot easily be lime-washed in a few minutes at any time. To quickly dry and fumigate a fowl-house after lime-washing, make a coke or cinder fire in some suitable receptacle, and place it in the centre of the house. The fire can be made in an old galvanized-iron pail, with holes for draught punched into the bottom and sides of it.

SKIN DISEASE.

(Feather Disease.)

Symptoms.—The feathers on parts of the body become frizzled and the shafts shrunken. The skin at the roots of the feathers is discoloured.

Cause.—The disease is in the skin and due to a parasite

located in the glands at the roots of the feathers. It evidently lives on the secretions which should sustain the feathers, and they consequently shrivel up and die.

Treatment.—Paint the affected parts two or three times on separate days with the parasiticide lotion advertised at the end of this book. All the feathers which do not soon regain their natural condition should be plucked out, and healthy ones will grow in their places. A little flowers of sulphur added to the soft food of the affected birds will assist a cure.

CATARRH—COLD.

Symptoms.—Sneezing and coughing, eyes red and watery, and plumage ruffled.

Causes.—Depression through exposure to cold and wet, sudden changes of temperature. Poultry are very liable to contract a cold when they are kept in a close and warm house.

Treatment.—When first affected the subject may be cured by giving from three to five drops of B.P. tincture of aconite in a teaspoonful of camphor water every three hours. As a rule the aconite fails to affect a cure after the disease has lasted twenty-four hours. It is then advisable to adopt the treatment prescribed for Wet Roup.

BRONCHITIS.

Symptoms.—The subject is very hot and feverish, so much so that it will be constantly drinking. There is usually a dry catchy kind of a cough, and in some cases a whistling sound when breathing.

Causes.—Inflammation of the bronchial tubes is set up by sudden atmospheric changes. It also follows a cold in the head, but in most cases it is due to the same cause as Roup.

Treatment.—Give tepid water to drink and add to it Krekodyne Powder. Also give half a teaspoonful of sweet oil night and morning, and keep the subject in a rather warm place.

EMPHYSEMA.

Symptoms.—The skin is puffed out like a ball, the enlargements being usually about the neck and front part of the body.

Cause.—This affection is generally found in young chickens reared in a close warm place, and it is usually associated with some affection of the lungs. It is certainly due to obstruction of the air passages, rupture of air cells, and escape of the air into the intra-muscular tissues.

Treatment.—With a needle puncture the skin and let out the air. It is also advisable to add two grains of citrate of iron and quinine to each wineglassful of the chickens' drinking-water. If they are suffering from an affection of the lungs they should be treated for that ailment.

PNEUMONIA.

(Inflammation of the Lungs.)

Symptoms.—In acute cases there is a spasmodic cough, with rapid and laboured breathing. The body in most cases heaves convulsively, and the neck is outstretched at every inspiration. The head and body are hot and feverish, and the plumage stands out from the body.

Causes.—Exposure to wet and currents of chilled air, and the same causes as those which set up bronchitis.

Treatment.—The subject should be kept in a moist warm atmosphere, and given every three hours two drops of B.P. tincture of aconite and ten grains of nitrate of potash in about two tablespoonfuls of rather warm water.

TUBERCULOSIS.

This disease, the scourge of the poultry-yard, is known by different names. These depend upon the part of the body attacked, and the symptoms produced. The most common names given to it are Roup, Wet Roup, Swelled Head, Dropsy of the Wattles, Gapes, Liver Disease, and Pip.

I am continually receiving letters from keepers of poultry who say that some of their birds have "caught a cold that is spreading." A moment's consideration should make it evident

that there *must* be something to be transmitted before a disease can be contagious. As a matter of fact, cold merely irritates and inflames the tissues, rendering them especially liable to be attacked by the germs (bacilli) of the disease, supposing them to be dormant or latent in the subject, or it in contact with some affected creature. This is how a contagious disease follows a simple harmless cold. The mucous membranes are naturally very sensitive, and the germs under ordinary circumstances set up the disease in a subject predisposed to be attacked by them. Various parts of the body are liable to be attacked separately and independently at different periods of life. In chicks and young birds the bowel is very susceptible. In old ones the liver is mostly attacked, because it has become to a certain extent disorganized through a course of feeding with food which, as a whole, contained too great a proportion of starchy matter. When the subject is very susceptible, the germs of the disease develop at a marvellous rate, and very soon cause serious illness if not death. If on the contrary the subject is not susceptible, the germs when taken are comparatively harmless. This I have proved to be a fact by feeding fowls and ducks with the cooked and uncooked flesh of poultry which died, including some just killed, while suffering from various diseases, including Enteric Disease. Those sparingly fed and with a small proportion of starch in their food were not visibly affected by the vast number of disease germs they must have swallowed. More, I fed a bird for more than twelve months *exclusively* upon the flesh of creatures that died of Tuberculosis and other diseases, and it thrived, because its food did not contain any amyloid matter. When a creature is only partially susceptible, the disease advances slowly and insidiously, but at any time it may be aggravated by atmospheric influence, unsuitable food, or some other excitant, and assume an acute form. A fowl may be suffering from Tuberculosis, and yet exhibit no noticeable symptom of disease.

ROUP, WET ROUP.

(Incipient Tuberculosis.)

These names are given to the disease when it attacks the membranes of the mouth and nose, causing a thickening of the secretions. This interferes with the bird's breathing, and

causes it to gape, cough or sneeze. The head is usually hot and feverish, and a clear transparent glairy mucous discharge, somewhat resembling the white of an egg, exudes from the nose. Frothy bubbles appear in the mouth, and when the disease extends along the lachrymal ducts they may become partially choked and cause frothy bubbles to appear at the corners of the eyes. The membrane lining the mouth and throat soon becomes rather white, owing to a filmy deposit taking place. Miliary ulcers follow this process, and these can be very plainly seen if low magnifying power is employed. If the disease is not checked, the deposit of tubercle increases to such an extent as to be plainly visible to the unassisted sight. The degrees of intensity of the attack differ, and the symptoms vary very much. The subject may be in a drooping condition, its eyes red and watery, and its plumage ruffled, or it may appear but little affected. The incipient stage of this formidable malady is soon passed, and in many cases the subject becomes thoroughly "roupy," that is, the thickened secretions in the nostrils decompose and give off a very offensive odour.

It was not until after I had written my "Manual of Poultry Diseases" that, with the aid of the microscope, I recognised the above symptoms as those of incipient tubercular disease. This discovery made clear the connection and unity of disease which had previously been supposed to be separate and distinct, and accounted for the cause of very many *post-mortem* appearances which had previously been perplexing.

Cause.—Direct contagion is the undoubted cause, primarily, of all forms of tubercular disease, except such as may be hereditary.

Predisposing Causes.—The chief of these is undoubtedly overfeeding, and feeding too exclusively with unsuitable food. A deficiency of saline matter in the food is said to be a predisposing cause, and no doubt it is. So is inherited weakness and weakening influences, such as overcrowding and its equivalent, defective ventilation, which causes the same polluted air to be breathed and rebreathed. Any insanitary condition is a predisposing cause. A cold or a chill from damp is very often spoken of as the cause of Roup, but they are simply the immediately exciting

causes. By long exposure to keen air, sensitive membranes become inflamed and are thus rendered liable to be attacked by the germs of disease.

Treatment.—Cure mainly depends upon our being able to expel the germs of the disease, or make the curative agents act upon the tissues of the body so as to make them unfit for the propagation and development of the germs. There is no proof that anything has been discovered that can be given to destroy the germs of tubercular disease without at the same time destroying the subject. There are, however, substances that will render animal tissues unfit for their propagation, and diminishing in numbers they lose their potency and are eventually eliminated from the body. I do not mean to say that this will occur in more than a good percentage of the cases treated. There must be no vital organ seriously affected, and the food of the subject, and environments too, must be such as will tend to promote health and vigour for any treatment to effect a speedy cure.

To be successful in treating the various forms of tubercular disease requires persistent attention. In all cases first give a teaspoonful of sweet oil to soothe the bowel. The mouth and, if necessary, the nostrils should be washed out with some antiseptic lotion, at least twice a day, to remove sticky mucus or offensive matter. If the nostrils are full of sticky mucus, while the mouth is wet with the lotion, close it, and with the forefinger of the right hand make gentle quickly-repeated pressure upon the nasal passages from the eye downwards. This, with the pressure of air from the lungs, will tend to force the lotion in and clear out the decomposed mucus loaded with contagious germs. This clearing out of the nostrils is very important. Having cleansed the mouth and nostrils, give two Krekodyne Pills night and morning, and lightly touch the mouth with Canker Lotion. Most cases might be cured by adding Krekodyne Powder to the food or drinking water. It is also a good plan to add a little sweet or salad oil to the food, or better still to give half a teaspoonful daily.

SWELLED HEAD.

A symptom frequently observed in poultry suffering from tubercular disease is swellings about the head, more especially under the eye. These enlargements are caused by a deposit of

tuberculous matter taking place in the glands or ducts, or infiltration into the tissues. This deposit is soft at first, but if it does not soon disperse it forms into a hard cheesy mass.

Treatment.—Besides treating the subject for Roup, foment the swollen parts with rather hot vinegar, or paint them with tincture of iodine. When the deposit has become hard, an operation is necessary for its removal. With a very sharp instrument cut down into the centre of the tumour and remove the deposit with the point of a stout quill, and insert a little Krekodyne Ointment (see "Tumours").

DROPSY OF THE WATTLES.

Symptoms.—The wattles become very much enlarged, and in some cases quite firm and hard. If pricked or cut, a watery fluid oozes out.

Cause.—Infiltration into the tissues of serous fluid loaded with disease germs. This sometimes occurs in "roupy" poultry, and I believe that it is a result of congestion of the kidneys, because when I have killed subjects affected in this way I have in all cases found the kidneys congested.

Treatment.—Besides giving two Krekodyne Pills night and morning, or adding Krekodyne Powder to the drinking-water, foment the swollen wattles with vinegar made rather hot, and dose the subject freely with rather warm water. If the swelling does not soon disappear, paint the enlargements with tincture of iodine, and insert a seton in the under side of the wattle low down—that is, pass a large needle threaded with worsted through the wattle, cut off the worsted sufficiently long to allow of the ends being tied together loosely to form a loop; move the worsted to and fro daily. When the swelling has disappeared the seton may be removed.

DIPHTHERITIC ROUP—DIPHTHERIA—DRY ROUP.

Symptoms.—The membrane lining the mouth first loses its natural pinkish colour, and a whitish film spreads over it. White spots next appear, which gradually enlarge and change in colour to a dirty yellow. In some cases large cheesy masses are found in the mouth; these give off an offensive odour. From the

mouth the disease sometimes spreads to the membrane lining the nose, and occasionally a deposit takes place in the mouth of the windpipe. When the windpipe is attacked, the fowl makes a rattling noise when breathing, has a catchy cough, and occasionally makes a loud, harsh noise. No doubt this noise was the origin of the name "Roup" (*Scotch*, to shout, to cry out). It may also be noticed arching and twisting its neck in a peculiar manner. In some cases the neck becomes distorted. Gaping is also a symptom of this affection, which is consequently sometimes erroneously called "The Gapes."

Treatment.—Give two Krekodyne Pills night and morning, and *lightly* touch the inside of the mouth with Canker Lotion. Before applying the lotion, wash out the mouth, and with a strong quill remove as much as possible of any cheesy masses that may be there, not minding if the parts do bleed a little. It is advisable to destroy all subjects which do not soon improve under treatment.

GAPES (False).

Fowls are frequently said to be suffering from "Gapes" when they gape in consequence of the secretion in their mouths being thickened and sticky, which interferes with their breathing. They may also gape when there is a deposit of tuberculous matter in the mouth of the windpipe, and more or less when their nostrils are filled with thickened secretion.

Treatment.—Birds which gape should be treated for "Roup" if the gape-worm (*sclerostoma syngamus*) is not discovered in the windpipe (see "Gapes").

ENTERIC DISEASE.

Symptoms.—The most noticeable symptom is diarrhœa of a more or less pronounced type. This is followed by loss of flesh —wasting. In some cases there is loss of power to stand on one or both legs. This condition is by some erroneously supposed to be due to cramp.

Cause.—Contagion. As a rule the germs of the disease are taken into the body with food or water. In some cases it develops slowly and insidiously, and owing to its interference

with the process of digestion, the muscular tissues of the subject gradually waste away. When the subject attacked is in a condition of body which favours the propagation of the germs, they multiply at a prodigious rate. In this case the germs soon invade the liver, spleen, kidneys, and other organs (see "Acute Enteric Disease").

Treatment.—The bowel is in all cases more or less inflamed, therefore it is advisable to give a dose of *salad* oil night and morning to soothe it; at the same time give a dose of Krekodyne Pills. A suitable dose for an ordinary sized fowl is half a teaspoonful of the oil and two pills. Or add oil and Krekodyne Powder to the drinking-water or food.

ACUTE ENTERIC DISEASE.

(Septic Fever—Cholera.)

Symptoms.—When first attacked the subject usually exhibits a disinclination to move about, in some cases remaining in the same posture and place for hours, with feathers standing out from its body, and having a most dejected appearance. Diarrhœa is soon set up, and the excrement is at first dark coloured, but later on changes to a greenish colour. In most cases the crop remains full of food. No doubt this is owing to the process of digestion being arrested through the congested state of the liver and other organs. In severe cases a deathly stupor takes possession of the stricken subject, and if roused it quickly falls again into the same lethargic condition. In some cases death takes place without the fowl having been seen to be ailing. In most cases of sudden death, it is the result of the plugging of the large blood-vessels with albuminous clots.

Post-mortem appearances.—These vary to a remarkable extent. In most cases the liver and spleen are very much congested, and gorged with dark fluid blood, and serum is effused into the tissues. All the vascular parts of the body are usually very much congested. In some cases albuminous clots are found in the heart, and are the immediate cause of death. The blood in some parts of the body is more fluid than usual, and in other parts it is of the colour and consistency of gas tar. The gullet, crop, and proventriculus have usually a natural appearance.

The bowel in its upper third part generally contains an inky coloured fluid, and its mucous membrane is stained of a very dark colour. On minute examination it is found to be inflamed in patches. The upper part of the bowel, if not the first, is one of the first parts of the body affected, for on killing a fowl when first attacked, it is the only place where traces of the disease can be found.

Cause.—Contagion. This malady, which in some cases assumes an epidemic form, occurs in poultry which are, more or less, the subjects of amyloid degeneration. It is set up by a germ which, like a ferment under favourable conditions, multiplies at a prodigious rate. Millions of them are propagated in a very short space of time, so that the blood of the subject soon teems with them, and its power of sustaining life is more or less destroyed. Owing to the germs being in the blood, congestion or inflammation is set up in the liver, spleen, and other organs. The severity of the affection depends upon the quantity of germs there are in the blood. The disease is not under all circumstances equally contagious, nor are all subjects equally susceptible. These conditions depend upon the extent to which the subjects have been starch fed, and the exercise they have had.

Predisposing Causes.—The too exclusive feeding with starchy food-stuffs. A careful investigation has revealed the fact that the disease is most virulent among fowls the food of which has, as a whole, contained a high percentage of starchy matter. The smaller the quantity of it in the food of poultry, the less is their liability to be attacked by disease. This I have proved by repeatedly feeding fowls under various conditions upon the cooked and uncooked flesh of feathered creatures which died of Septic Fever, and those thoroughly tuberculous. As might be expected, owing to the ferment-like nature of the germs, a warm close atmosphere favours their propagation, so do certain insanitary conditions.

Treatment.—Preventive measures are mainly to be relied on to stamp out the disease. All parts of the houses and covered runs should be thoroughly cleaned, the nest-boxes cleared, and the resulting rubbish and dirt burned or buried. Every part of the building in which affected poultry are found should be lime-

washed, including the furniture and nest-boxes, inside and out. The lime-wash should be made with freshly slacked lime, and used while it is hot. After lime-washing, a coke or cinder fire may be made in an old galvanized-iron pail, with holes punched in its bottom and sides, or in any other suitable receptacle, and placed in the centre of the building to dry it quickly. Of course, this is not necessary in warm drying weather. The floor of the place where the poultry are kept should be covered with ashes or dry earth mixed with a little lime. This deodorant should be frequently renewed. Quicklime is the only disinfectant necessary. The chief object of these preventive measures is the removal of the excrement from the affected poultry, because it contains the germs of the disease. The Krekodyne Powder advertised in this book should be added to the drinking-water, and affected birds which do not drink should be dosed with the water made rather warm. This should be done every three or four hours, mixing it with any food which remains in the crop by kneading the crop with the tips of the fingers. If at the end of twenty-four hours food still remains in the crop, it should be removed (see "Crop-bound").

SCROFULA.

Certain forms of tubercular disease in man and the lower animals are known as Scrofula, but the term is fast becoming obsolete.

Symptoms.—Deposits of cheesy matter in various parts of the body.

Cause.—General tubercular infection.

Treatment.—My unqualified advice is to kill all scrofulous poultry, because they are not likely to yield readily to treatment, and it is doubtful whether they would produce untainted stock even when they are apparently cured.

PIP.

When a fowl or chick is suffering from "Roup," the nostrils frequently become choked with thickened secretion, and the creature is consequently compelled to breathe through its open mouth. The constant exposure of the tongue to the air causes

it to become dry, hard, and like horn. This condition is known as "Pip."

Treatment.—Clear the nostrils, and treat the bird for Roup.

APPENDICITIS.

(Inflammation of the Vermiform Appendages—*Blind Tubes.*)

Symptoms.—Traces of blood and a slimy substance in the excrement, which is usually firm. The excrement being firm proves that it has been in one of the vermiform appendages, and that the slime and blood does not come from any other part of the bowel. In some cases a mass having a fleshy appearance comes away. Occasionally one or both of the blind tubes in a subject sent for *post-mortem* examination is found to be filled with a fleshy growth. This results from inflammation in the cavity and exudation of lymph.

Cause.—The inflammation is certainly set up by an irritant, and it is found to occur most frequently in chickens which have had pungent spicy condiments added to their food.

Treatment.—Give a little sweet oil night and morning, and add a little powdered charcoal to the soft food.

INDIGESTION AND CROP-BINDING.

Symptoms.—Food remaining in the crop; crop becoming hard and distended.

Cause.—The most common cause is congestion of the liver, which results in arresting the process of digestion. A fowl becomes crop-bound in some cases through an indigestible substance, such as a mass of dry grass matted together, blocking the passage from the crop to the gizzard. In rare cases a fowl becomes crop-bound through having swallowed a substance too large to pass from the crop.

Treatment.—To act on the liver and at the same time break up the contents of the crop, add as much Glauber-salts to a pint of rather warm water as will make it taste saline. Of this pour a little at a time down the throat of the patient, and endeavour to mix it with the contents of the crop. Do this by gently kneading the crop with your fingers. If by this means the

contents become well broken apart, repeat the process three times with intervals of three hours. If this process is not effectual in reducing the contents of the crop, and it still remains distended and hard, it should be opened and its contents removed.

When performing this operation an assistant will be required to hold the fowl. He should hold it firmly by its legs just above the feet with his left hand, and by its wings near the back with his right, the fowl being allowed to lie on its side. The operator, parting the feathers with his left hand, first carefully makes an incision through the skin of the fowl nearly one and a half inches in length, in line with the spinal column, and over that part of the crop nearest to the head of the fowl, then a shorter incision into the crop. He should turn the cut edges of the crop outwards through the skin, then with the handle of a small teaspoon or other suitable instrument remove the contents of the crop. He should next wash out the crop with warm water, and with his forefinger carefully examine it to see whether it is quite empty. Should there be anything too large to draw through the opening, rather than enlarge it, he should endeavour to cut the substance into pieces small enough to withdraw. This may be done safely with a pair of blunt-pointed scissors.

Having well washed the incision in the crop, it should be closed with ordinary single stitches, some animal substance being used. The wound in the skin should be closed in a similar way, care being taken that no foreign substance is left between the skin and the crop.

Immediately after the operation the fowl should have a teaspoonful of salad oil, and may be fed with a small quantity of raw egg. If the crop becomes empty, in about twelve hours feed as directed under the heading "Feeding Sick Poultry," and very sparingly for the first seven days after the operation.

EGG-BOUND.

Symptoms.—Going frequently to nest; tail depressed when walking; a hard pointed substance to be felt in the left side near the vent.

Causes.—In the majority of cases in *post-mortem* subjects the fowl has been found to be the subject of fatty degeneration. In

the oviduct, owing to fat taking the place of muscle in the circular muscular fibres of that canal, an extreme weakness results, and it fails to perform its natural functions. An extra large egg may cause a fowl to become egg-bound. Pullets are very liable to become temporarily so from this cause.

Treatment.—In all cases give a teaspoonful of treacle and a teaspoonful of sweet oil every two hours. At the same time a wineglassful of rather warm water may be injected into the vent. This would tend to allay any inflammation, and may assist in effecting the expulsion of the egg.

LEG WEAKNESS.

Symptoms.—Squatting almost continually, inability to stand or walk properly.

Cause.—As a rule weakness in the legs is the result of internal disease and consequent constitutional weakness. This loss of power in the legs of young birds is usually attributed to overgrowing their strength. As a matter of fact it is in most cases due to mild but chronic diarrhœa, which is provoked by irritant matter discharged into the bowel from the liver, which is disordered.

Treatment.—Keep the subject on a bed of hay or some other warm material, add Krekodyne Powder to the drinking-water, and give a dose of sweet oil night and morning. It is advisable to feed freely with meat or insect food and vegetables.

CRAMP.

Symptoms.—Distortion of the feet due to contraction of the muscles. This affection is usually accompanied by diarrhœa of a more or less severe type. Cramp can readily be distinguished from leg weakness by the contraction of the muscles.

Cause.—Cramp is mostly the result of improper management. Young ducklings and chickens are very liable to become cramped when improperly fed, and kept on a damp or wet floor.

Treatment.—Soak and wash the affected legs and feet in very warm water, dry them well and then rub in some camphorated oil night and morning. Feed affected birds with warm nourishing

food and keep them on a bed of hay or some other warm material. If diarrhœa is present, adopt the treatment prescribed for it.

RHEUMATISM—ARTHRITIC.

Symptoms.—Inflammation and swelling of the joints, stiffness in walking. The affected joints are rather red, heated, and in some cases enlarged. The hock joints are usually the most seriously affected.

Cause.—This ailment is certainly the result of faulty management as regards housing or feeding, though it is highly probable that there is in some cases an inherited predisposition.

Treatment.—Keep the subject on a warm bed, and give from three to five grains of salicylate of soda in a tablespoonful of camphor water three or four times a day. The affected joints should be painted with iodine, or some stimulating liniment should be rubbed in.

BUMBLE FOOT.

(Synovitis.)

Symptoms.—An enlargement on the sole of the foot, which in some cases gradually increases to such an extent that it bulges out between the toes. Owing to continued pressure a corn-like substance is formed on the sole of the foot. The tissues round the hard substance become inflamed, and in some cases suppuration takes place, resulting in an open sore. Before there is any enlargement, the foot at the junction of the toes usually becomes red and inflamed.

Cause.—Inflammation of a synovial sac, or sheath of one of the tendons. It may be caused by the fowl having to alight upon a hard floor from a high perch. No doubt constitutional disease is the predisposing cause in nearly all cases. It certainly has been so in the numerous cases which have been examined by me.

Treatment.—If observed before the hardening process has taken place, paint the affected part with iodine liniment, and then apply a bandage rather tightly, repeating this treatment daily. In bad cases, the only chance of effecting a cure is by dissecting out the growth. When doing this apply a ligature to

the leg just above the foot, that is, bind it tightly to prevent excessive loss of blood, then carefully cut through the skin all round the part requiring removal, leaving all the sound skin to close over the wound. Next dissect out as much of the affected part as can be removed without injuring the tendons or large blood vessels. Wash the wound by pouring upon it a stream of clean water and then close it with a few single stitches. Apply a wet pad, and keep it in place with a bandage.

SCALY LEG.

Symptoms.—An accumulation of epidermic scales upon an inflamed surface, with consequent enlargement of the leg. A white powdery substance can be seen between the scales, which are forced outwards from the legs.

Cause.—Eminent pathologists who have given attention to this affection have found that it is caused by a parasite, which has been named *sarcoptes mutans.*

Treatment.—Thoroughly cleanse the affected legs with vinegar and water—one part in three—using a rather stiff brush; dry well, and then on alternate days paint the leg with Scaly Leg Lotion. When painting the leg it should be held with the foot upwards, to allow the lotion to run between the scales. Four applications will usually cure the worst cases.

VARIOLA.

(SMALL-POX.)

Symptoms.—The most characteristic symptom is small pustules, which in different cases vary very much in size. At first they are yellowish blisters, but later on a rusty-coloured scab forms and eventually falls off. As may be expected, affected birds are rather feverish, yet in some cases do not appear depressed. When examining some fowls attacked by this disease I noticed turkeys near them, and very naturally asked if any of them had been ailing, and the poultry-man said they had not. I had one caught, and found that it was the worst case I have ever seen.

Cause.—A blood poison spread by contagion.

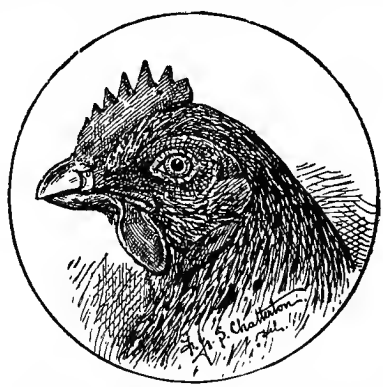
Treatment.—Add a saline, aperient and tonic preparation to the drinking-water, and dress the pimples with sweet oil when they break.

FEATHER EATING.

Symptoms.—When fowls are bare of feathers in patches, and there are not any feathers lying about their run, it is almost certain that the feathers have been plucked and eaten by some of the fowls.

Cause.—This vice may be the result of overcrowding, or a want of exercise and occupation. It is frequently set up through a fowl seizing and pulling out a feather because it has an unusual appearance. The feathers of fowls overfed, or new feathers, are full of fatty matter, and these when tasted are very much relished by fowls. This is made evident by the way they will race and scramble for them when they have contracted the habit of feather eating. In many instances it is set up through a fowl maliciously seizing another, as they do when a strange fowl is introduced. Therefore it is advisable to place fowls with fresh associates when it is dark.

Treatment.—The most effective method of curing a fowl of feather plucking is by passing a piece of copper wire through



VALE'S GAG FOR FEATHER EATING POULTRY.

the septum of the nose and attaching to it a piece of soft rubber or leather an eighth of an inch thick. The rubber or leather rests in the mouth and prevents the fowl closing it firmly enough

to pull out a feather. It is necessary to tether the fowl's legs together, so that it can walk but not lift its legs to scratch at the gag, which does not injure the wearer.

Prevention.—The most effective way of preventing and assisting to cure this cannibal vice in fowls is by providing for them, under compulsion, almost constant employment. If they cannot be turned on to a free range and left to forage for a portion of their food, their covered run should be filled to the depth of at least a foot with chaff, waste from a corn mill, or sweet stable manure. Amongst this refuse some oats should occasionally be mixed, and upon it their daily feed of corn should be scattered, and if sparingly but suitably fed the fowls would be almost constantly turning over the refuse in search of food. Besides, it would be warm for them to rest on.

PROTRUSION OF THE VENT POUCH.

(Down Behind.)

Symptoms.—A mass of membranous tissue protruding from the vent, which is usually red and inflamed.

Cause.—This affection when occurring in pullets is usually the result of straining to expel a large egg. In some cases it is the result of debility, especially when occurring in old fowls.

Treatment.—Thoroughly cleanse the protruding part by pouring strong warm tea upon it, then gently return it, and insert in the vent a piece of nutgall ointment the size of a horse bean. Repeat the treatment as often as necessary.

MOULTING.

This is not a disease, but the process tests the constitutional vigour of a bird, and disease which has been latent frequently strongly develops in it while moulting. The process should be a gradual one, and should be completed before cold weather sets in. In order that fowls may moult at a seasonable time, they should be hatched early in the year, so as to be matured before the advent of cold weather. If in a good state of health and not over fat, fowls need very little, if any, extra attention while

they are moulting. Cayenne pepper, ginger and other pungent substances are added to the soft food by some keepers of poultry, with a view to assisting a moult. This should not be done, because the pungent matter is ground into minute atoms in the gizzard, becomes mixed with the fluids in the intestines, enters the blood, and is carried into sensitive organs like the liver. Pungent matter sets up sub-acute inflammation in sensitive organs, and if its use is continued, disease of a more serious nature will certainly follow. Experience in *post-mortem* work has proved to me that pungent substances should not be given even as a medicine, because they increase the feverish condition of the patient.

Sulphur is frequently given to assist fowls when moulting. If any real benefit is derived from its use it is probably due to its laxative effect upon the skin. Warmth assists fowls to moult, and they are sometimes put in a very warm place with a view to hasten a moult. The increased temperature of a fowl when sitting tends to bring on a moult a little earlier than seasonable. Birds are usually rather depressed when they are moulting, therefore a mild tonic would prove beneficial. If possible the sexes should be separated when moulting-time approaches, and they should be kept apart until moulting is over or until the next breeding season. This will allow the males time to recuperate and become more vigorous than they may be if left with the females. Hens and pullets sometimes commence to pull at the feathers of a male bird when he is inattentive to them; in this way feather eating may be set up and become an established vice. A fowl very bare of feathers should be placed by itself. Fowls should not be allowed to get wet when moulting, because cold and wet tend to prolong the process, and may be the cause of a serious illness.

ENTERITIS.

(Inflammation of the Inner Coat of the Bowel.)

Symptoms.—These vary, from slight depression to complete prostration. Symptoms usually seen are thirst and diarrhœa, and in some cases the subject may be seen straining, but mostly remains squat on the ground.

Causes.—When not due to the action of disease germs, it is set up by some irritant mineral or vegetable substance. Cayenne pepper or such like pungent substances will set up inflammation in the bowel in a greater or lesser degree, and certainly in the liver.

Treatment.—To soothe the bowel, give a little sweet oil every three hours, and feed sparingly with raw egg and crust of bread scalded with boiling milk. In cases when the patient is frequently straining, increase the dose of oil and add to it two or three drops of chlorodyne.

CHRONIC TUBERCULOSIS.

("Liver Disease.")

Symptoms.—When the subject is suffering from chronic tubercular disease, and there is a considerable deposit of tuberculous matter in the liver, mesenteric glands or other important organ, there is a loss of tissue—wasting—which causes hollowness under the eyes, and soft and flabby thighs. The face too appears shrunken and has an unhealthy colour. When the liver is affected, the excrement is usually of a yellowish colour. Lameness is also a symptom of "Liver Disease."

Cause.—A deposit of tuberculous matter.

Treatment.—Chronic cases of tubercular disease are incurable.

FUNGOID DISEASE.

(Molluscum Contagiosum.)

In this virulent contagious disease, a growth somewhat like a fungus, or wart-like growth, appears upon the comb, face, or wattles, and occasionally in the mouth. By an ulcerative process, these enlargements usually break and a yellowish discharge oozes out. New growths appear round the original ones, and if not checked the disease extends over the head and neck, which in severe cases become swollen, the head sometimes to such an extent that the eyes are closed up. As the discharge becomes

dry, yellow crusts are formed, and a very offensive odour is given off.

Cause.—Contagion, and a peculiar susceptibility.

Treatment.—It is very advisable to kill all subjects of this contagious disease, though they may be producing eggs and appear to be not seriously diseased. Mild cases may yield to the following treatment: Gently scrape off the surface of the growth and apply Parasiticide Lotion. At the same time give half a teaspoonful of salad oil and two Krekodyne Pills.

GLOSSARY.

In the foregoing pages I have endeavoured to avoid using words not commonly used, and those which may not be understood are here explained.

Abdomen. (Lat. *abdo*, I conceal.) The posterior portion of the body, containing the intestines and other organs.

Albuminous. Having the properties of albumen, a thick glairy substance forming a constituent part of plants and animals, and existing nearly pure in the white of an egg.

Amyloid. (Gr. *amylon*, starch, *eidos*, form.) Of the nature of starch.

Analysis. (Gr. *analuein*, to resolve.) The resolution by chemistry of any matter into its primary and constituent parts. Analyses, plural of analysis.

Anæmia. (Gr. *a*, without, *aima*, blood.) A deficiency of blood.

Antiseptic. (Gr. *anti*, against, *sepein*, to putrefy.) That which will prevent putrefaction.

Apoplexy. (Gr. *apo*, from, and *plêssein*, to strike.) A stroke, a sudden deprivation of power due to an affection of the brain.

Appendicitis. (Lat. *ad*, to, and *pendere*, to hang. Gr. *itis*, denoting inflammation.) Inflammation of appendages of the intestines.

Arthritis. (Gr. *arthron*, a joint, and *itis*, inflammation.) Inflammation of a joint.

Bronchitis. (Gr. *bronchos*, the windpipe, and *itis*, inflammation.) Inflammation of the bronchial tubes.

Cloacitis. (Lat. *cloaca*, a sink, and Gr. *itis*, inflammation.) Inflammation of the cavity just inside the vent into which the intestines, oviduct, and urinary organs discharge their contents.

Catarrh. (Gr. *kata*, down, and *rhein*, to flow.) A cold accompanied by a discharge.

Cholera. (Gr. *chole*, bile, and *rhein*, to flow.) A disease of the digestive system characterized by bilious diarrhœa and great prostration.

Congestion. (Lat. *congerere*, to amass.) An unnatural accumulation of blood in an organ or other part of a creature.

Cerebral. Pertaining to the brain.

Capillary. (Lat. *capillus*, a little hair.) A minute blood vessel.

Chronic. (Gr. *chronos*, time.) Of long continuance.

Diarrhœa. (Gr. *dia*, through, and *rhein*, to flow.) A purging.

Debility. (Lat. *debilis*, weak.) Languor, weakness.

Diphtheria. (Gr. *diphthera*, a skin stripped off.) A growth, or formation of a false membrane.

Emphysema. (Gr. *emphysân*, to inflate.) Distension of tissue due to a collection of air.

Enteritis. (Gr. *enteron*, an intestine, and *itis*, inflammation.) Inflammation of the intestines.

Epidermic. (Gr. *epi*, on, and *derma*, the skin.) Pertaining to the epidermis, or outer layer of skin.

Epithelium. Superficial cell-tissue.

Excrement. (Lat. *ex*, out of, and *cernere*, to separate from.) Waste matter excreted and expelled from an animal.

Extravasation. (Lat. *extra*, out of, and *vas*, a vessel.) The act of a fluid passing out of its proper place.

Exudation. (Lat. *ex*, out of, and *sudare*, to sweat.) The matter exuded.

Fungoid. (Lat. *fungus*, fungus, and Gr. *eidos*, like.) A spongy excrescence.

Gastric. (Gr. *gastêr*, the stomach.) Pertaining to the stomach.

Hepatitis. (Gr. *hepar*, the liver, and *itis*, inflammation.) Inflammation of substance of the liver.

Incipient. (Lat. *incipere*, to begin.) Beginning, commencement.

Indigestion. (Lat. *in*, not, and *digere*, to dissolve.) Not digesting.

Intra-Muscular. (Lat. *intra*, within, and *musculus*, a muscle.) Between the muscles.

Lachrymal-ducts. (Lat. *lachryma*, a tear, and *ducere*, to lead.) The canals which convey the tears.

Lymph. (Lat. *lympha*, pure water.) A colourless fluid.

Mesenteric. (Gr. *mesos*, middle, and *enteron*, intestine.) Pertaining to the mesentery, a membrane in the cavity of the abdomen.

Metritis. (Gr. *metra*, the womb, and *itis*, inflammation.) Inflammation of the oviduct.

Miliary. (Lat. *milium*, millet.) Resembling millet seeds.

Muco-purulent. (Lat. *mucus*, secretion, and *pus*, matter.) Consisting of more or less fluid matter.

Oviduct. (Lat. *ovum*, an egg, and *ductus*, a canal.) The egg passage.

Parasiticide. (Gr. *parasitos*, a parasite or hanger on, and Lat. *cædere*, to kill.) A destroyer of parasites.

Pathologist. (Gr. *pathos*, affection, and *logos*, science.) One versed in pathology.

Pendulous. (Lat. *pendere*, to hang.) Hanging.

Peritonitis. (Gr. *peri*, around, and *teinein*, to stretch.) Inflammation of the peritoneum, a membrane enveloping the intestines.

Pneumonia. (Gr. *pneumon*, a lung, and *itis*, inflammation.)

Post-mortem. (Lat. *post*, after, and *mors*, *mortis*, death.) [Examination] after death.

Proteids. (Gr. *protos*, first, and *eidos*, form.) A class of compounds such as albumen (white of egg), gluten, caseine, &c., which go to form animal tissue—that is, flesh-forming matter.

Protrusion. (Lat. *pro*, forward, and *trudere*, *trusum*, to thrust.) The state of being protruded.

Proventriculus. (Lat. *pro*, before, and *ventriculus*, the stomach.) In front of the stomach.

Pungent. (Lat. *pungere*, to prick.) Affecting the organs of sense with a pricking sensation.

Purulent. (Lat. *pus*, matter.) Consisting of pus, matter.

Rheumatism. (Gr. *rheuma*, a humour.) A painful affection of the joints or muscles.

Scrofula. (Lat *scrofa*, a breeding sow—swine being supposed subject to something similar.) A defect of constitution causing tubercle in the tissues and organs of the body.

Septic. (Gr. *sepein*, to putrefy.) That which causes putrefaction, that is, makes pus, matter.

Septum. (Lat. *sepes*, a hedge.) A partition separating two cavities.

Suppuration. (Lat. *sub*, under, and *pus*, matter.) The process of producing purulent matter.

Synovial sac. (Gr. *syn*, with, and Lat. *ovum*, an egg; and Lat. *saccus*, a bag.) A receptacle for a fluid like the white of an egg, placed between the joints to lubricate them.

Synovitis. (Gr. *syn*, with, Lat. *ovum*, an egg, and Gr. *itis*, inflammation.) Inflammation of glands in the joints with effusion of a fluid like the white of an egg.

Tuberculosis. (Lat. *tuberculum*, a little swelling.) A disease in which tubercles are formed in various parts of the body.

Tumour. (Lat. *tumere*, to swell.) An enlargement.

Ulcer. (Gr. *elkos*, a sore.)

Variola. (Lat. *varius*, changing colour.) Small-pox.

Vermiform. (Lat. *vermis*, a worm, and *forma*, resemblance.) Worm-like.

Vertigo. (Lat. *vertere*, to turn.) An affection of the nervous system.

INDEX.

VALE'S REMEDIES FOR POULTRY.

"KREKODYNE" PILLS.—In all cases of Roup, Colds and Diarrhœa, give two Pills and half a teaspoonful of sweet or salad oil night and morning. Warm and divide the Pills for chicks, according to age and size.

BOXES containing 42 Pills, 7d.; 90, 1/-; one gross, 1/6; two gross, 2/6; five gross, 5/-, post free.

CANKER LOTION.—This Lotion should be used in all cases of ulceration of the mouth (Canker—Diphtheritic Roup). Bottles, 1/-, post free.

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WING LOTION.—This lotion should be painted on inflamed joints daily. It is also serviceable for clearing the legs and feet of scurf or parasites. Besides the local treatment, birds suffering from an affection of the joints should have ten drops of salad oil and a Krekodyne Pill daily.

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R.F.J.

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