

THE DAILY MAIL POULTRY BOOK



BY
TOM BARRON
& J. N. LEIGH

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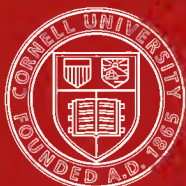
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THE "DAILY MAIL" POULTRY BOOK

THE BIRD ON THE COVER

THE cover illustration is reproduced from a photograph of the White Leghorn Cockerel which laid the foundation of MR. TOM BARRON'S success; the bird sired the first prize-winning pens of pullets he sent to compete in American egg-laying tests, and his stock has been built up from its progeny.



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THE DAILY MAIL POULTRY BOOK

BY
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WINNER OF 250 PRIZES IN LAYING TESTS IN ENGLAND
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FOREWORDS

THE simple single purpose of this book is to show the consumer how he or she may produce eggs at home.

Nowhere can eggs be produced more economically than in the garden or backyard pen or home paddock, and the great majority of householders could find space for a few fowls. They are also in a position to feed them much more cheaply than under any other conditions; by the proper utilisation of house scraps and kitchen garden waste, the corn and meal bill may be reduced to a minimum.

It is only by the multiplication of small poultry keepers that we can hope to reduce, and perhaps finally eliminate, the imports of foreign eggs, which now cost us so many millions of pounds annually.

Moreover, the question is not entirely one of economy. Food value and palatability must also be taken into account. There is no comparison between the quality, freshness, and flavour of eggs laid within a few yards of the kitchen door, and those that are brought from distant lands.

But it is essential to keep the right sort of fowls, and poultry differ as widely in their qualities as, say, horses. It is, for example, very generally understood that it is "blood" that gives its value to the thoroughbred, and that there is a vast difference between horses that are judged fit to compete on the racecourse, and those that are better suited to the dray or the tradesman's cart.

The difference is a matter of pedigree, and what pedigree is in the racehorse, "strain" is in the properly selected laying pullet. There are many breeds and varieties, but it is strain, or proved family fitness, that counts all the time in egg-production. It is that which makes some pullets lay up to 200 eggs or more in a year, as against

half that number laid by other fowls, even of the same breed and variety.

The speed and staying powers of the thoroughbred are put to the test on the racecourse, and the prolificness and stamina of the pullet of good strain are proved in the egg-laying test.

In the following pages the authors, who are the world's foremost authorities on the breeding and management of laying stock, explain all about strain, and give the plainest possible directions for the successful keeping of fowls for egg-production ; so that the novice who knows little or nothing of the subject, should be able to start poultry keeping, in any of the different ways open to the beginner, with the best possible prospects of success.

THE EDITOR.

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THE "DAILY MAIL" POULTRY BOOK

CHAPTER I

THE HOUSE AND FITTINGS

THE fowl-house is the first matter that must receive the attention of the would-be poultry keeper. The number of birds that may be kept in health and profit depends upon the extent of the accommodation available, and a place must necessarily be prepared for them before they are purchased.

In some instances there is a choice between building a house to suit the needs of the flock it is proposed to keep, or making sure that an existing building is in all essentials suitable. A poultry-house taken over from a previous tenant should, however, always be regarded with a certain amount of suspicion, and even when it comes up to general requirements, it should not on any account be used before it has been thoroughly overhauled, repaired, cleansed, disinfected, and either treated with creosote or lime-washed (*see* Chapter VIII).

In the great majority of cases the beginner must either make a house or buy one ready-made. But, however that may be, the general principles of good housing must be understood and complied with in construction, and in the main essentials it is possible to approach the ideal conditions in any ordinary circumstances. There are, as a matter of fact, very few situations in town or country in which it is not possible to keep a few fowls for laying, if their general needs—especially in the matter of housing—are properly understood and provided for at the commencement.

Healthy Housing

Healthy housing is quite as important for fowls as for their owners. Without plenty of fresh air and light, perch-room and floor-space, freedom from damp and draughts, and sufficient simplicity of design and construction to make cleaning operations easy, the fowls cannot be maintained in good health. Loss of health leads to loss of laying condition, with a consequent loss of profit.

To ensure the freshness and purity of the air within the house, the method of ventilation must provide for its circulation and exchange, otherwise it will become stagnant; but the required renewal must be effected without causing a direct draught in the vicinity of the birds. The admission of the maximum amount of light is also important. Not only is this necessary to enable the birds to make proper and free use of the scratching-floor, but the admission of sunlight is the best possible means of preventing outbreaks of disease and the multiplication of parasitic insects and mites. Light is also an important factor in the prevention of dampness, and it is essential to avoid this in the interests of health.

The system of housing may be so extremely artificial that it involves the close confinement of the birds, without access to an open run of any sort, and success may be attained—so far as the object is the production of eggs alone, and does not include breeding in the spring—provided hygienic principles are observed. But the best quarters for use in winter, as indeed at any time for this purpose, are those that provide for the protection from exposure of the fowls, and at the same time give them the use of a run when they wish to go outside. The really essential principles are the same in any ordinary circumstances, and apply equally to the small pen in a suburban garden and to the wider accommodation at the command of the country resident.

The winter quarters for winter layers must be as suitable for occupation by day as by night, and it is in that particular that the modern type of laying-house differs from the old-fashioned roosting-place. The house must consequently be roomy, airy, light, and dry. The birds must be made comfortable, but if the conditions are too cosy,

they are apt to be enervating, and productiveness is discouraged by inactivity. The busy fowl is the best layer, other conditions being equal.

The outside opportunities for foraging may be very limited, and even when the weather favours wandering on the range, there is not sufficient activity owing to the lack of incentive when there is no insect life and the rewards are insufficient to encourage much searching. It is by means of the scratching-floor that reasonable comfort and desirable activity are provided for and ensured. A water-tight roof, draught-proof walls, a well-lighted dry floor, and good litter in which to scatter grain, comprise the essentials. But there must be proper management to prevent the degeneracy of its use into a mere feeding rather than an exercising place.

A house may be made for any given number of birds, or, alternatively, the number of birds should be limited to fit the house. The minimum floor space must in all cases be ensured, the other dimensions being in due proportion. But the floor space allowance will not be sufficient if the area is encroached upon by any of the interior fittings, and the floor will not be light enough if any of the fittings obscure the windows.

The best way, therefore, to secure space, light, and air enough is to have the upper part of the front of the house open, except for wire-netting, and sliding shutters for use in bad weather, to fix the nest-boxes to the wall just below the bottom of the wire-netting, and to put two or more glass panels in the wall just below the nest-boxes and a little above floor-level. Other glass panels may be put in the back or the sides if necessary. The food and grit and shell-troughs, with the water fountain, should be fixed above floor-level, on a shelf or otherwise as is found most convenient. If the perch is fixed at the back from end to end, it will be in the best position to avoid draught.

Before dealing with the details of construction, and actual measurements, of the types of houses specially recommended for given numbers of birds, there are certain guiding principles of more or less general application to which we must first turn our attention.

Space per Bird

The basis of all calculations in making or buying a house is the amount of space that each fowl requires, because upon that depend the total dimensions as regards the number of birds to be accommodated. In the old type of tightly shut up roosting-house, with ventilation at the top, it was found necessary to provide a minimum air space of 10 cubic feet per bird to ensure a sufficient exchange of air and keep the conditions healthy during the night.

But although this rule is mentioned, in passing, for the information and guidance of those who may be in possession of such an old-fashioned kind of fowl-house, the types of houses recommended now are of such different construction that the capacity may be safely estimated upon the basis of floor space, the floor being used by day for feeding grain in the litter, thus keeping the birds busy and active in scratching for it. Four square feet of floor space may be reckoned as the minimum area required to meet the needs of each bird, so that a house measuring 8 feet long by 6 feet wide will—if constructed in the manner described later—provide accommodation for twelve birds.

Each bird, moreover, requires, on an average, 6 to 8 inches of perch room. A perch fixed along the length of a house of the measurement given will, therefore, be sufficient for the roosting of the same number of fowls that the floor space will carry in comfort. Nevertheless, it would be very unwise to make any calculation of capacity upon the basis of floor space alone, unless the house is sufficiently ventilated by a partially open front, as in the types to be described.

Having decided upon the size of house that must be built to provide for a given number of fowls in the space available, attention must next be given to:—

The Materials

It may be more difficult in some circumstances than in others to obtain the best materials for the purpose at a reasonable cost. But whilst less expensive substitutes must, perforce, under certain conditions be made to serve, the best materials are usually—all things considered—the most economical in the long run. Of the various substi-

tutes used, in place of the preferable tongued and grooved match-boarding, one of the most efficient and least expensive is a really good felt fixed on a wood framing. But that is by the way.

For sound houses of a lasting description the body—front, back, sides, partitions, etc.—is best made of $\frac{3}{4}$ or $\frac{5}{8}$ inch by $3\frac{1}{4}$ inch tongued and grooved matching; this form of timber makes the tightest joint, and is a better draught excluder than any other. With narrow match-boards the shrinkage is much less than with wide sections. For roof boards, to be covered with corrugated iron or felt, a thickness of $\frac{5}{8}$ inch will be suitable; and for flooring, where used, $\frac{3}{4}$ inch boards are desirable.

For framing, the sections that are generally most suitable are $1\frac{1}{2}$ inches by 2 inches, $1\frac{1}{2}$ inches by 3 inches, $1\frac{1}{2}$ inches by 4 inches, 2 inches by 2 inches, 2 inches by $2\frac{1}{2}$ inches, and 2 inches by 3 inches; particular sizes suited to the construction of houses of given dimensions will be noted in the descriptions and designs of these. The timber used for frames should always be planed, as it makes for greater cleanliness. It may be noted, in passing, that when horizontal timbers are used on the outsides of buildings, they should be planed to a slope on the upper surface to throw off rainwater.

In buying timber in the relatively small quantities required for the construction of poultry-houses, it is desirable to work out all the measurements in advance (making allowance for the tenoning of frames and bevelling to rafters) and order by scantling (that is, pieces cut to measure); the rather greater cost is more than counter-balanced by the avoidance of the purchase of excessive quantities and cutting to waste. It is also necessary to select the timber carefully, in order to make sure that it is well-seasoned, and that there are no pieces with loose or large knots; this applies equally to the purchase of houses ready-made.

For the covering of the roof, over the boards, corrugated iron sheets or roofing-felt will be required, according to the recommendations made or the convenience of the individual concerned. The common measurements of the former are from 6 to 8 feet long and from 2 to 3 feet wide, and allowance must be made in ordering for an overlap

of 6 inches; the joints should be double-riveted. The galvanising of corrugated iron should be protected by a coating of paint or tar on both sides, and this must of course be done on the underside before fixing. The usual width of roofing-felt is 32 inches, and it is made up to 35 yards in length. In fixing felt a lap of from 2 inches to $2\frac{1}{2}$ inches should be allowed, and it should be fastened by means of nailed slats.

For the glass shutters in the front of the house, clear glass $\frac{1}{8}$ inch thick is suitable; for the glass panels to light the floor, rough glass $\frac{1}{4}$ inch thick is best. As a substitute for glass in the movable shutters (but not in the lower panels), waterproofed calico or muslin may be used. To make the material waterproof, and yet translucent, give it two coats of boiled linseed oil with the addition of one teaspoonful of terebene (dryers) to each quart of oil. An alternative preparation is half a pint of gold beater's size to every gallon of the boiled oil. Galvanised wire-netting for the open front should be $\frac{5}{8}$ inch mesh, and in buying for this purpose, or for the division of runs (*see* Chapter II), cheap makes of inferior grade should be avoided; some have only two twists to the mesh instead of three. Wire-netting is made in rolls of 50 and 100 yards. For the hanging of doors, three 6-inch cross-garnet hinges are suitable.

As it is usually desirable to make houses in sections so that they may easily be removed when necessary, the several sections should be made to fasten together with bolts and nuts or screws. Nails should not be used in joining the sections, and bolt-holes should never be punched. Nuts and screws should not be too tightly fastened, neither should they be driven in with a hammer; and round-headed bolts should be avoided—they are less easily removed than those with square heads. Wrought iron screw-bolts, nuts, and washers are bought by the pound; the bolts are made in diameter from $\frac{3}{8}$ inch, and in length from 2 inches, upwards.

All sections should be creosoted (flat on the ground) before being erected.

The Site

The choice of the best site for the house or houses is necessarily limited by the area available and its general

situation, but it must in any case be as dry and well-drained as possible. Where the ground slopes, the house should, other conditions being suitable, occupy the highest position; provided, in the case of the small garden or backyard site, that this does not place it near enough to a dwelling-house to cause annoyance or contravene any rule of sanitation.

The site should also be selected, as far as may be, with a view to ensuring a southern aspect, in respect both to an independent structure and the small lean-to type of house that is in many instances most conveniently (and economically) built against an existing garden wall. In all circumstances the aim should be to put the house where there is the least risk of dampness, and where the maximum amount of sunlight will penetrate the interior by way of the open front.

The Foundation

It is extremely important to make a good foundation, and the most satisfactory and inexpensive method of doing this is to make a frame or sill of a suitable size to receive the superstructure of the house, so that the frame of the house will rest on the foundation and the match-boards of the walls will come down over the sides.

Having made this foundation frame, it should be filled in with gravel and ashes, well rammed, and made level with the top of the frame. When this is done, the ashes and gravel should be floated with boiling tar and then sprinkled with coarse sand.

This makes a much better foundation than concrete, because it does not sweat.

The "Daily Mail" House

The type of structure that is recommended for general use, more particularly in the southern parts of the country, is the *Daily Mail* Standard Poultry House, another type better suited to northern conditions being described in a subsequent paragraph.

The design of the *Daily Mail* house has the merit of being simple in construction, whilst providing the essentials of ample light and ventilation, and meeting other necessary

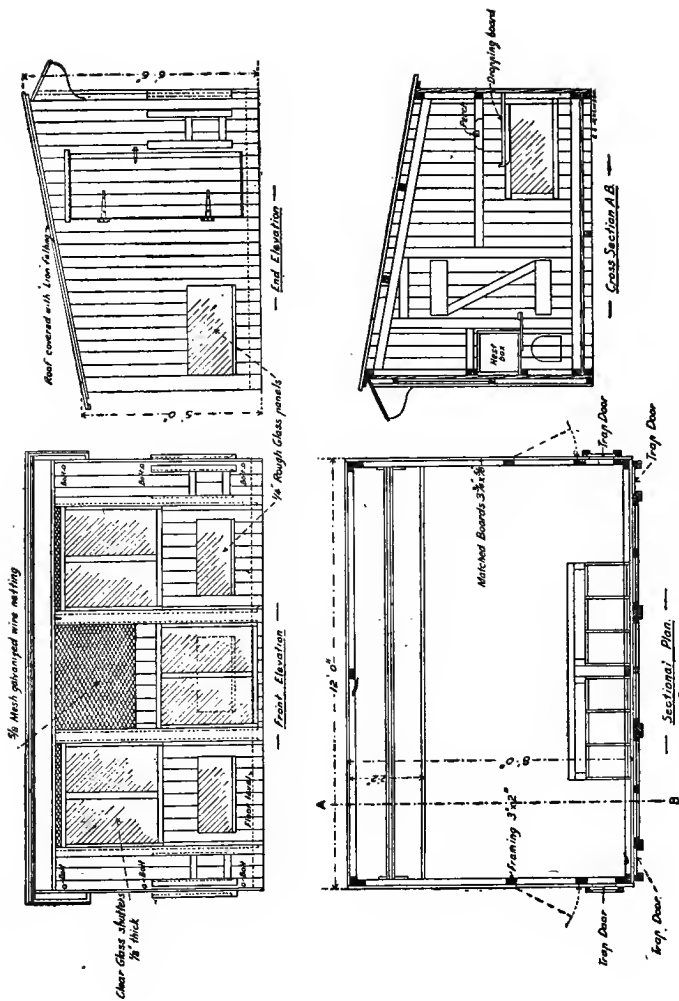
requirements. It is especially suited to the needs of householders who keep small flocks of fowls, and although the one described and illustrated (the 12 feet by 8 feet standard size) is designed to accommodate from twenty to twenty-four fowls, other numbers may be provided for by modifying the measurements in accordance with the essential basis of a minimum of 4 square feet of floor-space per bird.

In a house of the type and size shown the length is 12 feet, the depth 8 feet, the height in front 6 feet 6 inches, sloping to the back, where the height is 5 feet. It is constructed of $\frac{5}{8}$ inch by $3\frac{3}{4}$ inch matched boards, with a framing of 3 inches by 2 inches. For a smaller number of birds, say 8 to 10, a house measuring 7 feet by 5 feet 6 inches would be quite big enough, in which a framing of 2 inches by 2 inches would suffice, and only two glass shutters and panels would be needed.

Two trap-doors are provided, one at each end, so that the fowls may be allowed access to one or other of the two runs, which should preferably be arranged for alternate use, in order to prevent the fouling of the ground. The nest-boxes are fixed to the inside of the front of the house, over the glass panels at a height of 1 foot 9 inches above the level of the floor, and just below the bottom of the glass shutters. The glass shutters are of the up-and-down description, running in grooves on the outside of the house. As an alternative, for use in small houses, hinged shutters may be fitted on the inside, and made to hook up to the roof or drop down to cover the wire-netting as may be necessary.

The dropping-board and perch are along the back. The dropping-board is 2 feet wide and 2 feet above floor level, and the perch is 9 inches above the board and 13 inches from the back wall. The perch should be made of a 2 inch by 2 inch section, planed, and having the upper edges chamfered; it should not be fixed, but made to drop into sockets screwed on the wall, one at each end.

For greater economy in construction, a felt of good quality, fixed on wire-netting, may be substituted for the match-boards of the roof and walls. If this is done, the roof is made by fixing four $1\frac{1}{2}$ inch by $2\frac{1}{2}$ inch battens from end to end at equal distances, with one at the top



THE "DAILY MAIL" HOUSE.

and another at the bottom. In a small house, one batten in the middle with one at the top and another at the bottom would suffice. Over these battens smaller ones (2 inch by 1 inch) are then fastened in the opposite direction (from front to back), at a distance of 11 inches apart.

Two-inch mesh wire-netting is then strained tightly from end to end, and upon this the felt is laid in lengths (with an overlap of at least 2 inches) from front to back, and secured by means of laths placed along each batten and nailed through the felt to the battens. The walls may be made in the same way, by fixing intermediate uprights of 2 inch by 1 inch battens at 11 inches apart, between the main uprights of the framing.

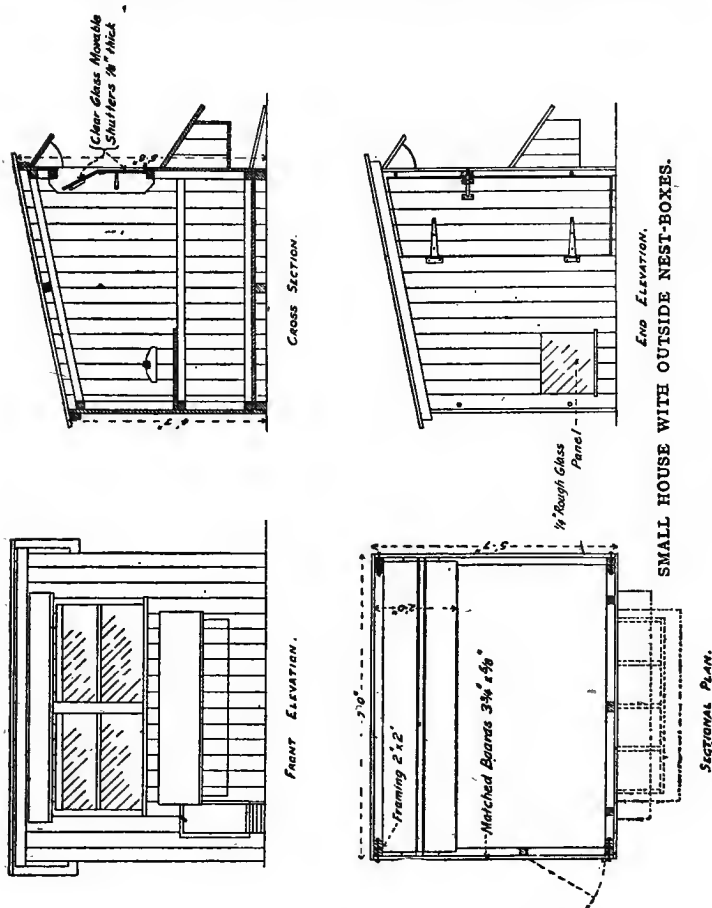
If this, or any other house, is made of odd pieces of timber which may be available, such as packing-cases, etc., the whole building should be covered with felt and coated with tar, this treatment being necessary to cover such crevices and spaces as are almost inevitable when make-shift material is utilised.

The Northern Type

The main point of difference between the style of house just described and that which is preferable for use in the north is in the construction of the roof, which in this type is of the span or ridged description instead of sloping from the front to the back. Otherwise the chief details of construction and the arrangement of the fittings are very similar, and the same match-board and batten measurements apply as regards widths and thicknesses.

For a house of this type to accommodate twelve fowls the principal dimensions are: 8 feet long, 6 feet from front to back, 6 feet 6 inches high at the ridge, falling to a height of 5 feet 6 inches at the front and back. Under the eaves, which project about 1 foot, there is an open space of 16 inches in depth covered with wire-netting. The nest-boxes are fixed below this and above the window panels. These latter measure 2 feet in length and 16 inches in height, and the bottom ledge is 9 inches above floor level: in a house of this size 2 windows are required. The wire-netted open portion at the top is protected by means of a hinged shutter, which is raised and hooked to the roof when not in use.

A house of this description for twenty-five fowls should measure 12 feet in length, 9 feet in depth, and should have a height of 7 feet to the ridge, falling front and back to a



height of 5 feet 6 inches. Such a house would require to have two window panels in the lower portion of the front and back.

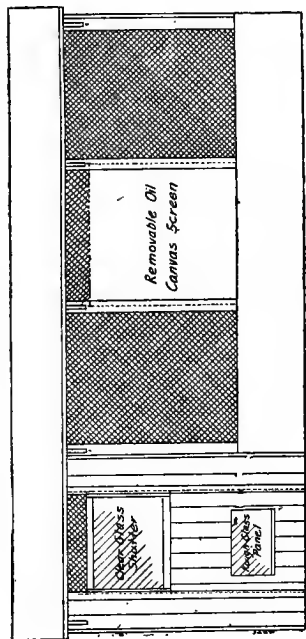
The Backyard House

For those whose available space is very limited, the most suitable method of providing for a pen of, say, half a dozen pullets, is to erect a lean-to house, backed by a convenient wall, with an adjoining covered run. The house proper should measure 4 feet long by 6 feet deep, by 6 feet 6 inches high at the back, sloping to a height of 5 feet 6 inches in front. The roof should be extended to cover the run to a length of 10 feet beyond the side of the house to ensure a minimum of 10 square feet per bird, the front of the run being boarded to a height of 18 inches above ground level, and the remainder covered with wire-netting.

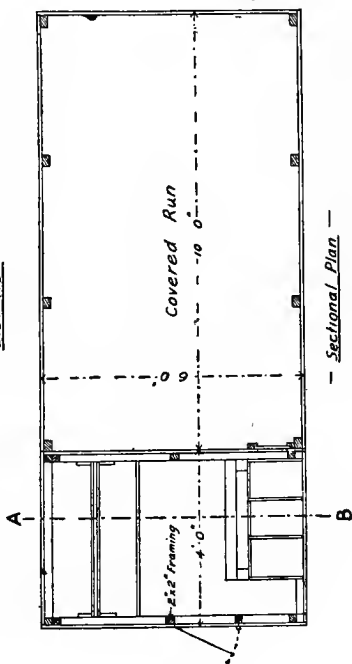
Both run and house must be fitted with doors, and a trap exit must be made in the side of the house next the run. The upper part of the front of the house must be open except for a covering of wire-netting, and in the lower portion a window panel must be inserted to give sufficient light on the floor. To prevent rain beating in, the roof of house and covered run should be 1 foot beyond the front. If in an exposed position, the open-fronted portion should be fitted with a glass or waterproofed calico shutter to cover the opening to within 1 foot of the top. When not in use, the shutter should be capable of being pushed in under the roof. The best method of making the foundation of a covered run, which is an important point in connection with the sanitation of the backyard poultry pen, is described in Chapter II, in which all matters referring to runs are dealt with in detail.

Interior Fittings

We purposely say fittings instead of fixtures, because everything should be as far as possible removable to facilitate cleaning and prevent the harbouring of parasitic insects and mites. The sizes of perches and dropping-boards have already been given in an earlier paragraph, and as the perches are made to drop into socketed brackets, so also should the dropping-boards be made to rest on wooden supports screwed to the walls of the house at each end. The dropping-boards should have a fillet of wood along the sides to prevent the droppings going over the side into the litter.

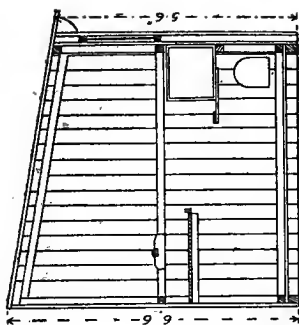


— Elevation —

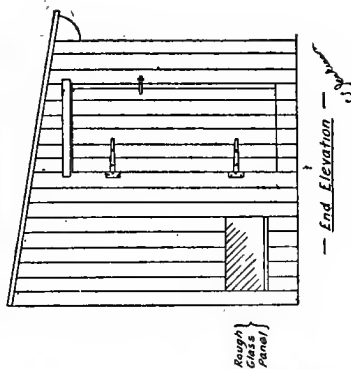


— Sectional Plan —

LEAN-TO HOUSE AND RUN.



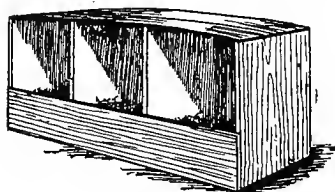
— Section A.B. —



— End Elevation —

Nest-boxes should be 12 inches wide and 14 inches deep. If these are of the trap-nest description, being made with a door that automatically closes when the bird enters and prevents its exit until released by the poultry keeper who wishes to record the laying of each fowl individually, the three essentials of its construction are economy, simplicity, and efficiency. There are many types in use, but so long as the purpose is suitably served, the manner of construction is of minor importance provided it embodies the essential requirements.

If trap-nests are used, at least one should be provided for every two birds, and should be fitted to the interior in the situation already indicated, or elsewhere if more convenient, provided the place is suitably dark. The best way to do this without causing any obstruction, or necessitating the use of struts to raise the nest-box from the ground, is to make it to fit into grooves fixed on the wall of the house.

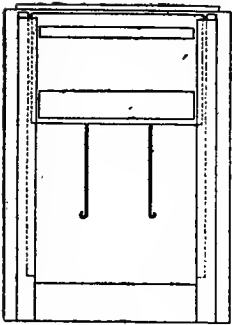


USE OF ORANGE-BOX FOR NESTS.

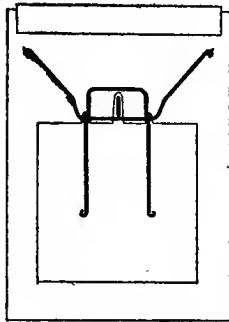
When ordinary nests of the type shown in the illustration are used, one for every three birds will be sufficient.

The next requirement is a dust-bath, and a place for this should be provided by putting two boards on edge and fastening them in a light corner on the floor of the house—the only fitting to occupy the floor; these boards should not be permanently fixed, but may be held in place by means of grooves fastened to the two walls forming the other two sides of the dust-bath. No bottom is necessary, provided the boards rest evenly enough on the floor to retain the dusting material (*see* Chapter VIII).

A shelf should also be provided in a suitable light place, raised high enough to prevent interference with the use of the floor, to hold the necessary hoppers containing dry mash, shell, and grit; or these may be made to hang on screws in the side of the house. The hoppers must in any case be raised, not only to keep the floor clear, but also to prevent the fowls scratching the litter into them; and



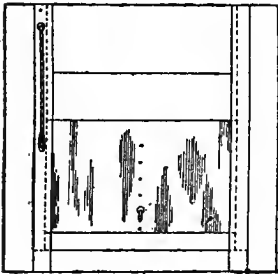
Front.



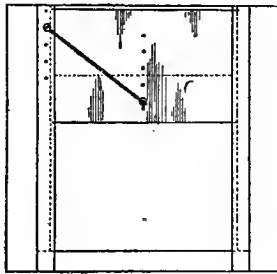
Back.



Section.



Trap sprung.



Trap set.



Section.

TRAP-NESTS.

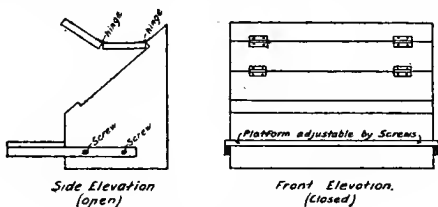
the same applies to the trap-nests, the mechanism of which would get clogged if too near the level of scratching fowls.

Food Utensils

These comprise the hoppers mentioned above and troughs used for wet mash mixtures, together with the drinking-water founts; the last-named are not, however, in any case placed inside the house, although they may be made accessible from the interior in the manner shown. This is effected by means of an opening in the side or front of the house, fitted with wooden bars, between which the fowls may reach the water vessel enclosed in a box (with

lid on top) fixed on the outside after the manner of an outside nest-box. This arrangement will meet the needs in circumstances that compel the confinement of the birds to the house, and is otherwise suitable for adoption when frost or snow prevents access to a water supply in the open run.

For grit and shell small wooden boxes may be used, but for dry mash a hopper is preferable. Hoppers of various designs and methods of construction are obtainable, or they may be made by the poultry keeper, the chief essentials being simplicity and efficiency. They must be so made that the supply of food in the open trough portion is



DRY MASH HOPPER.

constant, and the interior must be sufficiently get-at-able to facilitate cleansing operations ; the trough must be fitted with a lid, so that feeding may be regulated as required.

The wet mash troughs, for both hens and chickens, should be of the kind shown in the accompanying illustration, the rail along the top being an important detail, the object of which is to prevent the birds standing in the food. In the construction of these, as of all other utensils used in feeding, it is essential to bear in mind that the materials used and the method of construction must be such as will lend themselves to efficient frequent cleaning, and the avoidance of any factor likely to deteriorate the quality and condition of the food.

Litter

The well-being of the birds, as regards the maintenance of good health and profitable egg production, and the efficiency of the method of feeding grain on the scratching-

floor, depend largely upon the suitability of the litter used in respect to its character and condition. It is spread over the whole of the floor of the house to a depth of about 9 to 12 inches, and will remain in a sanitary condition for as long as four months without renewal, provided it is kept thoroughly dry, but if it gets damp, it must be renewed without delay.

There are several more or less suitable materials, and those who have the opportunity will find it economical to collect and store in a dry place any available dried bracken and dead leaves, but as these are quickly reduced to dust by the scratching of the birds, their use is at best but a temporary expedient. For more constant general use a stock should be stored of wheat-straw chaff for preference, but here again a considerable economy may be effected by those who keep fowls within easy distance of farms where corn is thrashed, by the acquisition from the farmers of a supply of the cavings, or refuse from the thrashing-machine, available at such times.

In towns, however, peat moss litter is frequently the most easily obtainable form of litter, and it has the advantage of occupying but a small storage space. It is an excellent deodoriser, which is a great point in its favour for those who keep fowls in somewhat crowded surroundings, but unless all the conditions are favourable, it is liable to absorb dampness, whilst when dry it is apt to get too dusty.

All things considered, wheat-straw chaff is the best material, and should be used in preference to any other whenever available. Hay should not be used in any circumstances. If for any reason, as sometimes happens, there is a difficulty about getting the straw cut or chaffed, it may be put down in its long condition, as taken from the truss; active birds will very soon reduce long straw to short pieces by their constant scratching exercise.

CHAPTER II

THE RUN

FOWLS may be kept with or without an open run, but whilst very many poultry keepers in towns must be content to make the best of their surroundings by providing a covered extension of the house for their birds, access to an area of grass should be allowed wherever possible. Breeding and chicken-rearing should never be attempted without a suitable range of sufficient extent, although eggs may be produced very successfully under backyard conditions.

The extremely intensive method of keeping fowls permanently confined to houses of the open front type is, however, very artificial, and should not be adopted except by those whose space is too limited to afford the more natural conditions secured by the use of an open-air run, preferably grass. The system, moreover, is only advisable when a very small number of birds is kept, and there is strict cleanliness, together with sufficiently good management to ensure constant activity on the part of the birds. But, whatever the measure of liberty or confinement, the number of birds must be carefully limited to the carrying powers of the space available ; and, as in housing, any overcrowding of the run will defeat the object and probably end in disaster.

Space per Bird

The safe limits of the carrying power of land are hard to define, and, inasmuch as they depend upon a number of variable circumstances, no exact rules of general application can be drawn up or adopted with a sufficient degree of security. One thing is certain, and that is that where land is continuously and heavily stocked, there inevitably comes a time when it is no longer fit or able to carry poultry

in health. This result is often the unrecognised or unadmitted cause of the failure of poultry-keeping enterprises that have had a more or less encouragingly successful commencement.

A proportionate relation of head of stock to the area that may seem to be amply justified by the returns when the soil is clean and the herbage fresh will in many cases quickly destroy the chances of continued success, unless the number of birds or the period of their occupation of the same ground be limited before the plot is contaminated. Soil and drainage are, of course, influences to take into account in the general connection, and a relatively dry situation should always be selected for the poultry run, where choice is possible.

A medium soil is generally to be preferred to one that is very light and liable to become parched and bare in hot weather, or to one that is so heavy that its drainage is a difficulty. A medium soil provides the best and most constant supply of fresh green herbage and insect life, such as the fowls appreciate, and on a range of any considerable extent, such natural foods will materially reduce the cost of feeding. As regards the carrying power of soils, those that are relatively light may be more heavily stocked than those that are definitely heavy.

The minimum capacity of runs (always subject to modifications on account of individual circumstances) under good management may be estimated on the following general basis, according to the several methods most commonly adopted, viz. : on grass in permanent occupation, up to 100 fowls per acre, and more or less on light or heavy soils respectively ; on grass, divided into two divisions for occupation and resting alternately, 20 square yards per bird ; on earth runs, if dry, limed, and dug occasionally, 20 square feet per bird ; in covered-in backyard runs, with a solid and sound foundation, 10 square feet per bird.

Small Covered Runs

In the construction of a small backyard or garden-run the roof of the house should be carried along over the whole length, in the way indicated in reference to this method of

housing in the previous chapter. But before the run is roofed in, particular attention should be given to the foundation, because the success of the system depends upon keeping the surface of the run dry.

Fowls can only be kept in health in such limited quarters by the avoidance of dampness under foot. The run will receive a considerable proportion of the droppings, and although these must be removed regularly by sweeping, the surface will quickly become impregnated and insanitary if it is at all damp; there is no herbage, as on a grass run, to use it up as a plant food. It is because of the influence of wet conditions upon the manurial product of the fowls, and the resultant danger to the health of the birds, that it is so important that small runs should be roofed over.

It very seldom happens that a suitable surface exists in a garden run, or that sufficient drainage is ensured, without some special preparation. The best way to prepare the run is to dig out some of the soil and fill in a good foundation of broken bricks, rubble, or clinkers. This should be rammed hard, and covered with a sufficient thickness of good gravel, bringing the surface several inches above that of the surrounding ground, and retaining it in place in front by means of a sufficiently stout board placed on edge and fixed by means of a few strong pegs.

The gravel surface must be made level and solidified by rolling it well with the garden roller until it is quite solid and firm. By the regular use of a good stiff garden besom such a surface may be kept clean and wholesome for a considerable time, provided the roofing is waterproof. It may be renewed when necessary by the removal of the gravel surface and the spreading and rolling of a fresh layer. If the soiled gravel that is taken out is put in some suitable place in the garden and exposed to the weather for a time it will be cleaned, and may be used again when the new gravel needs removal. Another, and in some circumstances better, method is to give the surface of the run a good coating of boiling tar.

The roofing material should preferably be the same as that used to cover the house (*see* Chapter I), and the eaves should project sufficiently to afford protection to the front of the surface of the run.

Earth and Grass Runs

Earth runs or an arable range may be more heavily stocked than grass runs and pastures, provided the ground is dug or ploughed, and cultivated regularly and properly. But although a piece of garden ground may be kept in good enough condition for fairly continuous occupation by fowls over a considerable period by the methodical forking or digging of the surface, the only safe system is to provide two runs, and to crop and stock them alternately.

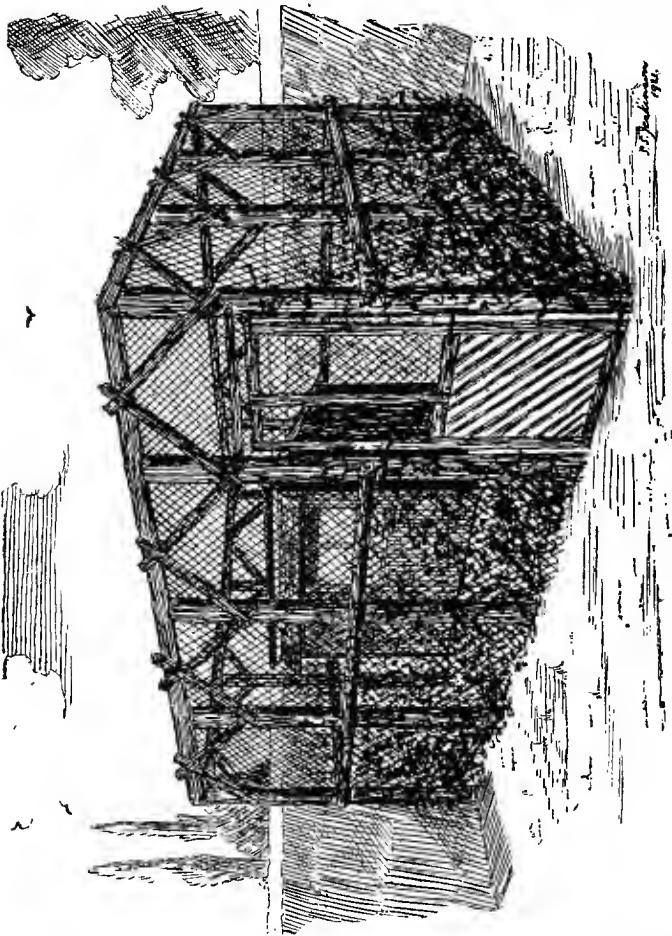
In comparatively small runs of this description various vegetable crops may be both suitably and successfully grown, whilst on bigger areas catch crops of the green fodder description may be cultivated in turn with the fowls' use of the land. The obvious advantage of the double run method is that the growth of suitable vegetable or other crops cleans the ground by the utilisation of the manurial product of the poultry. Poultry manure is nitrogenous in character, and crops of the cabbage family thrive well on plant food of this description, so that cabbages, broccoli, and kale are specially suitable for growth in the pens that are out of use for the time being.

Grass runs, on the other hand, although they will not carry so many birds on an equal area, may be in permanent use provided they receive proper attention. This consists in the use of lime as a dressing, more especially applying it freely in the immediate neighbourhood of the fowl-house, the ground surrounding which always receives a bigger proportion of the droppings of the occupants than the other parts of the run. Grass land used by poultry should also be dressed with basic slag.

This fertiliser is a by-product of the process of the purification of iron in the manufacture of steel, and as it contains up to 40 or 45 per cent. of phosphate of lime (if of good grade), it serves to supplement the poultry manure by supplying plant foods in which the latter is deficient. Grass that receives too big and constant a deposit of such highly nitrogenous manure as poultry droppings becomes sickly and unhealthy. In that state the herbage depreciates in value and becomes a danger to the health of the stock.

But, provided it is not overstocked, it may best be

maintained in a healthy and free-growing condition by dressings of basic slag, which does not contain nitrogen,



BACKYARD HOUSE AND RUN.

but does supply the other essentials for plant growth that are wanting in the poultry manure. The two together (poultry manure and slag) promote a healthy growth of

grass, especially of the very desirable clover plants, and maintain the run in a clean and suitable condition. Basic slag should be applied, at the rate of 10 cwt. to the acre yearly, during the autumn. The best time to apply it is just before rain, so that the birds may be kept off the run until it has been washed down to the roots of the grass.

Should the growth of grass be rank and patchy, a dressing of lime should be given at the rate of 2 tons per acre, and should a point be reached at which the freshness of the run is doubted (owing to overstocking or neglect of the use of slag and lime), the best thing to do to restore its condition is to exclude the fowls until there is sufficient growth to cut ; on a big enough area a crop of hay may be taken.

Arrangement of Double Runs

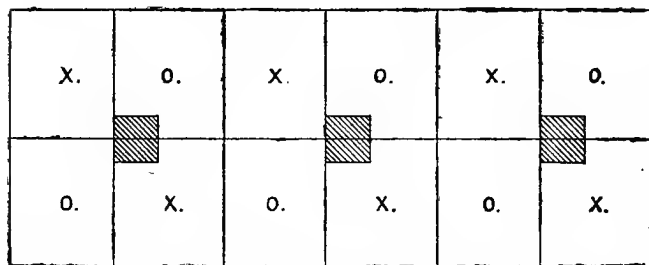
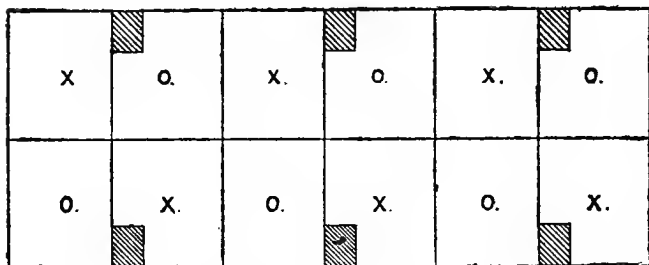
It is worthy of note in the first place, as regards any arrangement of runs, that square enclosures give the maximum space for the minimum quantity of fencing material—a point to keep in mind in view of the need for economy. A square run, moreover, if of grass, will keep in better condition than one that is long and narrow.

The most common and suitable method is to make the runs side by side with the house at one end, in the middle of the total width, so that a door at each end will give access to either run as desired. This arrangement may, of course, be applied in planning for any number of pens of laying stock or confined to the one house as may be required.

But for the accommodation of two or more pens of breeding stock another method is preferable, and the following plan is recommended. First set out a square of a size suitable for division into quarters, and place the double house in the centre of the four divisions, providing it with doors giving access to alternate divisions at will. A range of such pens may be erected side by side to any required extent, and if access is allowed to the several divisions alternately in the manner shown by the marks X and O on the plan, no two adjoining pens will be occupied simultaneously.

The object of this method is to avoid running pens of birds including cockerels side by side, thus preventing

fighting through the wires, and also effecting a saving in material by the avoidance of a considerable expenditure



METHODS OF ARRANGING RUNS FOR ALTERNATE USE.

on boarding enough to screen them effectually if placed side by side.

Fences and Hurdles

The fencing of the poultry pen must serve two purposes, the protection and retention of the occupants ; so that the materials used must be of a suitable description, in good condition, and fixed securely. The best form of fence consists of wire-netting above a sufficient height of boarding to prevent cockerels fighting, if penned in adjoining divisions, and also to afford the fowls some protection from high or cold winds.

The drawback to this method is the greatly increased cost consequent upon the use of timber, but where this is

obtainable at a moderate price, or there is a sufficiency of old boarding available, the wooden portion of the fence should rise to a height of from 2 feet 3 inches to 2 feet 6 inches ; over such a boarded base 2-inch mesh wire-netting should be erected to a further height of 4 feet. It is always preferable to use the boards, and as they will last a long time, such a fence is often more economical than appears at first sight.

But if a boarded bottom cannot conveniently be used, two widths of 3-foot wire-netting should be employed, this size being easier to handle than netting made to a width of 6 feet. The wire-netting should preferably be of a stout and heavy gauge, because, although the initial cost is greater, it will last very much longer.

The most suitable posts to support the wire-netting are 2-inch by 1-inch battens, with angle posts of a 2-inch by 2-inch section. If the poultry keeper has access to a wood or shaw in which there is suitable undergrowth, he should, of course, cut his own stakes and char the ends before driving them into the ground. Posts made of sawn sections should be treated with creosote before erection. The posts should be fixed at 3 yards apart, and where 2-inch by 1-inch battens are used, the widest side should be at a right angle to the run, so that the netting may be fixed to the 1-inch side.

The posts should be cut to a length of 7 feet 6 inches to support two 3-foot sections of wire-netting, thus allowing for a depth of 1 foot 6 inches in the ground ; if a higher fence is used (such as 4 feet of netting over 2 feet 6 inches of boarding), the length must, of course, be increased accordingly. When the posts are fixed, a single strand of stout wire should be run along the top, strained tight, and fixed to each post ; and when the netting is up, a second similar strand should be laced through the mesh at the bottom, so that it may be pulled taut to prevent the fowls getting out as a result of bulging.

It is also important to fix the netting the right way up. When a roll of netting is unrolled flat on the ground it will be seen that it curves, and in fixing it the tight selvage should be put to the top, the looser, curved side being at the bottom and held in position by the strand of wire in the way described above. To fix the netting to the posts it is

better to use nails, hammering the heads over to hold the wire, rather than the ordinary staples, the former being more easily removed.

For movable runs, hurdles measuring 6 feet by 6 feet are the most convenient. These may be made of a wooden frame, using $1\frac{1}{2}$ -inch by $1\frac{1}{2}$ -inch section, and two pieces of wire-netting, 6 feet long by 3 feet wide. The two end upright posts must be cut to a length of 7 feet 6 inches to allow for fixing in the ground, and the frame should be strengthened by a central cross piece in each direction.

A portion of the boarding or of the wire-netting, as the case may be, should be replaced by a small wooden grating (in the most convenient section) to allow the birds to drink from a water-vessel placed outside the run. For such a situation an open earthenware pan is preferable, and it should be wider at the top than the bottom to prevent breakage in frosty weather.

Gates

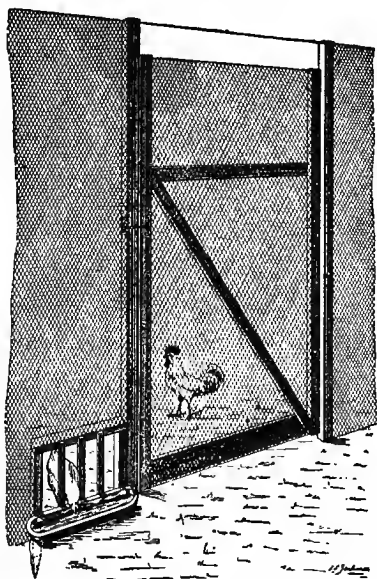
The position of all gates must be determined in accordance with the general plan of the run or runs, and this may vary considerably in different circumstances, but the chief deciding factor should be the saving of time in the daily work of attending to the stock.

A simple and inexpensive style of gate may be made with a framework of 2-inch by 1-inch battens, with 2-inch by 2-inch battens for the posts, driving these latter 1 foot 6 inches into the ground and supporting with struts if considered necessary.

To make such a gate as the one shown in the illustration, two pieces of batten 6 feet long, two of 3 feet 2 inches, and one of 5 feet in length, are required. The long pieces form the sides, the two pieces of 3 feet 2 inches make the top and bottom rails, the top one being fixed at about 18 inches below the top of the upright sides. The 5-foot length is fastened diagonally to form a brace and stiffen the frame.

A piece of 2-inch mesh wire-netting, 5 feet 6 inches long by 3 feet wide, is sufficient for such a frame if strained tightly and nailed securely. It will reach to within 6 inches of the top of the upright sides, and between the tops of these a single strand of galvanised wire should be strained and fastened.

The purpose of this arrangement is to prevent the fowls getting out by flying on to the top of the gate, as they will do if there is a solid wooden rail over all. As they are



CONSTRUCTION OF GATE, AND OPENING FOR WATER-VESSEL.

unable to alight on the single strand of wire, they are forced back if they make the attempt. The ordinary T-shaped cross-garnet hinges may be used to hang such a gate, and the fastening made in the manner shown in the sketch.

CHAPTER III

THE CHOICE OF BREEDS

THERE are so many breeds and varieties of poultry that the list is rather confusing to those who know little or nothing of the subject, and the difficulty is increased by the fact that strains, or families of fowls, within each breed often differ very widely in their useful qualities.

Breeds, Varieties, and Strains

It will help to make the matter clear if we start this subject by saying that for the poultry keeper's purpose a breed may be regarded as a race of fowls that possess particular qualities in common ; that a variety is a branch of a breed that differs from the main or original stock chiefly in the colour of the plumage ; and that a strain is a family of any given breed or variety that has been systematically selected and bred, during successive generations, for the maintenance and development of some special quality.

Again, the breeds of poultry are grouped in accordance with the qualities that predominate in all the breeds included in each of three groups, viz. egg-laying, flesh-forming, or a more or less even balance of both, so that we talk of breeds as belonging to the laying, the table, or the general purpose group as the case may be.

The breeds of each group are distinguished by certain broad differences in type. Breeds in the laying group are somewhat wedge shape, with the development at the stern ; those of the table group are characterised by their breast development, and the width of shoulders and flatness, width, and length of back ; and those of the general purpose are more evenly balanced fore and aft.

But, whilst such characteristics are of value as indi-

cating general tendencies, they are not of themselves reliable guides to the fitness of individual birds for a given purpose, and we shall have to consider the other factors as we come to them; whilst for the methods by which strains are made, reference must be made to Chapter IX, in which the subject of breeding is dealt with.

Laying and General Purpose Breeds

As our present purpose is to indicate the breeds that are most suitable for egg production primarily, it would be waste of time to devote space to the consideration of table breeds, as such. We will therefore confine our classification to the laying and general purpose groups, and suggest the most suitable breeds within those groups for the small poultry keeper in town or country whose chief object is to produce eggs.

But before narrowing our choice it will be useful to give brief notes on the general characteristics of the most useful breeds in each group, always remembering that strain as well as breed is necessary to ensure the best results. The novice must also bear in mind that whilst some breeds and varieties have had more attention devoted to them by those breeders who develop egg-laying strains, there is no reason to doubt the possibility of securing as good results from other breeds and varieties of similar types, provided they are selected and bred with the same care.

Laying Breeds (Non-Sitters)

The laying breeds are sometimes classed and described as "light" breeds, a description that has reference to build and weight, and not to colour, being used by way of comparison with the general purpose breeds, which are similarly referred to as "heavy" breeds. All "light" breeds are non-sitters and layers of white eggs. Among the laying or light breeds, those that claim our more particular attention are the following:

Leghorns.—This breed has long occupied a foremost position among birds of the laying type on account of its well-known capabilities for a high average annual egg

yield. It has always been accounted a good layer, and the records of egg-laying tests have proved the fact conclusively. The birds are non-sitters, and usually lay consistently for relatively long spells. The eggs of strains that are not too small in size are well up to the standard requirement (of 2 oz.), and more often rise above than fall below the average of marketable eggs in respect of weight. The eggs are white in colour.

Leghorns of good strains are characteristically hardy, and a high percentage of fertility in hatching is the usual experience of those who breed on sound lines, whilst, as commonly follows, the rearing percentage is also good. Birds of this breed that are of medium size are the best for good laying combined with desirable weight in the eggs; the smallest birds may lay the greatest number, but this involves a tendency to reduce the average weight and size of the eggs.

The White Leghorn is the variety that has been most widely used for the development of high-yielding egg-strains, a fact of considerable importance to amateurs, on account of the greater facilities thus created for obtaining fresh blood readily when required, without having to buy birds of unknown capabilities. Individual birds of this variety have approached and exceeded an annual egg yield of 300 eggs in official egg-laying tests, but although this shows the possibilities, it is not to be regarded as anything but exceptional and individual.

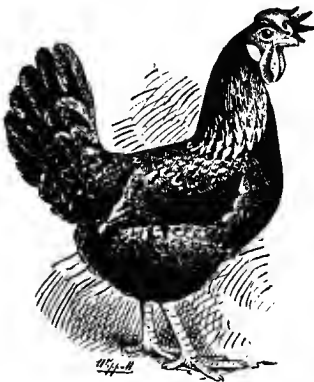
With this or any other breed or variety, the amateur who attains and maintains a flock average of from about 170 to 180 eggs per bird per annum may consider the results as excellent.

For keeping under conditions of more or less close confinement, the White Leghorn is preferable to the breeds of heavier build, these latter being more prone to grow fat and lazy in such circumstances. Whilst the White Leghorn may be kept equally well in town or country, the colour of its plumage is a disadvantage in thickly populated districts, where smoke and smuts abound. The city or town backyard poultry keeper may, on this account, wish to keep birds of darker plumage, in which case no variety is more generally suitable than the Black Leghorn.

The Black Leghorn.—This variety has rapidly increased

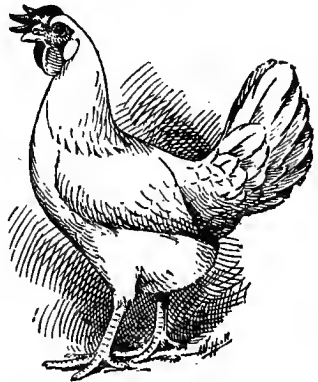
in popularity as the result of high scores made in the more recent laying competitions. Widespread attention was first directed to the possibilities of Black Leghorns by the outstanding success of the four birds of this variety which laid the remarkably high number of 984 eggs—an average of 246 eggs each—in the *Daily Mail's* year's test, which completed the records made during a four months' prize contest from October 1st, 1919, to January 31st, 1920, on the Great Eastern Railway Company's farm at Dodnash Priory, near Bentley, Suffolk.

At the end of this short period winter test this pen of four Black Leghorns stood third on the list of performances, but at the end of the



BLACK LEGHORN.

Utility type.



WHITE LEGHORN.

Utility type.

complete year (September 1920) they had risen to the first place, with a margin of nearly 50 eggs in their favour, establishing a world's record for this variety. A notable feature of this success is that these birds were bred by a small poultry keeper, the winter test being confined to persons keeping not more than 50 birds.

Again, in the National Twelve Months' Egg-Laying Test, 1919-20, a pen of the same variety came out top of its class, five pullets bred

by the winner in the *Daily Mail* test producing a total of 1,052 eggs, of which only 38 fell below the first grade

as regards weight. That there were other pens of the same variety that did not lay half the number is a fact that should be noted as showing the importance of having fowls of a good strain.

Black Leghorns of suitable strains are birds of medium size, and, in common with White Leghorns, are hardy and active. They lay white eggs of good average size.

The Ancona.—This fowl is also of the laying and non-sitting type, small in size, and mottled in the colour of its plumage. It is capable of considerable prolificness, is hardy, precocious, and very active. It is, however, subject to the drawback of its extreme activity and restlessness, being impatient of confinement and inclined to be wild in disposition. For this reason it is usually recommended as being best placed on an extensive range, where its foraging habits will materially reduce the cost of its keep. Nevertheless, the poultry keeper who is careful to deal gently and quietly with it may soon accustom it to confinement. It lays white-shelled eggs of good size, but, in common with Leghorns and breeds of the laying type generally, its table qualities are relatively poor, and surplus cockerels are consequently of small value.

The Campine.—In this breed the Silver variety is capable of an excellent egg production, and the eggs are of good average size, but, whilst less wild in disposition than the Ancona, it is apt to be restless in close confinement, seeking a way to escape.

The Minorca.—The Black Minorca lays a large egg, but is only moderately hardy, and often delicate. The chief reason for mentioning it is because many who know of it as a bird belonging to the so-called laying group, may not know that its useful qualities have been very generally impaired by breeders who aim at the development of exaggerated show points. Where strains of the right type exist, the birds should be worth consideration, but as such strains are difficult to find, the novice should be particularly cautious.

General Purpose Breeds (Sitters)

Among the advantages connected with keeping fowls of this general description are the following: they lay eggs with tinted or coloured shells; they possess a natural

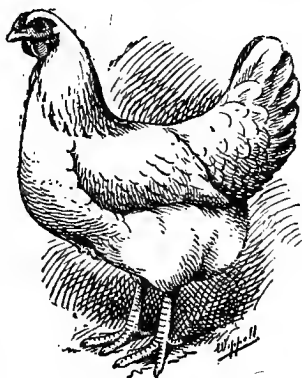
tendency to produce a relatively good number of eggs during the winter; are liable sitters and good mothers; and, having a capacity for flesh as well as egg production, the surplus cockerels have a considerably higher table value than those of the laying breeds.

The Wyandotte.—We need only mention one variety, the White, for our present purpose, because although others are not without merit, they do not approach this bird for egg production. As an egg layer the White Wyandotte is the great rival of the White Leghorn (as a winter producer it is, perhaps, the better of the two), and as it has been very widely developed and kept for this main purpose, its laying strains are, in the same ways as the White Leghorn, very generally available, for both starting and renewing stock.

Apart from outstanding and exceptionally high individual or pen records, it is worthy of note that in a recent test, in which there were 570 White Leghorns, and 440 White Wyandottes, the average production per bird per annum of the latter was 162·36, as against the 173·19 of the former. As an

example of pen and individual scores, in one test five White Wyandottes laid an average of 233·8 eggs per bird, and the highest individual record was 288 eggs. But here, again, a flock average of from about 170 to 180 eggs per bird would be very satisfactory in the garden pen.

Although this variety is well suited to meet the needs of those who wish for fowls for the dual purpose for their own home requirements, the commercial table chicken object is less well served on account of the yellowness of skin and legs. When, therefore, it is a question of developing for profitable production, the line of least resistance is in the direction of increased egg yield; but size may be considerably increased by selection, if required, just as



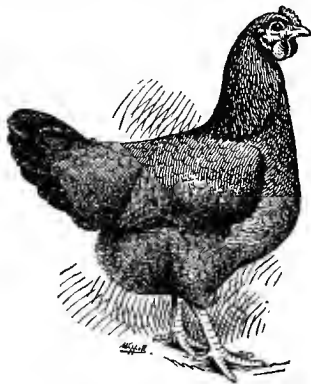
WHITE WYANDOTTE.

Utility type.

prolificness is also increased by selection. For egg production birds of moderate size are required, although care must be exercised in selection for breeding lest the eggs become too small in size.

The breed is suitable for keeping in confinement (if not so close as to produce inactivity and fatness) or on a free range, and, being of a docile disposition, may be kept in big flocks better than some others. All strains are not, of course, equally good, but the White Wyandotte includes some of the finest material for egg-laying strain-making.

The Rhode Island Red.—During the last few years this excellent general purpose breed has come very much to the front on account of its proved capabilities in egg-laying tests, the leading pens in some instances ranging close alongside the White Leghorns and White Wyandottes. In one instance (by way of example) 155 Rhode Island Reds produced an average annual yield of 152 eggs apiece, and the leading pen of five pullets put up a score of 1,027 eggs, thus indicating the possibilities of the breed when well selected for the purpose.



RHODE ISLAND RED
Utility type.

It must, however, be noted, as in the case of any other breed, that some pens laid less than half the number laid by the best—differences due to strain. The breed is characteristically hardy and vigorous, the chickens growing rapidly and thriving. The eggs are not only of a good average size, but the colour is relatively deep.

The Orpington.—The Buff Orpington is capable of an excellent production when bred for useful, rather than show purposes. For egg laying the strain should be smaller, and more closely feathered than in strains intended for exhibition. It is a good winter layer, averaging about 150 eggs and upwards per bird per annum in flocks of good strain.

The breed is hardy, and as suitable for the table as for laying. The eggs are nicely tinted and of fair average size. For the two purposes of egg and flesh production the White variety is, perhaps, preferable to the Buff. The breed may be kept in confinement or on a free range, provided the soil is not on the heavy and damp side.

The Sussex.—This is primarily a flesh-producing type of fowl, laying eggs enough for those who hatch and rear chickens for table by natural methods. But in the Light variety, as compared with the other three, the two qualities of laying and flesh production are most evenly balanced, and during the past few years egg-laying strains of rather more than moderate ability have been developed, especially in respect to production during the winter.

Whilst any excessive development in this direction should be avoided, as tending to lessen the value of the variety for table, it is hard to beat as a fowl that will best meet the needs of poultry keepers who require both eggs and chickens. The breed is hardy, suited to liberty or confinement, and thrives in most situations. The eggs are tinted, and of good average size.

The Plymouth Rock.—Another general purpose breed, in which the Buff variety is usually the best egg producer. Some strains are better than others as winter layers, although this was originally a characteristic of the breed generally. The eggs are usually of good size, and hardiness is a favourable characteristic of the breed, which will often thrive in situations that would be quite unsuitable for many other breeds. Generally speaking, it is more suitably kept on the farm than in the garden pen.

The Barred variety of this breed is capable of a good yield if selected for the purpose in the same way as has been done in breeding the Buffs, and the White variety has also put up good scores in laying tests in the United States of America, thus showing the possibilities of the breed.

The Houdan.—A breed characterised by very good laying and table qualities in combination. The eggs are of average size, but lack colour. Some strains are hardier than others, but the breed is generally unsuitable for

keeping under conditions that are exposed or liable to dampness, and it is usually considered more useful for cross-breeding than for keeping as a pure breed.

Breeds of Outstanding Merit

To aid the beginner in his choice of a breed and variety, we name the following as comprising strains of outstanding merit as egg producers, as proved in the records of laying tests, viz. :

White Leghorns.

Black Leghorns.

White Wyandottes.

Rhode Island Reds.

Provided carefully selected and well-bred strains are chosen, the novice will find in the above the best material with which to start poultry keeping for egg production.

It is of vital importance to secure birds of a good strain, the value of which is so plainly seen in the reports of the egg-laying tests. Although all the pens are housed, fed, and managed exactly alike, it is found in the final results that the birds of one breeder (of any particular breed) stand at the head of the list, whilst another pen of birds of the same breed belonging to another breeder stand far below at the bottom. This difference in results is entirely a matter of strain.

First Crosses

Whilst the above selection may be recommended as comprising the best laying strains now available, there are circumstances in which the acquisition of reliable birds of a given strain and breed present difficulties. It is, therefore, worthy of note that the crossing of such strains of two pure breeds as may be available will tend to improve the vigour and constitutional fitness of the resultant chickens.

That there is a vast difference between first crosses and

subsequent matings (which produce mongrels) is a fact the importance of which must not be underestimated. Mongrel fowls are usually unprofitable stock. First crosses, on the other hand, may give excellent results. Mongrels are the result of a more or less haphazard mixture of breeds and strains, but first crosses are the result of mating two pure breeds chosen for certain breed characteristics.

As a general rule the keeping of pure breeds is preferable to the making of first crosses, always provided that the pure breeds have retained their vigour and soundness of constitution. Pure breeds are not necessarily lacking in vitality, but in cases where any delicateness of constitution does exist, cross-breeding is certainly justified. And the same is true of certain strains which have been allowed to degenerate by unskilful methods of breeding management.

Suggested Crosses

Among the most useful crosses for egg production are:

White Leghorn—White Wyandotte.

White Leghorn—Rhode Island Red.

White Leghorn—Plymouth Rock.

Black Leghorn—Plymouth Rock.

Houdan—Leghorn.

Houdan—Black Minorca.

For the more general purpose of egg and flesh production, the following is a good cross:

Houdan—Buff Orpington.

One of the very best first crosses is the one first-named (White Leghorn—White Wyandotte). If good laying strains of both breeds are used, excellent layers are produced in the offspring, vigour is increased, the table qualities are improved, and the pullets are usually less

inclined to broodiness than their mothers. The chickens being hardy and easy to rear, this first cross may be recommended as most suitable generally for the purposes of the small poultry keeper.

It should be added that the laying powers of most breeds are improved by crossing with the White Leghorn.

CHAPTER IV

BEGINNING WITH A SETTING OF EGGS

HAVING arranged for the proper accommodation of the birds, the next step is to get the stock. There are three suitable ways of making a start. The beginner can buy one or more settings of eggs, and incubate them under broody hens or in an incubator; or the hatching may be left to the breeder, the novice buying day-old chicks and rearing them; whilst the third method is to let the breeder do the rearing as well as the hatching, in which case the pullets may be purchased when ready to commence laying, or very nearly so. The further method of starting with a breeding-pen is not recommended to the beginner, but breeding is dealt with in Chapter IX.

As the three methods involve the successive stages of management, this chapter and the two following chapters deal with the production of pullets for laying from start to finish, so that those who begin with a setting of eggs may learn how to rear and manage by reading straight on. Those who begin with day-old chicks may, however, skip this chapter and turn to the next; or if pullets are bought, their management will be found in Chapters VI and VII. But a general knowledge of the successive processes is desirable, as making for the better understanding of the whole subject.

Buying the Eggs

Do not buy eggs for setting without knowing something about the suitability of the birds that laid them, and the reputation of the breeder of the stock. During the hatching season eggs of all sorts are offered by advertisers, and some are as unreliable and undesirable as others are worth all the money asked for them. Remember that whilst the name of a breed is useful as a general indication of the type of fowl, it is the strain of the breed selected

that really matters. Buy from a breeder whose birds have been proved capable in a laying test.

Before coming to a decision, read what is said in Chapter IX about strains and how they are made, which emphasises the importance of buying only from breeders whose reliability has been proved. The whole future of the beginner's poultry-keeping undertaking depends upon making a good start, and however suitable the house and run may be, the result will be disappointing if the initial stock is not the best obtainable for the purpose.

By setting eggs laid by birds of inferior quality, the work of a whole season may be more or less wasted, and just as much time and money will be expended in rearing indifferent chickens as would be required to raise pullets giving double or treble the return in eggs.

The names and addresses of those who have done best in the various egg-laying tests may be obtained upon application to: The Manager, Great Eastern Railway Co. Poultry Farm, Bentley, Suffolk; The Secretary, National Utility Poultry Society, 3 Vincent Square, Westminster, S.W.1; The Principal, Harper Adams Agricultural College, Newport, Salop; The Secretary, Northern Utility Poultry Society, 35 Scott Park Road, Burnley.

When to Set the Eggs

The period during which eggs should be set for the hatching of laying stock is of comparatively short duration, varying to some extent in accordance with the build of the bird and its habit, or ordinary rate, of growth. Heavily built birds are slower in reaching a proper productive maturity than those of a lighter build, and it is essential to allow full time for growth and development so that the best condition is secured at the season when laying should commence, viz. at from six to seven months after hatching.

To bring birds to the point of laying in the autumn, the eggs from which they are to be hatched should be set at the following times:

Rhode Island Reds, and other heavy breeds, at the end of February, or beginning of March.

Wyandottes, in March.

Leghorns, and other light breeds, in April.

These limits should be kept to as far as possible, because pullets that are hatched too early will be likely to lay early in the fall of the year, and then go into a moult which will probably hinder further laying until the new year. Hatching that is too late will be likely, on the other hand, to prove unprofitable by delaying the commencement of production until the beginning of the following year.

Hatching by Hens

This involves the acquisition of one or more broody hens as well as the eggs to put under them, and it is obvious that both must be available at the right time.

As broody hens are in fairly general request at the height of the hatching season, arrangements should be made well in advance with a poultry keeper likely to have such birds. The breed of the broody is a matter of minor importance, provided the bird is of a suitable type—sufficiently big and well-feathered to hatch and rear successfully—and disposed to sit reliably; she must be in good health, free from vermin and scaly leg (see Chapter X).

Given the right sort of broody hen, the natural method of hatching is preferable for the novice, who is more likely to secure satisfactory results than by undertaking artificial incubation and rearing before some experience has been gained. But no broody should be bought or used until she has been sitting steadily for three or four days, and has been found in the nest-box at night as well as during the daytime.

If such an arrangement is possible, it is usually most convenient to arrange with the breeder who is supplying the eggs to provide the broody hens as well, provided he is not so far away that a long journey is involved.

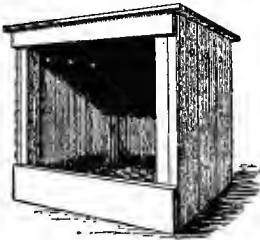
The Nest and Nest-box

The most readily adaptable ready-made boxes suitable for this purpose are those that have contained Tate's sugar cubes, and as such are usually obtainable at a grocer's, some trouble and expense in construction may be avoided. In any case a nest-box should measure about

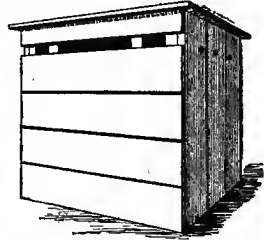
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16 inches in every direction. Turned on its side so that the opening forms the front, a strip of wood about 3 inches wide should be fixed at the bottom of the opening to hold the nest material in position.

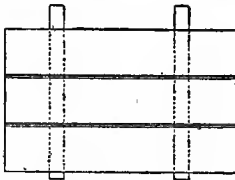
A removable door must then be made to fit the remainder of the opening, and the upper 6 inches of this door must consist of a panel of small mesh wire-netting to afford



OPEN



CLOSED



REMOVABLE FRONT



SECTION

SITTING-BOX.

ample ventilation. The door may be made to fit into a slot, formed by fastening a second narrow strip of wood to the one at the bottom, and projecting sufficiently above it for the purpose; it is fastened at the top by means of a wooden button or as shown.

To make the nest, first fill in a foundation of earth from which any large stones have been removed, filling the corners well, and shaping so that the whole inclines to the centre, which must not, however, be too deep, but

only hollowed enough to keep the eggs together. Then add a lining of sweet, soft hay, shape it with a circular movement of the hand and flatten, so that the result is a smooth, even, and saucer-shaped nest. When forming the nest it is advisable to mix a sprinkling of pyrethrum or other good insect powder with the material.

Setting the Hen

The nest-box, with the well-made nest, must be placed in a suitably protected situation, within the shelter of a dry and airy shed ; the place must be well-ventilated, but not draughty, and light enough and roomy enough for the hen to feed and exercise when the open-air conditions are unfavourable. As the first hens are set comparatively early in the year, the place must be warm enough to prevent any undue chilling of the eggs when the birds are off their nests during cold weather.

When a hen has been steadily broody for the required three or four days and nights, she should be well dusted with pyrethrum powder before she is put on the nest ; the powder should be well rubbed in, down to the roots of the feathers and among the fluff, turning the bird on her back to apply it under the wings and around the vent.

Set her at night on a couple of dummy eggs, and when she has sat steadily on these for twenty-four hours, they may be removed (again at night) and the real eggs gently placed under her ; when she has shuffled them into place she should be shut in again for the night. A hen will comfortably cover from twelve to fifteen eggs, according to her size.

Feeding the Hen

The sitting hen must be visited for feeding and general attention every morning at the same hour. The utmost regularity is essential, because whilst some hens are so lethargic that they will sit still whatever happens, others are liable to become restless if not attended to with punctuality. They are very variable in this respect, and to avoid trouble (due to the bird standing up and unduly cooling, and perhaps breaking the eggs) any neglect must be avoided.

If the hen does not come off the nest when the door is opened, she should be gently lifted out, by slipping the hands under her between the legs and raising the wings to free the eggs. Having lifted her out carefully, put her down on the ground in sight of her food.

This should consist preferably of whole maize or wheat, or a mixture of the two; a pan of fresh water; and a box of sharp flint grit. She should also have access to a dust-bath—a box or heap of fine dry earth or fine (but not gritty) ashes, with an admixture of pyrethrum or other insect powder.

She must, further, be allowed time to relieve herself before returning to the nest, otherwise she will probably foul the nest and make the eggs dirty. If by accident the eggs and nest have become fouled, the hay lining of the latter must be renewed and the eggs carefully washed in lukewarm water.

The time the bird should spend off the nest depends upon the period of incubation and the state of the weather; safe limits should be up to ten minutes at first, increasing to about fifteen minutes during the later stages. When a bird does not of herself return readily, she may be coaxed back gently. If she will not of her own free will enter the nest, then she should be lifted on to the front ledge so that she can step in. When a hen has been sitting for fourteen days she should again be dusted with insect powder.

At the near approach of the hatching date the hen will show a disinclination to leave her eggs, and if they have begun to chip, she should not be taken off the nest; in no case should she be removed after the morning of the twentieth day. With continuous steady sitting the eggs may be expected to hatch on the twentieth or twenty-first day. During the hatching period there must be no interference, by the removal of empty shells or otherwise; leave the hen severely alone.

When the hatch is well over, and all the chicks are found to be dry, remove the hen and give her a good feed of grain; when she has fed and relieved herself, place her with the chicks in the coop prepared for their reception. For subsequent treatment *see* Chapter V.

The Use of Incubators

In some circumstances, when broody hens are not obtainable or more chickens are required than can conveniently be hatched by hens, the use of artificial appliances becomes necessary. There are several makers of reliable incubators, of sizes to suit most requirements, but as there are also some cheap and undesirable appliances on the market, the beginner should be careful to deal only with firms of good repute and standing. The efficiency of such a machine depends a great deal upon the use of good material in its manufacture and good workmanship, both factors that so materially affect value nowadays, that it will be realised that reliable incubators cannot be made and sold very cheaply.

Among the different makes of reliable machines there is a variety of patterns, but they may be divided into two main classes or types, according as the eggs are incubated by means of heat supplied by a system of hot water, or by the circulation of heated air, and they are commonly spoken of as hot-water and hot-air incubators. Some users prefer one and some the other, but provided both are worked in accordance with the directions, there is little or no difference in the practical results.

The Place for an Incubator

The situation of an incubator has an all-important bearing upon its successful operation. Although these machines are fitted with automatic regulators, and may usually be depended upon to do their work within certain limits, it must be understood that such limits exist, and that the ideal internal temperature (given in the working directions issued by the makers) is based upon an assumed suitable external temperature in the room or building in which the machine is stood.

All ordinary fluctuations in the room temperature are balanced with the temperature in the egg-tray or drawer, but if the machine is exposed to sudden or extreme changes in the surrounding atmosphere, it becomes necessarily more difficult for the automatic adjustment to meet the demands made upon a mechanical regulator. The first essential, therefore, is that the room or other place used

for the purpose may be depended upon to maintain a relatively even temperature.

An approximation to 60 degrees may be regarded as the most suitable, and any considerable variation must be met by a corresponding adjustment of the machine in the opposite direction—such as may be suggested in the maker's list of recommendations. As a general rule, however, a sufficiently suitable external temperature may be maintained in a good cellar, provided it is well ventilated and not damp or unwholesome.

Failing this, a room in a dwelling-house will often serve the purpose, if it is not subject to any great vibration; or a solidly built outhouse may provide desirable conditions, if a ground-floor room is available with a loft or other chamber above to prevent fluctuations of temperature due to nearness to roof.

The requirements, therefore, include a reasonably even temperature, freedom from vibration, and a system of ventilation that ensures a regular supply of fresh pure air, without draughts or direct air currents in the vicinity of the incubator.

Starting an Incubator

There are points of difference in detail in the starting and operation of incubators of different types and make, to some of which we direct special attention in the succeeding paragraphs, but with reference to all such particular points the beginner is recommended to study carefully the instruction issued with the machines by the manufacturers. But apart from particular points of difference, the following are the broad lines of working that apply generally in starting an incubator of any ordinary type.

First, set the machine so that it stands solidly and straight, whether on its own legs or on a bench; use a small spirit level on the top to get it straight, and if necessary wedge up the legs to do so. Carefully follow the instructions in fitting the various parts into their places, and especially the regulating apparatus, and adjust the damper so that it rests gently on the top of the flue opening. It is advisable to test the accuracy of the incubator ther-

mometer by comparison with a clinical thermometer (obtainable from any chemist), as these instruments are not always reliable.

If the machine is of the hot-water type, fill the tank with water heated up to about 120° F.; this saves a great deal of time in starting if the water is hot enough, but it should not be hotter than suggested. Having filled the lamp with the best kerosene or petroleum, the wick being trimmed to burn without forks or tails, place it in position, and make an experimental working of the machine before putting any eggs in the tray or drawer. Do not put any eggs in without first becoming thoroughly familiar with the method of adjusting the regulator (according to the maker's instructions), and generally operating the machine so that it is under complete control.

When the working is thoroughly understood, and an interior temperature of about 102° F. has been evenly maintained for a period of about twenty-four hours, the tray or drawer may be filled with eggs. Select the best possible eggs, as regards normal shape, size, texture of shell, and freshness—preferably of that day's collection from the nests. Fill the tray or drawer so that the eggs may be handled easily for turning, but do not overfill; the advertised capacity of some machines is put a little too high for eggs of good average size.

When the eggs have been in long enough to get warmed thoroughly, the temperature should be gradually increased up to 103° F. during the first twenty-four hours of incubation; this is brought about by careful manipulation of the lamp flame, provided the regulator was properly adjusted previously. The damper of a well-regulated machine should hang at a height of about $\frac{1}{16}$ to $\frac{1}{8}$ of an inch above the top of the flue opening when the machine is running at the desired degree of temperature. This allows a margin for suitable automatic regulation in either direction. The reserve of heat that holds the damper suspended at about that height should be sufficient to meet the requirements of a falling temperature during the night in a room that is not subject to extremes.

But when the external temperature is likely to rise during the day, the lamp flame should be lowered in the morning and raised again in the evening; and whenever

there is any manipulation of the lamp, and a raising or lowering of the height of the flame, it is necessary to see that the lifting rod to which the damper is attached is acting freely. At about the tenth day of incubation, when heat is being generated freely by the developing embryos in the eggs, the flame may be lowered a little, thus saving the consumption of fuel, and avoiding any undesirable interference with the regulating apparatus.

Special Points

In tank-heated, or hot-water machines, the water-tray beneath the egg-tray or drawer should be half-filled with water at the start, first heating the water to about 80° F. Arrange the canvas according to the maker's directions, and make sure that it is sufficiently saturated with the water in the tray. As there is a regular loss of the contents of the water-tray by evaporation, water should be added about every third day, or as often as is found necessary. The tray and the canvas must be well cleaned once a week to prevent the growth of mould, for which purpose the use of boiling water is necessary.

In hot-air machines provided with a couple of removable pieces of felt, both should be placed in position beneath the egg-tray at the commencement of incubation. At the end of seven days one piece of felt should be removed, and the second taken out on the fourteenth day. When the eggs begin to chip, both felts are replaced in the incubator, first dipping in warm water the one felt to be put on the top.

When removing the second felt on the fourteenth day the eggs should be slightly moistened by dipping the hands in warm water before turning them; repeat this process each day until the eggs begin to chip and the felts are returned. The incubator must at that time be closed and on no account opened until the hatch is well off.

Turning and Cooling the Eggs

The daily details of management include, of course, the filling, trimming, and cleaning of the lamp; this must be properly done to ensure the flame burning steadily at a given height, and the flue must be cleaned to prevent

smoking, wiping the outside of the oil reservoir with a dry rag to avoid unpleasant odours. The perforated ventilator on the lamp should be removed every day and thoroughly brushed and cleaned to avoid a smoky chimney.

The eggs should be turned twice daily, once in the morning and again in the evening, and in turning them their relative positions in the egg-tray should be changed. This double object is best effected by removing some of the eggs from the centre of the tray, and then gently rolling the others towards the centre with the palm of the hand; those removed from the centre are then replaced on the outside, by which means the conditions are satisfactorily equalised. Begin turning on the second day of incubation, when the eggs have been shut up in the egg-chamber for twenty-four hours, and the process should be repeated twice daily until the eggs begin to chip.

The eggs require cooling daily for a short period, and this is best done when they are turned in the morning, the one cooling being enough. During the first week no special cooling is necessary, the egg-tray being removed long enough only for turning; but, beginning with the second week, they may be cooled for about three minutes, and at the end of fourteen days the cooling should be extended to five minutes, maintaining this period until the eggs begin to chip, as they should do by the nineteenth day.

Directly chipping begins, keep the egg-drawer closed until hatching is finished; on no account should the drawer be opened during the progress of hatching, from start to finish.

Testing the Eggs

Eggs are tested during the process of incubation in order to find out which are fertile and contain living and developing embryo-chicks, and for the removal of all others, viz. those which are infertile and those which are addled. These differences cannot be discovered beforehand, because it is only possible to see the distinguishing signs and appearances when the eggs have been long enough subjected to the correct incubating temperature to make the contents sufficiently visible before a strong light properly focused on the egg.

There are various reasons why it is desirable to remove all but the fertile eggs. An infertile egg cannot generate heat as a fertile egg does, but it is capable of absorbing a certain amount from the fertile eggs with which it comes in contact; this robbing of heat takes place more particularly after the cooling periods, during which the infertile eggs lose their acquired heat comparatively quickly, and, being without any natural reserve, draw upon the stores of the fertile eggs around them. Again, the contents of addled eggs, or eggs in which the embryo has ceased to live, give off gases which are inimical to the well-being of the living embryos by vitiating or tainting the air in the egg-chamber.



EGG-TESTING LAMP.

In addition to these very cogent reasons for testing out the infertile and addled eggs, there is the further advantage of the saving of space that is effected by their removal. When several hens are set at the same time, it may be possible, after testing, to make up the full number of eggs by bulking them under a certain number of the birds, and giving fresh settings to those that remain, and the same thing is possible with incubators or

when hens are used in conjunction with one or more incubators.

Testing may take place on the seventh or eighth day, by which time the distinctive appearances are sufficiently visible before a strong light to be readily distinguishable when the operator is familiar with the differences. As, however, all egg-shells are not of the same thickness, and some are much deeper in colour than others, the novice may find it easier and more certain to test on the tenth day, but the operation should not be further delayed, because after that period the developing embryos of fertile eggs are liable to lose more of their own heat by contact with eggs that contain no living and heat-generating germs.

The Testing Lamp

So long as the light is sufficiently focused on the egg, the kind of lamp used for testing is a matter of small importance. Most of the leading poultry appliance makers sell suitable lamps for the purpose, but it is a simple matter to construct one. All that is required is to enclose a strong light (an electric torch is as handy as anything) in a box, and to cut a hole in one side of the box, opposite the light, slightly smaller than an egg of average size.

This is used in a darkened room, holding the eggs one by one before the aperture and noting the character of their contents as revealed by the strong light behind them. The fertile eggs are, of course, returned at once to the nest or incubator. Those that are addled must be destroyed, but the infertile or clear eggs are quite wholesome for use in cooking or may be utilised in feeding young chickens.

Distinctive Appearances

The infertile egg appears quite clear and translucent (allowing the light to pass through, although not transparent), the only thing noticeable before a powerful light being a dim shading of the yolk; practically the appearance is that of a recently laid egg. The addled egg, on the other hand, is cloudy throughout, darker in some parts than in others, and more or less spotted; sometimes irregular lines are seen to be adhering to the side.

The fertile egg is opaque, or evenly dark throughout the greater proportion of its contents, with a clearly defined air-space at the broad end. When testing takes place at about the seventh day, the embryo appears as a dark body from which blood-vessels radiate in a spider-like arrangement, and at the tenth day a reddish shade is discernible and the direction of some of the bigger blood-vessels may be traced. The novice testing for the first time will find it useful to have a new-laid egg handy for comparison with those in the incubator.

Removing the Chicks

A word of warning—from the time the eggs chip, whether under a hen or in an incubator, avoid any interference. Leave the hatching and hatched chicks alone until all are out of the shell and dry. The period may extend from, say, about fifteen to twenty hours, and as they are provided with a natural supply of food (in the form of yolk substance which is drawn into the abdomen just before hatching), there is no need to be in a hurry to remove them to the coop or brooder; for their subsequent treatment *see* the following chapter.

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de biblioteek van
dhr. Fr. Van Doorn

CHAPTER V

BEGINNING WITH DAY-OLD CHICKS

IN this chapter we take up the story of the newly hatched birds from the time they are ready to leave the nest for the coop, or the incubator for the brooder; and whether they are hatched on the premises, or received in a box from the breeder from whom they have been ordered in advance, the treatment is along the following general lines. As in hatching, so in rearing, there are two methods—the natural and the artificial; the chickens may be reared under hens or in brooding appliances, and those who start by purchasing “day-old” chicks must provide a broody hen or a mechanical brooder in advance of the receipt of the birds.

When to Buy Chicks

Those who start with a setting of eggs will have read in the last chapter the most favourable periods at which to set them, according to the character of the breed that produced them; and those who make a beginning by purchasing newly hatched chicks should order them for delivery at the corresponding hatching periods, or about three weeks later in each instance. In other words, order day-old chicks of the following breeds for delivery at the approximate periods noted against each, viz.:

Rhode Island Reds, and other heavy breeds, during the latter half of March.

Wyandottes, at the end of March or beginning of April.

Leghorns, and other light breeds, in April or the early part of May.

This does not mean that the ordering of the chicks should be put off until the months named. On the con-

trary, it is usually necessary to book such orders with the reputable breeders some months in advance of hatching. But at the time of ordering the stipulation should be made that the chicks are to be hatched and delivered at the approximate times indicated, as being the most favourable for the purpose of rearing laying stock.

Before the time for the delivery of day-old chicks, or the hatching date of eggs incubated on the premises, the brooding appliances (coops or brooders) must be provided, and of the various descriptions the following are the most suitable generally.

The Coop

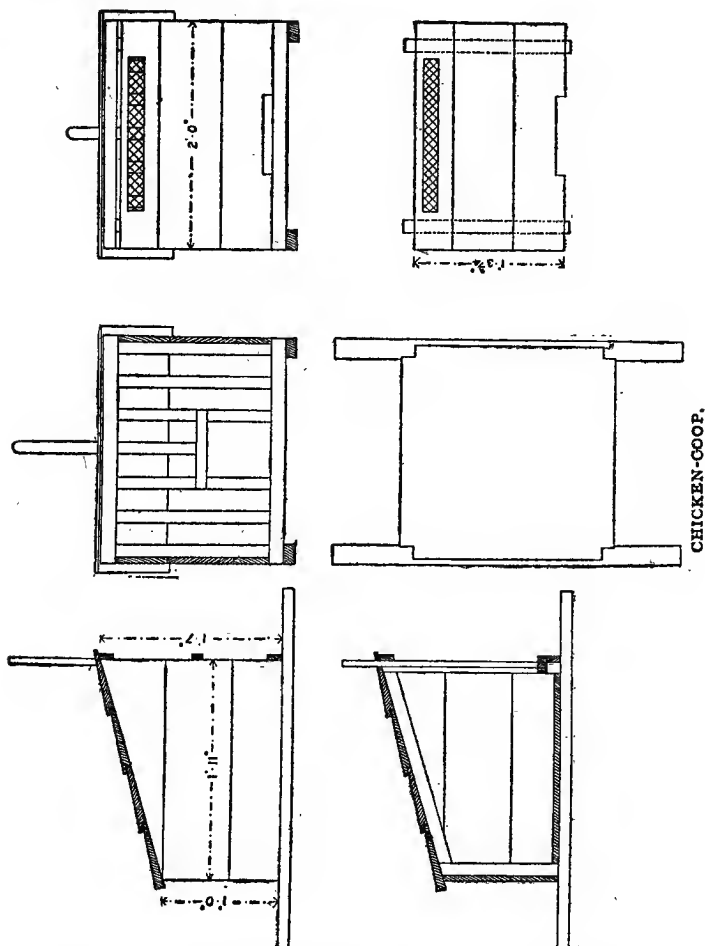
So much of the success in chicken-rearing depends upon the construction of the coop and its efficiency for the purpose that the beginner is advised to adopt the type illustrated, and described below, as being the most suitable. Match-boarding, $\frac{5}{8}$ inch thick, makes the best material for the sides and back, with weather boards for the top. The framing is made of 2-inch by 1-inch battens.

The general design of the coop is that common to most, except that the roof is made to project slightly all round. It is 2 feet wide, 2 feet from front to back; 1 foot 8 inches high in front, sloping to a height of 1 foot 1 inch at the back. In the front a piece of match-board, 3 inches wide, is fixed across the top; and another piece, 2 inches wide, across the bottom.

The bars, about 1 inch wide, also cut out of match-boards, are placed with a space of $2\frac{1}{2}$ inches between each. The middle bar, with an inverted T-piece at the bottom, is cut slightly wider towards the bottom, so that when it is raised through the slot in the front of the roof it fits tightly enough to hold it up without any fastening; this effects a saving of time when letting the hen out.

The floor is a considerable improvement on those of older types, and is made separately and removable. It consists of two pieces of 2-inch by 1-inch batten, 3 feet long. Six inches of both ends of these are left to project beyond the match-boarding which is nailed to them (one being on each side) to form the floor; these pieces of boarding are 1 foot $10\frac{3}{4}$ inches long (to allow for the

thickness of the sides, included in the measurement of 2 feet over all).



The floor when made in this way fits inside the bottom of the coop, the sides of which come down over the board-

ing so that the rain-water runs down right on to the ground, thus keeping the floor quite dry. The projecting battens at back and front enable the poultry keeper to pull the coop in either direction on to fresh ground; or the coop may be lifted by two persons for removal to a greater distance, without any disturbance of the hen and chickens.

The front is also of an improved description, and one that is readily fixed or removed without buttons or other fastenings. It is made of two upright pieces of wood to which the boards are nailed, the uprights projecting beyond the boards at top and bottom, so that it is placed in position by thrusting the upper projections in the space behind the strips of wood at the top of the front of the coop, and then dropping it so that the lower projections (which are a little shorter than the upper ones) fit into the space behind the strip fixed along the bottom of the front.

The boards on the front are 2 feet in length and 1 foot 2 inches in height, and a panel of wire-netting (small mesh) is fixed in the upper portion between the two upright pieces of wood, to provide the necessary means of ventilation—an extremely important detail of construction.

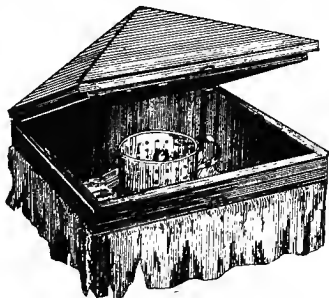
The Brooder

Of the many different kinds of brooders or foster-mothers, designed and treated in a variety of ways, the one that is most especially suited to the requirements of the beginner—on account of economy and simplicity—is that known as the "hover" type. There are several makers of this type of brooding appliance, but the principle of all is practically the same (the differences being in details of application).

As a general type it is recommended because of its adaptability. It consists of the heating apparatus, without any enclosing structure, so that it may be used by standing it on the floor of such poultry-houses as we have described in Chapter I, or in any other suitable houses, sheds, or outbuildings; its construction is simple, and it presents no great difficulties in management. It may, for example, be used at the commencement of the rearing

period on the floor of the chicken-house, to which the birds would ordinarily be removed from other types of foster-mothers, removing it (instead of the birds) when artificial heat is no longer required.

It will thus be seen that the use of a hover simplifies management, and that a considerable saving may be effected in initial outlay, as the cost of the heating apparatus is necessarily less than that of a brooding appliance made for use in the open. Moreover, at the end of the rearing season the parts may be cleaned easily, and the whole stored in a comparatively small space. Hovers are made in sizes to suit most requirements, and are heated either by anthracite coal or oil, the stove or lamp occupying a central position with a widespreading covering metal canopy or deflector (the hover proper), constructed at a suitable angle to throw the heat down evenly upon the backs of the chicks.



CHICKEN BROODER.

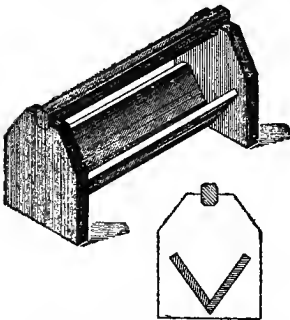
In practice the chicks range themselves around the lamp in a circle, at such a distance from the lamp as they find the temperature best suited to their needs at the moment. During the first two or three days it is necessary to place some pieces of board (about 8 inches deep), or a circle of small mesh wire-netting, 12 inches high, round the hover to keep the chicks together and within the heated zone, but after that they should be allowed the freedom of the whole floor space, and left to choose their own position.

Other useful types of brooders are, like incubators, of two main classes, according as the heat is supplied by means of a tank of hot water or by the distribution of air that has passed through some form of heater. These are mostly made with two compartments, one for brooding purposes and the other for use as a covered run. In construction they are usually weather-proof and suitable for use in the open ; whilst for more extensive operations

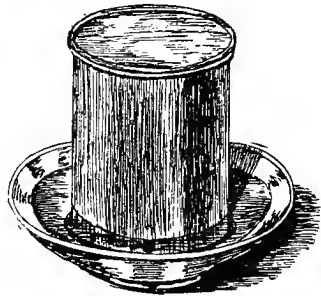
permanent brooding-houses are sometimes used, being heated by means of hot-water pipes. If outdoor brooders are used by the beginner, they should preferably be of a size that may be moved from place to place.

Utensils

For use with coops and brooders a sufficient number of food-troughs and water-founts must be provided, and whatever is used for these purposes must be of a type that may easily be kept clean. Earthenware or galvanised iron is a suitable material for food-troughs, preferably



TROUGH FOR SOFT FOOD.



WATER-FOUNT MADE FROM
TREACLE-TIN.

fitted with a barred guard on top to prevent the birds trampling their food.

There are many suitable and simple forms of water fount, but they are easily made with a golden-syrup tin (with a hole cut in the side near the top of the tin, which is inverted when filled with water) and an ordinary saucer—in the manner shown in the illustration.

For cleaning, a scraper is required for the floors.

Preparing for the Chicks

When the chicks are to be reared by the hen that hatched them, they should be placed with her in the coop provided for them as indicated in the last chapter. But when incubator-hatched chicks, bought as "day-olds," are to be reared by a hen, a suitable broody must be held in

readiness for their arrival from the breeder. Just as a broody must be tested for reliability before she is entrusted with a setting of eggs, so also must the hen have been proved before the stranger chicks are put under her; for this purpose a broody should have been sitting steadily for at least seven days, or from that to fourteen. Dust her well with a good insect powder.

The coops should be placed on short turf in a well-drained and fairly sheltered situation, not too near to trees or shrubs, but in a place where the young birds can benefit from the sunshine. For rearing in a garden a very suitable place for the coop is on the gravel path by the side of the lawn.

For rearing by artificial means, the hover or other type of brooding appliance should be operated in advance of the hatching date or arrival of purchased chicks, in order to make sure that it is in proper working order, and to become familiar with its manipulation and regulation. The novice should read carefully the instructions issued by the maker, relative to putting the parts together, and also in respect to the methods of regulation that may be peculiar to any given make of appliance.

If a lamp is used, it must be as carefully attended to as the lamp of an incubator, and should be lighted and the brooder run for a full day before use with chickens in order to observe the general tendencies as regards the maintenance of the required temperature. The proper brooding temperature at the commencement (after the chicks have been under the hover a couple of hours) is 90° F., with a subsequent gradual decrease; the presence of the chicks will raise the temperature several degrees when first put in. When all is found to be in proper working order, and the heating arrangements are subject to control, the floor should be bedded ready to receive the chicks. For this purpose peat moss, straw chaff, or cavings (the latter may be obtained by country poultry keepers from farmers when thrashing is going on) are the most suitable.

A small movable outdoor brooder may be put out on short turf, in the same way as a coop, but where a hover is used in a house or shed, there must be free access to a grass run outside. But in either case it must be remembered that brooder-reared chicks are without the care

and restraining influence of the mother-hen, so that it is necessary to prevent straying during the first week by making a small enclosure of 1-inch mesh wire-netting 12 inches high around the entrance. After about a week a bigger run may be allowed.

Treatment of Day-old Chicks upon Arrival

Newly hatched chicks when dispatched, as soon as they have dried and recovered from the exertion of hatching, in boxes of a suitable size and shape (properly lined and ventilated), will travel safely by rail over quite considerable distances.

But although they will come to no harm even if the journey occupies as much time as from twenty-four to thirty-six hours, the period should not be unnecessarily lengthened by any failure to collect them from the railway station as soon after arrival as possible. Their proper and prompt treatment upon arrival at their destination is all-important to their well-being, and any failure in attending to them then may counterbalance the care of the breeder in dispatching them.

Their first need when unpacked is warmth, not food. The best way to deal with them is to transfer them direct from the travelling-box to a flannel-lined basket placed in front of a fire; not near enough to scorch them, but at a suitable distance to warm them thoroughly—at a temperature of, say, from 95° to 100°. When well warmed they will begin to get lively, and probably show signs of seeking for food by pecking the flannel or basket.

They should then be given their first meal, which may consist of dry chick feed (as described in a later paragraph), or baked egg custard dried off with Sussex ground oats or breadcrumbs, and grit, with a drink of water or skimmed milk. It is sometimes necessary to dip the bird's beak into the vessel to teach it to drink. After warming and feeding, the young birds are ready to be put under the hen or hover.

If the former, the operation should be carried out after dark, and at first two chicks only should be put gently under the hen. If she takes to these kindly, clucking and settling down quietly, the remainder of the chicks may be

slipped under her wings at the end of an hour or two, and the coop closed for the night. In a brooder heated to about 85° (to allow for a subsequent rise in temperature) the whole batch may be put within the enclosure beneath the hover, preferably early enough to allow time for the regulation of the heat before night, and the thermometer should be examined once or twice at intervals to ensure the maintenance of a suitable temperature before leaving them for the night.

Feeding : First Three Weeks

It is best to start the chicks on a dry chick feed, and to continue this diet alone during the first three weeks. The best mixture consists of :

50	per cent.	kibbled wheat.
25	„ „	groats.
10	„ „	canary seed.
5	„ „	kibbled maize grits.
5	„ „	millet seed.
5	„ „	hemp seed.

The groats should preferably be Canadian, although not necessarily of the best quality. Generally speaking, however, the cost of the dry feed ingredients is of small account provided the quality is sufficiently good, because so much depends upon the proper feeding of the birds during the early stages, and the amount eaten during the first few weeks is relatively small. Sharp flint grit, of a size suitable for young birds, must be available at all times, and a continuous supply of fresh pure water is another essential.

Chickens that are unable to get access to short young grass should be supplied regularly with green food— young cabbages, lettuce, spinach, or any other green vegetable, or young onions, including the green tops, tend to keep them in good health.

At the beginning, until the birds are familiar with the character and appearance of the food, the grains and seeds should be sprinkled on a piece of brown paper near the hover, after which they will become gradually accustomed to search for it in the litter. Feed five times daily

during this period, feeding sparingly at first ; give no more than they will eat readily and remain active. Skimmed or separated milk should be given whenever available, as its use is most beneficial.

After the first couple of days the chicks, being naturally reared, should be fed just out of reach of the hen, otherwise she will eat more expensive foods than the wheat, maize, and oats which should be given her.

Feeding : Second Three Weeks

Begin to feed soft food after the third week, giving one feed only of this mixture at midday, and reduce the total number of meals to four daily.

The soft food mixture should consist of :

Boiled rice dried off with equal quantities of middlings or Sussex ground oats ; if rice is not available, use wheat, boiled until nearly ready to burst—but not quite bursting—and dry off as before.

In place of this soft food a cooked grain pudding may be made of kibbled wheat, maize, rice, and groats, with 5 to 10 per cent. of linseed (to help feathering). Make this with milk and bake like a rice pudding ; when well cooked dry off with Sussex ground oats or middlings.

Continue this until the sixth week, but alter the dry chick feed after the first month, cheapening the mixture by leaving out the canary seed and millet, and giving more wheat in proportion, with a little more maize.

Feeding : After First Six Weeks

From now onwards the grain mixture should consist of :

- 1 part of kibbled maize.
- 3 parts of kibbled wheat.
- $\frac{1}{2}$ part of groats (Canadian, not Scotch).

Whole oats—short, plump, and clipped—should be introduced gradually to accustom the birds to their use, increasing the quantity by degrees until they make one part of the whole mixture, leaving out the groats. When the birds reach the age of four months, the kibbled wheat should be discontinued, and whole wheat used instead.

For the soft food mixture use :

1 part of middlings, sharps, or thirds.

1 part of Sussex ground oats.

$\frac{1}{2}$ part of maize meal.

And a very little good meat meal ; 2 per cent. at first, increasing to full ration of 5 per cent. gradually ; this will be sufficient until it is time to put the pullets on a laying ration.

As it is preferable to feed small rations at short intervals rather than to give big meals less frequently, it is desirable to continue feeding four times daily until the birds are about sixteen weeks old, after which three meals a day will suffice. The best method of feeding during this period is as follows :

1st meal—a small quantity of mixed grain in the litter as early as possible.

2nd meal—a smaller grain ration at 10 a.m.

3rd meal—a feed of mash at noon.

4th meal—as much of the mixed grain as the birds will eat, as the last feed, in the latter part of the afternoon.

End of Brooding

The brooding period, whether by hen or artificially supplied heat, extends to from about six to eight weeks, according to the season of the year and the prevailing climatic conditions. At the end of the sufficient period the hen is removed from the coop, or the hover is taken out of the house.

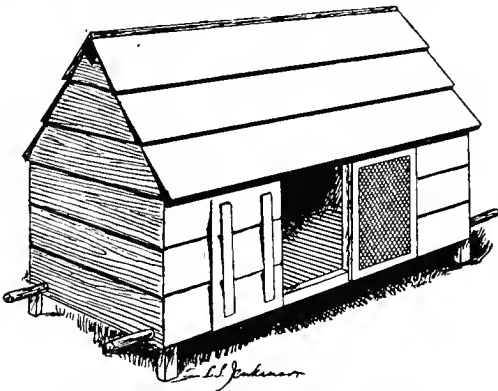
During the whole brooding period, in the case of artificial rearing, the heat should be gradually reduced as previously suggested, but at each stage in this progressive reduction the behaviour of the chicks must be carefully noted, lest there is any tendency to undue crowding, such as results from a too sudden drop in temperature. The use of perches at this period will reduce the risk of overcrowding.

General Management

Throughout the rearing period too much attention cannot be paid to cleanliness, whether in the coop or brooder, or

in the surroundings on the run. Coops and brooders must be cleaned daily, and particular care must be taken to keep the litter and the floor dry in wet weather—especially when shutting up for the night. It is a good plan with coops in wet weather to scrape the floor boards just before shutting up time, and to dust them over with fine dry sand, or if the ground is infested with gape worms, dust with air-slaked lime. Give them a thin covering of straw chaff or cavings. In fine weather, on dry soil, floors need not be used, but the coop should be moved twice a day.

Coops and movable brooders should be moved daily,



SUSSEX CHICKEN-ARK OR HUTCH.

if no more than their own length, to ensure clean surroundings, and also for the preservation of the turf on which they stand. When the birds are sufficiently grown, at or soon after the time they are able to do without the mothering hen or the heat of the hover, they should be removed to chicken-houses, which may be of the same general type as the houses described in Chapter I. Houses of the Sussex Ark pattern are also suitable.

This type of chicken-hutch is in appearance very like the toymaker's "Noah's Ark." The usual measurements are about 5 feet 6 inches long, 2 feet 8 inches wide, and 2 feet 6 inches high. The box-like body is set on legs about 1 foot 6 inches high, and the two pieces of quartering

which form the horizontal portion of the frame at the base of the body run out about 18 inches at either end to form two pairs of handles. About one-third of the side opens as a door, and the floor is a wooden grating, an arrangement by which the land receives the droppings direct, and the cleaning of the interior is reduced to a minimum.

Hen brooded chicks should be examined periodically for vermin, especially about the head and neck for ticks.

The sexes must be separated as soon as it is possible to distinguish the cockerels (at from six to eight or twelve weeks according to breed), dealing with these birds as recommended in Chapter VIII. Throughout the rearing period, from the time the birds leave the coop or brooder, not only is change of ground necessary as regards the immediate surroundings of the house or hutch, but the pullets should be allowed access to as extensive a grass range as possible. The encouragement of activity and the opportunity for foraging make for normal growth and development, and ensure hardiness and the stamina that is required in good laying stock.

For the further treatment of the pullets for laying *see* the next two chapters.

CHAPTER VI

BEGINNING WITH PULLETS

WE have dealt with hatching and the rearing of the chickens up to the near approach of the time when the pullets should be in a fit condition to commence laying. This brings us to the point from which many, and indeed the majority of, beginners make a start in poultry keeping by buying pullets that have been already reared by the breeders.

There is yet a further method of starting, by the purchase of a pen of fowls suitable for breeding, but we do not propose to deal separately with this, because the generality of beginners are, as a rule, not sufficiently equipped in the matter of knowledge and experience to make such a start desirable, and those who wish to learn something of breeding methods will find the subject discussed in detail in Chapter IX.

Comparatively few small poultry keepers are suitably situated to undertake breeding operations, and although there are some who are able to engage in hatching and rearing, the greater number would be well advised to start with a pen of pullets. This is by far the easiest method, apart from any question of the existence or otherwise of proper facilities for breeding, incubation, and rearing, all operations requiring certain qualifications, as well as more space than is needed for the accommodation of a pen of pullets.

To begin with birds that are nearly ready to lay is to escape many of the pitfalls that the novice is not always able to avoid otherwise; because, given good and well-reared birds, all that remains is to master the methods of feeding and managing laying stock.

When to Buy

The autumn is the time to buy pullets. Birds that were hatched at the times named in the last chapter should, if suitably reared for normal growth and development, be ready to begin laying at an age of from six to seven months—according to the build of the breed (light or heavy) and its average rate of reaching a productive maturity. Under normal conditions, therefore, suitable pullets should commence laying in October or November.

As it is desirable to give them time to settle down in their pens, amid strange surroundings, a little in advance of the beginning of laying, arrangements should be made with the breeder to deliver them some two or three weeks earlier, say sometime in September. To ensure the carrying out of any such arrangement it is usually necessary in dealing with the better-known reputable breeders, whose pullets are in keen demand, to book orders some time earlier in the year. If this is not done, there is a great risk of being unable to obtain the most desirable stock.

Where to Buy

The source of supply is obviously a matter of the first importance, whether the purchase consists of a setting of eggs, a batch of day-old chicks, or a pen of pullets. There are so many traps for the unwary that we must risk some repetition in order to impress upon the novice how vitally essential it is to his future success to begin with sound stock of a suitable description. In the autumn there are thousands of novices seeking pullets to stock their garden or backyard pens, and it is at this season that unscrupulous dealers reap their richest harvest by disposing of poor, and very frequently diseased, fowls at high prices.

There are, moreover, many common swindlers who advertise non-existent stock from an accommodation address, and many more who buy in birds from any and all available cheap sources for re-sale at greatly increased prices by means of descriptions that are deliberately intended to deceive. In other cases the names of breeders of good repute are unfairly used in naming so-called "strains," by those who have at some time introduced into their flocks a few fowls that originated from the yards

of the breeder whose name is thus appropriated for advertising purposes.

It is for such reasons as these that the novice is advised to buy his pullets direct from one of the many well-known breeders, whose birds have competed in recognised laying tests, and whose records in such tests furnish reliable proof of the productive value of his or her strain. There are many such breeders, so that the choice is not unduly restricted, but the recognition of such a limitation is essential in the interests of all concerned in the advancement of poultry keeping among small producers. [For the names and addresses of the authorities who will supply lists of breeders whose birds have done well in laying tests, see Chapter IV.]

Put Bought Birds in Quarantine

Not only is the quality of birds bought from unknown sources so often questionable, but there is the ever-present risk of importing disease along with the fowls. Many fowls that are already diseased, or that have come from infected quarters, are dispatched by unscrupulous dealers, and there is always the possibility that the crate in which they are sent may have contained diseased birds previously.

There is also the more or less unavoidable risk to which birds from any source may be exposed, consequent upon delay in transit; such delays very often involve an amount of exposure sufficient to cause colds and chills. It follows, therefore, that whilst the risks that are run by making purchases from careless or wilfully unscrupulous dealers may be avoided, it is always desirable to put pullets into quarantine for ten days or a fortnight when first received. This is a necessary and commonsense measure of prevention in any circumstances.

Health, Vigour, and Soundness

In addition to the several points in selection described in detail in Chapter IX, to which the purchaser of pullets would do well to refer, it is particularly necessary to look for the signs of good health and constitutional vigour, without which the highest results are unattainable. In Chapter X the general appearances of birds in bad health

are described, and against these may be set the following general indications of good health and constitutional vigour.

Select pullets that are active and lively (as distinct from birds whose energy is of a nervous character); look for a generally alert carriage and appearance and quick movements. If possible, watch the birds scratching or foraging, and note those with a good appetite and a relatively well-developed crop. The eye should be clear and bright (but not with the brightness that is characteristic of some forms of disease), and the comb and wattles of a healthy red colour. The droppings should be normal—rather dry, or enough so to retain their shape, and about one-third white in colour. There may be slight departures from the normal character of the droppings, without any serious significance of ill-health, but any very abnormal appearance should suggest inquiries.

The plumage should be bright and close-fitting, and there should be no sort of physical deformity, such as a roach (or crooked) back, a badly crooked breast-bone (as distinct from slight indentations due to early perching), or knock-knees—all such departures from perfect formation being more or less indicative of want of constitutional soundness and vigour. The birds must also, when purchased in the autumn, be sufficiently well grown and developed to indicate the near approach of a productive maturity.

Reject any bird that is at all stunted for its age and breed as having been subjected to a check in progressive rearing from which it will scarcely recover or prove properly profitable. On the other hand, birds that are too precocious (showing signs of laying whilst still immature) are equally to be avoided, lest production hinder the attainment of full maturity. With due regard to the type and average size of the breed there must be a "fine" appearance about birds selected for laying, which, in conjunction with alertness and activity, is in direct contrast to the coarseness and heaviness that characterise birds of an unsuitable type.

But for the more particular points of the laying type and the meaning of "strain" reference must be made to Chapter IX, always bearing in mind the supreme importance of health, constitution, and vigour.

General Treatment

Make all ready for the pullets, as regards the preparation of the permanent laying-house and run, whether for the accommodation of the birds reared on the premises or for the reception of pullets bought from a dealer. Avoid as far as possible any great or sudden change in the method of feeding or management generally, and in the case of purchased pullets it is always advisable to ascertain the breeder's course of feeding so that there may be no unnecessary or avoidable break in the continuity of treatment.

With the near approach of the commencement of the laying season, due attention must be given to the condition of the birds. Any loss of condition at this period will retard production, and it is as necessary to avoid this as it is to check any disposition to lay before the attainment of a suitable degree of maturity. Birds that are too precocious, reddening up in the comb and showing signs of an inclination to lay, must have their rations revised by the elimination of stimulating foods, and be removed to a fresh run amid other surroundings. A fat condition is another danger that must be avoided at this stage, and if such a tendency is revealed when the birds are handled for examination, the feeding must again be modified by leaving out any ingredients of a fattening character.

When the pullets have been successfully reared to a suitable age, maturity, and condition for putting into the laying-house and feeding for immediate results, the question of feeding involves that of the method of housing and management generally. In order to secure the best results in egg production, there should have been a progressive "feeding for eggs" right through the successive stages of rearing from the shell onwards, culminating in the more direct feeding for immediate production in the manner described in the next chapter.

Advantages of Buying Pullets

Although the purchase of pullets ready to lay is necessarily a more expensive way to start than by buying a setting of eggs or a batch of day-old chicks, it is a method that is very advantageous to the beginner who is without much knowledge or any experience. By this method the

novice eliminates all the risks of breeding, incubation, and rearing, and secures the required number of birds, embodying (as they will if bought from a reputable source) the result of the accumulated knowledge and experience of a skilled breeder and strain-maker.

Such a man has the best facilities for the proper conduct of all the operations, and is enabled to secure the required growth and development to ensure the attainment of a suitable condition to respond to the right feeding and treatment at the commencement of the laying season. Those who have not a suitable place in which to rear chickens, or are unable to give the necessary attention without which the proper progress of young birds may be hindered, are recommended to adopt this method of beginning poultry keeping.

Renewal of Stock

In the same way, a multitude of small poultry keepers must also necessarily depend upon the specialist breeders for the birds required to renew periodically their laying stock, in order to maintain it within due limits of productive age. We have pointed out elsewhere, and would again emphasise, the importance of keeping the laying stock young. This is the only way to ensure a sufficient egg yield to show a profit on the feeding, because there comes a period in the productive career of a fowl beyond which its output of eggs sinks below the level required by economy.

There must therefore be regular periodical clearances of birds that are no longer worth keeping, and these must be replaced by birds purchased from the breeders. We have pointed out that two and a half years is the profitable extent of a hen's career for the egg-laying purpose, so that arrangements should be made well in advance of the attainment of that age for the renewal of all birds when their limit is reached.

CHAPTER VII

FEEDING LAYING STOCK

THE whole subject of feeding is of vital importance in its bearing upon the economic success of any poultry-keeping undertaking. It is necessary to feed the mature pullets in the autumn (the beginning of the egg-producing season under conditions of domestication) to ensure a commencement of laying during October and November and to maintain the yield subsequently. The real test of the pullets' suitability and their owner's skill is the measure of success obtained in the production of eggs during the winter months.

If the birds have been well bred from selected stock, and reared to a suitable degree of maturity at the proper period, they should respond to a suitable diet, fed generously at the beginning of the laying season, although the extent of the winter yield varies to some extent in accordance with natural breed tendencies. But, given the right birds, the measure of success in this respect depends mainly and directly upon the skill of the poultry keeper in judging the requirements, and providing for the needs, of his birds.

Varying Needs

It is necessary to begin by recognising the fact that the needs of the laying flock vary considerably, being subject to a number of influencing conditions. As a consequence, no hard-and-fast rules for feeding can be drawn up for application at all times and in all circumstances. The personal factors required in the feeder of fowls are close and constant observation, and commonsense in fitting the methods to changing conditions.

The spring is the only natural season for egg laying, and the natural instinct is to lay one or two small batches of

eggs during that period for the simple purpose of reproducing the species. That, as a matter of fact, is the ordinary course of events in the Indian jungle—the haunt of the wild fowls from which our domestic birds have been derived. But we look to our birds, which have been developed by skilful breeders, to produce up to 200 eggs or more in a year, and to yield a goodly proportion of that number in the winter—a most unseasonable period for the purpose.

It follows, therefore, that we must carefully adapt our methods to the peculiar needs, and that whilst the treatment is necessarily more or less artificial, it must be as free as possible from the defects of artificiality. The highly prolific fowl that begins to lay at an unnatural period for egg production, and continues to lay when the weather conditions are inclement and all the circumstances naturally adverse, is herself a product of artificial methods of breeding and selection. The responsibility is therefore on the poultry keeper, who must at all times—especially in autumn and winter—suit the treatment to the current needs.

The succeeding seasons each bring different requirements. In the late autumn and winter dependence must be placed largely upon the feeding of carefully adjusted rations under suitable conditions of housing, making full use of the scratching-floor accommodation. In the spring the feeding must be carefully readjusted, especially in cases where the birds have access to a range where natural food (both fresh herbage and insect life) increases and abounds, as it will do naturally as the year advances. In the summer the increasing temperature necessitates the modification of the rations by decreasing the quantities of heating and fattening foods, and so on, all seasons, moreover, being variable within their own limits, so that rations cannot be regulated by the dates of the calendar.

The condition of the birds, as regards both pullets of different ages and the individuals included in any flock, is also variable. Not only do the requirements, but the appetites vary from day to day, in accordance with individual condition, the rate of production, and the state of the weather. For example, a bird in full production needs more food than one that is not laying. All these

facts give point to the advice given in Chapter VIII relative to the regular handling of the birds (preferably at night) in order to ascertain their condition.

A fair amount of fleshy covering is essential to good condition, especially during winter, but fatness or undue thinness should suggest the necessity for a rearrangement of the rations. It is only by such careful personal observation that sufficient skill in feeding is gained to ensure satisfactory egg production.

Good Plain Food

It would be a great mistake to be too dogmatic and to assert that this or that method, or any particular ration, is the only right one; but experience has proved the efficacy of the foods and mixtures recommended below, although it is not suggested that it is the only system under which any or every poultry keeper can attain success. There is, however, this to be said, that it is in the feeding that good birds properly housed are either made or marred as winter layers; but whilst the arrangement of the dietary may present difficulties, these are very often quite needlessly accentuated and increased by elaborate systems adopted by many poultry keepers, not to mention the unknown quantity that is frequently introduced by purchased proprietary mixtures of which the user has but an imperfect knowledge.

Plain fare, fed in a simple manner, is the best, provided the feeding value of the ingredients is suitable and the necessary constituents are properly balanced. Spices and forcing preparations should not be used; they are not foods according to the ordinary use of the term, although often included in winter-feeding schemes. It is, no doubt, a fact that some of the compounds tend to hasten the commencement of egg laying; but it is also the experience of practical men that such methods of forcing must be paid for in undesirable ways. Among the possible effects are loss of health and fitness, loss of size in eggs due to a too early or forced production, the laying of shell-less eggs, derangements of the egg organs, and the impairing of the powers of breeding.

Meat and fish meals, on the other hand, although stimu-

lative, have a well-recognised feeding value, especially in relation to egg-formation, and quite legitimately should be included in the rations in properly limited quantities. When, for example, full-grown birds are reddening up in the comb, and show general signs of having reached a productive state of maturity, they should be given an increased percentage of albuminoids (required for egg formation), and this may best be given in the mash in the form of meat or fish—increasing the proportion gradually.

The best meals to use in combination with the meat or fish, and any available cooked vegetable material, include middlings (sharps or thirds), bran, Sussex ground oats, and maize meal. When vegetables and roots are scarce, really good clover meal makes a useful addition to the mash, but it must be clover leaf meal—not refuse. But any excessive use of meat or fish meal may be as harmful as their discriminative use is helpful; suitable proportions are given in the suggested rations in a succeeding paragraph.

For grain feeding there is nothing better than sound, heavy, short, plump oats, with wheat and kibbled maize. The use of maize should not exceed the proportions recommended, and the use of barley must be avoided owing to its harmful effect upon the liver. Meat and fish meals should be bought upon analysis, with a guarantee, with reference to which *see* the notes on the purchase of these and other feeding stuffs in Chapter VIII.

Suitable Mixtures

The following mixtures are recommended as being the most suitable for laying stock :—

Grain Mixture

- 2 parts of oats.
- 2 „ „ wheat.
- 1 part of kibbled maize.

This mixture should be fed in the morning in the litter on the floor of the scratching-shed, or scattered widely in the long grass on the run. For suitable sorts of litter *see* Chapter I.

Wet Mash

- 1 part bran.
- 1 ,, middlings, sharps, or thirds.
- 1 ,, Sussex ground oats.
- 1 ,, maize meal.
- $\frac{1}{2}$,, fish or meat meal.

The quantity of fish meal may be varied from 2 to 3 per cent. either way as the feeder may consider advisable.

This should be fed in the afternoon in troughs, and if there is not a good growth of sweet and fresh grass on the run some cooked vegetables should be added to the mash.

Dry Mash

- 2 parts middlings, sharps, or thirds.
- 1 part bran.
- 1 ,, Sussex ground oats.
- 1 ,, maize meal.
- $\frac{1}{2}$ to $\frac{3}{4}$,, fish or meat meal.

This should be put in the hoppers, which should be opened and accessible between the hours of 9 a.m. and 3 or 4 p.m.

Suggested Rations

The actual average allowance of food per bird, per day or per meal, varies with the circumstances. But, taking the above mixtures and suggested times of feeding as the standard example, an average allowance of grain in the morning would be $1\frac{1}{2}$ oz. per bird. Of the wet mash the birds may be allowed to eat all they will take readily, leaving the troughs before them for, say, fifteen or twenty minutes. We suggest the feeding of the mash on five or six days a week, and on the days when it is not fed (of which in our practice Sunday is one) a further allowance of grain is given instead, at the same time in the afternoon, the allowance being 1 oz. per head, scattered in the litter as in the morning.

When dry mash is not used, the following method of feeding may be adopted, as it was in the *Daily Mail* test,

under which the remarkable total of 984 eggs was laid by four Black Leghorns (a world's record for this variety):—

In the morning 1 oz. of grain per bird, consisting of



HOW TO MEASURE FOOD BY THE HANDFUL.



HOW NOT TO DO IT.

wheat and oats in equal proportions, scattered in the litter. At midday a wet (or moist) mash of 1 part of bran, 2 parts of middlings, 1 part of Sussex ground oats, 1 part of maize meal, $\frac{1}{2}$ part of clover meal, and 10 per cent. of fish meal,

the whole making a quantity equal to about 2 ozs. per bird. In the afternoon (late enough to allow just about time enough to feed before roosting) another 1 oz. per bird of grain, consisting of oats and cracked or kibbled maize, thrown in the litter. In mild weather the maize should be reduced to about one-third of the quantity of grain.

Generally speaking, according to the different methods of feeding, it will serve as a rough guide for feeding to reckon on the approximate basis of an average daily allowance per bird of about 4 ozs. of dry food, and this usually consists of up to 2 ozs. of grain (which may be fed half in the morning and half in the afternoon) and 2 ozs. of mash ingredients, weighed dry before mixing with water. But these quantities may be increased or diminished as the feeder finds necessary, in relation to the needs and prevailing conditions. The eagerness of the birds at feeding time is a safe indication of requirements. As a rough guide in measuring grain for feeding, a handful taken palm downwards will be about two ounces.

Notes on Grain Feeding

As suggested above, about one half the daily allowance of food should consist of grains, and the proportions of the different kinds given in the standard mixture are the best for general use. But when, as sometimes happens, it is not possible or convenient to combine the different kinds, the preference should be given, as far as may be, to oats, as being the best and safest for constant use.

Oats must be sound and heavy, weighing not less than 42 lbs. to the bushel; light or husky samples should be rejected, on account of the high proportion of indigestible fibre. Wheat is the next best grain for fowls, and the small grained varieties are better than the large, the latter being too starchy for constant use. Maize is a very useful winter food, as it is heating and supplies bodily warmth when most required, but in the warmer months it is not generally desirable; it is best fed in combination with oats, and should be cracked or kibbled to prevent the birds finding it too quickly in the litter and thus losing exercise that is essential to health.

One very important result of grain feeding, especially in winter, is the incentive to activity at a period when the outside opportunities for foraging are very limited. Even when the weather is sufficiently favourable to encourage some amount of wandering on the range, there is not sufficient activity owing to lack of interest when there is little or no insect life and the rewards are insufficient to make the search very persistent. It is by means of grain feeding on the scratching-floor that reasonable comfort and desirable activity are provided for and ensured. But the grain must be properly fed in the litter, to prevent the degeneracy of the use of the scratching-floor into a mere feeding rather than an exercising place. The litter in which the grain is scattered must be from 6 to 8 inches deep, when the birds will be kept busy scratching throughout the greater part of the day.

Grain may also be fed by scattering it in rough long grass in the run when this is available. It should on no account be thrown in the litter in a house in which the birds are suffering from any infectious disease; in such circumstances it must be fed outside.

Preparation of Wet Mash

The small poultry keeper will find one of the chief opportunities for the cheapening of feeding in the preparation of the wet mash by the inclusion of house scraps and the sound and wholesome "waste" material from the kitchen garden.

All the bits of bread, meat, fish (not bones), and vegetables that come from the table or are rejected in the preparation of food for cooking should be put into a stock-pot kept for this especial purpose. A double saucepan is the best utensil, as it enables the limitation of moisture more easily than when the scraps are boiled in the ordinary way. When thoroughly cooked, all the ingredients should be passed through a mincing- or chopping-machine, and then dried off with the middlings or other meals.

By this method not only is a saving effected in the bulk of the food fed to the fowls, but very often the use of meat or fish meal is rendered unnecessary by the sufficient proportion of such scraps in the whole. Never-

theless, there must be no omission of such necessary meals if there is any deficiency in this respect in the house scraps.

To prepare a wet mash mixture on a bigger scale, where house scraps are not available, such ingredients as fish meal, clover meal, and maize meal, with chopped swedes, mangolds, or other roots or vegetables, may all be boiled together in a copper, and dried off with the bran, middlings, and Sussex ground oats.

Yet another method is to cook or scald sufficiently the mash ingredients overnight, well mixing, and then covering with a thick layer of dry middlings with which the drying-off process is completed in the morning. But in any case, however or whenever the mash is prepared and mixed, the aim must be to secure a crumbly consistency and condition for feeding, and on no account to feed it when wet or sloppy, or, on the other hand, as a sticky mess.

To ensure thorough mixing, it is best to rub the ingredients well between the hands, the only really efficient method. The mash should be moist enough to bind when squeezed in the hand, but dry enough to fall apart if thrown on the ground.

Fresh Green Food

Not only should there be a sufficient use of cooked vegetables in the mashes to cheapen feeding and keep the birds in health, but fresh green food is also essential. The importance of this food is not perhaps sufficiently realised. It is more generally understood that geese are grazers than that the ordinary domestic hen is in some measure a grass eater.

As a matter of fact, a flock of fowls on a free range will consume a fairly wide selection of growing vegetation, from cultivated trefoils to many so-called "weeds" of the hedgerow, including a fairly large quantity of the young shoots of grass. It may, therefore, be said that in general domestic fowls will find a sufficiency of suitable green food to meet all their requirements if allowed a wide range over grass land, just as long as the herbage is fresh and nutritious. At other seasons, or when the birds are kept in more or less close confinement, supplies of suitable green stuff must be provided. Fresh cut short grass from a lawn mower is very useful.

The feeding of green food may be liberal, provided it is always sound and fresh when given to the birds, and that any that may remain unconsumed in the runs is removed ; but to keep it out of the dirt and prevent waste it should be hung up, within reach of the birds, either by the stalks or else in hanging nets or racks against the wall. It should, moreover, be given daily, as it is likely to upset the fowls by inducing a disordered state of the bowels if given at irregular intervals.

The best form in which to supply grown fowls with fresh green food is the whole cabbage, lettuce, kohlrabi, or swede. Such a root as the last named, which is greatly approved of by the birds in winter, when much of the other green food is unavailable, should be split before it is given them. Clover, as a wet mash ingredient, may be prepared by drying, chaffing finely, and scalding before use. The required quantity should be covered with boiling water overnight, and the mouth of the vessel closed with sacking, leaving it until the next day.

Lime and Grit

Recommendations relative to the feeding of fowls nearly always contain some more or less formal mention of the fact that it is important to supply the birds with sharp grit and some form of calcareous material. But that the necessity for and the uses of lime and grit are often ignored or misunderstood is, at any rate, sufficiently proved by the disorders that result from the lack of such materials, and the numerous questions that arise in correspondence.

The different functions, or peculiar uses, of grit and calcareous substances are in particular very insufficiently understood, and when the digestive uses of the former are to some extent realised, poultry keepers not uncommonly suppose that fowls on a good-sized range will be able to find all the material of that sort that they require for the grinding of the food in their gizzards and the proper exercise of the digestive process. In reality, this supposition is often wide of the mark, and it by no means follows that even an extensive range will provide enough grit of a suitable character. Birds allowed the run of open fields will also regularly resort to boxes of sharp flint grit if these are provided in places where they may find them.

It will, therefore, be understood that it is a matter of great importance to provide this material where fowls are kept in the more or less close confinement of runs and laying houses. From the time that day-old chicks receive their first feed, onwards throughout rearing and their productive careers as egg layers, they require grit at all times. Without it they have no means of grinding the food in the gizzard, and the full activity of this organ is essential to the assimilation of food, the maintenance of health, and due productiveness. Wherever fowls are kept, whether in the laying-house, the run, or on a free range, boxes or hoppers of sharp flint grit should be provided, and refilled as an essential part of the ordinary routine.

The need for lime is equally evident, being required for the formation of the shells of the eggs. It is true that lime salts, in a more readily assimilative form, are derived from certain foods, but not in sufficient quantities to meet the greatly increased requirements of prolific egg layers kept in confinement. As an example of the natural craving of fowls in full lay for shell-forming material, it is worthy of note that in one test 120 pullets during a period of four months consumed over $2\frac{1}{4}$ cwt. of crushed oyster-shell, in addition to the lime salts in their food.

These birds were, of course, in close confinement, but although the supplemental requirements of fowls at liberty may be reduced in some proportion to the extent and quality of the herbage (especially clover) from which a good proportion of the natural supply is obtained, it is never safe to neglect the provision of a box of suitable material. There cannot in any circumstances be any harmful excess of lime supply, although the lack of the required material is one cause of the laying of shell-less eggs. On the other hand, any unusual thickness of the shell depends rather upon an individual abnormal habit of production than any excessive supply of the formative material; any surplus that may be consumed will ordinarily pass away in the droppings in the course of nature.

The best form in which to supply this material is as crushed oyster-shell. Crushed cockle and other sea-shells may be similarly used, as also may crushed dry bones, but oyster-shell is usually found to be the most satisfactory. The shell-box or hopper is an essential utensil, and it must

be filled regularly. Both grit and shell-boxes or hoppers are most conveniently placed inside the laying-house.

The Water Supply

Although succulent vegetables contain a big proportion of water, and there is a further considerable quantity in wet mash, laying fowls require an additional plentiful supply provided in vessels of the sort described in Chapter I, and placed as recommended in that section. Not only does the egg contain a high percentage of water, of which some 80 per cent. of the white consists and the yolk more than half, but the consumption of water in fairly copious draughts tends to aid and increase the consumption of protein in the body, protein being the chief and most valuable constituent of food for egg production.

The water supply is therefore of vital importance to the well-being of the birds themselves (their bodies contain a large percentage of it), and to the general economy of feeding and egg production. The supply must be drawn from a pure source, and that in the drinking-vessels kept fresh by regular renewal—at least once a day, and twice during the warmer weather.

Birds not Laying

It is a by no means uncommon complaint of beginners that their birds are not laying when the commencement of production is overdue and the winter laying season is in progress. This may, and does, happen in all sorts of circumstances, whether the birds have been reared by the disappointed poultry keeper or bought as pullets a few weeks before from a breeder, and the fault is frequently to be found in the method of feeding. Either the quality or the quantity of the food is unsuited to the needs of the birds. The failure may, however, be due to strain.

The most common mistake as regards the quality is in the matter of the nitrogenous or protein constituents, or, in other words, there has been a failure to include a meat or fish meal in the mash as a substitute for the worms and insects (often referred to as "animal" food) which would be available for birds on a wide range in the spring—the most natural time for egg production. As regards the

quantity of food required, some poultry keepers err by overfeeding, and thus get the birds into an unsuitable condition to begin laying, whilst others underfeed for this purpose.

In the latter case the birds may be in good enough condition for the mere purpose of healthy maintenance, but just lack that little extra amount of suitable food required for the formation of eggs. If the novice is unable to judge the condition by handling the birds (a matter that requires some little experience), a great deal may be learnt by careful observation of their behaviour at feeding-time. Birds that are unduly eager when they see the poultry keeper approach with the food basket—scrambling and crowding against the wire netting—evidently need bigger (if not better) rations to induce them to begin laying.

There is, however, another possible explanation of their failure to start. They may be in good condition, so far as their state of body is revealed by handling, and the quality and quantity of the food may seem to be quite correct; they may, indeed, be bright in comb and show all the usual signs of a productive maturity, without actually beginning to lay. In such a case a simple tonic may be the one thing needful.

For this purpose a little sulphate of iron, two pieces each the size of a pea, dissolved in one gallon of drinking water, will probably prove effective; or Douglas mixture may be used, the preparation of which is given in Chapter X.

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CHAPTER VIII

GENERAL MANAGEMENT

Regularity Essential

THE key to success in the general management of poultry, whether kept in large or small numbers, is regularity. The proper care of the birds consists in the due performance of a lot of little things, and although many of the details may seem to be more or less trivial, the neglect of any one essential may seriously affect the results aimed at. It is in such matters as cleaning, feeding, refilling the water vessels and the grit and shell-boxes, and in the opening and closing of the windows and shutters of the houses, the collection of the eggs, and so forth, that the utmost regularity should be practised.

The hours of feeding should be fixed and kept to as far as possible. The times may be arranged to suit the general convenience of the poultry keeper, although those suggested in the earlier chapters dealing with rearing and feeding are the most suitable, but once the time-table is drawn up, it should be adhered to. Any irregularity in feeding is apt to make fowls restless, and tends to cause a bad effect in their condition, for both growth and production, and in the case of a sitting hen any unusual delay may cause the bird to stand up in her nest, with the result that the eggs may get chilled and perhaps broken.

There must be the same regularity in cleaning the house and all the quarters, any accumulation of dirt or dust, or failure to renew litter or nesting material when foul or damp, being a direct encouragement to disease, and the multiplication of parasitic insects and mites. Moreover, when feeding and cleaning, it should be remembered that it is an important part of the regular routine to keep a watchful eye on the birds, in order to make sure that they are in

good health and condition, and always to be on the look-out for anything wrong in connection with the well-being of the stock generally. Special attention should be paid to the behaviour of the birds when first let out in the morning, and any that do not take their food readily should be picked up and examined.

Cleaning Operations

To ensure thorough cleanliness, there are some things that must be done daily, and others only when found necessary, whilst at least once a year (and preferably twice) there must be a complete turn out of all the fittings, and a general overhauling.

The utensils most frequently required for cleaning include a short-handled hoe or scraper, a short-handled shovel, and a cheap metal coal-box (of the type illustrated) or other convenient receptacle for the collection and removal of the droppings, etc.

The chief daily work is the removal of the droppings from the board fixed beneath the perch. The board should be well scraped with the hoe, and the droppings lifted off in the shovel and placed in the scuttle. The board should then be well sprinkled with sand or fine ashes, but not lime, as it affects the manurial value of the droppings. If it is found inconvenient to do this daily, which is preferable, it should be done on alternate days, and not at longer intervals.

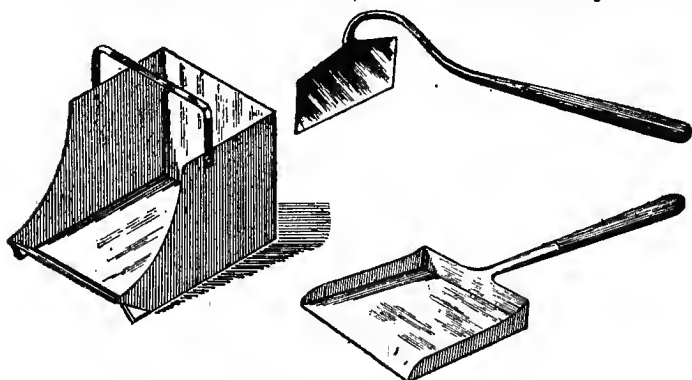
The nest-boxes should then be examined, and any soiled hay or straw removed and replaced with clean and sweet material, avoiding any that is the least damp or musty as being likely to spoil the flavour and condition of the eggs. When removing the nesting material, it is a wise precaution to sprinkle some powdered sulphur or any good insect powder in the box, to prevent insect infestation.

Insect powder should also be sprinkled periodically in the dust bath, for the same purpose, and the dusting material must be renewed at sufficient intervals. It is best to use dry earth for this, or fine sifted (but not gritty) ashes. The dust bath should be in a light corner of the house, either in a box or a division made by fixing two pieces of wood to make a square in a corner.

Every now and again the birds themselves should be dusted with insect powder, which should be well rubbed in under the wings and around the vent. If this is done over a sheet of newspaper the powder that falls may be used for treating the next bird.

In addition to the general observation of the birds, they should also, at frequent intervals, be more especially examined to see whether they exhibit any symptom of disease, such, for example, as scaly leg. A description of the symptoms of the various common diseases will be found in Chapter X.

Feeding-troughs and drinking-vessels need daily atten-



CLEANING UTENSILS.

tion. Earthenware pans are best for use in feeding small flocks, but wooden troughs are frequently required where larger numbers of birds are kept (*see* Chapter I). In either case it is desirable to remove any feeding-troughs after use, or to turn them over after a meal so that the birds do not perch on them and foul them; they should be well washed daily, and the wooden ones scalded and scrubbed periodically.

The litter should be removed as often as necessary. If good and suitable material is used, and it remains dry, it will probably need no renewal for three or four months, but directly any portion of it gets wet, that portion must be removed immediately and dry material put in its place.

Dry litter is essential to the maintenance of health, warmth, and comfort at any time, but more particularly during the winter. Moreover, the action of the damp on the droppings in the litter is such as to make the condition insanitary, although the presence of a certain amount of manure in the dry litter is not harmful provided the whole is renewed whenever necessary.

The perches, made to rest in slots, as shown in Chapter I, must be lifted out at fairly frequent intervals, and the ends (as well as the slots) examined for the discovery of red mite, to guard against which paraffin should be applied once a month during the summer; dip the ends of the perches in a jar of paraffin, and put some in the slots by means of a small painter's brush. Paint the perches two or three times a year with a mixture of half paraffin and half creosote, a sure protection against red mite. The presence of red mite is often quite unsuspected, although possibly present in thousands in the cracks and crevices of the houses, in the sockets, and on the undersides of perches. They remain hidden by day and attack the fowls at night. Their presence is indicated by a white powdery substance round their hiding-places. This mite is naturally greyish white, but becomes red when full of blood sucked from fowls, and birds subject to such attacks cannot possibly lay satisfactorily.

Where incubators and brooders are used, the daily routine includes the filling of the lamps, the trimming of wicks, and any cleaning or other essential operations.

General Overhauling

The preservation of thorough cleanliness involves more than the daily, and more or less frequent, attention to such details as we have been talking about. Poultry-houses and all places regularly occupied by fowls must be completely turned out, cleaned, disinfected, and repaired at least once every year, preferably in autumn.

Such things as brooders and coops should also be more especially cleaned after use by one brood, and before occupation by the next batch of chickens; and so also should incubators between the hatches.

The first thing to do in this annual cleaning of a poultry-

house is to take out all the fittings, which must be removable, for separate treatment outside. Then remove all the litter and shovel out the dirt and dust. To cleanse the walls and roof, nothing is better than the jet of water from a garden hose, hand spray pump or syringe, to wash down all the clinging dust. The floor should be well scraped with a hoe, and when all the dirt thus displaced has been taken out with the shovel, play the hose or sprayer again, and well scrub with a stiff broom.

When the whole of the interior is thoroughly dry, and to ensure rapidity of drying the work should be done in fine weather and the doors and windows left open, the whole of the woodwork should be well treated with creosote. Hot lime-wash, with an admixture of a good disinfectant, is sometimes used, but creosote is better, because it penetrates more thoroughly; it is both a preservative and a disinfectant, as well as being effectual in keeping away insect pests. Birds should not be returned to the house for a couple of days after its treatment with creosote. Great care must be taken to cover the whole surface of the woodwork, and to work it well into the crevices, joints, etc. The nest-boxes, perches, dropping-boards, and any other fittings should also be similarly cleansed and treated before being put back in position.

Recipe for Lime-wash

Although creosote is best for woodwork, the brickwork of garden runs is most suitably treated by first spraying with a solution of one part of carbolic acid with forty parts of water. When that is dry, a coat of lime-wash should be given. Lime-wash may be made with 5 lbs. of fresh lime shell, $\frac{1}{2}$ lb. of soft soap, $\frac{3}{4}$ lb. of salt, 5 gallons of boiling water, or enough to make it of a creamy thickness. Disinfectant may be added.

At the time of the annual overhauling, and at other times in case of emergency, all necessary repairs to walls and roof must be done. Felt roofs should be tarred, using a long-handled brush, and applying a hot mixture made by boiling tar, pitch, and lime in any available suitable vessel; a gallon of tar, 2 lbs. of pitch, and 4 lbs. of lime being most suitable. To make a good job of it, two

coats should be well and evenly spread at an interval of a fortnight, doing this in the mornings of fine days, and adding a coating of sand or fine gravel after the second application.

Such small details as the oiling of door and window and gate hinges should also receive attention at this time; any broken places in floors should be made good, and damaged wire-netting around runs repaired.

Disinfecting after Disease

In any case of sickness or disease the affected fowls should be removed immediately, and put by themselves for treatment in a hutch or house away from the healthy birds.

The house they have occupied must then be turned out, the litter and the material from the nest-boxes removed and burnt, and the interior and fittings well cleaned and disinfected. Carbolic or any other good disinfectant may be used, and it is advisable to apply the disinfectant by means of any ordinary spray pump or syringe, and also by the use of a brush where more convenient, but it must in any case be done very thoroughly.

In the event of an outbreak of roup, for example (*see* Chapter X), a 5 per cent. carbolic solution may be used in the houses and on the yards, and all implements and utensils should be disinfected and kept separate from anything used for the birds undergoing treatment. All diseased birds that die or are killed should be burnt, or buried deep with lime, and after handling them the hands should be well washed and disinfected.

For the treatment of soil that has become contaminated by the presence of diseased birds, or that has become fowl-sick through too long use, *see* Chapter II.

Treatment of Manure

Poultry manure is a very valuable fertiliser for use in the garden, but its value depends very largely upon the care with which it is stored after the regular collection from the dropping-boards in the houses. For greenhouse plants, poultry manure in a liquid form, well diluted, is invaluable, and when used dry on the garden it must, on

account of its concentrated strength, be well mixed with mould before use.

But unless it is kept dry during the time it is stored it will lose much of its value. For this reason, therefore, the amount that is collected daily from the dropping-boards should be stored under cover, in an old barrel, where the quantity is small, or in a heap in a shed where the daily collection is considerable. With each fresh addition to the store there should be a covering layer of fine dry soil.

Kept in this way, with alternative layers of manure and soil, the manurial properties are preserved, and a considerable addition is made to the profits of poultry keeping.

Inspection by Night

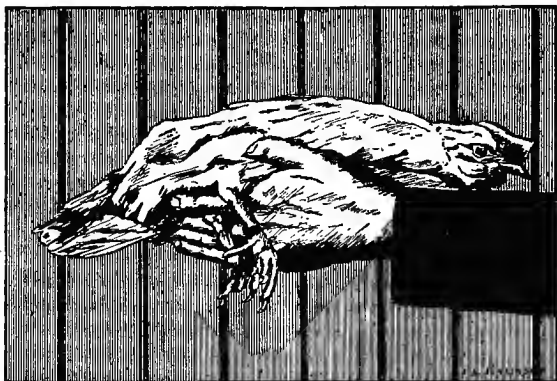
The shutting up of the birds at night concludes the duties of an ordinary day, but at regular intervals it is necessary to pay a visit to the houses after dark.

One reason for this is that there are some parasites that prey upon the birds when they are roosting, and retreat to the crevices of the woodwork during the day, when their presence in the house may be quite unsuspected. Although the red mite, which is thus nocturnal in its habits, should not find harbourage in a house that is kept clean, it is always advisable to make sure that the birds really are free from this and other pests by an occasional examination after nightfall.

Another reason for the periodical nightly round is that when the birds are roosting they are readily accessible for examination as to condition. A bird to be in good productive and therefore profitable condition must be neither too fat nor too lean, and a little experience will soon enable the poultry keeper to judge of a fowl's fitness by handling. The feeding and management must be modified to remedy any defects in the condition of the stock that are discovered by this process.

There is yet another reason for this nocturnal visit of inspection—it reveals the existence of broodiness, and enables the poultry keeper to find out which birds are steadily determined to sit. A disposition to occupy the nest overmuch may be noticed during the day-time, but

when a bird continues to sit during the night, there is not much doubt about the seriousness of her intention. A bird that is thus found to be broody may then be further tested for steadiness and reliability as a sitter if it is desired to use her for hatching, or, if it is preferable to



HOW TO HOLD A HEN.

keep her laying, she may be subjected to the treatment of the broody coop.

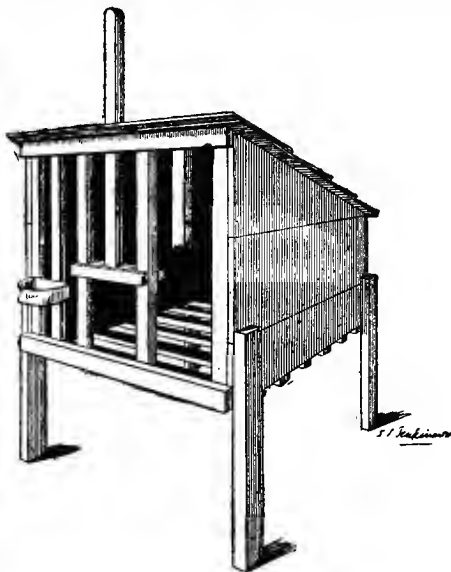
Treatment of Broodies

A simple and cheap form of broody coop may be made by taking an ordinary chicken coop, fitting it with slats at the bottom in place of a solid wooden floor, and fixing it on short legs to raise it about 18 inches off the ground. This will be found sufficient to serve the purpose of the small poultry keeper, but where many fowls are kept, and timber is available without any undue expenditure, a bigger affair may be used for the treatment of several fowls.

In this case a hutch of any required size is made and stood on short legs. It is made without any bottom whatever, but is fitted with perches at a suitable height for the birds to reach, and the whole is surrounded by an enclosure of wire-netting. Broody hens turned into such

a pen which is placed in the open have no opportunity to sit—except on the ground in an uncomfortably exposed situation. When they tire of any such attempt they have no alternative but to use the perch.

Birds placed in coops or hutches of this description, especially when confined in full view of other fowls enjoying the freedom of a run, soon realise the hopelessness of such situations for the incubating purpose, and quickly



BROODY COOP.

regain a normal activity and are ready to resume egg laying. Broodiness taken in hand in the early stages may be cured within about three days, but unless the tendency is noticed early enough it may take some considerable time even by such methods.

It is important to feed broody hens that are undergoing treatment of this sort on a laying ration (*see* Chapter VII), otherwise they will go out of condition for production, and time will be lost in recovering it when they are returned to the run.

Moulting

The shedding of the old feathers and the growth of new plumage is a perfectly natural process, and when it takes place under the best conditions it is hardly noticeable so far as the appearance of the bird, the chief evidence of the happening being a litter of cast feathers in the house and run and the drying and shrinkage of the comb. But whilst a proper moult is almost imperceptible, as it is when wild birds moult, the artificial conditions under which domestic fowls are kept introduce various factors that influence the process and sometimes tend to make it unseasonable or difficult. The time of the beginning of the annual moult and its duration vary considerably. It is influenced by the age of the bird, the date of hatching, the character of the feeding, and the method of management, as well as the state of the weather, and, in the case of hens, by the conclusion of their productive season. Active egg production in winter will often end in a partial moult in the early spring. A partial moult is often caused by heat, and this may be succeeded by a short period of laying, and a subsequent completion of the moulting process, which is subject to various checks and irregularities of this and other descriptions.

Pullets that are hatched too early often lay by about August, and then go into a late autumn moult and remain unproductive until the new year. But the more natural period for the gradual and complete process of shedding and removing plumage is during the summer months.

Treatment during Moulting

It is necessary to remember that feathers are living growths which have a vital connection with the body of the bird, and continue to draw nourishment from the system until they reach their full development. This is one reason why the condition of the plumage in fowls is in general a good criterion by which the poultry keeper may judge the health of his stock. It is also a fact that makes it easy to understand that the bodily condition of the moulting bird, and the influence of the food and surroundings, must be given particular attention during the whole period of the process. As a general rule fowls that

are running free over a good range require less special feeding and attention when they are moulting than do those that are kept in more or less close confinement. But in many circumstances heating foods, such as maize, should be avoided during the moult, and the rations should consist of the most easily digestible ingredients, nitrogenous rather than starchy. Some linseed meal should be included in the mash about three times a week, and a little powdered sulphur added at the rate of one teaspoonful to every six birds once or twice weekly will be beneficial. A natural effect of the moult is to interrupt laying. During the actual casting of the feathers most hens continue to lay for a time, but to a decreasing extent. But with the growth of the new feathers there is a general stoppage of laying, and the drain on the system makes it necessary to give a sufficiently nourishing diet to meet the demands of this growth, and such foods as oats, ground oats, bran, middlings, and some lean meat or meat or fish meal are most suitable. It is especially necessary that moulting fowls kept in confinement should have a good and regular supply of green food. When the moult has started among a pen of birds kept for breeding, if they have not been separated already, the cocks should be removed at once and penned in a place by themselves until it is time to mate them again. Where surplus stock have to be cleared out, this should always be done as far as possible in anticipation of the commencement of the moult, because if the birds are to be sold or used for table, they will not be in a suitable condition until the process is completed when once it has started, and the cost of feeding during the period will represent a loss.

Collecting the Eggs

It is desirable to visit all the nests regularly for the collection of eggs, the frequency of the visits depending upon circumstances. If a good many birds are kept, it may be possible to do this twice daily, in addition to the inspection at feeding times, but where a few fowls are kept in a garden run, the eggs may perhaps be gathered most conveniently when feeding and at shutting-up time.

The use of trap-nests necessarily causes more labour,

but these are only necessary where breeding is carried on, or in cases where the poultry keeper has the need and the time to keep the records of eggs laid by individual birds. For the more general purpose of the ordinary amateur poultry keeper it is sufficient to know the average egg yield of the birds in a pen or flock. Those who use trap-nests for any considerable number of fowls, find it necessary to go round very frequently to collect the eggs, release the birds, and make an entry of the eggs laid against the numbers of the birds in the book kept for that purpose. In some cases, when many birds are in full lay, it is usual to go round almost every hour during the morning when the greater number of eggs are laid. For further reference to trap-nests, *see* Chapter I.

If the nests and nesting material are kept perfectly clean, there is little risk of soiled or dirty eggs. But there is always risk of occasional soiling or the accidental breaking of an egg (although the latter is chiefly prevented by frequent collection, so that several eggs are not allowed to accumulate), and in case of any such happening, the soiled eggs should be rubbed clean with a damp cloth, or washed carefully in tepid water and well dried. It must be remembered that washed eggs deteriorate more rapidly than eggs that are collected clean as laid.

Egg Eating—Prevention and Cure

One reason why the frequent collection of eggs is desirable is that it removes a possible incentive to the birds to eat the eggs. The bad habit of egg eating is one that is likely to spread very quickly in a flock when once it is started, and one very common commencement is a broken egg or the laying and smashing of an egg without a shell. Shell-less eggs may be the result of a lack of shell-forming material (which is best provided as crushed oyster-shell), or such an egg may be dropped when a fowl is suddenly frightened, or when egg production is unduly forced. But, whatever the cause, the presence of such an egg is often quite sufficient to start the egg-eating habit. This is not a disease, but a morbid or unnatural appetite created as a rule by some such accidental happening as suggested.

Egg eating is not easily cured, but among the methods that are sometimes successful is that of extracting the contents of an eggshell and replacing them with some such unpalatable mixture as bread and egg soaked in spirits of ammonia, mustard, or any equally objectionable substance. Such "cooked" eggs are placed where the birds will easily find them, when a hasty mouthful may or may not effect a cure.

Another method which has frequently proved effective is the placing of china eggs on the floor of the house. When the egg-eaters find they cannot break them, they will very likely leave all eggs alone, possibly concluding that all are alike. Birds kept intensively are the most prone to contract this habit, especially if not kept busy scratching in the litter for grain food.

Disposal of Cockerels

Those who keep fowls for egg production only, do not need to keep and feed male birds. In crowded neighbourhoods the presence of a cock or cockerel in the backyard or garden pen will more often than not be a cause of trouble on account of the annoyance caused to non-poultry keepers by its crowing. The presence of the male bird does not help to increase the egg yield of the pullets or hens, so that where birds are kept for laying only, the cost of the unnecessary male and his food simply makes the cost of producing the eggs higher than it need be.

The male bird is only required to fertilise the eggs, and this is not only unnecessary, but is also undesirable where the eggs are not to be hatched; eggs produced for eating keep better when they are not fertilised. Moreover, breeding and rearing should not be undertaken unless there is plenty of room for the proper growth and development of the chickens. Those who have the opportunity to breed, will find information for their purpose in Chapter IX. Those who have neither the room nor the need should not keep male birds.

But when, as often happens, poultry keepers have room to rear a few chickens, and avoid the trouble of breeding by buying a setting of eggs or a batch of day-old chicks, they will find that they have some cockerels among the

pullets. These they should separate as soon as they are able to distinguish the sex; and, of course, those who breed as well as rear should do the same. In the lighter breeds, such as Leghorns and Anconas, it is possible to pick out the cockerels earlier than in the case of such breeds as the Orpington or Wyandotte; but with a little experience the amateur should be able to separate the former at about six weeks, and the latter at from eight to twelve weeks of age.

Those who breed will, of course, retain some of their cockerels for future mating, but in any case all the surplus males should be disposed of as soon as possible to save the cost of feeding. Cockerels of most breeds are in the best condition for killing at about three months old, or between that and four months, but if they are not sufficiently plump for the table, they may be fattened for a time before killing.

To get the best results they should be put in a small pen and fed for about three weeks on fattening foods. Sussex ground oats may be used if not too expensive, otherwise equal parts of barley meal, crushed oats, and boiled and mashed potatoes, mixed with sour skimmed milk, will do very well. It will also help to add greaves to the mixture, starting with a small quantity and gradually increasing up to $\frac{1}{2}$ oz. per bird.

How to Kill

Every poultry keeper should know how to kill a fowl, whether it is a cockerel or an old hen for the table, or a diseased bird that cannot be cured with advantage. If it is a cockerel or other fowl for the table, it should be fasted for twenty-four hours before killing. This is necessary to empty the crop and intestines, and in order to delay the process of decomposition if it is required to keep the bird before cooking.

It is easier to sit when killing a fowl, so that the bird may be held (with the breast down) across the knees towards the right side, with its head inclining downwards. With the left hand take firm hold of the legs, the tail feathers, and the ends of the flight feathers in the two wings. This is done to prevent violent movement or flapping of the

wings. The right hand is then turned from right to left to bring the palm outwards, so that the head of the fowl may be grasped in the fork of the first and second fingers; the bird's comb will then be against the palm of the hand, and the end of the neck where it joins the head will be in the fork of the fingers.

Then gently draw the bird's neck out straight in a downward direction, and when it is extended to its full length, dislocate the neck by giving a sharp outward turn to the wrist; this will result in a sudden pulling of the head upwards and backwards at a sharp angle to the neck, and will divide the top joint of the vertebræ, or spine, and snap the spinal cord. If this is done firmly and without hesitation, it is the cleanest and most humane way to kill, death being instantaneous.

Do not leave go of the legs or wings, however, because although dead, there will be a great deal of muscular movement for some little time. A fowl killed for table should be plucked directly it is killed, holding it with the left hand and allowing the head to hang down so that the blood will collect in the cavity, caused by the dislocation, within the skin of the neck. If plucked at once, whilst the body is still warm, the feathers will come away more easily, and there will be less risk of tearing the skin than if left to get cold first.

Culling, or "Weeding Out"

The aim of the egg producer must always be to keep on levelling-up the laying average of the flock by careful and systematic weeding out and disposing of birds that lay the least number of eggs, and also of those that are the least fit as regards health and robustness. This latter is especially necessary in the case of those who are able to undertake breeding operations, and for their purpose a sound constitution in the birds kept for breeding is of even greater importance than their prolificness as layers.

It is only necessary to examine the records of any egg-laying test to see that although all the birds are fed and managed alike, there is a very wide difference between the number and weight of eggs laid by individuals, not only of the same breed and variety, but also of the same

strain or family and included in the same pen. A moment's reflection will make it plain that to continue to feed poor layers along with good ones—and they eat as much or more—is to increase the cost of production all round; and by lowering the average profit on the total egg yield, the effect is to make the good layers pay for the keep of the bad ones. In culling, therefore, the poor layers, and the birds of indifferent health and stamina, must be got rid of to make room for others better worth keeping.

But this is not all, because culling involves also the sorting out of the good hens that have reached the profitable age limit. It is not profitable to keep layers for an indefinite period, because there is a recognised limit to their ability to lay a sufficient number of eggs to more than balance the cost of the food they consume and the other expenses of management. The generally recognised limit of usefulness in layers is reached when birds are two and a half years old, that is supposing them to have been hatched in the spring.

The best time for the annual culling is in the early autumn, August and September, at which season there should be a general clearance of the hens that have passed or approximately attained their age limit, and such other hens and pullets as are found to be undesirable. Apart from this general annual weeding of the flock, the culling of individual birds may be necessary at any time and age, as the result of that habit of constant watchfulness for "something wrong" which should be cultivated by every poultry keeper.

For the general points to be considered in selection and rejection, reference should be made to Chapter IX, but in connection with the culling it is necessary to make a note here of the relation between pigmentation or colouring (in yellow-legged breeds) and egg laying, in that it helps in the work of culling to the extent that there is a loss of colour in the shanks, etc., that increases gradually during productive periods. If, therefore, fowls of such breeds are found to be pale in the beak, shanks, and the skin round the vent, the practical conclusion is that the bird is still laying; but when the colour is deep, it indicates the end of the productive period.

Marking for Identification

It is very desirable that a poultry keeper should adopt some simple method of marking fowls, if only to know their age, for culling. For trap-nesting it is, of course, necessary to be able to identify each bird individually by number, otherwise each cannot be credited with the eggs it lays. But where the trap-nest is not used, it is at least essential to know when the hens have reached their profitable age limit, and in this case there is less need to use numbers.

For the purposes of identification it is usual to put leg bands on the birds, numbered ones for individual recording or bands of different colour for each season where it is only required to know the age. For details of marking methods to be used for keeping pedigree records, see Chapter IX.

Record Keeping

An essential part of good management, and a matter of daily routine, is the proper keeping of records. This applies particularly to the entering in a note-book, or on a card kept in the laying house, of the number of eggs produced daily. In trap-nesting each fowl should have its number and separate numbered column on the card or in the book ; otherwise the total laid by the flock should be entered at the end of the day.

An account should also be kept, even in the simplest form, of all money paid out for food, appliances, labour (if any), etc. ; and on the other side there should be recorded the value of the eggs and birds sold or consumed. Unless this is done it is quite impossible to know how far, if at all, the birds are profitable. Whether the financial aspect of the undertaking is or is not a consideration, it is always satisfactory to know the results at the end of the year, and to discover the weak spots (if any) in the method of management.

Buying and Storing Food

Keep the food bill as low as possible by making full use of all the scraps from the kitchen and the surplus vege-

table material from the garden, but what food is bought must be, as far as possible, the best for the purpose. Cheapness in feeding, as distinct from economy, is a poor policy in poultry keeping, and never pays in the long run.

It is economical to buy in as large quantities as are consistent with the rate of use, but not to store for too long on account of the probable deterioration and loss of quality. To buy in smaller quantities than necessary is expensive, because retail lots are more highly priced; but to keep foods—especially meals—too long involves loss from the probable presence of insects and mites and the possibility of mustiness.

Carefully examine and compare the samples, and select grain—particularly oats—that is heavy and plump and free from an excess of husk.

Before buying meat or fish meals ask for a guaranteed analysis. This is important in the case of the latter especially. "White fish meal," or meal prepared from white fish only, is preferable; it should conform to the following limits as to composition:

Albuminoids, not less than	55	per cent.
Phosphate of lime	16	"
Oil, not more than	5	"
Salt	4	"

It should be lightish brown, well ground and free from large bits of bone, and not offensive in smell.

The proper storage of grains and meals is important, in order to preserve the condition and quality of the food, and also to prevent loss from rats and mice. Metal bins are preferable, and galvanised iron sanitary dust-bins or any other similar receptacle answer the purpose very well. An economical bin can be made of thin iron sheeting fixed to a wooden frame of 2 in. by 1 in. battens, keeping the frame on the inside of the bin.

CHAPTER IX

BREEDING

WE have purposely refrained from putting this chapter in the forefront of the book because, as we have already pointed out, the great majority of small poultry keepers (for whose benefit we have primarily written) are not suitably circumstanced to engage in breeding operations; and, in any case, it is not advisable to breed until some experience has been gained.

We have consequently indicated, in the first place, the methods of starting poultry keeping that are within the reach and capabilities of the greatest number. Nevertheless, the ambition to breed, and if possible to build up a personal strain of good layers, is widespread; and this chapter has been prepared for the guidance of those who are in a position to do so by putting in practice the methods explained.

The mere mating of birds in a haphazard manner, in ignorance of their qualifications for reproduction, or of the probable characteristics of their progeny, leads nowhere except to the multiplication of chickens of uncertain value. On the other hand, if we select our breeding stock with knowledge of their pedigree and individual fitness, we may at least hope to maintain in their offspring the good qualities of their strain or family, and, in addition, gradually improve the average egg yield of our flocks until a safe maximum output is attained.

What that maximum may be it is somewhat difficult to say at our present stage of breeding knowledge, but experience suggests that it is reasonable to assume that a 200-egg strain is probably the most we may hope to reach. Those who make more extravagant claims may very well, in our opinion, be doubted; a flock average of

from 170 to 180 eggs per bird may be regarded as excellent. How a high average yield may best be attained and maintained it is our object to explain in this chapter.

Strain Making

The proper process of breeding for egg production is that commonly spoken of as strain making. In other words, it is a method of building up a family of fowls, each member of which is selected on account of personal qualifications plus the accumulated pedigree records of each succeeding generation, the birds being mated with others of similarly selected but separate lines.

By the establishment of separate blood lines, in the manner explained later, it is possible to avoid any very close breeding (*viz.* the mating of nearly related birds), and although a skilled breeder may occasionally inbreed, such a course must be avoided by those who are unskilled. The safe rule is to breed from blood lines that are unrelated, or as nearly so as possible, because otherwise there is always a risk of loss of stamina and health; and any method that renders it necessary to make a practice of breeding more or less related birds is opposed to the object of producing highly prolific egg layers.

The manner in which blood lines are established, and the general principles that should guide the breeder in mating the birds, will appear in later paragraphs. It is first necessary to explain the method by which birds should be selected for breeding, apart from any records or evidence of egg-laying performance.

Points in Selection

Given health, vigour, and constitutional soundness—the general indications of which are described in Chapter VI—the following signs of a general fitness should be looked for in each individual fowl selected for the purpose of breeding.

The eyes should be large and bright, with as large a black centre as possible. This is an important point, because it indicates a capacity for that quickness of sight that enables a bird to secure a desirable amount of food; a bird with a dull, sleepy eye will miss much that the other

will find. The eyes should also be prominent, projecting well from the skull. The head should be narrow, the skull coming low down the neck ; the beak short and stout, and the face short ; the neck thin, and of medium length. The comb should be fine in texture, neither too small nor too beefy, and together with the wattles should feel like silk to the touch.

The back should be as long and as broad as possible, and very wide across the wings. A short breast-bone is desirable. The breast should be broad, and there should be considerable width behind ; when handled, the abdomen should feel like a sponge, not shrunken, and without any hard substance whatever. Without what may be called roominess, a bird cannot possess fully developed organs, such as are essential to a high degree of prolificness.

When standing upright the general shape of the bird should approximate to that of a wedge, not deep in front but very deep behind, thick-set, with rather short legs and a good carriage. The legs should be thin, and after a short period of laying they lose their colour in yellow-legged breeds. The tail of the good layer is nearly always carried high, and the plumage generally should be tightly knit and kid-like to the touch. In size the medium should be sought. Very small birds usually breed layers of small eggs, but, on the other hand, it is desirable to reject those that are too large.

There should be no sign or suggestion of fat in the bodily condition of the birds, but they should feel firm and fleshy. The condition of the pelvic bones is also an important indication of a bird's suitability. These bones, of which there are two, project one on either side in the direction of the vent, and are easily located in handling the fowl. They should feel pliable, straight and thin, without any suggestion of lumpiness at the end or any fat on them at all. The greater the distance between these bones and the end of the keel or breast-bone, the better the laying capacity.

The distance between the pelvic bones themselves is also a generally reliable indication of the bird's condition in relation to the nearness of laying, a point of importance in selecting for early production. To ascertain this condition, the distance between the bones may be measured

by the width of the fingers. If there is space enough for two or three fingers, side by side, between these bones, it may be concluded that the fowl is well on the way to an early commencement of laying. In a good layer, when in full lay, there would be a space of about four inches between the pelvic bones and end of breast-bone, or keel, in the general purpose breeds, and about three to three and a half in birds of light breeds.

In the selection of a cockerel for mating with selected hens, choice should be made, so far as may be possible, of one that has been bred by a hen of proved laying powers. Vigour and health are also, and necessarily, among the essentials. The above-mentioned points, so far as they apply, should also be taken into account, but a cockerel will not measure the same as a hen from the breast-bone to the pelvic bones; a first-class breeder would probably measure two inches from breast to pelvic bones.

So much for the points that are revealed in the appearance of the birds, or are ascertainable by careful examination and handling. In combination they indicate capabilities, but the actual egg-laying performance can only be determined by trap-nesting.

The Use of the Trap-nest

A laying strain or family is built up upon the definite evidence of the trap-nest (for a description of which *see* Chapter I), and without the use of this appliance there is no certain guide to the respective merits of pullets as egg producers. This involves more time than the average small poultry keeper can afford, but the necessary attention must be devoted to a system of recording and identifying throughout breeding, rearing, and laying if reliable pedigrees are to be built up.

Each bird must receive credit for each egg she lays, and each egg and chicken produced must be so marked that identification is maintained throughout the progress of all the processes from first to last. The individual poultry keeper's records may start at one of the several points, according as he commences with a setting of eggs, a batch of day-old chicks, a pen of laying pullets, or birds mated for breeding.

If we assume that he begins with a pen of birds selected in accordance with the points given above, he must identify them by fixing a numbered leg band on each and recording against the numbers (in a book kept for the purpose) the eggs laid by individuals from day to day. The trap-nests must be visited at fairly frequent intervals for the purpose of releasing the birds that have laid, and each egg collected should be marked with the number on the leg band of the bird that laid it.

Following the accurate recording of the eggs laid, and their marking, the process is continued during incubation and rearing by the following system.

Methods of Identification

Assuming that eggs are sufficiently marked to connect them with the producing hen, and are set in the ordinary



TOE PUNCH.



















THE PART PUNCHED.

way, no mistake should be possible up to the time of hatching, when the resultant chickens may themselves be marked in turn before they are allowed to run with birds of the same or other broods. In the case of a large or varied production, involving the use of incubators, some special precautionary measures must be taken to prevent the indiscriminate mixing of the birds of various strains which may be hatched simultaneously within the machines.

To meet this difficulty some breeders adopt a simple contrivance consisting of an egg-tray of special construction. Instead of the ordinary open tray, a form known as the pedigree egg-tray is used. This is divided, to a sufficient height by wire gauze, into four or more compartments, with corresponding divisions in the nursery (or drying) section. The easiest method is to put the eggs in muslin bags on the nineteenth day of incubation, thus ensuring the identification of the chick with the egg. By

this method each batch of newly hatched chickens may be separated so that there is no risk of loss of identity, and it becomes a simple matter to mark each bird before removal for rearing.

Of the various manners of marking newly hatched chickens, that of toe-punching is the most accurate, with the additional use of indelible ink for additional recording

RIGHT.	LEFT.	RIGHT.	LEFT.
	1		9
	2		10
	3		11
	4		12
	5		13
	6		14
	7		15
	8		16

TOE-MARKING CHART.



LEG-MARKING BANDS.

purposes (examples of which will be found in subsequent paragraphs). The practice consists in stamping, by means of a small steel punch, a hole or holes in the web between the toes of the chicken's feet. This web or membrane is not very sensitive, and the operation is performed without any apparent discomfort to the bird. Care must be taken not to injure the bones of the foot.

The marking must obviously follow some tabulated arrangement, and, although the possible combinations are

limited, the accompanying table indicates the scope sufficiently for the ordinary purpose. By the adoption of some such order of marking it will be seen that the system affords opportunities for the preservation of the identity of a reasonable number of broods without any duplication. When the chickens are about six weeks old, leg bands may be used to identify them, in the same way as the older birds. It is not desirable to put rings or bands on their legs at an earlier age, because there is always a risk that they will outgrow them, and the metal may become embedded in the legs, to the ruin of the birds.

Mating the Birds

The breeding-pen should be mated up not later than December, and should preferably consist of hens (second year birds) and a cockerel, the hens being sisters bred from one dam and a sire unrelated to her; and the cockerel should be the offspring of an unrelated line of good layers, and bred from a hen with a good record.

It is desirable to use hens that have been run on stubble or free range, following the conclusion of their season's laying, and fed very sparingly. If necessary, efforts should be made to keep them from laying (by change of ground and a bare maintenance diet) until they are required for breeding. They should then be in such a suitable condition that when they are mated an increase in their rations will produce an abundance of good fertile eggs within a few weeks.

At the time of mating they should be very carefully examined for vermin, the presence of which—especially on the cockerel—will seriously affect the fertility of the eggs. A good dusting with insect powder at the start, and once every fortnight during the breeding season, is an essential part of good management.

The ideal proportions of the sexes in a breeding-pen is eight hens and a cockerel of the general purpose (or heavier breeds), and ten hens and a cockerel of the light breeds. Although December mating affords ample time to ensure fertility before the eggs are required for setting in the ordinary way, it should be noted that at least a week, and preferably ten days or a fortnight, should in any case be allowed between mating and setting.

Pedigree Breeding in Practice *

To breed first-class laying stock it is necessary, by means of the trap-nest, to build up and establish different families or blood lines (a few or many according to the proposed extent of the operations) in order to provide for matings that shall be as far as possible unrelated, thus ensuring the maintenance of good health and stamina without which a good yield of eggs is unattainable.

These several separate families, or lines, are bred in accordance with a general plan that is put into practice in the manner indicated in the following detailed example.

No. 1A Family

To establish the first line, or family, to be known for reference as No. 1A, we will assume that the hens originally selected are all sisters, bred from one hen and an unrelated sire, and that they have been carefully trap-nested.

In the result the records show that each bird has produced in twelve months the number of eggs noted against her individual number, as follows:—

Number on leg band.	Eggs laid in a year.
1A	100
2A	138
3A	150
4A	180
5A	200
6A	238
7A	250
8A	255

} Eliminated.

A further selection must then be made, the birds being judged by a standard which the breeder has set up for his own guidance. This should ensure the selection for breeding of those birds only that produce more than, say, 150 eggs in a year, the eggs being of a good size and the shells of good texture; in addition, such birds must be healthy and strong.

* This section embodies the methods employed by Mr. Tom Barron in breeding strains of high fecundity, as proved in laying tests.—EDITOR.

These latter requirements are so vital, that even if the best layers in the pen failed to come up to the standard in respect to health, texture of egg-shell, or size of eggs, they should be eliminated. But supposing all these birds pass the test as regards health, etc., the choice of individuals for breeding from would depend solely upon the number of eggs laid.

Those selected would, therefore, comprise numbers 4A, 5A, 6A, 7A, and 8A, the progeny from which would be toe-marked for pen distinction with the outside right toe-punch, as follows:—

Left.



Right.



The progeny of No. 8A would, however, receive an additional mark made with indelible ink on, say, the top of the head, in order to distinguish them as being those of the hen with the highest record of egg production in the pen.

At the end of the hatching season the progeny of this pen will be about, say, forty pullets and cockerels bred from the hens numbered 4A, 5A, 6A, and 7A, and in addition, say, ten pullets and cockerels bred from No. 8A, and recorded and marked as Pen No. 1A pedigree 255.

No. 2B Family

The second line or family is established in the same way, from sisters mated with an unrelated male, all being unrelated to the birds comprising No. 1A family.

We will suppose these birds put up a similar record:—

Number on leg band.	Eggs laid in a year.	
1B	100	} Eliminated.
2B	138	
3B	150	
4B	180	
5B	200	
6B	238	
7B	250	
8B	255	

The same method of marking is adopted, with the difference that the inside right toe-punch is used, viz. :—

Left.



Right.



The progeny of No. 8B would similarly receive the inside right toe-punch, with the addition of the indelible ink mark on, say, the right wing-bar, so that it would be known that those distinguished as No. 8B with the right inside toe-punch were bred from the best bird in this pen.

These two lines being established, it will be seen that it becomes possible to make unrelated matings between the progeny of the best layers in each pen (8A and 8B), and in each direction. That is to say that the males from each line (representing the best layers in each case) may be mated with the females produced by the best layers in the others.













Further Families

In exactly the same way any number of further unrelated families may be established, known, and marked as No. 3C, 4D, and so on, to the extent required to provide for successive unrelated matings, the possibilities being considerably increased with the progress of the method. The reason that the best hen's progeny is used for mating in each case is that it is obviously the soundest principle in breeding to do so.

But this does not necessarily prevent the mating of birds that produce 200 eggs, or even 180 eggs. Indeed it is a wise thing to do so, because if there is any falling off in the required qualities in the progeny of the highest producers (such, for example, as loss of size in eggs), matings may at once be made by using a cockerel from a high record hen with birds bred from 180 or 200 egg layers, with the probability of an improvement in the desired direction. If it is required to improve the size of the eggs, this character is secured more quickly through the female line than that of the male.

Keeping Pedigree Records

In accordance with the scheme outlined above, the chickens are first marked by the toe-punch and with indelible ink, followed by a leg band when old enough, in the following manner, the significance of each combination of marks being duly noted in a book kept for the purpose.

Family.	Left Foot.	Right Foot.	Ink Mark.	Ring and Record.
1A			Purple top of head.	No. 1A = bred from No. 8A Pedigree 255.
2B			Purple right wing.	No. 2B = bred from No. 8B Pedigree 255.
3C			Purple left wing.	No. 3C = bred from No. 8C Pedigree 255.
4D			Purple on tail.	No. 4D = bred from No. 8D Pedigree 255.
5E			Purple on back.	No. 5E = bred from No. 8E Pedigree 255.
6F			Purple both wings.	No. 6F = bred from No. 8F Pedigree 255.

Further combinations may be made by the use of the other possible toe-marks as indicated in the code, in conjunction with black or other coloured inks.

Inbreeding

Inbreeding is by no means recommended as a method to be adopted generally, and the practice is obviated by the establishment of sufficiently separate, unrelated blood lines in the manner indicated above. But there are exceptional circumstances in which it is justified to a very limited extent, provided due consideration is given to the constitutional soundness of the birds involved.

If, for example, it is found that a given hen in one of the families, bred as above suggested, possesses some unusually good quality (such as size of eggs) which it is desirable to perpetuate in the strain, she may be mated

with one of her most carefully selected sons. On no account should this be done more than once, and the female progeny of this special mating should in turn be mated with an unrelated male bred from a hen possessing the quality it is sought to fix in the strain. The result of this method of mating, carefully carried out, will generally prove satisfactory.

Nevertheless, the general principle of unrelated mating when breeding for eggs is sound, and should be adhered to as far as possible, and the establishment of the separate families usually prevents the necessity for any inbreeding, or for the use of outside stock, for quite a long time. In many cases the mating of hens produced by a pen of high prolificness with an unrelated cockerel, also of a good laying strain, will straightaway give progeny capable of winning the highest position in an egg-laying test.

The introduction of new blood from an outside source necessarily involves some risk, and birds of alien blood should always be tested. The method suggested is as follows: Purchase a setting of eggs from a reliable breeder, taking care that they are of good size, shape, and texture of shell. Trap-nest the pullets hatched from these eggs, and, if the results are good enough, mate the best of the pullets the following season with one of the home-bred cockerels, bred from a good hen. If the resultant stock are thoroughly satisfactory, a cockerel from that mating may in the third season be introduced into the flock.

A Simple Method for Novices

Although the above system of pedigree breeding may be recommended to those who have the required skill and opportunities for strain-making on a more or less ambitious scale, it can scarcely be adopted extensively by the generality of poultry keepers. Nevertheless, there is a considerable section of novices who have the space to spare for breeding and rearing, and the time to attend to the birds, and who wish to engage in this extremely interesting work to a more limited extent. The following plan of operations should suit the capabilities of such beginners.

It is generally best in such circumstances to start with a setting of eggs, obtained from a breeder of repute, because

it enables the novice to see the kind of egg that is produced by first-class stock, and to note the size, colour, texture of shell, and so forth. Having progressed through the various stages of rearing, the pullets must be trap-nested throughout so that the best birds are known.

These pullets should preferably not be bred from until their second season, when they should be mated with a cockerel bought from another and equally reliable breeder ; or the novice may rear his own cockerels from a setting of eggs obtained from an unrelated source, the birds being reared in the second year to come into use in the breeding-pen with the tested hens. In succeeding seasons the mating requirements may be similarly met by the purchase of an unrelated cockerel (or a setting of eggs for rearing) from breeders of repute.

CHAPTER X

DISEASES: THEIR PREVENTION AND CURE

ALTHOUGH it is perfectly true that prevention is better than cure—and nothing should be neglected that is likely to keep the birds in good health—it is equally true that the most careful poultry keeper is sometimes troubled with ailing fowls, and that there are diseases against which ordinary good management may be no protection, the causes sometimes being beyond the control of the owner.

It is, therefore, necessary for every poultry keeper to have a general but sufficient knowledge of the common complaints to which fowls are liable, as regards their symptoms, and the proper steps to take to stop and if possible cure the disease.

But, first, as regards

Preventive Measures Generally

Diseases may best be prevented by cleanliness; the admission of sunlight and air in the houses, and the exclusion of damp; the use of pure foods, clean water, plenty of greenstuff, and the avoidance of over-feeding; the use of clean land; encouragement of activity; the suppression of parasitic insects and mites; whilst the spread of disease is prevented by the isolation of all sick birds directly symptoms of disease appear, and the burning or deep burial in lime of birds that die or are killed as the result of disease.

In addition to the foregoing general precautions, which are all a part of ordinary good management, it is of the utmost importance in this connection to select and keep only such birds as are sound in constitution, and always to avoid the purchase of stock of doubtful origin or derived from weakly strains.

It is further very desirable to keep newly purchased birds under observation for a time, and not to introduce them to the existing stock until reasonably assured that they are in good health, and have not contracted a cold or rousy conditions as the result of exposure during travelling. Symptoms of any ailment are most easily detected in the early morning, and a watchful eye should be kept on the birds when first let out and fed; fowls showing any lack of appetite should be examined.

General Symptoms of Disease

There are two ways of discovering the disease from which a fowl may be suffering, viz. by observing the particular symptoms that all may see, and by the appearances of the internal organs that are revealed by opening and examining the dead bird. The latter method is rather beyond the scope of our present intention, because post-mortem examinations require more knowledge and experience than is possessed by the average small poultry keeper, and it serves the general purpose of the amateur to be able to distinguish the several common complaints, that may be more or less easily treated, from the external symptoms. But where easily recognised internal appearances may be mentioned helpfully, this will be done for the aid of those who care to make a rough examination of dead birds.

Before dealing separately with some of these diseases, the following general symptoms should be noted as being more or less common in conditions of ill-health. A bird that is ailing is usually inclined to mope, to lose the desire for activity and companionship, and to remain quiet, inactive, and solitary. The head is often sunk in the shoulders, the eyes become dull, the feathers rough, the comb and wattles either unusually pale or abnormally dark.

These are among the most common early symptoms of ill-health, and their appearance necessitates the prompt removal of a fowl exhibiting them to a place apart from the other birds, and careful examination for such further signs as will suggest the nature of the complaint.

Common Colds

An ordinary cold or non-contagious catarrh is so very similar in its early stages to contagious catarrh or roup, that the more particular symptoms of the latter should always be looked for in a bird that sneezes, breathes badly, has a watery (or thicker) discharge from the nostrils or eyes, and becomes dull, exhausted, and rough in plumage, with loss of appetite.

Common colds are usually caused by wet or cold conditions, draughty houses, bad ventilation or overcrowding, and are prevalent in autumn and winter. As the same treatment that is applied in the early stage of roup is effective in cases of common colds, the section below dealing with roup should be read, as well for the curative methods as for the characteristic symptoms of that disease.

Roup

Roup in any form is a contagious disease, or one that may be communicated from the contact of an affected bird with one that is healthy. There are two chief forms of roups, viz. a form in which the symptoms are similar to those of a common cold, and another—known as avian diphtheria or diphtheritic roup—which starts like a cold or nasal roup, and then develops by the formation and growth of a whitish or yellowish matter in the mouth, throat, nostrils, and around the eyes.

To deal with the less serious form—nasal roup or contagious catarrh—first, the symptoms of a common cold appear, but the general condition may vary a good deal in different cases. There will be dullness, moping, lack of appetite, and sneezing, with a watery discharge from the nostrils, and very often from the eyes, the lids of which swell and become inflamed.

In the development of the disease the discharge from the nostrils thickens, becomes gelatinous, putrid, and very offensive in smell. Even a casual acquaintance with the disease will enable the poultry keeper to recognise its presence readily by this unpleasant characteristic odour. The partial blocking of the passages makes breathing difficult and more or less noisy, with sneezing and coughing,

and when the blocking of the passages increases, the bird will be sure to open its beak to breathe.

The feathers under the wing and at the base of the neck become soiled with the thickened discharge, roughened by general loss of condition, and the bird becomes sleepy and disinclined to activity except to take water; with loss of appetite the fowl gets thin and weak, squatting and finally lying down. With the unchecked progress of the disease the inflammation often spreads from the nasal cavities to the sockets of the eyes, where there is formed a whitish secretion, causing a surface swelling with a foul discharge. This may cause blindness, or even entirely destroy the eyes, and at this stage, as the fowl cannot see to eat, the loss of strength is rapid and death follows quickly.

This form of roup or contagious catarrh differs from a common cold in its origin, because whilst the latter is caused by the prevailing surrounding conditions, the former is "caught" by contact with infected birds, or through the agency of the boots or clothes of persons coming from infected places. It may also quite possibly be carried from place to place by pigeons, sparrows, or other wild birds.

Treatment of Roup

The treatment of this disease, which applies also to cases of common colds, and should at once be adopted when the symptoms common to both these diseases appear, consists in the first place of the removal from the flock of the bird or birds showing any such symptoms. Then take immediate steps to prevent the spread of the disease. Clean out the houses thoroughly, burn the litter, and disinfect the whole place thoroughly. For this purpose a 5 per cent. solution of carbolic is excellent, but the free use of any good disinfectant will serve the purpose. The poultry-keeper's hands and boots should be cleaned and disinfected, and this should be done after every visit to the sick birds. It is also a wise precaution to colour the drinking-water of the healthy birds with a solution of permanganate of potash.

Deal with the affected birds by first cleansing the mouth

and nostrils, removing the secretions, and washing with warm water. The secretions come away more easily if the nostrils are pressed and massaged gently but firmly in the direction of the beak. To cleanse the nostrils thoroughly there is nothing better than a 2 per cent. solution of permanganate of potash, and this may best be introduced into the cavities of the nostrils by a small syringe. The same solution should also be applied to the inside of the mouth, and especially into the slit forming the internal opening to the nasal air passage by means of a small camel-hair brush. After each such treatment put a small plug of cotton-wool, saturated with the disinfectant, in the entrance to each nostril.

Where several birds require individual treatment, and time is an important consideration, they should first have the secretions removed in the same way as above, but instead of the separate application of the disinfectant, their heads may be plunged into a tepid solution in any suitable receptacle. The head may be kept in for about twenty to twenty-five seconds, or as long as the bird can bear it. In either case the birds should be treated once a day, and preferably twice.

In the event of swellings about the eyes or on the cheek, massage may disperse these when they are soft, but if they harden, it becomes necessary to lance them with a sharp, clean lancet or the small blade of a penknife; the matter must all be removed, the wound washed with disinfectant, and a cotton-wool plug saturated with disinfectant inserted to keep the place open until the formation of matter ceases.

During treatment keep the birds in a warm, dry, well-ventilated place, and feed on nourishing food, so that the maintenance of strength may enable the birds to throw off the disease. Cod-liver oil or chemical food is helpful. If the eyes are affected and the fowl cannot see to feed, pellets of soft mash should be given. Birds previously sound in health and constitution treated as suggested directly the symptoms appear will usually recover within two or three weeks, but early treatment is essential to success. If the disease has advanced too far, or the stock is in any way weakly, it is much better to kill and burn than to attempt a cure.

Avian Diphtheria

Avian diphtheria, or diphtheritic roup, is by far the worst and most deadly form of roup or the group of diseases included under this general name. It is so deadly and so troublesome and difficult to deal with successfully, that every precaution of cleanliness and forethought should be taken to prevent its introduction into a flock. As a healthy fowl can only be infected from a diseased bird or the carelessness of those who pass from one to another, the methods of prevention are fairly obvious. If for the prevention of the spread of this disease alone, it is extremely important to keep newly purchased birds isolated and under careful observation for about a fortnight or three weeks.

The early symptoms may be those that first appear in the case of a common cold or of contagious nasal roup, but the first sign of avian diphtheria will be found in the formation of a whitish, or yellowish white, growth on the surface of the mouth, the tongue, the throat, the nostrils, or about the eyes. At first it may be no more than a slight local inflammation, and the growth on the surface may be very small, and of very slight thickness; but, without prompt treatment, very rapid progress is made, and the deposits spread, thicken, and darken in colour. The growth or deposit on the surface is commonly called "false membrane," and consists of exuded or discharged matter which adheres very firmly to the mucous membrane, or natural coating of the part affected, and contains solid cheesy matter in the centre. Like nasal roup, this form of disease has an unmistakable and very disagreeable odour.

Unless taken in hand and treated quickly, the growth of this so-called false membrane spreads until it blocks the mouth, nostrils, or throat. Breathing becomes very difficult, the head swells, and the odour from the decomposing secretions is most offensive; diarrhoea usually results, and death follows quickly. In some cases it begins in the air passages, and without any previous symptoms reaches the lungs, and death takes place in a short time; such cases are difficult to deal with, and are nearly always fatal. A bird showing any symptoms of cold or nasal trouble, or that breathes with difficulty, or in which the comb is

pale or discoloured, should be examined at once for the discovery of such growths.

Treatment of Avian Diphtheria

The most sensible, and usually the most economical thing to do in the case of an outbreak of this dread disease is to kill and burn the affected fowls at once. It is so highly contagious, and so likely to lower the value of a bird even when the treatment effects a cure, that it is generally cheaper in the long run to make the sacrifice. Sometimes it is considered worth while to devote the necessary time and attention, in the case of individual fowls of more than ordinary value, to treating with a view to curing.

But in either case, whether for killing or treatment, affected birds must be removed from the flock at once, and the necessary steps taken to prevent the spread of the disease. This consists in thorough cleaning and disinfection of the house, fittings, and all the quarters that have been occupied by the diseased birds. The inside of the house and the fittings may be sprayed with a 5 per cent. solution of carbolic, and this may also be used on the yards.

All birds in the affected pen must be kept carefully apart from any other birds, and the utensils must not be interchanged. Disinfectant must be used freely in the litter and in nest-boxes and other places, and the drinking-water should be coloured with permanganate of potash. Meanwhile all the birds in this pen must be watched carefully for any sign of the disease, making frequent individual examination of the mouth, throat, etc.

The treatment is at best a tiresome business, and as the results are doubtful, it should never be attempted unless the bird is not only of exceptional value, but also vigorous and constitutionally sound, apart from the recently contracted disease. If taken in hand promptly, the disease may yield to the application of tincture of iodine, with which the disease patches should be painted by means of a camel-hair brush, and the face and nostrils may be swabbed with a warm weak solution of the same.

Another method of treating this disease is to carefully

remove as much as possible of the cheesy matter formed by the disease, and to touch the surrounding membrane of the affected parts (which contain germs of the disease) with a caustic (silver nitrate) pencil. It may be necessary to repeat this frequently. It is also essential, in addition, to thoroughly disinfect the mouth, throat, and nostrils, using permanganate of potash as in the case of nasal roup.

During the treatment the bird or birds must be kept in a warm, dry, and well-ventilated place—quite isolated—and given nourishing and easily digested food; unless their strength is well maintained, they will not be able to aid the treatment and throw off the disease. Give some cod-liver oil or chemical food.

If the treatment does not produce promising results within about a couple of weeks, it is useless to continue the effort to effect a cure, and the bird should be destroyed to prevent further trouble from such a source of infection.

Chicken Pox

Chicken pox, or sore head, is by some considered to be a form of roup, but however that may be, it is a disease that makes its appearance as yellowish or grey spots or small lumps on the comb, wattles, and other parts of the skin of the head—round the beak, nostrils, and eyes sometimes singly, and at others in groups or clusters. With unchecked development these clusters assume what has been aptly described as a mulberry-like appearance, and darker coloured crusts form on the surface.

That the disease is infectious is undoubted, as also is the fact that it may be spread by pigeons and carried by parasitic insects and mites. It is, therefore, important to isolate birds that show any such spots on the head, and to disinfect and take all the ordinary precautions recommended in the case of roup.

By way of treatment the crusty formations should be removed when possible, and an antiseptic ointment applied to the parts, and the skin of the head well greased wherever exposed. Red mercurial ointment is effective, or the sores may be painted with iodine with excellent results. Keep the birds in a warm place, and feed them well with good nourishing food.

Bronchitis

It sometimes happens that a common cold spreads from the nostrils and throat to the bronchial tubes, or air passages, which become inflamed. The surface membrane of these tubes becomes dry and more or less thickened, with the result that in breathing the bird makes an unusual noise somewhat like a whistle. Unless checked, the disease progresses, and mucus, or a slimy fluid, gathers and causes a rattling noise in breathing.

When these symptoms accompany or follow those of a cold, prompt treatment will probably prevent any more serious development; but without attention the bird may get out of condition, become drowsy, lose its appetite, and with the increasing breathing difficulty will soon die. The origin of the complaint is the same as in the case of a cold, and is usually found in exposure to cold, draughts, damp, or badly ventilated roosting-places.

Taken in the early stages, it is possible to give relief and effect a cure by putting the bird in a warm, dry, and well-ventilated place, and feeding on nourishing food mixed with milk. Twice a day in feeding the soft food it should have mixed with it two grains of black antimony, and instead of water the bird should be given to drink the liquid in which some linseed has been thoroughly steeped. If the breathing is very bad, a few drops (four or five) of ipecacuanha wine will relieve the bird.

Liver Diseases

There are various diseases of the liver, some of which can scarcely be detected by external symptoms, and such signs as are apparent are common to most complaints of this character. Among the most general indications of a disordered liver are a fairly fluid diarrhoea, becoming yellowish in colour with the progress of the disease; loss of appetite; thirst; rough plumage; dark colour of the comb, changing from purple to black; mopishness and a preference to remain quiet and apart from other fowls. It is really only by post-mortem examination that the disease can be identified accurately. In one form of liver disease the organ enlarges, is of a deep red colour, and very greasy; in another it is shrunken and hard, and

spotted with yellow fat; and an inflamed liver is large, full of blood, and easily broken.

All the ordinary liver troubles are due to wrong methods of feeding and insufficient activity. Over-feeding, the excessive use of rich and stimulating foods, and more especially the use of barley and barley meal, most frequently cause such disorders; these troubles often begin during the winter season, when inactivity is most likely to prevail, unless there is some direct incentive to exercise, such as is provided by the proper use of a scratching-floor. Careful feeding and exercise will prevent liver disease, but whenever its presence is suspected or proved, the birds should be dosed with Epsom salts (half a teaspoonful for a grown fowl, dissolved and mixed in the mash) and put on a light and bulky diet, including plenty of vegetables both cooked and put in the mash and supplied green for the birds to peck at. They must also be made to work hard for their grain ration, by scattering it and covering it well with litter; reduce the quantity by half. The addition to the mash of well-boiled oatmeal porridge is excellent, stopping grain entirely for a week.

The water in which the cut up roots of dandelions have been steeped helps to stimulate the liver if mixed with the mash, for which purpose it may very usefully be employed in the feeding of fowls that are kept very intensively.

Kidney Diseases

It should be noted that the *post-mortem* examination of a large proportion of birds that are thought to have died of "liver disease" reveals a diseased condition of the kidneys. There are no very reliable distinguishing symptoms of kidney diseases in the living bird—beyond those commonly associated with liver complaints—but the best way to prevent such disorders is to feed a well-balanced ration, including a good supply of vegetable food, and to avoid an excessive use of meat or other protein ingredients.

Coccidiosis

This name is commonly given to contagious diseases caused by a minute parasitic organism which belongs to a group of such creatures known as *Coccidia*. The forms

of disease thus caused in fowls affect mainly the liver and the intestines.

In the former case the symptoms are those common to other disorders, including mopishness, loss of appetite, etc., together with a darkening of the comb and diarrhoea. After death the liver will be found to be enlarged and more or less covered with whitish or yellowish spots or clusters. If the presence of the disease is suspected or proved, the best general treatment is that adopted in other classes of liver disease, and the cleansing of the run used by affected birds.

In the other form the intestines of chickens are mainly affected, and the symptoms are so similar to those of white diarrhoea in chickens that reference should be made to the following paragraph dealing with that complaint, the general treatment of the one applying to the other. The same precautions should also be taken.

White Diarrhoea

This destructive chicken disease (most common among artificially hatched and reared chickens) is the cause of considerable losses among birds during the first few weeks of rearing, but birds of about three weeks and upwards are very seldom affected by it. In its least harmful form (if indeed it is true white diarrhoea) it may be caused by a weakness in the stock or some error in incubation, brooding, or feeding; but in its most destructive or true form it is caused by bacterial infection, and as there is always the risk of the latter, the common symptoms of white diarrhoea should cause the poultry keeper to take all the precautions necessary in the case of the infectious disease.

The general symptoms of white diarrhoea may be easily recognised. Chickens thus affected prefer brooding to a healthy and natural activity. They appear drowsy, disinclined to eat, their feathers get rough, and they droop their wings; but the chief sign is the whitish character of the diarrhoea, although the discharge may sometimes be a mixture of brown and white. The discharge is sticky, and often clings to the down so much that the birds become pasted up around and over the vent. The effort to void under such conditions causes the chickens to make

a plaintive cry. The abdomen swells and the head sinks into the shoulders.

Such treatment as is possible consists in the remedying of any defect in the management of the brooder or in the feeding, and the preliminary dosing of the birds with Epsom salts. For young chickens of an age to be liable to this disease, say up to four or five weeks old, the proper dose would not be more than fifteen grains each, dissolved in water, and mixed with the soft food. Boiled rice should be included in the mash, to which charcoal should be added, and the drinking-water should be coloured with permanganate of potash. Give also a regular supply of fresh green food, if there has been any failure to do so before. Sour or skim milk feeding has proved most beneficial in the growth of young chicks, and tends to reduce mortality from all causes. It is most useful in suppressing the forms of diarrhoea attributed to errors in feeding or brooding.

It is above all things important to separate such birds and do all that is possible to prevent the spread of the disease. Carefully collect and burn the litter and droppings, and clean and disinfect the brooders and surroundings. As eggs may be infected as well as birds, every care must be taken in the purchase of settings and day-old chicks to make sure that these are not procured from contaminated sources. The same care should be taken in buying breeding stock, owing to the possibility of the disease being transmitted by these birds as carriers.

Diarrhoea

Simple diarrhoea, or looseness of the bowels, may be no more than a slight passing disorder, due to the eating of some indigestible material or exposure in cold or damp weather. But as diarrhoea is one of several symptoms common to various diseases, it would be a mistake to regard it as a matter of no account.

Any departure of this description from the normal character of the droppings should serve to draw attention to the conditions and the food, so that defects may be remedied. It is, moreover, in any case a wise precaution to give a dose of Epsom salts all round, up to half a teaspoonful per bird for full-grown stock; the salts should be mixed in the mash when dissolved.

Rice boiled in skim milk and dried off with middlings or Sussex ground oats will be found of great use. In persistent cases three or four drops of chlorodyne should be given.

Enteritis and Dysentery

With diarrhoea in its more severe forms the voidings may be dark or greenish in colour, and sometimes mixed with blood. If there is a combination of blood and slimy fluid, the disease is probably dysentery, but for the practical purpose the treatment of dysentery, enteritis, or other more or less serious disorders of the intestines is the same, so that the exact form of the disease is of minor account.

With such discharges there is a general loss of condition, and frequently a loss of weight, with mopishness and a disinclination for activity; the comb may first lose colour, and then become dark. Common causes are foul water, bad food, putrid or poisonous matter, and dirty surroundings; or it may be caused by bacterial infection.

If possible, the cause should be found and the conditions improved. The drinking-water should have a little of the solution of permanganate of potash added to it. The use of bran or any form of husky food should be discontinued, and some powdered charcoal added to the soft food. As a dose give up to a small teaspoonful of Epsom salts per bird, dissolved and mixed with the food. It is of the first importance to isolate affected birds, and to cleanse and disinfect houses and runs.

Digestive Disorders

These range from slight to serious. Simple indigestion may result from over-feeding or an insufficiency of green food, and the symptoms include listlessness, an abnormal appetite, diarrhoea, or constipation. Better feeding and encouragement to exercise, together with a dose of Epsom salts, will usually be sufficient to put the birds right.

But if, as sometimes happens, there is inflammation of the crop, which becomes filled with gas, liquid, and food, with a resultant swelling, accompanied by dullness, loss of appetite, etc., more direct treatment is required. Hold the bird with its head down, massage the crop to empty it—and this may be aided by pouring in a little

warm water—and then give a dose of one teaspoonful of castor oil. Feed soft food (mixed with charcoal) in small quantities, and induce exercise. Add oatmeal porridge to the mash.

Inflammation of the crop or other digestive disorders may also be accompanied by gastritis, or inflammation of the stomach, the causes and symptoms of which are similar. The treatment consists in feeding more carefully (with plenty of green food), giving a dose of castor oil or Epsom salts, and milk or barley water to drink. Charcoal should be added to the soft food. Stop grain feeding for a week. See that there is a good supply of sharp flint grit.

Crop Binding

This very common trouble may be due to conditions brought about by disease, but is mostly the result of the blocking of the passage by a mass of swollen grain, or by an accumulation of hay, stringy grasses, or other material picked up with the food. The symptoms that characterise this trouble are the swollen and hard condition of the crop.

When noticed early enough, relief may be given by pouring some castor oil into the crop and then gently kneading that organ to loosen and move the tightly packed mass. By such means some of the food may be ejected by way of the mouth and the rest passes in the ordinary way.

But if other material continues to block the passage it becomes necessary to open the crop to remove it. First pluck a few feathers to make a clear space, then open by cutting through the skin and the wall of the crop for about an inch in length by means of a sharp penknife or lancet. Remove the contents by the aid of an egg-spoon and tweezers, wash out with disinfectant, and sew up the crop and then the covering skin (making separate stitches in each). Dress the place with antiseptic ointment, keep the bird in a quiet place, and feed on soft food until recovered.

Peritonitis and Dropsy

These may be considered together; the latter as a development of the former. Peritonitis is the inflammation

of the lining membrane in the abdomen which covers the various internal organs, and the inflammation of the latter may result in the inflammation of the former, or the intestines may be perforated by some sharp material that has found its way there.

A ruptured oviduct often causes peritonitis, and there are other possible causes, such as perforation by worms, but in any case the symptoms include loss of appetite, restlessness followed by inactivity due to weakness, the swelling of the abdomen, and a state of fever.

Dropsy, or an accumulation of liquid in the abdominal cavity, is a frequent result of peritonitis. The abdomen becomes very distended, and is soft under pressure. In the dead bird masses and lumps of egg substance and pus are sometimes found, resulting from the rupture of the oviduct (*see* paragraph under this heading) or from the failure of an egg or eggs to follow the normal course by way of the oviduct.

Treatment of either of these conditions is seldom successful, and never very profitable, and the best course is to kill the birds.

Ruptured Oviduct

There are seldom any very noticeable symptoms of this trouble, although such a happening may result in peritonitis as suggested above. The oviduct may be ruptured as the result of the passage of an abnormally large egg or on account of the inflammation of that organ. If there is such a tear or break in the walls of the oviduct, the contents pass into the abdominal cavity, and although a small tear may sometimes heal, continued laying will enlarge the rent and the condition will be hopeless.

The only useful treatment is to reduce the feeding and avoid all stimulating foods directly there is any appearance of a quantity of blood on an egg; if the rupture is small, this may prevent its extension and result in healing. But more often than not the death of a bird is the first indication of the trouble. Sometimes, however, a number of eggs will pass from the ruptured oviduct to the abdominal cavity, and the bird show no symptoms until there is a swollen appearance, as in the case of dropsy.

Prolapsus of Oviduct

This term is used to describe a condition in which a portion of the oviduct projects from the vent as the result of straining in laying or attempting to do so. If the suffering fowl is found at once, it may be dealt with successfully by gently cleansing the protruding part with warm water, greasing it well with vaseline, and very gently and carefully replacing it by pressure with the fingers.

After treatment the bird should be kept in a coop quietly in a dry, warm, and not too light building. It must be fed on light food and green stuff, and anything likely to stimulate laying should be withheld for a time.

If the condition has become very bad, or the parts have become torn and injured before discovery, treatment is probably of little value, and the best thing is to kill the bird.

Egg Binding

Sometimes a fowl is seen to go frequently to the nest without laying, or is noticed straining and in evident distress. The reason for this behaviour is an inability to expel the egg, either because of its abnormal size or because the muscles of the oviduct are in a state of exhaustion ; or, again, the oviduct may be inflamed, or possibly twisted.

If the cause is simple, relief is given by holding the fowl so that the stern is over a vessel containing boiling water, the steam from which helps to relax the parts. The passage of the egg may also be aided by applying oil to the vent by means of a feather. If the obstruction is caused by the skins of broken shell-less eggs, a portion of these will probably be seen upon examination, and the whole may be carefully removed with the little finger. Where the trouble is more complicated, the chances of successful treatment by removal of the egg, except when carried out by an experienced person, are small, and the operation should not be attempted by an amateur.

Abnormal Eggs

The laying of soft, or shell-less eggs may be due to a want of shell-forming material, such as crushed oyster-shell. It is also caused by sudden fright, by the use of

spices, over-feeding, or the use of a food that is too stimulating. Such defects must be remedied, and a few small doses of Epsom salts given to the birds.

Blood spots in eggs often cause anxiety, but they are commonly due to the rupture of small vessels in the production organs, and usually occur in the spring or when the egg yield is heaviest. In ordinary cases they need not cause alarm, and will soon disappear without any special treatment.

Tuberculosis

Tuberculosis is sometimes confused with so-called "liver disease," and birds thus affected are often spoken of as "going light"—this latter doubtless on account of the emaciation and loss of weight which is a distinctive symptom of the disease. Other symptoms are anæmia (pallor of comb, wattles, and face), roughened plumage, abnormal appetite, diarrhœa, and general weakness, often combined with lameness.

It is a contagious disease, caused by a minute germ, and spread chiefly by means of the droppings of the diseased fowls. Treatment is of little or no value, as the disease is usually beyond cure when the characteristic symptoms are noticed. The diseased birds should be killed and their bodies burnt, and the whole place very thoroughly cleaned and disinfected.

The risk is, indeed, so great that the healthy birds should be put on a fresh run, and the old one well cultivated before use again. The house is best disinfected with chloride of lime— $\frac{1}{4}$ lb. to 1 gallon of water.

Apoplexy

A sudden unexpected death is usually caused by apoplexy, which is due to the breaking of a blood-vessel in the brain. This may be brought about by some disease or abnormal condition of the vessels, and the immediate cause may be fright or straining to lay an egg. To prevent such happenings the birds should be kept in good condition, and not too fat.

Vertigo

When a bird staggers, walks in a circle or backs, twists its head backwards or behaves in similar odd ways, it is said to be suffering from vertigo, or congestion of the brain. It may result from a blow, or any sort of extreme excitement, and sometimes accompanies acute forms of indigestion.

To treat such a fowl, bathe its head with cold water, and give it two teaspoonfuls of castor oil; put it in a quiet place, and it may recover.

Rheumatism

Lameness and stiffness of the joints, if not due to tuberculosis, may be the result of inflammation due to exposure to cold and dampness. To remedy this, the conditions must be improved and the birds fed on a generous ration, with plenty of greenstuff. Rubbing the joints with a good embrocation may give relief.

Leg Weakness

This occurs chiefly in young birds during the first six months of rearing, and is more common among cockerels than pullets, although the latter are sometimes subject to the trouble when about to begin laying. It is usually a case of youngsters outgrowing their strength, their size and weight increasing too rapidly in proportion to the strength of the birds, so that they become weak in the joints and top-heavy.

To avoid this state of affairs the feeding must be of a nature calculated to produce a more normal development. Do not give too big a proportion of fat-forming foods, but use a proper quantity of flesh and muscle-formers—oatmeal, bran, oats, and wheat. Give plenty of greenstuff, and in case of any weakness give milk to drink instead of water.

Bumble Foot

This is shown by lameness and a disposition to raise the affected foot from the ground. It is the result of accident,

such as treading on a piece of broken glass, a nail, or by the perches being placed too high so that the birds descend with too much force. In the result an abscess forms on the ball of the foot. This must be opened and the pus and core removed; then wash with an antiseptic, apply any good ointment (boracic or carbolised vaseline), and bandage. Keep the bird in a coop during the healing period. Other abscesses may be similarly treated.

Simple swellings may yield to washing in soapy water and painting with tincture of iodine.

Gapes

A disease of chickens more commonly than of older fowls (among which it is rare), caused by the presence of very minute parasitic worms in the air passages. The name of the disease indicates the prominent symptom—gaping, with sneezing and coughing. Unless the cause is removed, the multiplication of the worms will often choke the chickens. The only cause of the disease is the worm or ova, picked up by the birds on their run, and the first step is the removal of the broods from the infected ground. Where this is not possible, dust the bottom of the coop and the ground with air-slaked lime.

Isolate the affected birds, and remove as many of the worms as possible by means of a small feather, stripped all but a small tuft at the end, dipped in turpentine; insert this in the windpipe, and withdraw with a turning movement, taking care to destroy the worms removed. In the drinking-water add some salicylate of soda, in the proportion of 3 drams to 1 quart.

Burn any birds that die, clean and disinfect the coops, houses, and runs, giving the last-named a rest from occupation for a time. Tainted runs may be treated with air-slaked lime and well dug over, or they may be sprinkled with a 2 per cent. solution of sulphuric acid, but in any case chickens must be kept off for some considerable period—several seasons in some cases.

Colour the drinking-water of the healthy birds with permanganate of potash. Chopped raw onions or garlic mixed in the food is useful, as also is the placing in the drinking-water of a small piece of camphor.

Favus, or White Comb

This is a disease of the skin caused by fungi, and as it may be contracted by the poultry keeper who handles affected fowls, especial care is necessary to avoid this. It makes its appearance first on the comb and other parts of the head, and unless checked may spread over the feathered areas of the body as well, showing first as small white or grey spots like mildew, which tend to grow together, thicken, and form crusts. The disease has an unpleasant odour, somewhat mouldy or musty in character.

Being so contagious, separation and other precautions should be taken directly it appears. If taken in the early stages, it yields to treatment more or less readily. Wash the affected parts with warm water and soft soap, and apply a suitable ointment, such as sulphur and lard in nearly equal proportions or carbolised vaseline. If crusts have formed, these should be removed after softening by washing, and the parts painted with iodine tincture.

Scaly Leg

So called from the enlarged and scaly appearance of the legs when attacked by a very minute mite which gets under the skin and breeds there. The legs get rough, and the scales are pushed out by a crusty deposit, with resultant discomfort and lameness. To prevent the spread of the trouble the birds must be isolated, and the houses cleaned out, with a thorough cleansing of all perches and treatment with paraffin, or equal proportions of paraffin and creosote.

To effect a cure, soak the legs and feet in warm soapy water, brush the parts well with a small brush, and apply an ointment of 1 part of oil of caraway with 5 parts of vaseline, or an ointment of sulphur and vaseline. Continue this treatment until cured. As a preventive, rub the legs of the birds well with a paraffin rag twice a year.

Feather Plucking and Eating

These vices are more often than not the result of the infestation of the fowls by parasitic insects (lice) and mites, the plucking and eating of the feathers originating in

the efforts of the birds to get at the cause of their irritation. These pests multiply rapidly in spring and summer unless the houses are thoroughly cleansed and the birds examined, and when necessary treated (*see* Chapter VIII).

The parasites may be got rid of by the sufficient application to the affected parts of such ointments as are recommended for scaly leg, together with greater cleanliness in the houses and the free use of insect powders. But it is sometimes difficult to break the habit of pulling and eating the feathers; the sponging of the plumage with a strong solution of quassia will sometimes check the habit, but prevention must always be the chief aim.

Worms

In connection with intestinal and other troubles, worms may sometimes be seen in the droppings, and in cases of indigestion or kindred complaints, the giving of a purgative may reveal their presence. Whenever their presence is suspected or proved, each affected fowl should be given a dose of santonine—2 grains, dissolved in water and mixed with the soft food. All droppings containing worms, especially after such a dose, should be destroyed.

Wounds

In case of cuts, tears, or wounds generally, clean the place thoroughly with warm water containing a good disinfectant. If necessary, sew the wound with silk, paint round it with iodine, tincture, and dress with an antiseptic ointment.

A simple fracture of the leg or wing may be cured by means of splints and bandaging, keeping the splints on for three weeks after the accident.

A Useful Tonic

For use in cases of indigestion, or for toning the system after other complaints, "Douglas Mixture" is a useful tonic. Make a stock solution of $\frac{1}{2}$ lb. of sulphate of iron crystals and $\frac{1}{2}$ oz. of sulphuric acid, with 1 gallon of water.

Use two tablespoonfuls of this in each gallon of drinking-water.

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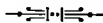
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Composed of carefully selected cereals, flaked and dried. Pre-digested, therefore readily assimilated—suitable for Chickens, Growing Stock, Laying Hens, the Show-pen and preparing for the Table.

LAYING MEAL.

Scientifically milled cereals, blended in well-balanced proportions with granulated Meat, Malt, and “Vi-Do.” Contains the necessary elements for egg-production in a concentrated form. 50% Middlings may be added.

“CE-DO”
(Dry Mash).

A well-balanced complete food in itself, can be fed dry, or moist, also mixed with house scraps.

CHICKS’ DELIGHT
(Fine and Coarse).

Containing cracked grains and seeds. Just what Chickens delight in, and do well on. The dry feed necessary from the shell to 3 months old.

POULTRY MIXTURE

Chiefly Wheat, Oats, Barley, and Maize for adult stock.

“VI-DO”
(The Life-Giver).

HEALTH FOOD. Containing over 45% of flesh-forming elements. Stimulates the appetite, assists digestion. Braces up the system. Wards off disease. A great aid to egg-production.

Ask your Corn Chandler for “CLARENDO” Foods as above. If he cannot supply, write direct to us for samples and prices.

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Tel. : Avenue 5320 (3 lines).

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One Speciality :

SCIENTIFIC BREEDING FOR
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WYANDOTTES & LEGHORNS

EVERY bird trap-nested.
Full pedigrees supplied.
Many Pullets producing
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Eggs for Hatching. Day-old chicks, etc.

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Uveco Poultry Food is a scientifically prepared combination of flaked grain and crushed wheat containing all the food elements required to build flesh, frame and feathers and fill the egg basket. The grain is cooked by a special process which breaks down the starch cells and makes the food quickly and easily digestible, so that young stock are always asking for more—the healthy sign—and mature hens remain lively and busy.

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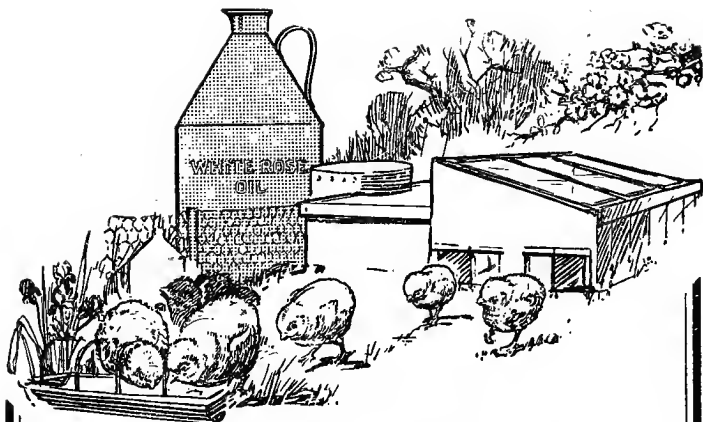
Feed your Fowls on our "Laon" Poultry Mixture
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These will keep your birds in good condition and
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Poultry Keepers

Every variety of Poultry Foods in stock
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Don't Take Chances

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OBTAINABLE **OIL** EVERYWHERE

THE IDEAL FUEL FOR INCUBATORS
AND SAVE YOUR CHICKS FROM DANGER

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EVERY EGG LAID IS WEIGHED & GRADED

ALL eggs laid on my farm by breeders and trap-nested birds are weighed and graded, so that the small egg factor can be cut out of the strain. This means a good deal of time, labour and money, but such is a small item so long as

I Give You Satisfaction

In fact I guarantee satisfaction because I refund in full all purchase money, and pay return carriage if you do not like the birds I send you. Thus you have a look at the birds ere you buy, and nothing could be fairer for you and me.

I am able to concentrate on heavy laying because I specialise in ONE BREED and keep ONE BREED only, viz.

WHITE WYANDOTTES

(large egg strain)

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The Poultry Notes which appear every Saturday are written by experts for the practical poultry-keeper. They give the essential news and notes of the week in condensed and readable form, and every aspect of poultry-keeping is dealt with authoritatively.

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Decorating &
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Houses and all outdoor and in-
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Esitol is a guaranteed preventive—and
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For loose cabbage leaves, etc., etc.

This useful article may be used for a variety of purposes and prevents the birds fouling their food.

Price **4/6**

Post 9d. extra.

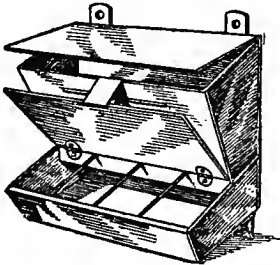
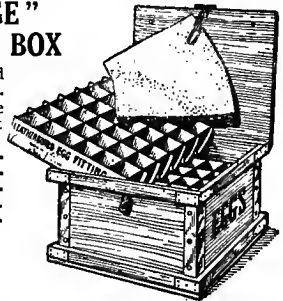
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Carriage extra.

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Made of stout Galvanised Iron. Strong hinged lids, thoroughly rat-proof. Made to stand firmly on the ground or hang on the wall.

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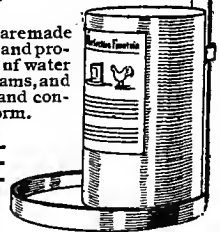
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WHITE
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EGGS FOR
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BREEDER of PEDIGREE UTILITY LIGHT SUSSEX, -RHODE ISLAND REDS, WHITE WYANDOTTES, WHITE LEGHORNS, WHITE RUNNER DUCKS. Sitting Eggs and Day-old Chicks from carefully selected winter layers, mated to Cockerels from high egg record trap-nested Hens. Pullets for sale in July, August, and September, from 21/- each. All birds have either large grass runs or free range, and are kept under ideal conditions, ensuring high fertility and strong, rearable Chicks.

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Some of the best “Non-Stop” Laying strains in the Kingdom.

Prizes won with Blue Leghorns at the following Shows: The “Dairy,”
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THESE DUCKS ARE REGULAR EGG MACHINES.

EGGS FOR HATCHING, DAY-OLDS, AND STOCK SUPPLIED
FROM ALL THE ABOVE BREEDS.

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Specialists in Utility Breeding

Hardy Prolific Trap-nested Strains of following varieties:

White Leghorns	Black Leghorns
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Our Strains have been built up over a period of many years. By careful selection and the use of Trap Nests the **Large Size Egg** and **High Prolificacy** have been attained.

Price list of eggs for hatching and day-old chicks on application to
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From Pure White Leghorns and White Wyandottes.

Write for Terms and Prices.

Send also for particulars of best Poultry Foods.

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Ideal for Small-holders.

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**IMPORTED AUSTRALIAN
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Holding World's Laying Records
339 and 335 Eggs per bird. 12
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95% 2 oz.

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Send a Post Card NOW for FREE SAMPLE and full particulars, then judge the merits of this chick-feed for yourself. You can get just as satisfactory results as those mentioned above.

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Nr. WESTON-SUPER-MARE

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Winner Bronze Medal and 1st and 2nd Class Certificates at Harper-Adams Laying Tests

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Breeder of High-class PEDIGREE
UTILITY WHITE WYAN-
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Breeder and Owner of S.P.15,
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Fourth Position in the Midland
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PALMER'S PURE FISH MEAL

As supplied to the Bentley, N.U.P.S., Harper Adams, and Munster Laying Competitions.

Chick Foods	Biscuits
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THESE are the best Poultry Foods it is possible to make, and are the result of 30 years' practical experience with a large stock by one of the best-known poultry experts in the world.

Send for samples and literature

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**POULTRY BASKETS
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WHITE WYANDOTTES.**

**GOOD TYPE. FINE LAYERS.
VERY HARDY.**

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NO DEAD CHICKS



Strong—Lusty—Big-Boned—Healthy

FED EXCLUSIVELY ON

ARMITAGE'S DRY CHICK FOOD

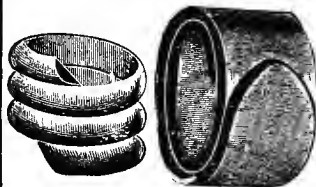
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SPIRAL.

EXPANDING BAND.

BRITISH MADE THROUGHOUT.

CELLULOID POULTRY RINGS, 3 coils, in various colours. Our Rings are used in the various laying competitions, and can be relied on not to come off. State whether all one colour or assorted colours when ordering, also the breed required for.

PRICES: 150, 10/-; 100, 7/-; 50, 3/9; 25, 2/-. FLAT BAND RING (Celluloid), in various colours, same prices as above. Celluloid Spiral Rings, same quality as above, but two spirals instead of three; 150, 8/-; 100, 5/6; 50, 3/-; 25, 1/3. Spiral Celluloid Rings for Day-old Chicks: 150, 3/-; 100, 2/3; 50, 1/5; 25, 9d. Growing Chick size. 5/- 150, 3/6 100, 2/- 50, 1/3 25. We pay postage on all orders.

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This Fount is very strongly made of galvanised iron and painted a nice dark red. This Fount entirely supersedes the old-fashioned closed-up kind, as it is made in two parts, rendering filling and internal cleaning a simple matter.

Holds one gallon of water.

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All carriage paid per return; no waiting.

We supply everything for fowls. Send for free catalogue No. M1.

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THE BEST OBTAINABLE

1-cwt - - - 16/-
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Bags free. Carriage paid.

Special quotations
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WHITE LEGHORNS
STOCK COCKERELS
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Eggs for Sitting and Day-old
Chicks in the season

Catalogue and full particulars on
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RUN ON MODERN COMMERCIAL LINES
FOR EGG PRODUCTION ONLY

THREE thousand White Leghorns are run, and as the stock is fully replenished each year, there is constantly a quantity of two-year-old hens and year-old pullets to be disposed of.

This offers a quite exceptional opportunity to acquire birds of high quality and laying strain at reasonable prices.

Sittings for incubator and day-old chicks during the hatching season, January to May.

The flock average is one of the highest in England, and the birds are remarkably healthy and full of stamina and vigour.

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COTTENHAM, CAMBS.

Pedigree Laying Black Leghorns

All Birds specially bred for Egg Production.

Winners 3rd Prize *Daily Mail* Test for 4 winter months, and 1st Position in 12 months, creating a World's Record for their breed

Also Supreme Champions in 1920 National Laying Test, winning Gold Medal, Challenge Bowl, and 2 Silver Cups

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GALVANISED STEEL,
RAT PROOF
CHICKEN COOP

is practically the only Coop worth buying, and the Cheapest, for it lasts a lifetime, and no losses from vermin. Nothing better for Setting Hens.

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APPLY FOR FULL PARTICULARS

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DAILY MAIL POULTRY HOUSE

Built according to the design specially prepared for and recommended by them.
Light, Airy and Roomy without draughts.

The House that appeals to all poultry keepers, and of which the sales have been very large.

Made in Sections of best T. and G. Matching, on Stout Batten Frames, and furnished complete with Bolts, Nests, Dropping Boards, Perches, and Creosoted outside and Felt on Roof.



Size: 8 ft. by 6 ft. by 6 ft. Price: £13 13s.

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Catalogues of other designs, and all Poultry Appliances FREE.

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Breeder of

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Church Farm, Elstead
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Specialities :

BLACK LEGHORNS
WHITE LEGHORNS
WHITE WYANDOTTES
EGGS FOR SITTING
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STOCK BIRDS

All Breeding Stock is well housed on grass runs, and is very healthy, hardy and vigorous

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WHITE WYANDOTTES
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Winner of GOLD MEDAL and
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My five pullets laid more First
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SAVERNAKE POULTRY FARM
STANDON, HERTS.

FISH MEAL *for* POULTRY

The unique value of FISH MEAL as an Egg Producer is now so widely recognised that we do not propose to deal with its virtues in this advertisement.

As, however, there are some very inferior brands of Fish Meal on the market, we strongly advise the reader to consider only those Fish Meals which are recognised to be of the highest quality.

On account of their absolute purity and freedom from moisture

The "Humber" Fish Meal

. . . AND . . .

Fish Poultry Grains

have achieved a reputation second to none, and we cordially invite all interested in Poultry Keeping to write for our Descriptive Catalogue, which gives full information respecting these splendid feeding stuffs.

That the "**HUMBER**" **FISH MEAL** and **GRAINS** satisfy all the requirements of the most discriminating buyers is proved by the fact that this Brand is used in connection with the

"DAILY MAIL" YEAR TEST & NATIONAL EGG-LAYING TEST

and is giving complete satisfaction to most of the best-known Poultry Breeders throughout the Kingdom.

ALBUMINOIDS 55%-60%

PHOSPHATES 16%-20%

OIL under 4%

SALT ,, 3%

GUARANTEED TO BE MADE FROM
SOUND WHITE FISH ONLY
AND TO CONTAIN NO ADDITION
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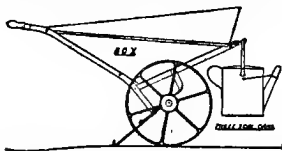
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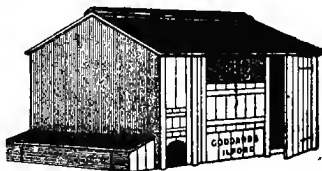
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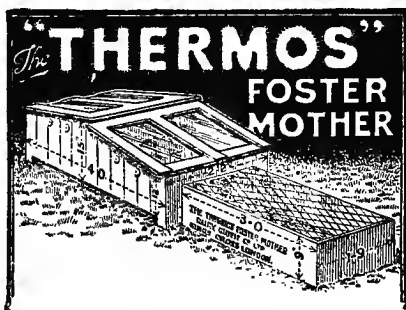
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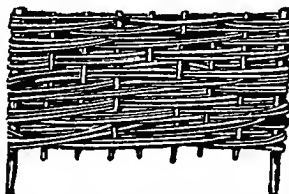
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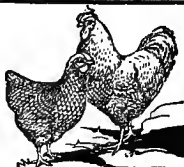
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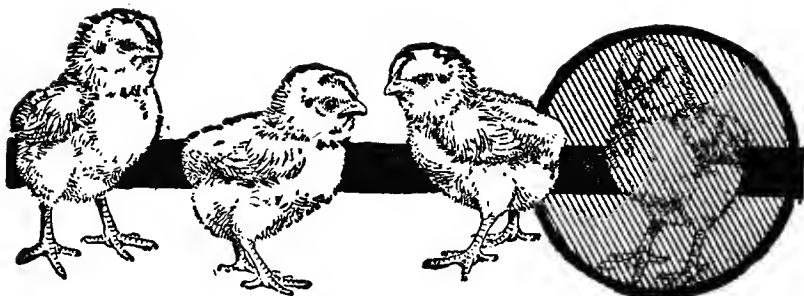
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