

POULTRY ON THE FARM.

By Miss AGNES KINROSS, N.D.D., Holmes Farm, Kilmarnock.

Introduction.

It is to be hoped that the guiding principles and practical information contained in this article will be helpful alike to the general farmer and the smallholder. There is so much foreign competition now that neither the farmer nor the smallholder can afford to neglect any opportunity of gaining knowledge of how to manage poultry successfully.

Almost three-fourths of the supplies of eggs and chickens are produced under the system of mixed farming. This system is the most promising field for increasing supplies.

Eggs can be produced at greater profit by the general farmer than by any other class of poultry-keepers. Poultry-keeping fits in with all systems of farming. In the past the general farmer regarded the poultry on the farm as a necessary evil, and tolerated them as a means of providing a little pocket-money for his women folks. Even in these days there are still farmers who regard them as such, whilst many are realising that poultry-keeping is one of the most profitable branches on the farm, forming a most important side-line. To-day it is one of great importance on the smallholding, constituting a leading feature of the holding. The general farmer might even be considered a poultry specialist and still cultivate part of his farm, as specialisation does not necessarily mean one-crop farming. The best of poultry specialisation is that it makes the best use of land, and secures the best profit per head of the fowls kept.

On mixed farms the cost of food for poultry is comparatively low, and the smaller the number of fowls kept per acre the lower will the food cost be. The ordinary by-products of other branches of farming will go a long way towards keeping a small flock of fowls at low food cost.

Dairying and poultry is a good combination. The by-products of the dairy—separated milk, soured milk, butter-milk, or whey—can be economically utilised for the poultry. There is an excellent first-hand market for the produce—eggs and table chickens,—especially where the produce of the dairy is sold direct to the consumer.

On grain-growing farms poultry may be said to be kept at lowest cost. Apart from the returns in eggs and chickens,

the farm is benefited not only by the destruction of weed seeds and injurious insects or pests which poultry remove from the land, but by their manure or excrement which is deposited during their foraging. Their value as destroyers of injurious pests is steadily being recognised, and there is evidence on many farms of the value of their excrement in improving and maintaining the fertility of the land for the growth of crops.

The poultry can be made to fit into the ordinary system of crop rotation in practice in any county of Scotland. There is also great advantage to the poultry themselves under the conditions of mixed farming, the fresh ground obtained by taking advantage of moving the hens, when they form a part of the rotation of crops, being very beneficial to their general health and vigour. There is no over-crowding of the land, and the danger of soil contamination or foul ground is largely obviated, which is one of the difficulties that poultry-keepers have to contend with where fowls are kept on the semi-intensive and intensive systems. It may therefore be safely assumed that the general farmer has means for the maintenance of good health and vigour, and for low cost of production.

In the interests of the poultry industry it is very desirable that development of poultry-keeping on general farms should be encouraged. Examples of profitable poultry-keeping on general farms may be found in any county, but examples where it is conducted on a large methodical scale are not numerous. The general farmer is slow to realise the importance of specialising in poultry-keeping in the same way that he does with his dairy, pigs, and other sections, and of maintaining a flock large enough to place a trained capable person—either man or woman—in charge of it. He does not realise the steadily growing importance of poultry. Many still cling to the old belief that every hen dies in the poorhouse.

In these modern times, when foreign competition is increasing, every farmer ought to foresee the necessity of developing and of making the most of every department. This can only be done by following a planned system of management. Train a member of the family in the work of each department and put him or her in charge. Spend the necessary capital required for equipment—good housing and good stock. Keep accurate accounts of outlays and income. After a fair trial hard facts will convince the farmer that poultry-keeping could be one of the best-paying sections of the farm. Not only will a well-managed poultry section be a good source of income, but it will help to keep large sums of money in circulation within the country that would otherwise be spent on imported products.

There is a steadily growing demand for both eggs and poultry. It will be many years, if ever, before Great Britain can produce them in sufficient quantities to meet her own requirements. With the markets at first hand, grain at first cost, climatic and other conditions favourable, prices for the products likely to be well maintained, poultry-keeping on the farm should be profitable to all who undertake it, and doubly so to those making use of the latest scientific knowledge available.

Quite recently a farmer's wife, who is most successful with her poultry, remarked to me, "It is no use attempting much unless the men folks of the farm are on your side." I suggest that where the women folks are anxious to overcome the prejudice of their men folks, they make a good job with a small number. It is also regrettable that farmers allow their daughters to go to college to be trained in dairying and poultry-keeping and then to take posts where they are in charge of either or both. They do not recognise what the importance of this training would mean to themselves, and rather than allow their daughters to leave home for employment, they should be given every facility within reason, such as good housing, &c., to work with, to encourage them to stay at home and put into practice the valuable training they have received. If the work they do for strangers is to be to the latter's advantage, it would assuredly be of even greater advantage and profit at home, and congenial both to parents and daughters alike.

Whilst egg production is the most important part of poultry-keeping on the farm, where opportunities occur, such as nearness to a good market in the vicinity of a city or industrial centre, other branches will be important adjuncts and should receive attention. These are:—

1. *Production of special Table Chickens of all kinds to suit any particular demand.* (a) Milk chickens: These are chickens specially grown to be sold at about 8 weeks old and weighing about 1 lb. each. (b) Spring chickens: These are chickens about 12 to 14 weeks old and weighing from 2½ to 3 lb. (c) Large roasting chickens from 16 weeks upwards and weighing from 4 lb. upwards. (d) Boiling fowls: These are hens coming to the end of their second laying season and which should be got rid of throughout the summer months and before they reach their second adult moult. Culling of these is necessary in order to make room for the incoming pullets. Other fowls, such as pullets that do not look like layers, should be culled out.

No doubt the final preparation and marketing of table poultry would be more successful if conducted on co-operative lines, where they would be fattened and graded before being marketed, rather than by selling direct to the poulterers; but

where the opportunity arises, a private trade may be catered for. Either way, the farmer might with advantage keep a pure breed or first cross, the cockerels of which would be a better marketing proposition than breeds like the Leghorn, Ancona, &c., it being well known that cockerels of these breeds do no more than barely pay for their rearing.

2. *Turkeys*. In localities where the conditions of soil and climate are suitable and genial, a flock of turkeys may be profitably kept. Turkeys are essentially a farm product requiring extensive range for the best results. If all farmers who have favourable conditions for turkey-rearing would undertake a small flock each, they would prevent numerous foreign turkeys being placed on our markets.

3. *Geese*. Like turkeys, geese are also suited to farm conditions. They can be kept on poor pastures, marshy ground, or hill ground. They do with little attention the first few weeks. They are essentially grazing stock. They would be of immense benefit in improving poor pasture, eating down coarse grasses and thus giving the finer grasses a chance to grow. A seasonable demand might be created by placing them on the market at Michaelmas instead of Christmas. The turkey has largely superseded the goose at Christmas.

4. *Ducks*. Duck-rearing can be undertaken by all classes of poultry-keepers. They do remarkably well under either very confined or semi-intensive conditions, but there is no doubt that *laying ducks* especially are more profitable on farms. Given the opportunity, they will forage extensively, thus reducing the necessity of heavy hand-feeding. Where a market is available for duck eggs, a flock of laying ducks would be profitable in addition to the ordinary poultry. Such breeds as Khaki Campbells, White, Fawn-and-White and Fawn Runners, Orpingtons, &c., may be kept. They should be housed and fed apart from the hens. There are industrial centres where the demand for duck eggs would justify the farmer, so situated, in keeping laying ducks in addition to the ordinary fowls, but only where the conditions are favourable, and where they may have free range. *Table Ducklings*: This branch, in suitable localities, may also be undertaken, Aylesbury ducks being the best breed for the purpose. The ducklings are noted for their rapid growth and size and, with suitable feeding and limited range, are ready to kill at from nine to ten weeks old, and weigh from 4 to 5 lb. each. It is important that they be reared and fed in such a way as to have them ready at the above age, otherwise they cast their duckling plumage, begin to grow adult feathers, and take several weeks longer to be again in condition of flesh. Up to 10 weeks they are profitably grown, but after that quickly eat up the profits. Ayles-

bury ducks are unlike the above-mentioned laying breeds in that their season of laying is comparatively short, extending from the middle of January at earliest until the end of July, when they begin to moult and laying ceases.

5. *Guinea Fowls*. These are in season just after the New Year, and take the place of game or chickens, both of which are extremely scarce at this season. They command a good price.

Any of these branches may be profitably taken up as a side line to ordinary egg production on the farm.

Whilst farmers as a whole are endeavouring to improve their poultry, there is still room for further development in the production of winter eggs, without which the profits for the total year will be very considerably lowered.

The various items requiring attention are :—

1. The best breeds for the general farmer.
2. Provision for the annual renewal of stock.
3. Hatching the eggs.
4. Rearing of the chickens.
5. Housing of adult stock.
6. Feeding of laying and breeding stock.
7. General information.

1. *The Best Breeds for the General Farmer.*

In order to reduce the cost of production, it is important that the productive quality of the fowls should be increased. To accomplish this, the breed or breeds which the farmer proposes to keep should be suited to conditions of climate, locality, and soil.

It is better to keep to one or, at most, two breeds. When the number is increased their management becomes more complicated: it is impossible to concentrate on flock improvement: the difficulty of keeping each breed by itself is greater: production is lower: the cost of labour is higher; all of which is reflected in the returns.

For some time past the *White Leghorn* (Fig. 15) has been greatly in favour as a farm fowl, partly no doubt due to its non-broodiness, which saves considerable time in removing hens to and from the broody coop, but also because of its widespread popularity as a layer. Whilst it is an excellent egg producer, it has a few faults: (a) the cockerels do not pay for their keep in rearing them to a marketable age; at their best they are poor table chickens. (b) At the present time a number of the strains lay smallish eggs—*i.e.*, under two ounces—for a period after they start laying. (c) Unless it is very suitably housed and fed, it is more susceptible to climatic changes than some of the other breeds—*i.e.*, egg production may go down. (d) After the first adult moult,

which takes place at the end of the pullet year, it takes a long time to come into productivity again—in fact, it rarely lays from October or November until the end of the following February. It is, therefore, being kept at the expense of other producing fowls. If a 50 per cent flock is being carried over into the second laying season, they are simply spring and summer producers. The eggs fetch the reduced prices prevailing at that season excepting those required for hatching purposes. (e) When the Leghorn is kept, only a sufficient number—about one-third of the total stock—should be carried over into the second season as breeders, the balance, or two-thirds, being pullets, so that the production will be greater in the autumn and early winter months, the season of scarcity and higher prices. These remarks apply even more particularly to the black than to the white variety of Leghorn.

One of the general purpose or heavy breeds might be kept along with the Leghorn. One of the following may be chosen—White Wyandotte, Rhode Island Red, Light Sussex, Barred Rocks, Buff Rocks. These breeds have been well tested for their merits as egg producers. They are excellent autumn and winter layers. With the exception of some strains of White Wyandottes, their eggs are very soon of good marketable size or first grade—*i.e.*, two ounces. All breeders of the Wyandotte should be most careful in the selection of stock for the breeding-pen, taking special note of the pullets that are laying good-sized eggs, retaining them as breeders for the following spring; also by keeping hens of good type and size, improvement in the size of egg will follow.

The *Wyandotte* (Fig. 16) is one of the best heavy breeds. (a) It is well suited to varying conditions. (b) It matures very quickly, especially on medium and lighter classes of soils. (c) The cockerels are very plump at 14 to 16 weeks, weighing from 3 to 3½ lb. without any special feeding, fetching a good price per lb. for table purposes. (d) With the exception of the small egg of certain strains it is an excellent farm breed. (e) It is only slightly broody in early spring and summer.

Rhode Island Red (Fig. 17). (a) In general it lays a very good egg, both for size and colour. (b) It is rather broody in spring and summer. (c) The cockerels have larger frames than Wyandotte cockerels, characterised by longer keels. They are not so plump or well fleshed at 14 to 16 weeks. This could be greatly improved by curtailed exercise and special fattening food from 12 to 16 weeks. (d) It does not mature so early as the Wyandotte, taking two or three weeks longer to start laying. (e) Well suited to stand varying conditions.

Light Sussex (Fig. 18). (a) It is better suited to conditions where the climate is fairly dry and not too cold. (b) To the lighter and more kindly soils than to damp heavy soils. (c) The cockerels mature quickly under suitable conditions. They are

plump and well fleshed at 14 to 16 weeks, and having white flesh and skin, they are specially fine for table purposes. (d) It is only within recent years that it has been developed along egg-producing lines. The majority of the strains are not equal to the Rhode Island Red or Wyandotte as layers. (e) The eggs are very good size and colour.

Barred Rock (Fig. 19). (a) It is not so well known or popular as it might be. It is the most largely kept breed on the general farms in Canada and the United States. It might be more extensively kept in Scotland, being well suited to free range. (b) It is an excellent layer in autumn and winter. (c) It has a large frame—*i.e.*, heavy boned and consequently slow in growth and taking longer to start laying. (d) The chickens should be hatched as early in March as possible so that the pullets will start to lay in the early autumn. (e) The cockerels are well fleshed at 14 to 16 weeks, and practically ready for sale without any special feeding. (f) It lays eggs of good size and colour.

Buff Rock (Fig. 20). (a) A very good layer in autumn and winter. (b) The egg is of good size and colour. (c) It matures rather earlier than the barred variety. (d) Like the Rhode Island Red, the cockerels are not so plump or fleshy at 14 to 16 weeks, and would be improved by being specially fed for a week or two previous to selling them.

Any one of the above-mentioned breeds is suitable for the general farmer, along with the Leghorn, where two breeds are kept.

A necessary addition to the housing of heavy breeds is a broody coop of a suitable size for use with each flock. Whenever a hen shows signs of sitting she should at once be put into the coop; by doing so she will be broken off the sitting habit and in two or three days may be returned to the house. She will start laying again within 10 to 14 days. The removal of "broodies" will only occupy the time of the attendant for a few minutes when collecting the eggs in the evening or, later, when the house is being locked-up.

Whilst in the coop "broodies" should receive the same food and water as when laying, and should not be starved, as so many poultry-keepers believe.

There are several newer breeds and varieties—Barnevelder, Australorp, &c. The general farmer should be thoroughly convinced of their merits and suitability before taking them up in preference to the above-mentioned breeds.

First Crosses. Instead of pure breeds there are several good crosses that might be kept. For laying purposes a cross between a light and heavy breed is preferable, the cockerel being the light breed. To cross two heavy breeds does not improve any particular point, such as egg-laying, nor does it decrease broodiness. The following crosses are all

good—White Leghorn x White Wyandotte, Brown Leghorn x Buff Bock or Buff Orpington, Houdan x Buff Orpington. These are all well known to be good layers. Excepting the first mentioned, the cockerels do not have such a nice appearance for table purposes. There are also one or two very excellent sex-linked crosses which may be kept by farmers who have not a good outlet for cockerels. As the sexes are easily distinguished when hatched, the cockerels may be destroyed, thus rearing the pullet chickens only.

1. *Brown Leghorn x Light Sussex* (Fig. 21). (a) The "down" of the pullet chicken is pale buff in colour; (b) that of the cockerel is white, with or without little specks of black.

2. *Black Leghorn x Barred Rock* (Fig. 22). (a) The "down" of the pullet chicken is similar in appearance to that of any other black chicken—viz., black on the back with white under body; (b) that of the cockerel chicken is the same (black not so pronounced), but showing a small greyish-white spot on the back of the head. In both crosses the female progeny take after the male parent, and the male progeny take after the female parent. The pullets of both crosses mature quickly. They are very good layers and rarely become broody. The cockerels may be reared and separated at an early age from the pullets, and given different treatment as regards getting them ready for table. They can be in excellent condition for selling at 12 to 14 weeks—an age to which they may be profitably kept. It is clear therefore that the farmer has a choice of excellent, well known, pure breeds and first crosses, and that there is no need to take up other breeds whose merits are still doubtful.

2. *Provision for the Annual Renewal of Stock.*

According to the size of the flock, there are various ways in which from a half to two-thirds may be renewed each year:—

(1) *A Breeding Pen to produce a sufficient number of Hatchable Eggs at the right time.* (a) If the flock consists of a heavy breed, the eggs will be required for hatching from the middle of February to the end of the first week in March. (b) The date of starting the incubator may be any time from the middle of February to the end of the first week in March for heavy breeds, and from the middle of March to the end of the first week in April for light breeds. When a first cross is preferred, it is necessary to have a breeding pen of pure-bred hens in order to provide for the first cross, as cross-bred hens cannot be used as breeders. Chickens which are hatched out earlier or later than above dates are more difficult to rear—January and February chickens requiring great care and attention to guard against chills, which are inevitably followed by leg

weakness which will lead to a high death-rate. Leg weakness may develop when they are confined to the brooder too long. Late hatched chickens (May and June) are slower in growth, and are also more difficult to manage than those hatched out in March and April—the natural hatching season of spring-time. (c) To simplify hatching and rearing operations, the incubator capacity should be large enough to have all eggs hatched out in two lots. (d) If fifty pullets are required for renewal purposes, 200 hatchable eggs will be wanted, allowing four eggs to provide one good pullet. (e) In order to get this number of well-selected eggs collected within fourteen days, from 30 to 40 breeding hens should be kept. (f) One incubator of 100-egg capacity will be required. For large numbers of pullets relatively more hens will be necessary, with increased incubating capacity.

Care of the Breeding Stock. In order to have satisfactory incubation, the breeding stock should have attention. (a) At the end of their laying season—*i.e.*, the end of their pullet year, select the hens which are to be retained as breeders, removing the surplus hens to another house to finish their laying period, when they can be suitably disposed of before they start moulting. (b) The future breeding stock should be fed in the usual way, allowing them to come through the moult naturally and without forcing. (c) Before the end of November, when the moult will be over and they are still in the resting period, remove them to fresh ground. There is nothing to beat the portable housing system for breeding stock. The benefits of fresh ground and natural conditions improve the fertility and hatchability of eggs. (d) Grain-feeding morning and evening will maintain them in good health during November and December. (e) From 1st January they should have different feeding in order to get them started laying as soon as possible. In the morning give them well prepared wet mash— $\frac{3}{4}$ to 1 ounce per hen. Let them out in the morning as early as possible. Encourage them to roam over the pasture by scattering a handful or two of grain away from the house. In the evening give them from $1\frac{1}{2}$ to 2 ounces grain per hen. This will be sufficient feeding when they can be out-of-doors, but should the weather be severe a little extra grain may be necessary at mid-day. They should never be without water or milk to drink. Better fertility is got when more grain than mash is fed, and by encouraging outdoor exercise when the weather permits. Breeding hens on farms should not be encouraged to stay inside the house with dry mash or hopper feeding. Their housing and food mixtures will be dealt with elsewhere. (f) Two-thirds of the total flock should be pullets and one-third hens beginning their second laying season. These

latter will be the breeding stock. (g) When a flock of one hundred hens is kept, from 60 to 70 should be pullets and the balance two years old. (h) Winter eggs are mainly produced by the pullets. The yearling hens begin to moult in September and October, they are non-producing during November and December, and are only again starting to lay in January, when their eggs will be required for hatching.

(2) *The Second Method of renewing Stock.* Instead of mating up breeding stock, day-old chicks may be bought in. (a) It is important to get them from a reliable breeder whose stock is known to be perfectly healthy, and who has not had any disease amongst his chickens, such as bacillary white diarrhoea, &c. (b) It is unnecessary to buy the most expensive chickens; rather have them from stock that have put up a good average yearly record. (c) The brooders or foster-mothers should be in readiness to receive the chickens on arrival. (d) Warmth is the first necessity rather than food. (e) The trouble of hatching the eggs is obviated. (f) To make certain of the number of pullets, double the number of day-olds should be bought, assuming that it takes two chickens to produce one pullet.

(3) *The Third Method of renewing Stock.* Instead of mating breeding hens or buying day-olds, the farmer may buy pullets up to ten or twelve weeks old. This is a very good method if the farmer is handicapped in having no suitable person to look after the hatching and rearing. It is a profitable way of renewing stock. If adopted, the order for the pullets should be placed in the spring in order to be certain of getting them all from the one source and of the same age.

By whichever method the stock is to be renewed, the main point is to have the pullets hatched at the right time, and each kind to be uniform in age. In this way there is a greater prospect of good egg production during the following autumn and winter. The difference in the cost of renewal by any of these methods will be infinitesimal.

Mating of the Breeding Hens.

(a) 15 to 20 hens of the light breeds are mated to 1 cockerel.

12 to 15 hens of the heavy breeds are mated to 1 cockerel.

30 to 36 hens of the light breeds are mated to 2 cockerels.

20 to 24 hens of the heavy breeds are mated to 2 cockerels.

Larger numbers of hens are mated proportionately. (b) The pen should be mated in December. (c) Where more than one cockerel is mated with one flock, they should have been reared together, as there will be less chance of their fighting.

(d) Each pen should be far enough apart to keep the cockerels with their own flock. Fighting is harmful to fertility, and should be, if possible, prevented. (e) In order to keep the cockerels in good health and condition during the breeding season, they may require separate feeding from the hens at least once a day.

3. Hatching the Eggs.

(1) *The Care of the Eggs previous to Hatching.* (a) In the early part of the season it is advisable to lift the eggs from the nests twice daily in order that they may not be exposed to low temperatures. (b) Use plenty of clean fresh straw in the nests for warmth and to keep the eggs clean. It is preferable that hatching eggs should not be washed unless it is absolutely necessary. (c) At the end of each day, select all the suitable eggs—i.e., for size, shape, and texture of shells. Place them in a box, covering them over with bran or sawdust, with flannel or thick paper above, in order that they are not exposed to a current of air or low temperature. The room in which they are stored should be about 50° F. When they are being kept for longer than seven days, they should be turned occasionally. The shorter the period they are kept the better, as the membrane (vitteline) enclosing the yolk is weakened with age. Handling whilst putting them into the incubator and daily turning during the incubating period, unless very carefully done, will cause this membrane to break, hence a broken yolk.

(2) *Management of the Incubator.* All of the well-known incubators may be relied upon to hatch eggs successfully if all the factors in the management of the breeding stock and eggs are attended to. The important points are: (a) The incubator should not stand in a draught. (b) The incubating temperature should be one degree higher than that given in the working instructions, particularly in the earlier hatches of the season. The climatic conditions of Scotland are different from that of England. (c) Turn the eggs twice daily, beginning on the third morning and continuing until the morning of the nineteenth day. (d) Cool the eggs after the first test (eighth day), the length of time varying with the atmospheric temperature of the room. (e) Provide more humidity in a hot-air incubator than that recommended. It is necessary from the beginning of the hatch, and more so during the cold weather period than during warm weather. Where the outside temperature is low, the rate of air circulation within the incubator is more rapid, tending to remove too much water from within the egg. This humidity may be provided by the use of a sand tray placed in the chicken nursery under the egg tray. A galvanised tray, 18 inches square and 1 inch in depth, is required for incubators of 100 to 150 egg

capacity; put in clean fine sand $\frac{1}{2}$ an inch deep. Sprinkle the sand with lukewarm water (80° F.) each morning, or whenever it appears necessary. The sand should just be damp, not saturated. The sand-tray is taken out on the nineteenth day, at the time of the last turning and cooling, saturated with water, and placed on the floor beneath the incubator. In addition, the moisture device of the different hot-air incubators is used throughout the period and during the final hatching from the nineteenth to twenty-first day, or until the hatch is completed. The additional humidity prevents toughening of the shell membranes and excessive evaporation of the water of the egg. A heavier chick is hatched, and the percentage of dead in shell is reduced. (f) The incubator door should not be opened from the nineteenth to the end of the twenty-first day, or until the hatch is likely to be over, otherwise the humidity in the incubating chamber which is so necessary for successful hatching is lost, owing to the inrush of cold air and the lowered temperature. This is often the cause of chicks dying in the shell and after the cracking of the shell has begun. (g) After completion of the hatch, the chickens should remain in the incubator nursery until the evening of the twenty-second day, when they will all be at least thirty-six hours old. (h) Before refilling with a fresh lot of eggs, the incubator should be thoroughly cleaned, washed, and disinfected, and a fresh adjustment of the regulating apparatus made.

4. *Rearing the Chickens.*

When the chickens are hatched at home, or day-olds bought in, a system of rearing is necessary. The following methods are suitable for the general farmer: (a) Ordinary portable rearers of a well-known pattern. These are sold by the makers with a capacity for 100 or 150 chicks, but it is unwise to put more than 72 and 100 in each respectively; even a smaller number will give better results. Either size will be required to take the chicks from incubators of the above capacity. As the second batch of chicks will be due a month later, it will be necessary to move on the first lot. They are not old enough to do without heat. A hover is very suitable, placed in a portable hen-house. It will carry them over until they can do without heat, or for the hover may be substituted an ordinary storm-lamp. Perches should be put in before the hover is taken away, in order that they may become accustomed to perching, thus reducing the risk of loss by crowding together and smothering after the heat is dispensed with. Chickens get an excellent start in portable rearers, but when they are moved into a house with a hover they develop rapidly, owing to more floor and overhead space, and the better admittance of fresh air, which is beneficial. After the cockerels are separated

out, the pullets may remain in the same house until they are ready to go into the laying-house, which they will occupy in the following year. Instead of using portable rearers, small chicken houses and hovers may be used from the start, the same temperature being given as with rearers. During cold weather the rearer may be placed inside a shed or any other spare building during the first fortnight, or until the chickens are allowed on to a grass run. This lessens the risk of chill. (b) The *brooding temperature* for the first fortnight is 90° to 95° F. in the heated compartment, and 80° to 85° F. for the second fortnight. Until the brooding stage is over at 8 to 10 weeks, gradually lower the temperature each week. Sufficient warmth is important in the early stages of rearing. If chickens are chilled they contract diarrhœa, which, if not checked, will result in stunted growth and mortality. (c) *Clean Ground*: Even on the general farms, the importance of fresh rearing ground is often overlooked. With every advantage of fresh ground better grown pullets should result. The farmer very often fails to realise its importance. He can, as a rule, bring off excellent hatches, but very often he does not make a good job of rearing the chickens. For convenience in looking after the young chickens it is an advantage to have them near the house, but as soon as they are large enough to do without constant overlooking they should be put farther away on fresh ground, when they will develop into strong vigorous pullets.

There are certain arguments in favour of rearing one's own pullets. With the immense advantage of fresh ground, better grown pullets should result. Hatching from home-breeding stock makes it possible to follow out a definite line of breeding, and thus increases the possibility of securing hardier pullets as regards health, egg production, and quality of eggs.

(d) *Separating the sexes*: This should take place with light breeds at 8 to 10 weeks old, and if possible earlier—10 to 12 weeks for heavy breeds. Feed the growing cockerels heavily in order to get rid of them at an early age. Remember that after a time they eat up any profit they are likely to make. The demand is for chickens not less than 2½ to 3 lb. On the other hand, it is unprofitable to keep them until they weigh 4 to 5 lb. (e) *Keep the growing pullets from different hatches apart*: This applies throughout the whole rearing period. The older chickens keep the younger ones from the food. (f) *Starting with 100 chickens*, and after allowing for *normal mortality*, there should be left, after separation of the sexes, a probable 50 to 60 pullets, or approximately 50 per cent. This result is not got without proper care and management, especially during the early rearing stages, when the greater losses occur. (g) *Summer Management of growing Pullets*: It



FIG. 15.—White Leghorn Pullets.



FIG. 16.—White Wyandotte Pullets.



FIG. 17 —Rhode Island Red Pullets



FIG 18 —Light Sussex Pullets



FIG. 19.—Barred Rock Pullets



FIG. 20.—Buff Rock Pullets.



FIG. 21.—Brown Leghorn × Light Sussex Pullets.



FIG. 22.—Black Leghorn × Barred Rock Pullets.

is a mistake to adopt the dry mash or hopper system of feeding on the general farm. It discourages foraging by keeping the chickens at the mash hoppers inside the house, thus reducing the benefits of free range. At the end of summer or by September, when the pullets are almost matured, all those of uniform size may be placed in their winter laying-house or, on arable farms, they may be moved on to stubbles. They will require no hand feeding. They will find large quantities of fallen grain, grubs, &c., which will keep them going for some weeks. No other method of treatment is so beneficial. They will require fresh water daily, and only a little soft mash in the late afternoon if it is found that their crops are not entirely filled. They may remain on the stubbles until ploughing is likely to start, when they can be moved into the grass field. On the arable farm the poultry may form part of the rotation. It will be found that the field occupied by the hens will greatly benefit as regards the future crop by reason of the manurial value of their excrement. They are excellent land improvers, removing injurious grubs, &c., and weed seeds. When they are placed in the laying-house, on pasture, begin to give them the laying ration that is to be used during the winter. (*h*) *Cleanliness*: Throughout the whole rearing stage, cleanliness of rearers, houses, feeding and drinking dishes, is important. (1) Clean out houses frequently, putting in fresh litter. (2) Mouldy or fusty litter and grains and meals should be avoided. It may cause a disease called "Brooder Pneumonia," which is due to a fungus or mould. (3) Frequent disinfecting of the interior will keep down lice and red mite. (4) Open the windows or ventilators as required to admit a sufficiency of fresh air day and night. Growing pullets should not pass the summer nights in an overcrowded and badly ventilated house. They do not develop properly. It is, along with dirty ground, the cause of an anæmic condition. They are likely to get intestinal worms on dirty ground. (5) If there is a predisposition to any disease, lack of fresh air and overcrowding would most certainly contribute to its development. (6) Face the house so that the front and the chicken exit will be sheltered from wind and rain. There should be no danger of colds, &c., developing if the pullets are housed in the manner outlined. (*i*) *Chicken diseases*: Higher productivity, more stimulating food, and more intensive conditions have had a slightly deteriorating effect on the constitution of one or two of the popular breeds, which partly accounts for the increased infertility of hatching eggs, dead in shell, and death-rate in rearing the chickens. Outbreaks of ordinary diarrhœa, the result of chill, and gapes have always occurred from time to time. Diseases such as bacillary white diarrhœa, coccidiosis, &c., were practically unknown a few years ago, and might

still remain unknown on the general farm if the farmer makes certain: (1) That he is buying hatching eggs, day-olds, or stock cockerels from a poultry-breeder who has had none of these diseases. (2) That his own breeding and laying stock and chickens are kept under natural conditions—*i.e.*, periodic changes to fresh ground, good housing, good feeding, and the ordinary rules of cleanliness and sanitation observed.

Gapes can be prevented by having two rearing grounds, to be used in alternate years. Even then *gapes* might appear, a common contributing cause being the frosty east winds that are occasionally prevalent in March, April, and May. A roomy rearing-house helps. The chickens may be kept indoors when the outside conditions are unfavourable; at other times, allowing them out only after the heavy morning dew has lifted, keeping a sprinkling of fresh lime shell on the floor beneath the litter, using an antiseptic in the drinking water or giving soured milk, will lessen the risk of an outbreak. One is apt to forget that the change to summer-time makes the morning hour much colder, and increases the difficulty of rearing. Bearing this fact in mind, the chickens should not be allowed out so early, but the time lost in the morning is regained by the longer evening light.

Ordinary diarrhœa, brought about by a chill through low temperature in the rearer, or by feeding, may be checked by attention to these points. Added to a pint of water or milk, 10 drops of sweet spirits of nitre, given in the morning before feeding for a week or so, will generally stop the diarrhœa.

More serious diseases. Should there be an outbreak of a more serious and contagious nature, such as bacillary white diarrhœa, coccidiosis, or brooder pneumonia, no time should be lost in seeking expert advice from any of the Agricultural Colleges.

Bacillary white diarrhœa appears almost as soon as hatching is over—*i.e.*, within the first week. It is characterised by a droopy condition and a rapid and high death-rate of the chickens.

Coccidiosis appears when the chickens are from 4 to 8 weeks of age, generally at 5 to 6 weeks. They die off suddenly.

Brooder pneumonia may occur at any time. Diarrhœa is a characteristic of all three. These diseases are responsible for very heavy losses each rearing season, many thousands dying from any one of them.

Method of Feeding Chickens on Farms.

First Period.—Third day after hatching to end of sixth week.

7 A.M.—Seed mixture No. 1.

10 A.M.—Meal mixture No 1.

2 P.M.—Meal mixture.

6 P.M.—Seed mixture.

Second Period.—Seventh to tenth week.

7 A.M.—Seed mixture No. 2.

NOON.—Meal mixture No. 3.

6 P.M.—Seed mixture.

Third Period.—Eleventh week until the pullets are put into their laying-house at 1st September and receiving the laying mixture.

7 A.M.—Meal mixture No. 3.

NOON.—Seed mixture No. 3.

6 P.M.—Seed mixture No. 3.

Note.—Meal mixture No. 1 is changed to No. 2 at the end of the first or second week. Soured milk may be given instead of water from the beginning of the second week. It is an aid to growth. Continue its use for at least 6 weeks, or longer if possible.

Seed Mixture No. 1.

	lb.
Chicken wheat . . .	35
Fine kibbled maize . . .	21
Pinhead oatmeal. . .	35
Canary seed . . .	14
Hemp-seed . . .	7
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Mash Mixture No. 1.

Hard-boiled egg—1.
Oatmeal—3 parts by weight.

Seed Mixture No. 2.

	lb.
Broken wheat . . .	35
Medium-fine kibbled maize	21
Groats . . .	35
Small dari . . .	14
Hemp-seed . . .	7
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Mash Mixture No. 2.

	lb.
Bran	24½
Thirds	21
Oatmeal	28
Maize meal	28
Meal and bone meal . . .	7
Ground linseed	3½
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Seed Mixture No. 3.

	lb.
Wheat	35
Kibbled maize	21
Oats	35
Dari	21
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Mash Mixture No. 3.

	lb.
Bran	21
Thirds	21
Gr. oats or crushed oats	28
Maize meal	28
Fish meal or meat and	
bone meal	10½
Ground linseed	3½
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The quantity of food to be given to a certain number of chickens is not stated. At each meal they should have as much as they will eat up greedily, giving them a very full meal in the evening.

The quantity increases daily after the first week.

5. *Housing of Adult Stock.*

Undoubtedly the proper systems of housing poultry are (1) the portable and (2) the colony methods. No. 1 means small flocks in houses that are portable or capable of being easily moved periodically from one part of a field to another. All the benefit of clean ground is available. The labour is no doubt slightly greater owing to the number of houses required for a given number, say in flocks of 25 to 50 hens, and their distance apart. No. 2 means larger flocks of, say, 100 hens. The houses are more permanent and would remain in the same field for one or two years. To remove them they would require to be made sectional and bolted so that they could be easily taken down. In general, the farm poultry-house could very well be improved. It is very dark, lacks ventilation, and cleanliness is too often forgotten.

An existing house may be modernised by (1) inserting a floor light, (2) admitting more fresh air by providing adjustable shutters or windows of glass in the front, (3) giving more attention to the internal arrangements, such as putting in a droppings-board, proper perches and nest boxes, and by regular cleaning and disinfecting.

No. 1. To house a flock of 100 hens: four houses to hold twenty-five in each, or one with fifty and two with twenty-five each (Figs. 23, 25, and 26). This is a good house for a flock of twenty-five. The measurements can be readily followed. The same design would be suitable for a fifty unit.

No. 2. Houses to hold 100 to 150 hens in each. This is a profitable and economic flock, but the houses are more permanent, and the hens do not have all the advantages of change of ground that they have in No. 1. On farms where large numbers of birds are kept this system would be more economical (Figs. 24, 27, and 28).

(a) *Pure air.* This is very important. Too many farm poultry-houses lack proper means of admitting fresh air or ventilation. Lack of it lowers the health and vigour and predisposes the hens to disease such as colds, roup, and other respiratory disturbances. Protection from wind, rain, and snow is necessary, but a regular supply of fresh air is essential to health and egg production. The hen has a high body temperature, rapid respiration, and no sweat glands. She therefore removes a large amount of waste moisture from the body through her breathing organs, consequently using more air in



Fig. 23 — *Portable Poultry House (No 1).*



Fig. 24. — *Poultry House—Colony Method (No. 2) (30' x 10').*

This photograph illustrates a larger house than 80 x 10'.

proportion to her weight than other domestic animals. The air in the house becomes quickly saturated with moisture when there is a lack of fresh air. Closing the house—*i.e.*, admitting no fresh air—is wrong. Moisture, combined with lack of air, is very harmful. The importance of this cannot be too strongly emphasised. Admittance of fresh air is usually provided in the front of a house of the shed type by means of adjustable windows and open space just under the roof.

(b) *Sunshine*: Whilst on farms the hens will be outside most of the day, they may be confined more closely to the house in winter. In order to take full advantage of light and sunlight, one or two floor lights are provided in a good house. The additional light openings provided in the ends or back of the house should be placed just low enough to get light falling on all parts of the floor. Remember, however, that too much glass makes a colder house. The hens will take full advantage of sunlight, and delight to stand or lie on any part of the house which it particularly strikes. Keep the glass in good repair, protecting it with half-inch mesh wire-netting on the outside from being damaged by other animals.

(c) *Floor Space*: There is a tendency to overcrowd the hens in order to reduce the cost of the house. This is false economy. Overcrowding and lack of fresh air together are very detrimental to health and good egg production. In any part of Scotland where the climatic conditions will allow the hens to be out practically all winter a smaller amount of floor space may do, say 2 to 2½ square feet per bird (House No. 1 will take from 20 to 25 hens): but in any locality where the climatic conditions are less favourable, and the hens are likely to be kept enclosed pretty constantly during winter, a slightly larger house will be required for 25 hens in order to allow them about 3 square feet each. There is more economic return from a flock that is allowed plenty floor space.

(d) *Shape*: As a rule, the shed or lean-to type of house (No. 1) is rather warmer in winter than the span-roof type (No. 2). In the latter there is too much air space for comfort. In Canada and the United States, where it is used, what is called a straw loft is made—*i.e.*, boards are laid across the span and the space above filled with straw. The straw loft is cool in summer and warm in winter. The shed type is more easily constructed, and cheaper than the span-roof type. A portable house should be mounted on sledge-runners or skids to facilitate its easy movement from one part of a field to another. It should be strongly built to withstand the strain of moving, preferably of match-boards or weather boarding, ¾ to 1-inch in thickness.

(e) *Cleanliness and disinfection*: To ensure a parasite-free and disease-free house, it should be thoroughly cleaned at least twice yearly, and especially before the pullets are put in.

Examine carefully for red mite such places as perch ends and their sockets, ends of droppings-board, nests, &c. If they are found, take out all movable fittings, remove all litter and nest material, paint the interior with ordinary commercial creosote obtained from gasworks, also all the fittings, before putting them back.

Red mite can do an immense amount of harm by lowering the general health and egg production. Their presence is difficult to detect as they do not live on the hens, but chiefly in the above-mentioned places, coming out at night when the hens are on the perches. They suck blood, hence their characteristic red colour after feeding. At other times they are pale yellow in colour.

(f) *Internal Arrangements*: Allow one nest for six hens. Renew the nest litter frequently. A droppings-board should be placed 6 to 8 inches beneath the perches and fitted tight against the rear and sides of the house and well beyond the front perch. Light breeds require 7-inch perch room, and the heavy breeds 9-inch. Have a good-sized earthenware vessel for water, and a box for shell and grit, both of which should stand well above the floor level to prevent the floor litter being scratched into them, also a wooden trough for the soft mash, large enough to allow all the birds to get at the food at one time. After the meal is over fix it against the wall to be out of the way. (g) *General*: Repair and clean the windows whenever necessary. Periodically clean out all old litter. The best litter is a mixture of fresh straw and chaff. It should never be allowed to become damp or dirty, and never use mouldy or fusty litter. The front of the house should provide good circulation of air without draught upon the hens. In order to preserve the exterior the walls should be creosoted and the roof tarred yearly. Just before the pullets commence to lay, promising healthy pullets of uniform age should be put into their permanent laying-house. They will continue their development, and start laying without change in management. If they have started to lay before they are put in, the change will check egg-laying and cause a complete or partial moult. At the time they are put in they should be examined for lice, and if these are found on their bodies they should be given a dusting with a good insect powder. Attention to these points will assuredly increase the winter egg production.

6. Feeding of Farm Poultry.

As with the housing of poultry on the farm to take full advantage of free-range conditions, so also should the method of feeding be such as will encourage foraging. The hens will pick up quantities of all kinds of natural food—grass, weed-seeds, worms, slugs, small stones and suchlike,—the con-

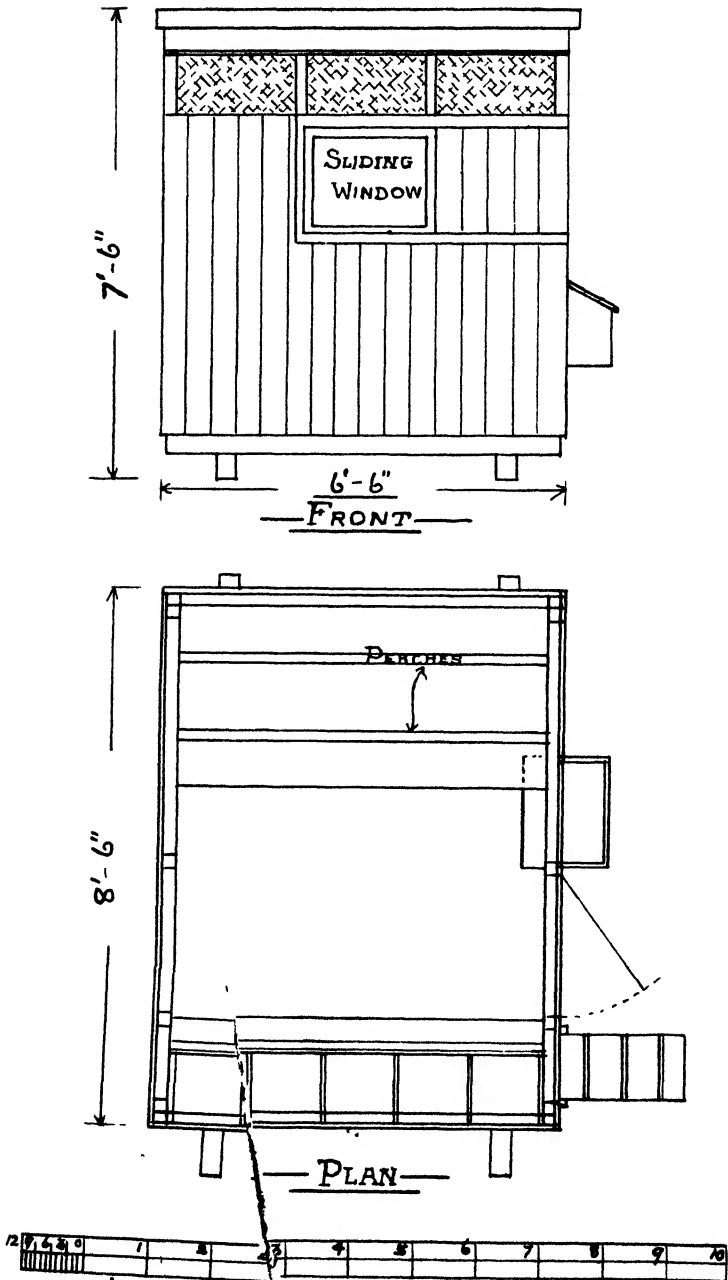
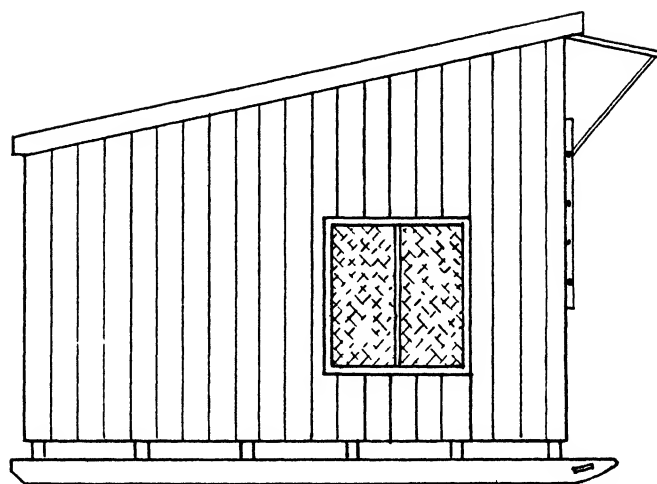
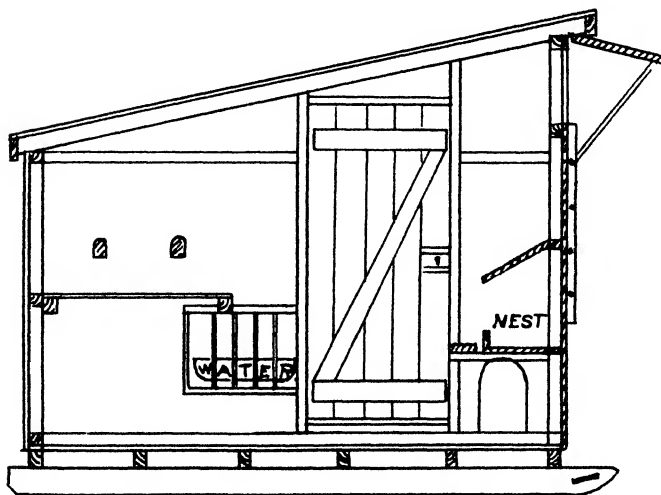


Fig. 25.—Front Elevation and Plan of Portable Poultry House (No. 1).



— SIDE —



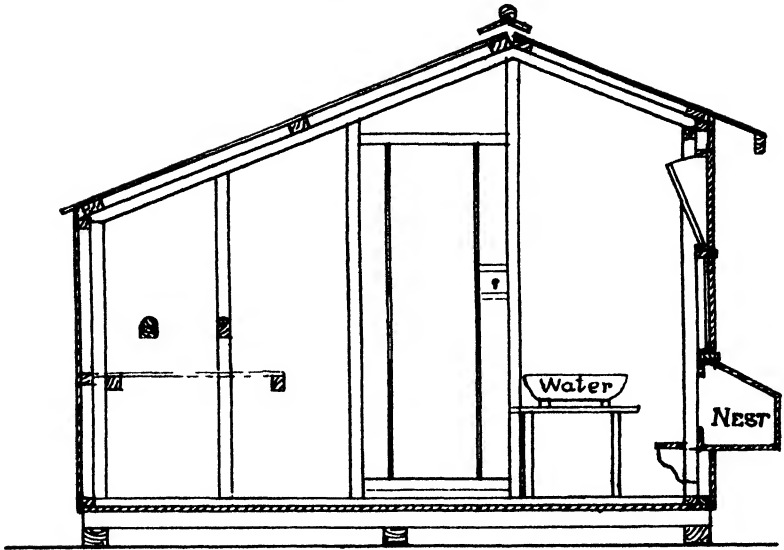
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Fig. 26.—*Side Elevation and Section of Portable Poultry House (No. 1).*

sumption of which lowers the food bill, and thus the farmer is in a favourable position to secure the maximum production with the minimum of cost in feeding. A grass field which has clover in it is greatly appreciated by the hens. They eat clover greedily. The pasture is improved by their droppings and by the removal of weed-seeds. From experimental results it has been shown that they eat slugs and worms that are injurious to crops, such as wireworm, &c.

(a) *Animal Food.* The saying "The early bird catches the early worm" is very applicable. When worms are plentiful a reduced quantity of animal food, such as fish meal, meat meal, and meat and bone meal, should be used and only increased when worms are scarce—*i.e.*, in winter when they do not readily come to the surface, and during spells of dry weather in summer when the ground is hard and dry. The skilled feeder should take note of these times and increase or curtail the animal food supply. It is one of the expensive ingredients of the ration. To feed it at such times, when nature's supply is plentiful, is wasteful. (b) *By-Products of the Dairy:* Skimmed or separated milk—preferably given soured,—buttermilk, and even whey may be utilised. Soured milk can be given for drinking if it is plentiful. The soft mash in summer may also be mixed with it. It is specially valuable as an aid to summer egg production. On farms where cheese is made, whey can also be used for drinking and mixing of food. It differs from soured milk—the casein or protein part has been extracted during the process of making cheese. It is also excellent for mixing mashes for fattening cockerels. (c) *Grit:* On free range hens pick up small stones, reducing the necessity of supplying grit. Small stones are required in the gizzard. They take the place of the teeth of other animals. They help to grind the food—meals and grains—into a pulp. Thus they are as necessary as any other part of the food of the hen; without them proper mastication is impossible. Heavy clay and peaty soils may be deficient in small stones, but they are plentiful in other classes of soils.

It is, moreover, important to give the hens shell-forming material, such as oyster shells or ordinary shells from the shore, or limestone chips. These provide carbonate of lime for the egg-shells. Hens prefer shells to limestone chips; it may be largely on account of the white colour—nevertheless they show their preference and it ought to be satisfied. (d) *Water:* This is not the least in importance. One hesitates to make the statement, but in a great many instances the water supply is too often neglected—no doubt unintentionally and without realising that water is necessary to carry on the vital processes of the body and also for the formation of the egg, the water content of which is over 70 per cent. A scarcity of water is detrimental to good egg production. The water supply



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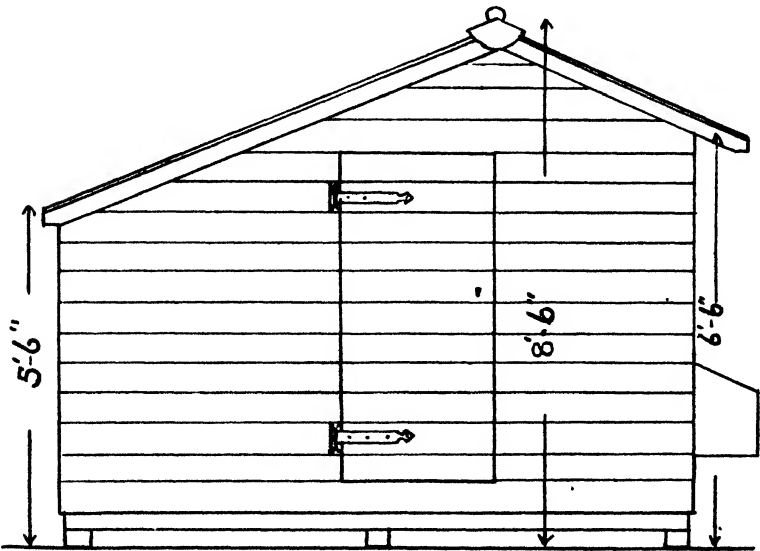


Fig. 27.—Section and End Elevation of Poultry House—Colony Method (No. 2).

is apt to be neglected on free range ; if it has to be carried it is one of the drawbacks of the system, increasing the labour. (e) *Vegetable food* : When hens have a wide range over grass, they lay eggs with deep-coloured yolks as compared with hens less favoured—*i.e.*, curtailed range and backyards. With them green vegetables are a most important factor at all seasons. Whilst grass is succulent for the greater part of the year, it should be augmented during the winter and early spring with any vegetables that are available—cabbages, thousand-headed kale, rape, swedes, mangels, &c. Green food is a great aid to health and egg production. Cooked potatoes may be included in the wet mash, but, as they are very starchy, the quantity should be small, otherwise the hens may become overfat, a condition which is detrimental to good egg laying.

(f) *The following system of Feeding is recommended for the Farm* : Morning, 7 A.M. in summer and as soon as it is daylight in winter, three-quarters to 1 ounce per hen of soft food, the meals being scalded with boiling water and cooked vegetables added.

The ingredients of the mash mixture are—

	lb.
Bran	21
Thirds	21
Crushed oats or Sussex ground oats	28
Maize meal	28
Fish or meat meal	10½
Ground linseed meal	3½

112

Note.—The linseed meal is omitted at the end of spring, the quantity being made up with bran.

11.30 A.M. (in winter only) 1 ounce per hen of grain mixture, scattered on the grass away from the house when the weather is fine, at other times raked into the floor litter inside the house. Evening—3 to 4 P.M. in winter—5 P.M. in summer—1 to 1½ ounce per hen of grain mixture given as above.

The grain mixture may be varied. (1) Equal quantities by weight of oats and kibbled maize ; or (2) equal quantities by weight of oats and wheat ; or (3) equal quantities by weight of wheat, oats, and kibbled maize.

Note.—Should the above ration be too much, it should be reduced until at each meal all the food is eaten. On the other hand, at times it may be necessary to increase the quantities. Common-sense will be a guide in the matter.

(g) *Good production during the summer*, especially in June, July, and August, adds considerably to the income. Eggs are then going up in price, and every extra egg secured at this season increases the profits. (1) Make alterations in the feeding to

suit summer conditions—*i.e.*, during dry weather, when insect life is scarcer, add a little extra fish or meat meal, mix the mash with soured milk; (2) add more vegetables to the

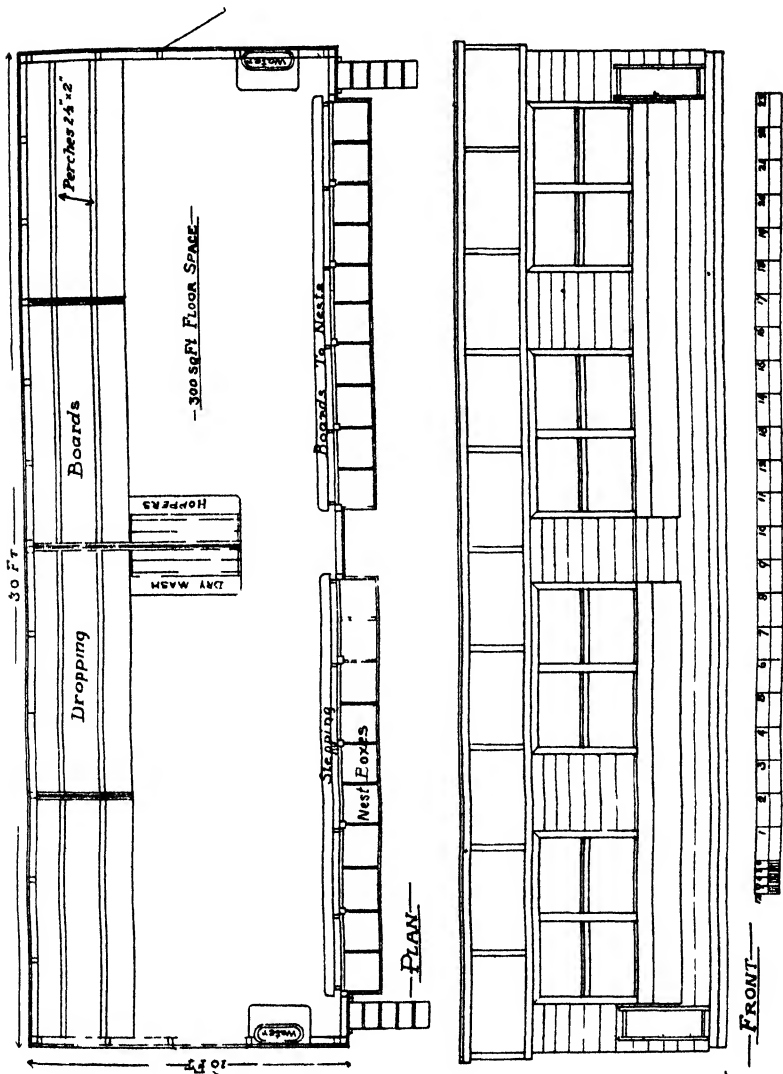


Fig. 28.—Plan and Front Elevation of Poultry House—Colony Method (No. 2).

soft mash—garden and field crops, nettles, dandelions, &c.; (3) give a plentiful supply of clean water or milk; (4) keep down lice and red mite; (5) give as much fresh air as possible day

